



# I4MS Success story portfolio

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November 2021



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FundingBox



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## Best Practise portfolio (37 AEs)

### Phase 2 (7)



- (2)
- ELAPHE
  - HPC-Sheaks



- (3)
- BEAUTY
  - COMPLEMENT
  - ENDORSE



- (2)
- Elvez
  - HOP Ubiquitous

### Phase 3 (30)



- (2)
- IK4 LORTEK
  - SASSHPPE



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- CAPSULE
  - EndeF
  - Fermicloud
  - HANNIG



Smart logistics for manufacturing

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- Chemi-Pharm
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  - KULINAARIA
  - MARGO
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- AWEAR
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(2)

- ELAPHE
- HPC-Sheaks





## ELAPHE: HPC-Cloud-based simulation of coupled electromagnetic and structural-acoustics in in-wheel electric motors

FORTISSIMO

### Key facts:

Elaphe (Slovenia) produces direct-drive in-wheel motors.

Cineca (Italy) provides tools for HPC.

### Challenge:

- Optimisation of noise, vibration and harshness (NVH) characteristics of in-wheel propulsion technology design.
- Development of a production process with less physical prototype assembly and measurement.

### Solution:

- A new workflow for an optimisation and automated computation of a detailed acoustic noise map of in-wheel motors.
- The overall noise level of the motors improved by a minimum of 20 dB(A) and up to 60 dB(A).

### Results and impact:

- Fewer prototypes and resultant measurements, with estimated savings of €120,000-€150,000 per year.
- Up to 80% shorter time-to-market and at least 80% faster introduction of NVH-related improvements to products.



### More information:

<https://www.fortissimo-project.eu/en/experiments/911/hpccloudbased-simulation-of-coupled-electromagnetic-and-structuralacoustics-in-inwheel-electric-motors>





FORTISSIMO

## HPC-Sheaks: HPC-Enabled system for enhanced seakeeping and station-keeping design

### Key facts:

VICUSDT operates in the shipbuilding industry.

WAVEC is a consulting company specialised in offshore renewable industry.

COMPASS is an SME specialising in simulation software.

CIMNE is a research organisation specialising in numerical methods.

### Challenge:

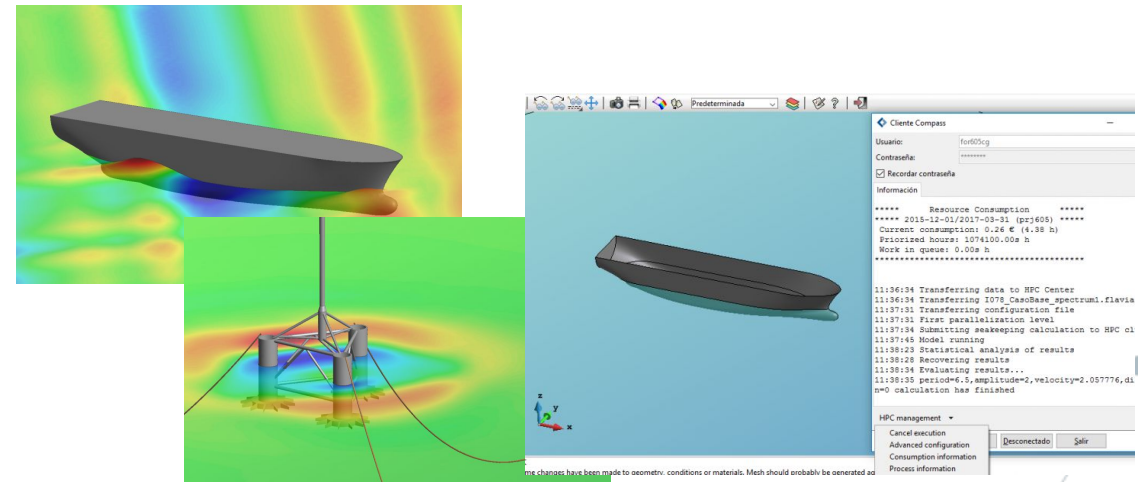
- The use of advanced simulation of a ship or a marine structure subjected to the action of waves.

### Solution:

- An overall simulation package including relevant software ported to the HPC-Cloud-based system.
- An effective interface between the end-user and the HPC resources, enabling the simulations to be run from a familiar desktop system.

### Results and impact:

- The use of Cloud-based-HPC simulations enables cases to be analysed more quickly.
- Previously infeasible simulations are now feasible paving the way for development of new services.



### More information:

<https://www.fortissimo-project.eu/en/experiments/605/hpccloudbased-seakeeping-design>



(3)

- BEAUTY
- COMPLEMENTANT
- ENDORSE



## **BEAUTY: Process Supervision**

### Key facts:

TETRA Industriservice Group (Poland) is a metal component manufacturer.  
CMBIT is the technological provider.

### Challenge:

- Production of custom-design bent metal components used for steel yacht or stair railings and aluminium frames for kitesurfing.
- Currently, they are mostly manufactured using manually operated equipment, which often suffers from repeatability and quality issues.

### Solution:

- Fully automated production process, including a combination of a flexible cell-based industrial robot and standard, yet automated, machines.

### Results and impact:

- Equipment worth 80,000 euros performing a task of equipment worth of 400,000 euros.
- Solution can be applied to a wide range of different use cases requiring the integration of legacy equipment and existing tools in a complete smart industrial platform, enabling their control and monitoring, keeping a very low cost.



### More information:

<http://www.horse-project.eu/BEAUTY>



## **COMPLEMENT: Human-centred robot collaboration in an injection moulding process**

### Key facts:

Ghepi (Italy) operates in the plastic materials field with focus on injection moulding technology. Technological providers are HOLONIX (Italy), SUPSI (Switzerland) and UNIMORE (Italy).

### Challenge:

- The component injection moulding is completely automated but still requires on-board machine processing by a human operator for the finishing process.
- Worker's physical and mental stress have a relevant impact on production process and product quality.

### Solution:

- The use of the cobot in implemented workcell supporting the operator in the different tasks of the process.

### Results and impact:

- Improvements in quality control resulting to reduction of quality issues from 2.9% to less than 1%.
- Process productivity increased by 16%, whereas operating costs reduced by 11%.
- Increased the well-being of workers.



### More information:

<http://www.horse-project.eu/COMPLEMENT>



## **ENDORSE: Effective Robotic GriNDing of Surface Areas through HORSE framework**

### Key facts:

ENIKON (Croatia) is specialised company in preparation and final painting of molded interior parts for commercial and business aircraft.

Technological providers are Larics Laboratory (Croatia), ICENT (Croatia) and University of Zagreb (Croatia).

### Challenge:

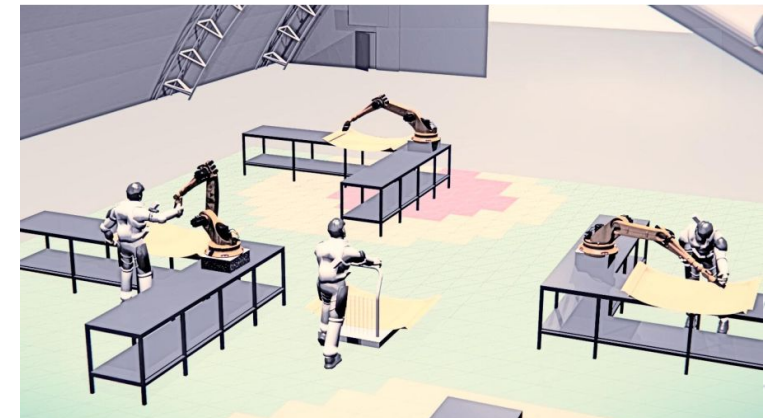
- Although the grinding work cell is automated, and major part of the work is done by robot, 92% of the time the part is handled and processed is still done by human workers.
- Since the grinding produces a very fine dust, the goal is to shorten the time of a human worker.

