DOCUMENT TITLE:

CUMMULATIVE REPORT ON SMART FACTORY SOLUTIONS

Project: Improving RD and business policy conditions for transnational cooperation in the manufacturing industry

Acronym: Smart Factory Hub

Work package	WP5: L&C Hub 4 Tech alliances
Activity	A 5.4: Learning demonstration workshops
Deliverable	D 5.4.1: Report on Smart factory solutions
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SMART SOLUTION BY COUNTRY

Click on the map for acess the smart solutions from each country.

- Click on the icon from footer for come back here.

SMART SOLUTION BY TYPE

- Click on the icon from footer for come back here.

SMART SUPPLY NETWORK
- ABF – OneBase – MFT (material flow control), intralogistics solution

NEXT-GEN MANUFACTURING SYSTEMS
- Mikro-Pro Production Tracking system
- Pro²Future: Modular Production
- Clever packaging for productive automation
- Air cushion plate for fast and gentle transport
- Modernisation of the textile cloth rubbering line
- SMART Factory – TIA (Totally integrated automation)

CLOUD STORAGE / PROCESSING
- SMIP - Smart Information platform
- LCM - Digital Platform – SyMSpace
- Black Sea Smart Alliance
- Cloud PLM
- OSICE

DATA ANALYTICS
- IoT Digital Transformation in Production Process
- BusinessQ
- PROEL Factory Monitoring
- Energy Monitoring and Management
- Zero defects production with RQM

CYBERSECURITY
- XiTrust – Sequre QR tage
- ReCheck

INTELLIGENT SENSORS/ACTORS
- Smart High-Speed Motorized Spindle
- Monarco HAT
- Smallest passive contactless sensors of physical quantities in the world
- Orange BOX

CYBER PHYSICAL SYSTEMS
- CYBER-PHYSICAL factory training platform
- The Digital Twin of an industrial Production line within the Industry 4.0 concept
- Collaborative robot integrated in industrial environment of Smart Factory

SMART MAINTENANCE
- SCCH - Predictive Analytics Message Board

Green Monitor
Aucobo system

MOBILE WORKFORCE

REWO
EVOLARIS - Live-Video-Assistance-System called EVOCALL
Tablet Solution – Work Held Voice Assistant
Virtual reality work instructions

ADDITIVE MANUFACTURING

RHP - 4M System - Direct Metal Deposition
IZIT d.o.o.
Metal additive manufacturing
3D Printing
3Dimension supported by MYMEDIA

ROBOTICS

ROBO-FLEX
Robotic solutions
PROFACTOR – X Rob - easy robot configuration
FANUC Robotic Automation
Collaborative Robotics
drag&bot
Special Purpose Machinery
Robotic Arm & Sensor Techniques
Automated Guided Vehicle (AGV)
Automated production line with industrial robots for manufacturing cardboard pallets
CNC robotic packing, palletizing and welding
Collaborative robot integrated in industrial environment of Smart Factory
Bin picking solution for flexible Automation

PHYSICAL AND COGNITIVE ASSISTANCE

AI machine Vision
cubu:S
Schlauer Klaus

OTHERS

Quality control - Plasmo - Quality Assurance Solutions for automated production processes and additive manufacturing applications
Business Upper Austria - Industry 4.0 Maturity Model
INVENT
Virtual Engineering Center (VEC)
Building Management System
UPI - Unified Platform for Innovations
Decentralised indoor climate systems
Smart Communications & IoT for Manufacturing

ThingWorx - Industry Innovation Platform
Topomatika d.o.o.
Optimisation of products by numerical simulation methods
OTHERS (cont.)