### Solution:

- Deployment of a semi-collaborative industrial manipulator in the process of sanding composite parts for aviation industry.

### Results and impact:

- Increasing the number of treated products from 2 to 3, and the robot-ground surface area from 60% to 80%.
- Automated quality control that detects surface roughness on a micrometre scale and localizes it with centimetre precision.
- The scope of this algorithm is not limited to grinding and sanding but can also be applied to various other tasks that require the robot to provide a delicate touch.



### More information:

<http://www.horse-project.eu/ENDORSE>



(2)

- Elvez
- HOP Ubiquitous



## ReconCell **ELVEZ: Assembly of Automotive Light housings**

### Key facts:

Elvez d.o.o. (Slovenia) is the manufacturer of specialized products for the automotive industry. The technological providers are Jožef Stefan Institute (Slovenia), the University of Southern Denmark (Denmark), the University of Göttingen (Germany) and the University of Aachen (Germany).

### Challenge:

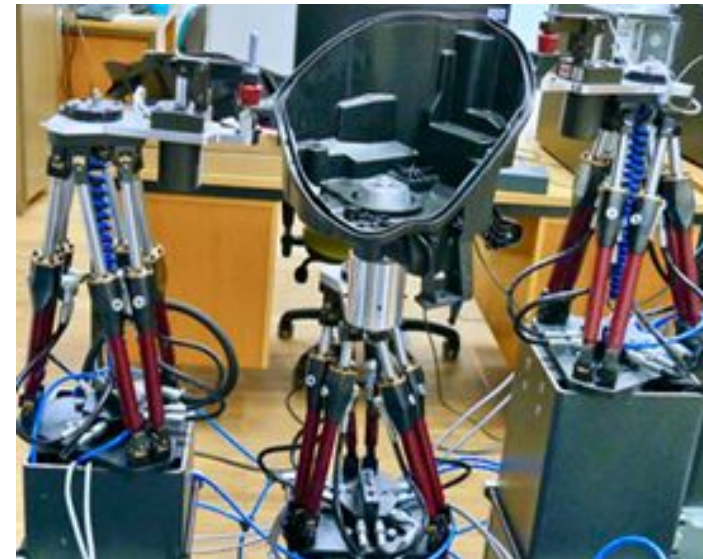
- Manufacturing of automotive light housings requires unique assembly device for different light types.
- Production of spare parts occurs a few times per year, which poses a problem because the large, cumbersome assembly devices must be swapped into the production process.

### Solution:

- Passively reconfigurable fixtures that are integrated into the workcell as peripheral modules using a Plug and Produce connector.

### Results and impact:

- The reconfiguration time of the production line reduced from hours to four minutes.
- Estimated return time on investment in one year and a half and savings of up to EUR 1.6 million over the next five years.



### More information:

<http://www.reconcell.eu/content/space/experiments.html#elvez>

## ReconCell **HOP Ubiquitous: Flexible Manufacturing of PBC**

### Key facts:

HOP Ubiquitous is offering a wide range of IoT devices and sensors for monitoring air quality, gas, temperature, humidity, and noise. Technology providers are Jožef Stefan Institute (Slovenia), the University of Southern Denmark (Denmark), and the University of Göttingen (Germany).

### Challenge:

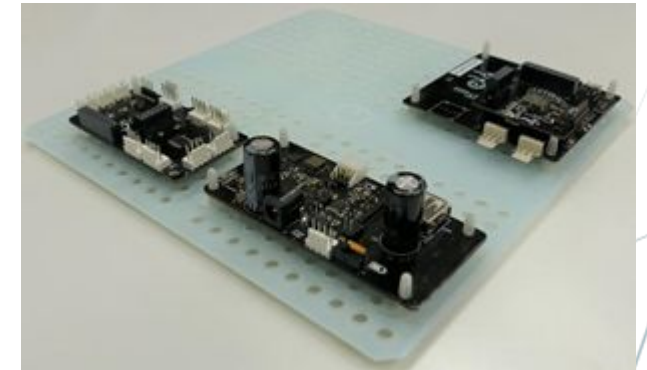
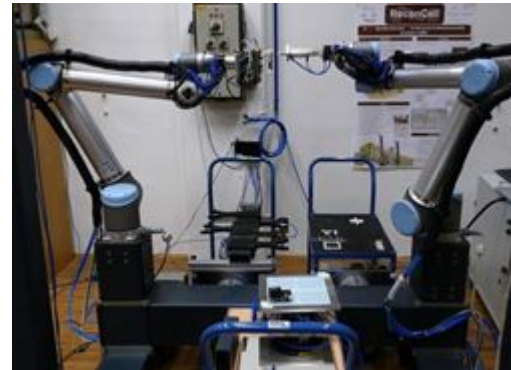
- This manufacturing process involves assembly of different printed circuit boards (PCBs).
- Handling orders for a system with multiple configurations presents a key challenge in terms of automation.

### Solution:

- The reconfigurable and modular design integrating various innovative technologies including an innovative spacer gun, and a Power over Ethernet servo gripper was designed.

### Results and impact:

- Reduction of manual work and changeover time, and improved assembly quality of PCB boards.
- A payback time is estimated to be 11 months.
- The solution is adaptable and can be used by any company dealing with the assembly of PCB boards.



### More information:

<http://www.reconcell.eu/content/space/experiments.html#hop>

**AMable**

(2)

- IK4 LORTEK
- SASSHPPE





## AMable IK4 LORTEK: Additively manufacturable fittings save energy on earth and in space

### Key facts:

LORTEK (Spain) is a technology centre focusing on digitalisation of manufacturing processes, and MTC (UK), and Frederick Research Center (Cyprus) are technology providers.

### Challenge:

- Additive manufacturing for a structural component of satellites requires 3D-printed metallic fittings that connects carbon reinforced tubes.
- These fittings need to be light weight and sufficiently robust.

### Solution:

- An innovative design that achieved both cost reduction for production and weight saving to minimize energy consumption during the satellite launch.

### Results and impact:

- 45% lighter components produced at half price.



### More information:

<https://spaces.fundingbox.com/spaces/i4ms-success-stories/6040b2ec9bbc1905d0abc0d4>

## AMable SASSHPPE: Featherlight Head Protection

### Key facts:

Productos Climax (Spain), manufactures personal protection equipment and Topofab (Spain) offers engineering design services.

### Challenge:

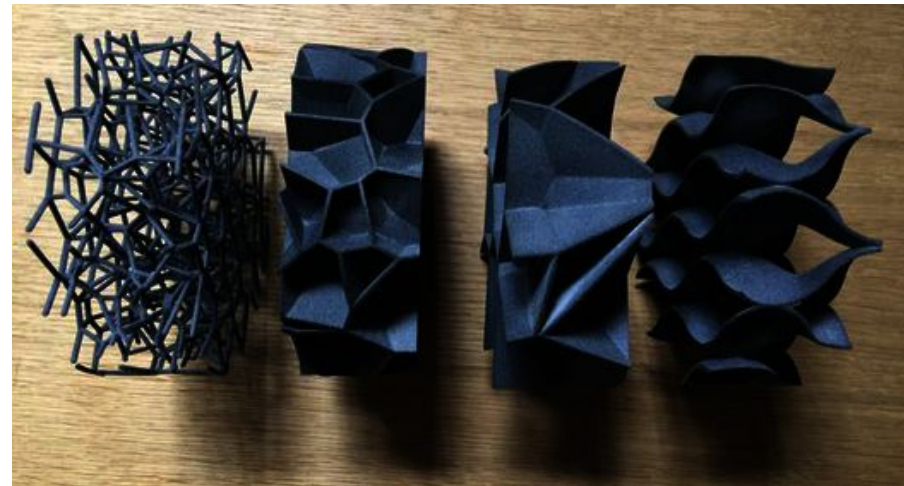
- To produce light head safety devices with optimum protection at competitive price.