Real Time Location Systems
Mold ID
Custom-Made Devices
Palletized warehouse inventory scanning using drones
Time logger
Volumetric measurements by UAV
eDOCU SMART FACTORY
INFOTECH - OPEN RTLS (Real Time Locating Services) Platform
Bielomatik Lubrication
Augmented maintenance & remote assistance using smart devices

1 Smart Factory solutions from Slovenia

1.1 REWO

Smart Factory solution REWO

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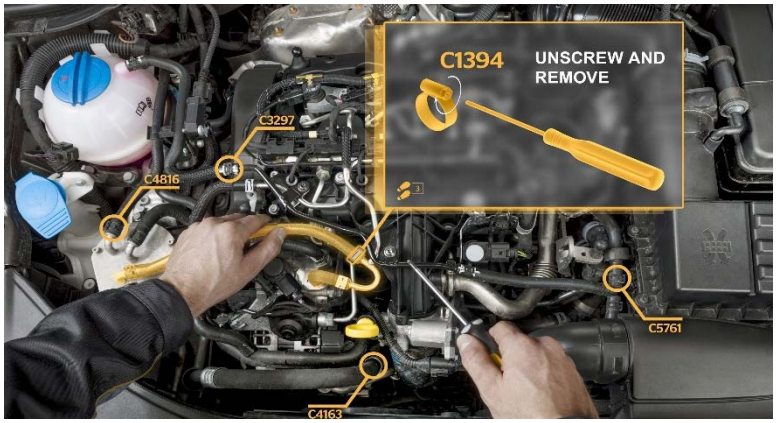
Market sectors:

- Automotive industry
- Electrical and electronic engineering industries



Services provided:

- Services
- Education/Training

Type of solution:

Software and service

Smart Factory description:

REWO is a visual digitization platform, which drastically improves capturing and communicating knowledge to anyone within the company's ecosystem.

- Save years of knowledge

REWO offers an efficient way of capturing, preserving, and sharing knowledge throughout your company ecosystem. Share knowledge in the form of visual instructions to your workers, distributors, customers, and more.

- Ensure standardization

Standardize your processes through tracking and visualization of instructions. Don't just write bullet points but guide your coworkers with step-by-step videos showing precisely how tasks are executed.

- Immediate assistance onsite

Wherever you or your expert workers are, remotely assist your colleagues, your customers or others by seeing what they are seeing and visually guiding them through any process or procedure.

Keywords:

Industry4.0, Digitalization, Knowledge management, Internet of Things

Figure: REWO

Example of Product/Service usage:

- **Procedures and Work Instructions**

Procedures describe a process, while a work instruction describes how to perform the conversion itself. Process descriptions include details about the inputs, what conversion takes place (of inputs into outputs), the outputs, and the feedback necessary to ensure consistent results.

- **Training and onboarding**

Ensure that all new employees are inducted into your company according to the specific requirements of your workplace environment. Quickly create content tailored to your workplace, take for example the specific characteristics of the safety protocols necessary within a laboratory or steel factory. REWO allows you create a step by step visual introductions, which allow you to receive a step by step confirmation that everything has been understood by an employee.

- **Field work support**

Your field service workers can't bring with them all the manuals when they are working outside your company. Remote assistance is a key feature of REWO that will help you reduce repeat visits by connecting workers on the field with experts in the office.

- **Product instructions for distributors and buyers**

Many books, manuals, industry standards, and regulations deal with some aspect of product instructions. Unfortunately, much of this information is scattered, hard to find, overly technical, or narrow in perspective. It's also hard for the buyer to follow instructions if they are not explicit enough.

- **Machinery and equipment manuals**

REWO gives your operators more ownership of their machines: Enable workers to initiate the startup process for a machine and enter in the right values for production rather than having to wait for an engineer to do it for them. REWO also allows you to quickly resolve issues when they happen. Quicker intervention times will save yourself from costly production line outages/late deliveries penalties.

- **Complex or small batch assembly**

REWO can be used to break a complex or infrequently performed assembly process into logical visual steps. This works particularly well when dealing with small batch production that only happens a couple of times per year. Visual instructions allow assembly workers to refresh their knowledge before starting. The same goes for complex production where there is a high probability of mistakes.

- **Lean manufacturing**

The hardest part of lean manufacturing is teaching processes to workers when they have been doing it in a certain way for many years. REWO make Single-minute exchange of die (SMED) simpler by visualizing the new process. It also allows you focus on TMP and to transfer basic maintenance operations from your maintenance staff to your machine operators.