### Solution:

- Novel combinations of materials and internal structures that provide advantages in safety and wearing comfort.

### Results and impact:

- Improved functionality at competitive price: a robust and reliable construction of the shock absorbing hull inside the helmet creates a new offering to the market.



### More information:

<https://www.amable.eu/cases/sasshppe>



(4)

- CAPSULE
- EndeF
- Fermicloud
- HANNIG





## CAPSULE: Cloudification of image analysis for human measure collection for Personalised Safety protection clothing engineering and production

### Key facts:

i-Deal S.R.L. (Italy) is a safety protection clothing designer. The end user is TroTusTex (Romania). The technological provider are University of Westminster (UK), the German Research Center for Artificial Intelligence (Germany), CloudBroker and SINTEF (Norway). The DIHs: STAM Mastering Excellence (Italy)

### Challenge:

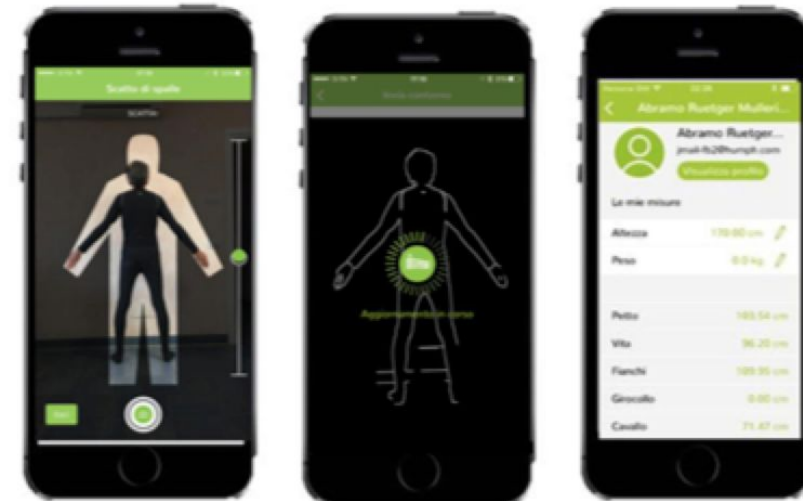
- Currently the measures of the workers and the matching between them and the clothing size is carried out by hand leading to error up to 50%, causing costs for repair and repeated manufacturing.

### Solution:

- Novel technology for human measure collection using mobile image analysis.

### Results and impact:

- Improved worker comfort and precision of production, reduction of wasted resources due to imprecise human anthropometric data collection, with positive environmental and economic benefit.



### More information:

<https://www.cloudifacturing.eu/exp-9-capsule-cloudification-of-image-analysis-for-human-measure-collection-for-personalised-safety-protection-clothing-engineering-and-production/>



## EndeF: Optimizing solar panel production

### Key facts:

EndeF (Spain) manufactures hybrid solar panels. NablaDot (Spain) is an engineering company specialising in fluid simulations and IT4Innovation (Czech Republic) is expert in supercomputing. Cloudsigma (Switzerland) provides cloud services and Innsomnia (Spain) is an open innovation hub.

### Challenge:

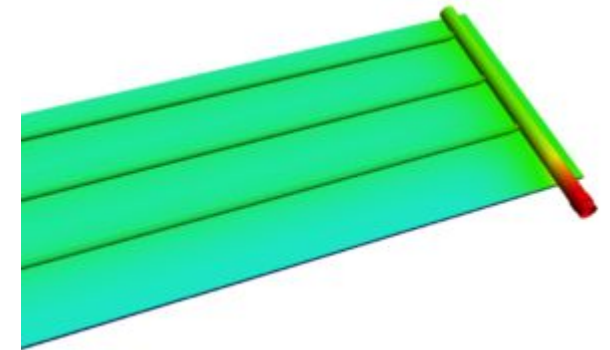
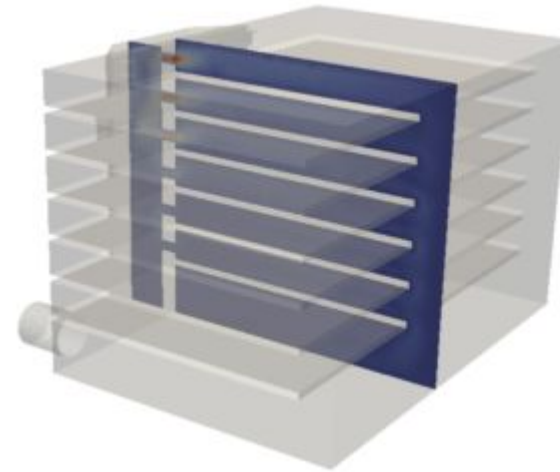
- To minimise the energy consumption and power needed for the lamination process of solar panels, as well as minimising the production time required and manufacturing defects.

### Solution:

- A real-time cloud-based process simulation and optimisation model for fluid flows and heat transfer.

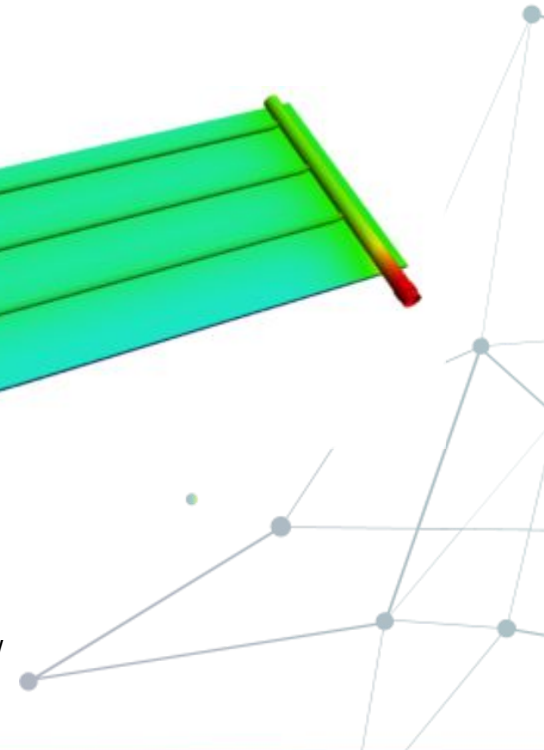
### Results and impact:

- 20% reduction in manufacturing time and up to 30% reduction in energy consumption.
- The reduction of the manufacturing costs is expected to lead to 10% sales increase.



### More information:

<https://www.cloudifactoring.eu/experiment-5-outcome/>







## Fermicloud: Fermentation production optimisation using cloud manufacturing techniques

### Key facts:

Fermentia (Hungary) is a contract manufacturer of fermentation technology. SpinSplit (Hungary) is specialising in digital electrospinning products and EssiTech (Slovenia) fabricates microfluidic molds. Sztaki (Hungary) and Innomine (Hungary) are the competence centre and DIH involved, respectively.

### Challenge:

- Optimisation of *Pichia* fermentation process.
- Manual sample analysis and corrective actions led to low product yield and even serious product loss.

### Solution:

- A new way for bioprocess optimisation via automatisisation and analysing past process data.
- Solution is based on data driven modelling which reduces the response time of the control loop and replaces heuristic decision making by a rule library based on big data analysis.

### Results and impact:

- Enthusiastic end-user's reception and prospect of lowering the time specialists need to devote to a single fermentation process from 40h to 17h.



### More information:

<https://www.cloudifacturing.eu/experiment-17-fermicloud-fermentation-production-optimisation-using-cloud-manufacturing-techniques/>



## Hannig: Optimising Design and Production of Electric Drives

### Key facts:

Hanning Elektro Werke (Germany) produces customised drive systems and components. Linz Center of Mechatronics (Austria) works on distribution computation for electric drive design. CloudBroker (Switzerland) is a HPC service provider and ScaleTools (Switzerland) is a system integrator. Lund University (Sweden) and German Research Center for Artificial Intelligence (Germany) are the competence centre and DIH involved.

### Challenge:

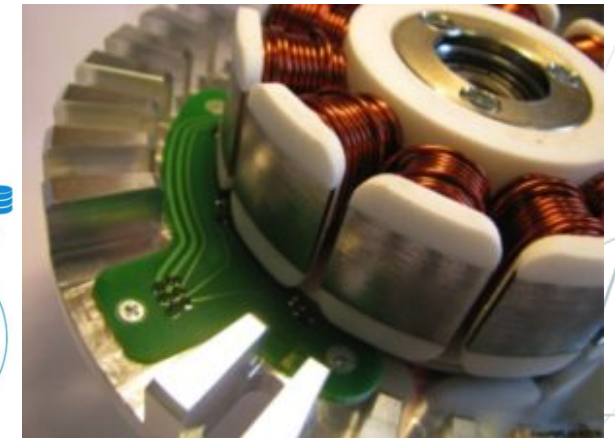
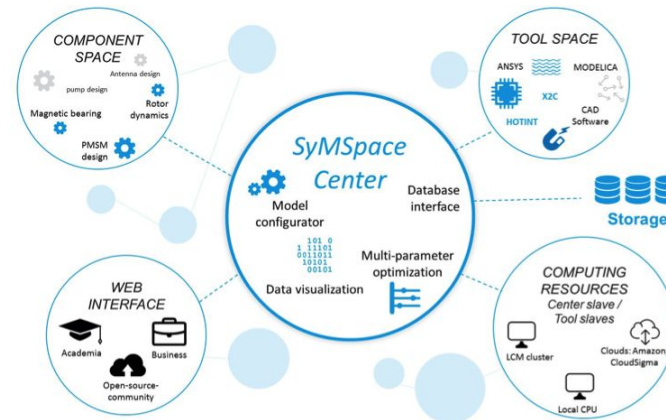
- Optimisation of design and production of prototype electric motors.

### Solution:

- Set up simulation models for prototype electric motors including electromagnetic, thermal, mechanic and other aspects using a system modeler SyMSpace running in the cloud environment.

### Results and impact:

- Very fast and streamlined process of prototyping without human data handover.
- Increased product quality, product flexibility, and reduced design to production time from more than one month to less than one week.
- High potential to scale up.



### More information:

<https://www.cloudifacturing.eu/experiment-1-outcome/>

# **I4MS**

Smart logistics for manufacturing

(11)

- Chemi-Pharm
- HAMLET
- KLAPPER
- KULINAARIA
- MARGO
- OHTS4LS
- OPTIFLOW
- RIOgistics
- RobOPIL
- SMARTIST
- VCLMP



Smart logistics for manufacturing

## Key facts:

Chemi-Pharm (Estonia) is a manufacturer of chemical products. System Integrator KINE (Finland) is specialised in 3D modelling and IMECC (Estonia) was the competence centre providing testing facility.

## Challenge:

- To reduce the workforce in intra-factory logistics and to achieve better and on-time movement of necessary ingredients inside the factory.

## Solution:

- A 3D digital twin of the factory was created in a simulation system to better streamline the production process.
- The project was executed using the Industrial IoT platform OPIL (Open Platform for Innovations in Logistics) together with a 3D simulation tool (Visual Components).

## Results and impact:

- Increased efficiency and productivity in logistics processes that contribute to the competitiveness of the company.
- Reduced human error in terms of making entries into IT systems.
- Improved analysis of material flows and bottlenecks, which provided valuable insights into further improvements and to what hardware to invest in.



## More information:

<http://www.l4ms.eu/Chemi-Pharm-Pilot-Application-Experiment>



## L4MS

Smart logistics for manufacturing

## HAMLET: Mobile robots to increase efficiency by facilitating mould change in footwear factory

### Key facts:

Procalçado produces footwear components and moulded footwear. EWEN is the solution provider.

### Challenge:

- To automate the transportation of moulds, raw materials and products.

### Solution:

- Development of EL2OPIL (Event Logistics to OPIL) application, acting as an interface between the OPIL and production planning system.
- EL2OPIL enables automatic delivery of moulds by automated guided vehicles (AGVs) to operators just in time.

### Results and impact:

- >50% time saving in setting up the moulding machines.
- 5% increase in productivity of the machines.
- 70% decrease in accidents.



### More information:

<http://www.l4ms.eu/content/mobile-robots-increase-efficiency-facilitating-mould-change-footwear-factory>



## L4MS

Smart logistics for manufacturing

## KLAPPER: Collaboration of robots and workers to improve factory logistics

### Key facts:

Klefer (Greece) manufactures elevator doors.  
Centre for Research and Technology Hellas (Greece) is the solution provider.

### Challenge:

- Automation of workflow by using robots in collaboration with people.

### Solution:

- OPIL platform based solution enabling machine operators to order raw materials via OPIL, and warehouse workers are able to send them with the AGV.

### Results and impact:

- As robots took on repetitive tasks, workers were able to focus on their primary tasks, and manufacturing processes became faster.
  - 30% less time idle on the workstation.
  - Workers walked 1.3 km less per day.



### More information:

<http://www.l4ms.eu/content/collaboration-robots-and-workers-improve-factory-logistics>

## KULINAARIA: Robots for intra-factory logistics in food industry

### Key facts:

Kulinaaria OÜ (Estonia) is a food manufacturing company. TALTECH (Estonia) is the technology provider and ITT Group (Estonia) the system integrator.

### Challenge:

- Improvement of the intra-logistic process by automating transportation of boxes.

### Solution:

- Deployment of AGVs (Autonomous Ground Vehicles) and OPIL (Open Platform for Innovations in Logistics) to optimise the material handling process and the routes along which the material is transported.

### Results and impact:

The intra-logistics process became more efficient because less time and workforce were needed for transportation.

- 10% reduction of intra-logistics defects and 10% increase in the speed of transport.
- 20% decrease in labour cost.



### More information:

<http://www.l4ms.eu/content/robots-estonia%E2%80%99s-largest-ready-meal-producer-cuts-labour-cost>

## L4MS

Smart logistics for manufacturing

## MARGO: Optimizing Material Flow with AGVs in Ring Gear Production

### Key facts:

KLS Ljubno (Slovenia) produces starter ring gears for flywheels of passenger cars, cargo vehicles and movable working machinery. Pumacy Technologies AG (Germany) and Bremer Institut für Produktion und Logistik GmbH (Germany) are the solution and technology providers, respectively.

### Challenge:

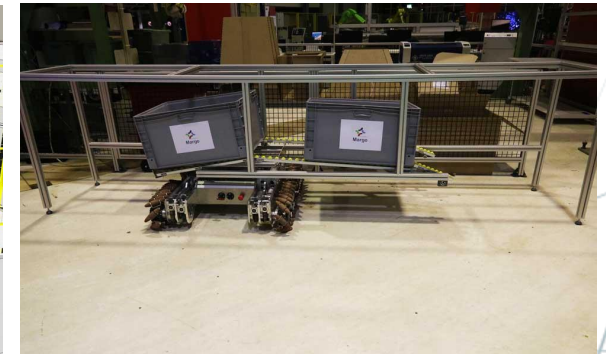
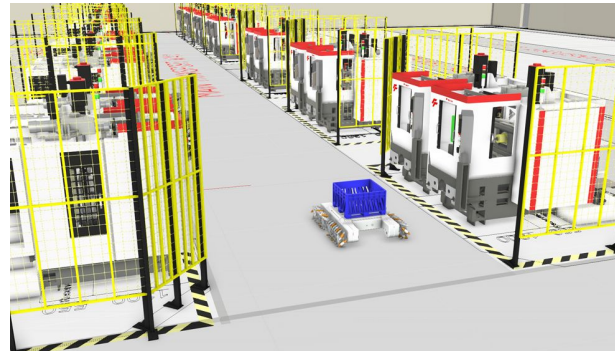
- To automate the intra-factory logistics.