- **Asset migration or relocation**

Moving production machines or production lines is a complex process. With thousands of parts involved, all situated or orientated in a certain way there is a high potential for something to go wrong when reassembled in a new location. This could result in costly site visits from engineers or unproductive Skype/phone calls trying to resolve any issues. REWO allows you to document the disassembly and guide someone through the reassembly process once the asset is moved to its new location.

- **Quality Assurance**

REWO is used to show workers exactly how to execute precise measurements or other QA processes where there is a low tolerance for any faults. Your customer today is not only looking at the values you measured but also how you got to those values. Ensure you successfully get through supplier audits by using REWO to guide and train your workers on the QA.

Improvement areas covered by the Product/Solution:

- Increased speed of production operations
- Improved agility and responsiveness in the production process
- Improved product quality
- Improved maintenance/uptime

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology
- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Service presentation
- Attachment 2: REWO logo
- Attachment 3: REWO UseCase promo video

Product/service technological focus:

- Information Processing & Systems, Workflow
- IT and Telematics Applications
- Multimedia
- Telecommunications, Networking
- Education and Training

Market availability:

Available on the market since 2018.

1.2 IPSPlus

Smart Factory solution IPSPlus

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Type of organization:
SME

Market sectors:
- Manufacturing

Services provided:
- Services

Type of solution:
Software and service

Smart Factory description:
IPSPlus is complete and easy to use software designed for small and mid-sized manufacturing companies that offer advanced word orders, bills of materials and other features that your company needs to maximize efficiency. It offers high level of flexibility, which means that it is customized for your production process. The process of implementation also involves blueprint and several meetings with key employees responsible for production, with the aim to develop solution that will help manufacturing company keeps its competitive advantage and increase efficiency. It is suitable for make to order, custom and series production.

- **Increase efficiency**

By using IPSPlus companies can significantly increase their efficiency. Each employee must start and finish specific work order by identification, which helps company determine and react on problematic tasks and improve the process. Additionally, the efficiency can be increased by less administration and preparation work, due to fully automatized and digitalized process.

- **On-time delivery**

By tracing the stage of specific work order and implementing automated work orders for semi-products and material orders, company can determine more accurate delivery-time. In case

some problem accrues, fast actions can be implemented. This brings more on-time deliveries and highly satisfied customers.

- **Reduced costs**

By using IPSPlus, company can reduce costs due to better and more optimized material purchasing. Solution suggests the purchase quantity based on new orders and demand in previous period. Real-time and accurate inventory and semi-product data additionally help determine the quantity and time of next material order.

- **Enhanced product quality**

Solution makes it easy for company to monitor product quality and detect defected products. Additionally, the production stage and work station, where problem accured, can be defined faster and needed actions can be implemented. All this can reduce percentage of defected products and increase customer satisfaction. Moreover, product quality can increase due to work order instruction presented on monitors and available for employees on each work station and work order.

- **Integration**

IPSPlus can be integrated with almost any other software solution. This mean, company can save visible amount of time on administration. Document and administration flow is fully automatized and digitalized.

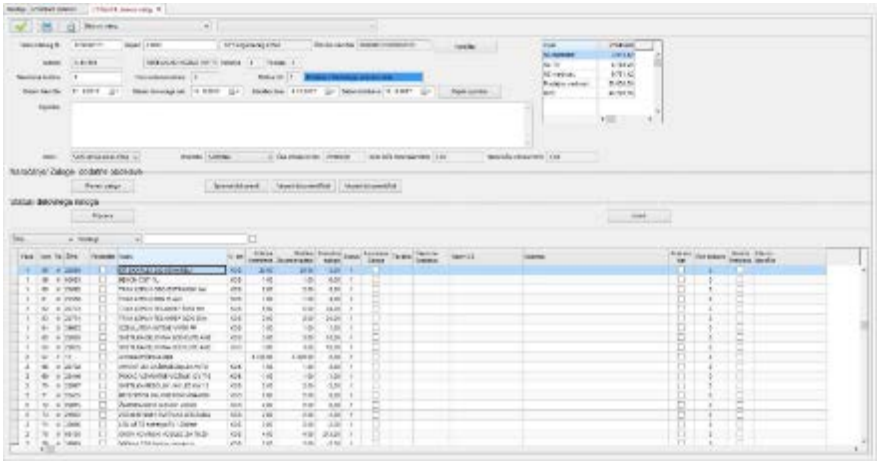

Figure: IPSPlus Work order

Keywords:

Industry4.0
Digitalization
Production process
Manufacturing software
Cost efficiency

Example of Product/Service usage:

- **Easy to use and complete solution –** one solution including all modules that manufacturing company needs for covering its information flow. It covers manufacturing process, material process and engineering.