### Solution:

- A logistics solution using the OPIL framework.

### Results and impact:

- Both quantitative and qualitative benefits derived from the reduction of manual work in intra-factory logistics:
  - Increased production capacity,
  - Reduced labour costs,
  - Smaller inventory,
  - Higher worker productivity,
  - Increased health and safety.



### More information:

<http://www.l4ms.eu/content/production-waste-%E2%80%93-good-starting-point-when-automating-intra-factory-logistics>



**L4MS**

Smart logistics for manufacturing

## OHTS4LS: Overhead transport to tackle lack of floor space in the factory

### Key facts:

Devold (Lithuania) manufactures woollen, knitted garments. Factobotics UAB (Lithuania) is the solution provider.

### Challenge:

- To search for an automated overhead logistics solution for moving parts of garments between workstations.

### Solution:

- Two sub-systems: one to stack and dispatch boxes in the warehouse, and the other one to move boxes on cables over the sewing stations and lower them where needed.
- OPIL modules are used to guide and monitor both systems and to help production supervisors to keep track on garment bundles.

### Results and impact:

- Lead time decreased by 9%.
- Transport time decreased by 20%.
- Improved workplace monitoring and resource management.
- Business process optimisation with more efficient routing and production planning.



### More information:

<http://www.l4ms.eu/content/overhead-transport-tackle-lack-floor-space-factory>

## OPTIFLOW: Automated quality sampling to provide significant time savings

### Key facts:

Dedienne Multiplasturgy Group (France) is specialists in processing of technical plastics. Still (France), EWEN Energy (Portugal) and HMI-MBS (France) collaborated for providing a solution.

### Challenge:

- To automate quality sampling.
- Every two hours quality controllers go through the injection molding shopfloor with a trolley and manually pull samples of the product parts. A 250-metre round takes about 30 minutes.

### Solution:

- Replacement of manual work by an AMR (Automated Mobile Robot) connected to the OPIL framework.

### Results and impact:

- Time savings of a minimum of 6 hours per day, which is almost a full working day of one employee.
- The opportunity for quality controllers to go deeper into root cause analysis which may lead to improvements of manufacturing processes.
- Improved ergonomics.



### More information:

<http://www.l4ms.eu/content/automated-quality-sampling-provide-significant-time-savings>



## RIOgistics: Replacing forklifts with robots to speed up intra-factory logistics

### Key facts:

EMKA Sealing Systems (Spain) manufactures rubber profiles that are used for sealing in the automotive sector. Bosonit (Spain) is the solution provider, and Robotnik (Spain) provided the robot.

### Challenge:

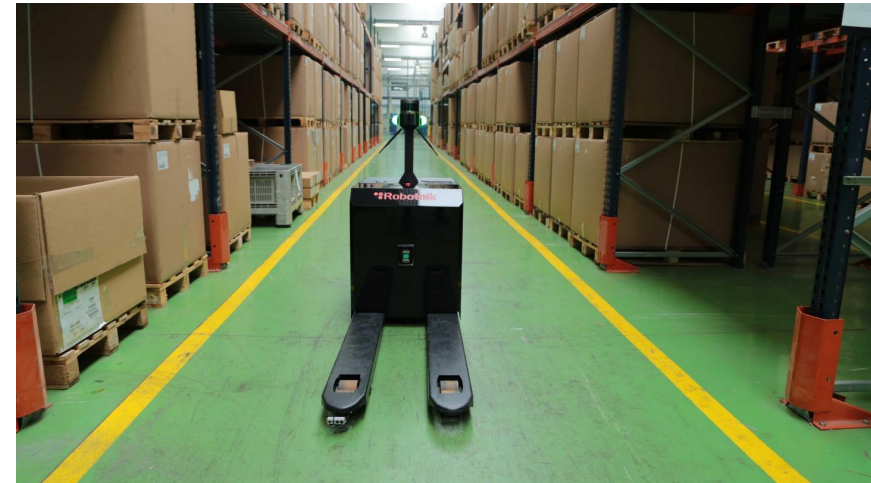
- To automate intra-factory logistic processes which need conventional forklifts.
- As conventional forklifts require drivers, a considerable amount of time of the operators is spent on transportation of semi-finished and finished products.

### Solution:

- Replacement of forklifts with collaborative mobile robots.
- Altogether seven sensors were added to the factory floor to guide the robot, and both the robot and the sensors integrated to the OPIL platform.

### Results and impact:

- Speeding the logistics process by one hour per day.
- Relieving employees from operating the forklift.



### More information:

<http://www.l4ms.eu/content/replacing-forklifts-robots-speed-intra-factory-logistics>

## L4MS

Smart logistics for manufacturing

# RobOPIL: Robotic Collaboration for OPIL based Logistic Solutions

### Key facts:

MYL (Spain) manufactures and repairs special machine tool spindles. LINQcase (Spain) provided intelligent automation solutions and Ceit the robotic software.

### Challenge:

- To improve logistics between the warehouse and workstations and partially automate intra-factory logistics by automatically deliver components weighing less than 12 kg.

### Solution:

- Replacement of manual logistics with two robots: an AGV (Automated Guided Vehicle) and a stationary collaborative robot arm.

### Results and impact:

- Cut downtime caused by intra-factory logistics from around 20% to almost 0%.
- Increase weekly assembly capacity from 15 spindles to 19 spindles.
- 26% improvement of overall productivity.
- 100% traceability of components used in each assembly and repair process.



### More information:

<http://www.l4ms.eu/content/mobile-and-stationary-robots-automate-intra-factory-logistics>

## L4MS

Smart logistics for manufacturing

# SMARTIST: AGV's transporting small parts

### Key facts:

Bazigos SA (Greece) is a SME manufacturing high precision tools and equipment, such as moulds and dies. Casp SA (Greece) is small software company.

### Challenge:

- To support intra-factory logistics of unique workflows by use of AGVs (Automated Guided Vehicles) for transporting small parts.

### Solution:

- Replacement of manual transportation of small parts by AGVs. Machine operators call an AGV to the workstation, load half-finished products on it and send it to the next workstation. All orders would be given on tablets or smartphones and directed to AGVs by OPIL modules.

### Results and impact:

- 20% of space was saved in the shop floor.
- Labour and ergonomics costs related to intra-factory logistics were cut by 70%.
- Time spent on intra-factory logistics information was reduced by 65%.



### More information:

<http://www.l4ms.eu/content/even-unique-workflows-can-be-supported-automated-logistics>

## L4MS

Smart logistics for manufacturing

## VCLMP: Voice controlled logistic system for automation in meat production

### Key facts:

Nedeljkovic (Serbia) is a slaughterhouse and meat processor. Solution provider is NO Solutions and technology providers Faculty of Technical Sciences at University of Novi Sad (Serbia) and University of Heidelberg (Germany).

### Challenge:

- Improving the traceability of meat to the level that the final product can be traced back to one single animal.

### Solution:

- A voice-controlled logistic system that enables full traceability in meat production.
- Main components are an AGV (Automated Guided Vehicle) with a robot arm which replaces workers in every possible situation.
- Traceability was achieved by using NFC and RFID tags on every meat hook and meat box, and by distributing readers and writers all along the production process.

### Results and impact:

- Important cost savings, mostly driven by lowered costs of nonconformance.
- Improved customer and employee satisfaction.



### More information:

<http://www.l4ms.eu/content/robots-and-electronic-tags-ensure-food-traceability>



(13)

- AWEAR
- CEMTEC-FIWARE
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- E-ROBOTIC
- IoTandCI
- MAMOC
- MARINA
- MIDAS
- OffshoreLytics
- PGPLANT
- PROFILE
- Robo-OptimAI





## AWEAR: A Wearable Expert Augmented Reality System

### Key facts:

Research Studio Forschungsgesellschaft (Austria) focuses on transfer of knowledge and technology from universities to markets, digital intelligence and future technologies.

### Challenge:

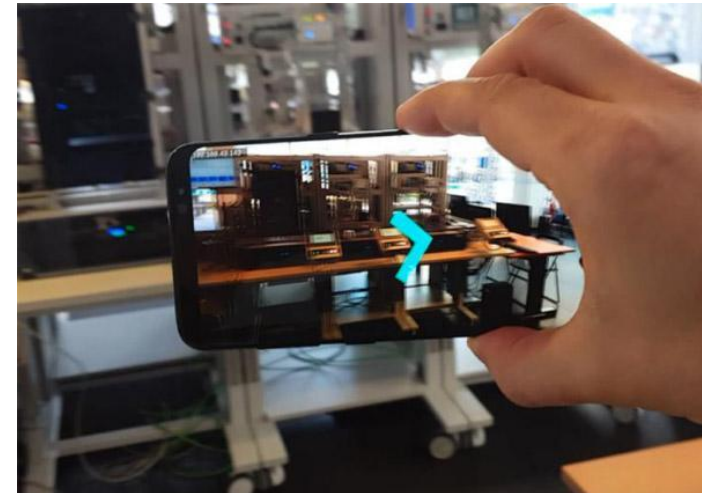
- To realize the integration of cutting-edge awareness technology (object tracking, real-world interaction, user localisation in complex environments, augmented reality).

### Solution:

- AWEAR platform consists of three main components:
  - Generation of a point cloud 3D model of the relevant environment.
  - Localisation of the user in the recorded environment and tracking motion of user or users.
  - Displaying AR guidance markers.

### Results and impact:

- The modular technical augmented reality (AR) platform can be adapted to most diverse industrial assistance applications enabling both, adaptivity and scalability.



### More information:

[https://midi.h.eu/experiments/open\\_call\\_detail.php?id=2](https://midi.h.eu/experiments/open_call_detail.php?id=2)



## CEMTEC-FIWARE: Energy Efficient Milling using Data Driven Models for Cement Manufacturing

### Key facts:

Linz Center of Mechatronics GmbH (Austria) is a solution provider in the fields of mechatronics and CEMTEC (Austria) provides technologies for mining and cement industries.

### Challenge:

- To implement a FIWARE based process condition monitoring and expert system platform at cement milling pilot plant.

### Solution:

- Cloud-centric platform for automatic process monitoring and data analysis.

### Results and impact:

- New insights into the cement grinding process, required for competitive product development.
- Similar solutions can be implemented in different industries.



### More information:

[https://midih.eu/experiments/open\\_call\\_detail.php?id=22](https://midih.eu/experiments/open_call_detail.php?id=22)

## DREAMBot: Dual-level Recognition for Environment Aware Mobile Robot

### Key facts:

Tractonomy (Belgium) produces autonomous towing robots.

### Challenge:

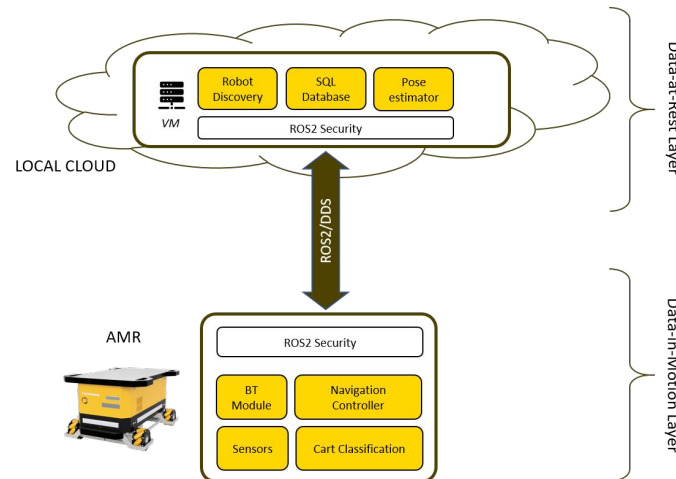
- To develop a proof-of-concept edge-cloud application based on the MIDIH reference architecture (RA) to enhance the performance of the Omnit Autonomous Mobile Robot (AMR).

### Solution:

- Dual-level recognition application using onboard vision sensors, in near-real-time, to generate a probability map of carts in the viewport of the robot as it approaches the parking area.

### Results and impact:

- Reaching out to new potential customers and establishing a demonstration showroom.



### More information:

[https://midi.h.eu/experiments/open\\_call\\_detail.php?id=33](https://midi.h.eu/experiments/open_call_detail.php?id=33)



## DELTA: Data-driven experiment for energy saving and quality assessment

### Key facts:

Tera (Italy) is focusing on digital technologies and providing solutions for IoT.

### Challenge:

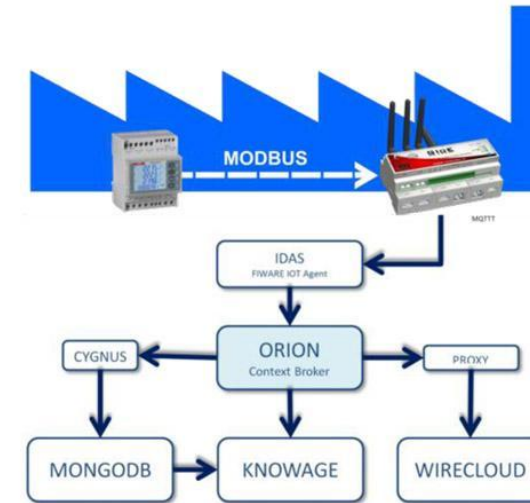
- To develop a decision support system for energy efficiency and zero-defect manufacturing of production line, capable of supporting the production manager with information concerning the energetic state of physical resources of the production line.

### Solution:

- DELTA system is composed of various sensors which provide different measurements (e.g., energy consumption, power consumption and power production), both from the machineries and in the plant. These sensors share the collected data, which is finally, transferred to the MIDIH platform for advanced data processing and visualisation.

### Results and impact:

- Enhanced support the production manager in monitoring the energetic state of physical resources of the production line and providing an adequate decision support to intervene in the event of loss of efficiency.



### More information:

[https://midi.h.eu/experiments/open\\_call\\_detail.php?id=6](https://midi.h.eu/experiments/open_call_detail.php?id=6)







## IoTandCI: Energy Consumption Prediction Based on IoT and CI techniques

### Key facts:

Paufex (Slovakia) is a company focusing on control and regulation systems for technological processes.

### Challenge:

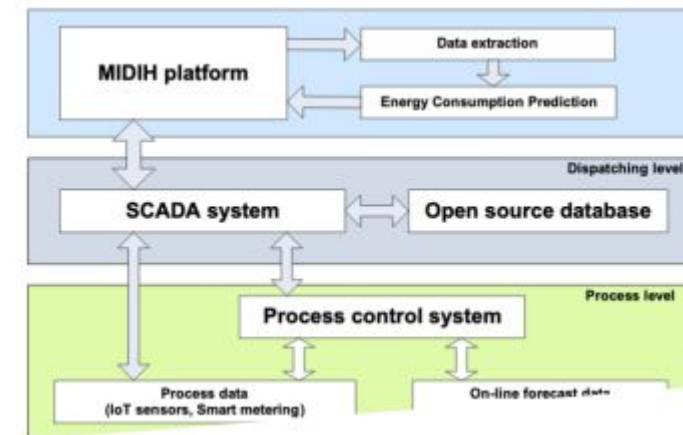
- To design and validate energy consumption prediction models with improved prediction accuracy.
- To integrate monitored and predicted data into MIDIH Platform with access for researchers in the field of energy consumption optimization and also for end users in companies supplying heat.

### Solution:

- A prediction model of energy consumption at different loads based on data obtained by on-line monitoring (using IoT devices).

### Results and impact:

- The solution can improve the energy efficiency of different types of facilities (e.g. schools, public buildings).