- **Work orders –** custom made, series and semi-product work orders – all adjusted for specifics of manufacturing process. It allows you to create both simple and complex work orders for a variety of tasks. You can also establish accountability at each step of the manufacturing process.
- **Flexibility –** solution can be adjusted to fit production process and specifics of any manufacturing company.
- **Inventory management –** provides features that helps you manage multiple warehouses, automatic material reorders, generate purchase orders and more.
- **Products management –** solution includes managing semi-manufactured products, finished products, defective product and cooperation
- **Material evaluation –** material evaluation with direct connection to liquidation
- **Cost Price calculation –** solution provides the feature of cost price calculation for each product or semi-manufactured product (comparability with flat-rate costs of manufacture)
- **Production tracking –** feature for production tracking using barcodes and scanners.
- **Optimized purchasing –** solution helps manufacturing company with material orders with quantity and time suggestion
- **Internal work orders –** automatically generated internal work orders for semi-products
- **Production stages –** solution includes defining multilevel work orders that utilize production stages, which helps manufacturing company track work order status and see if everything is according to schedule.
- **Work order instructions and multilevel bills of material –** solution allows company to create work order instruction and multilevel bills of material for each product. It makes production faster and accurate, because instructions and list of required material is always available for workers.
- **Accompanying documentation –** each product and/or work order can require different accompanying documentation. Solution provides feature that helps you determining required documentation and providing instruction for attaching it to the product or order.

Improvement areas covered by the Product/Solution:

- Production process
- Efficiency
- Administration
- Communication with partners
- Stock optimization

Product/Solution is related to the following type of implementation:

- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Company logo
- Attachment 2: Service presentation
- Attachment 3: Service brochure

Product/service technological focus:

- SQL Database

Market availability:
Available on the market since 1990 with major updates in 2017.

1.3 8DReport.com

Smart Factory solution 8DReport.com

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Type of organization:
SME

Market sectors:
- Automotive industry
- Electrical and electronic engineering industries
- Information Technology

Services provided:
- SaaS (Software as a Service)
- Consulting
- Research and development

Type of solution:
- Services

Smart Factory description:
8DReport.com is a problem-solving portal for production companies. It is based on a well-known and proven 8D methodology.

Unlike other software solutions that just enable recording of corrective actions, 8DReport.com makes problem solving a team sport.

8DReport is a cloud application that brings together people from anywhere in the world to work on a given problem. Team can include persons from any plant in the company, suppliers or customers. They can work on the same document at the same time. Every change someone makes others see immediately. All team members get informed about the progress via email messages and rich graphical tools in the portal.

In the dashboard users get a graphical overview of currently open problems. They can quickly see in which areas they should focus their attention. Rich graphical reports help you not only solve problems quickly but also improve your problem-solving processes.

Every time a new problem is opened the archive gets analysed for similar problems and results get presented to the operator. This way he never misses a recurring problem.

Templates in the portal are very customizable. A company can design many different templates that match their problem types or individual customer requirements.