### More information:

[https://midiH.eu/experiments/open\\_call\\_detail.php?id=7](https://midiH.eu/experiments/open_call_detail.php?id=7)

## MAMOC: Machine Learning Application for Motion Capture

### Key facts:

DMC-SMARTSYSTEMS GMBH (Germany) is a company focused on making the control of autonomous and networked technical-physical systems more intelligent, efficient, versatile and performant.

### Challenge:

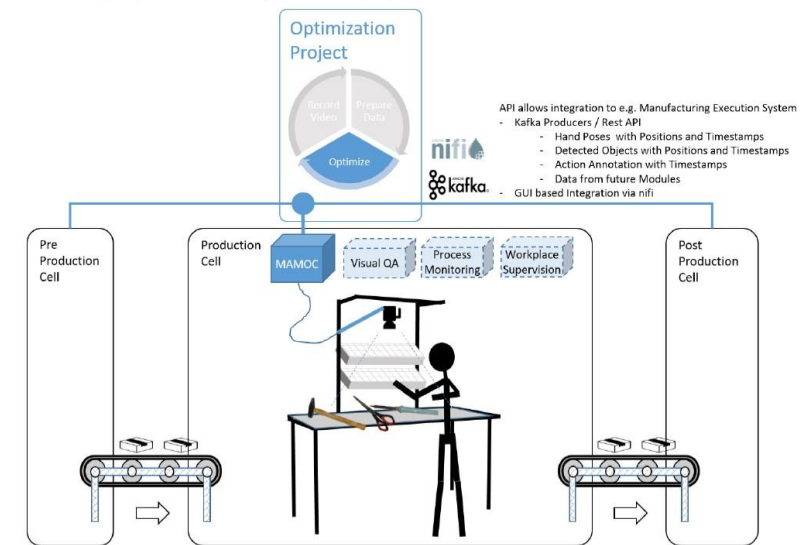
- To show that an artificial intelligence (AI) application enables automatic annotations of video material in the sense of «recognizing the activities that happen in the video».

### Solution:

- A combined object detection and hand pose estimation, enriched with position data used for training a neural network to recognise the actions happening.

### Results and impact:

- The solution is particularly intended for the optimisation and digital support of workplaces in manual production.



### More information:

[https://midi.h.eu/experiments/open\\_call\\_detail.php?id=25](https://midi.h.eu/experiments/open_call_detail.php?id=25)

## MARINA: Manufacturing optimization with ARtificial INtelligence Advanced planning & scheduling

### Key facts:

ManoGem SA (Belgium) provides intelligent enterprise systems.

### Challenge:

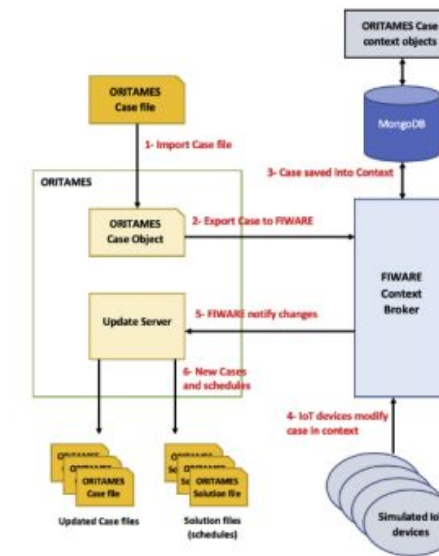
- To “use AI to fine tune the AI”. I.e. to build an artificial intelligence (AI) and machine learning (ML) layer on top of an existing multi-solvers and multi-heuristics optimisation system.

### Solution:

- A new process, in which solver parameter tuning is done using the implemented machine learning framework.

### Results and impact:

- The AI brings better optimisation, and more manufacturing process improvements, leading to improved competitiveness of companies using the application.



### More information:

[https://midih.eu/experiments/open\\_call\\_detail.php?id=4](https://midih.eu/experiments/open_call_detail.php?id=4)



## MIDAS: Multi-tenant Active Deep Monitoring Platform for AVN Trust Management and Optimization

### Key facts:

Eneo Tecnología S.L. (Spain) creates cybersecurity solutions.

### Challenge:

- To develop a monitoring tool designed for a shopfloor environment that will allow to autodetect risks and abnormal situations, based on manually tagged and categorised events and traffic patterns, and initiate some mitigation or resolution actions.

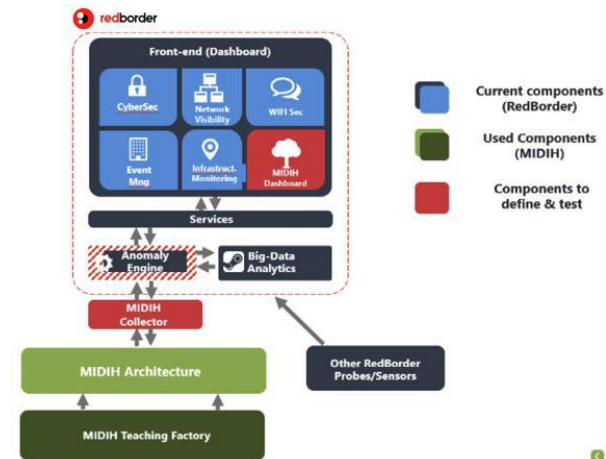
### Solution:

Improving the network monitoring software by developing two new components:

- The MIDIH Dashboard which will show the results of the data analysis, allowing to improve the security of the network and detecting abnormal traffic flows.
- The component that allow to capture and analyse the network traffic and feed the dashboard.

### Results and impact:

- Solution has very interesting business perspectives, as security is one of the major concerns of industries to deploy Smart solutions for Industry 4.0.



### More information:

[https://midiH.eu/experiments/open\\_call\\_detail.php?id=3](https://midiH.eu/experiments/open_call_detail.php?id=3)





## OffshoreLytics: Improving asset and process management in Offshore gas production using MIDIH industry data analytics

### Key facts:

Rolloos Oil & Gas B.V. (the Netherlands) provides services for offshore operations.

### Challenge:

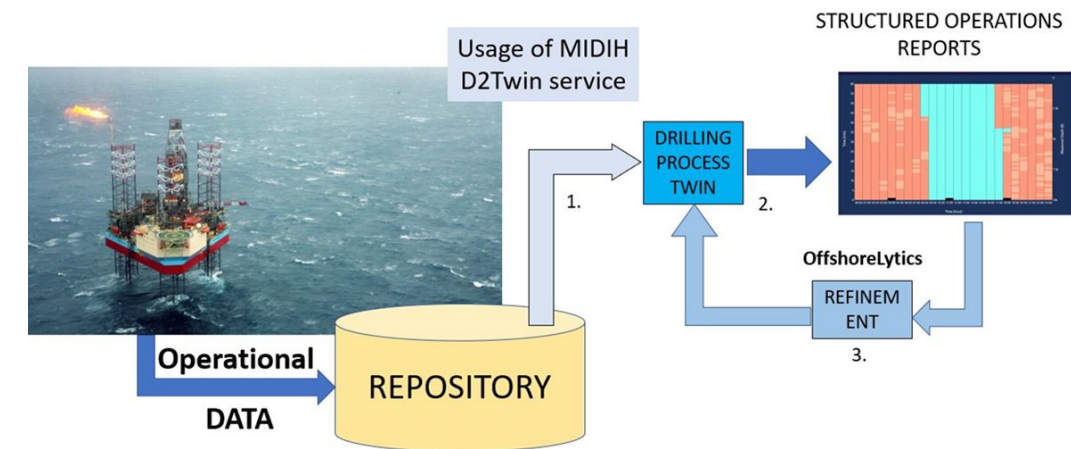
- To perform a feasibility study, Proof of Concept, to test the suitability of MIDIH data analytics platform for resolving monitoring of alarm situations in offshore oil and gas exploration and production.

### Solution:

- A MIDIH data analytics based platform providing an automatic overview of the dynamics in the realisation of the rig operation/processes, enabling an automatic analysis and reporting of important processes in a rig operation scenario.

### Results and impact:

- The usage of MIDIH components was very successful, both from the point of view of the easiness of usage and the effectiveness of services.
- Implemented data-driven process monitoring and control can be applied in various use cases, esp. for the domains where the processes are ill defined.



### More information:

[https://midi.h.eu/experiments/open\\_call\\_detail.php?id=23](https://midi.h.eu/experiments/open_call_detail.php?id=23)



## PGPLANT: Boosting the uptake of Industrial Internet by a revolutionary multi-layered 3D Digital Twin

### Key facts:

Process Genius Oy (Finland) is provides 3D digital twin solutions.

### Challenge:

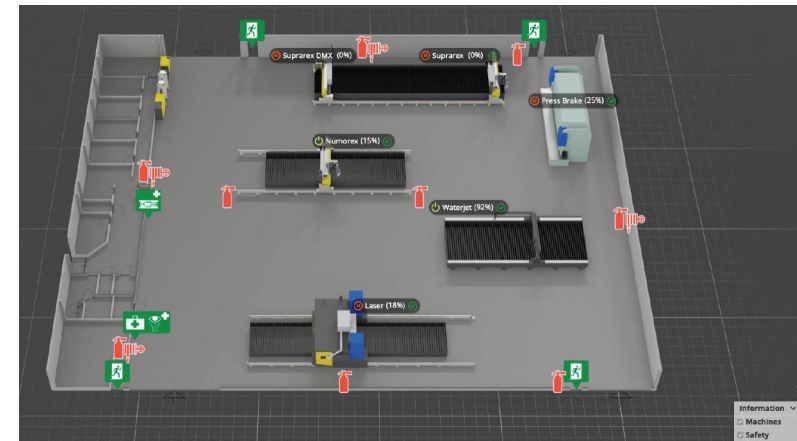
- To build connectivity of PGPlant with MIDIH reference framework to extend the architectural capabilities and to improve the compatibility of the PGplant solution with standard IoT platforms and frameworks.

### Solution:

- A cloud platform based product offered as an easy-to-deploy solution, which integrates with any standard frameworks via open APIs .

### Results and impact:

- Deployed automation solutions has reduced the time developers spend in server maintenance tasks from a 1 day job to less than 2 hours job.
- Technical results has enabled the platform to be used by wider audience.



### More information:

[https://midi.h.eu/experiments/open\\_call\\_detail.php?id=24](https://midi.h.eu/experiments/open_call_detail.php?id=24)



## PROFILE: PeRsOnalised design by manuFacturing LiFeCycle feedback loop

### Key facts:

i-Deal S.R.L. (Italy) is an Innovative SME focused on the analysis of images through artificial intelligence.

### Challenge:

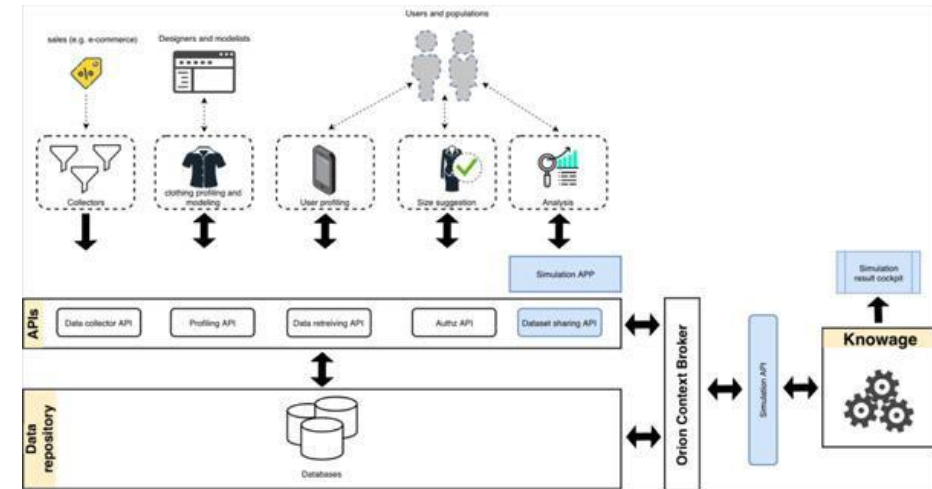
- To demonstrate the potential of real-time simulation tools for design and manufacturing clothing products.

### Solution:

- A real time delivery of the 3 levels of simulation required to support the design a new clothing collection:
  - Current design vs present consumers (reference success rate of present product),
  - New design vs present consumers (simulated success of the new collection),
  - New design vs new target consumers (simulated success rate of new collection in a new market).

### Results and impact:

- The obtained results demonstrated that experiment had success and it is possible to offer a business service to clothing designers in order to reduce the collection failures.



### More information:

[https://midiH.eu/experiments/open\\_call\\_detail.php?id=10](https://midiH.eu/experiments/open_call_detail.php?id=10)



## Robo-OptimAI: Robot Optimization Platform in Real-Time

### Key facts:

Infinite Foundry (Portugal) is a 3D digital plant platform for improved production efficiency of any industrial sector.

### Challenge:

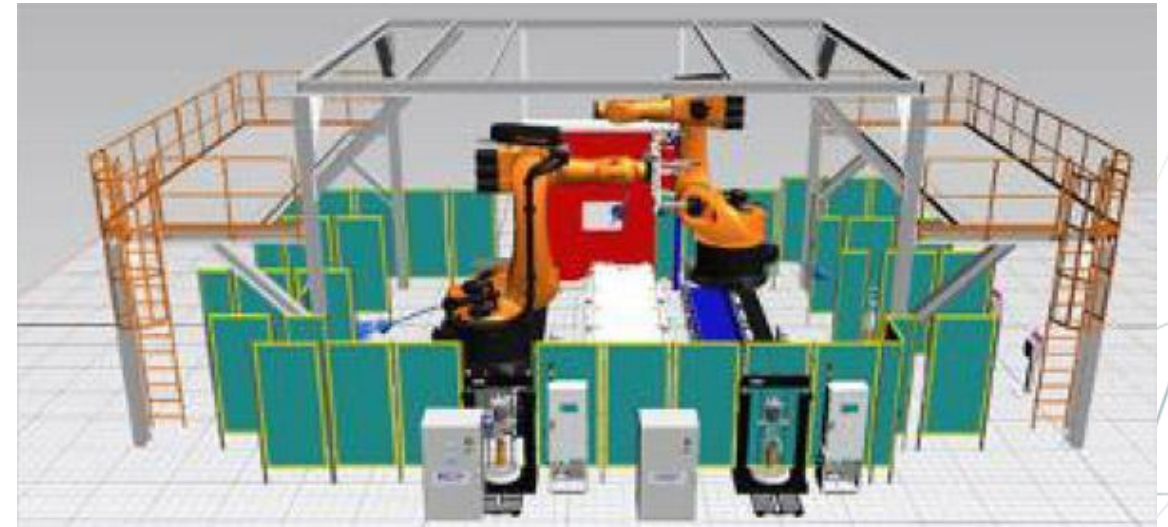
- To develop a cloud platform enabling engineering to raise on demand computational capacity to execute 3D design and virtual product simulation and testing, through web browsers.

### Solution:

- A cloud service that virtualises the access to the main commercial CAD, CAM, CAE and simulation software through the browser on a pay per hour pricing, which allows physics-based modelling technology to be used before, during, and after production of a physical product e.g. a vehicle for complete lifecycle analysis.

### Results and impact:

- Showed the potential of using the power of cloud and its “pay as you go nature” to allow industries to optimise their production process without needing an on-premises engineering infrastructure.



### More information:

[https://midih.eu/experiments/open\\_call\\_detail.php?id=11](https://midih.eu/experiments/open_call_detail.php?id=11)





# THANK YOU

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