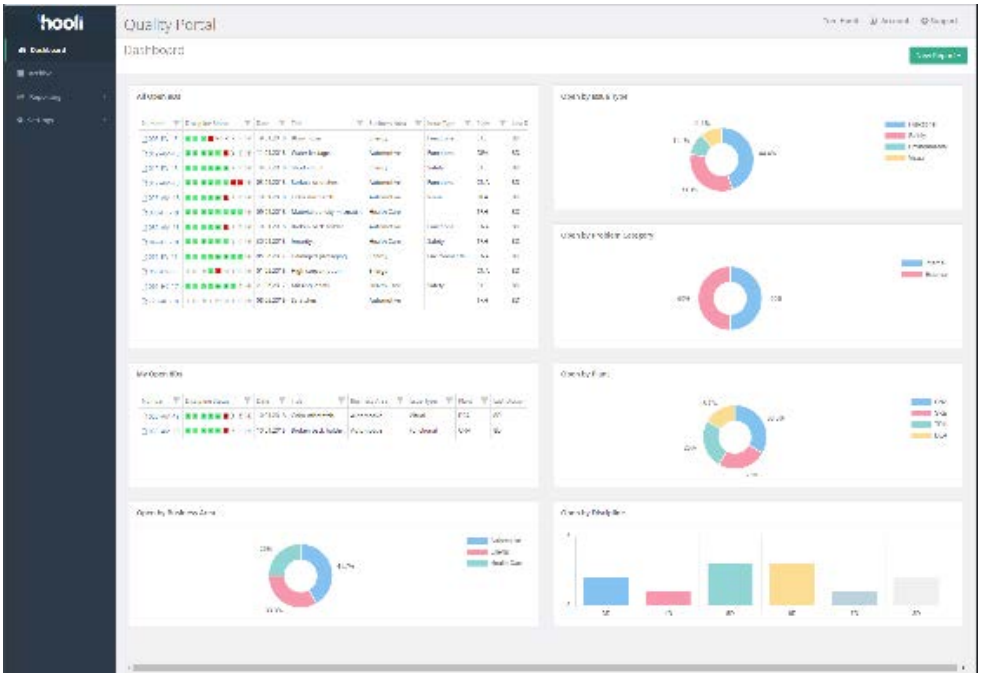

Figure: 8DReport.com

Keywords:

8D Report
Corrective Actions
Problem Solving
SaaS

Example of Product/Service usage:

- A company received a customer claim. A quality engineer opens a new 8D report and invites other team members to help. All team members get informed about the new claim and their role in solving it. They are always on the same page about the current progress and status of the given problem.
- The quality engineer gets a graphical overview of currently open problems and which ones are not meeting the deadlines. This way he can spend less time with busy-work and focus on the problems that need his attention.

- A company sends a claim to a supplier. Instead of requesting a PDF report at the end of the process they open an 8D report in their portal and invite the supplier to use it. This way the company gets all the previously mentioned analytics to monitor the supplier progress.
- Internal audits: For findings of an internal audit a company creates an Internal Audit Report that includes all the findings of the audit. Each finding has a link to a Corrective Action related to the finding.
- The templates can be easily customized and the company built a special template for implementing Internal Audit Corrective Actions.
- As the Corrective Actions get implemented the statuses in Internal Audit Report get automatically updated.

Improvement areas covered by the Product/Solution:

- Improved coordination with suppliers
- Improved coordination with customers
- Decreased manufacturing costs
- Improved product quality
- Improved compliance with customer specs or regulatory requirements
- Improved information for business analytics
- Improved information for product decisions

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology
- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Logo
- Attachment 2: Product brochure
- Attachment 3: Product introduction (https://vimeo.com/249637380)
- Attachment 4: Product presentation
- Attachment 5: Template editing (https://vimeo.com/8dreport/8d-template-editing)

Product/service technological focus:

- Process control and logistics
- Industrial Manufacture
- Information Processing & Systems, Workflow
- IT and Telematics Applications
- Technologies for the food industry

Market availability:
Available on the market since 2018

1.4 ROBO-FLEX

Smart Factory solution ROBO-FLEX

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Type of organization:

SME

Market sectors:

- Mechanical engineering (Robotization and automation of production processes)

Services provided:

- Engineering
- Manufacturing
- Education/training
- Consulting

Type of solution:

Product

Smart Factory description:

Flexible robotic cell ROBO-FLEX

Robo-flex Basic is a robotic welding cell for every pocket. It consists of a robot, robotic steering and all the necessary welding equipment. It is mounted on a compact base which allows an easy transport with a forklift. The welding cell makes it very easy to add additional modules (e.g. positioners) to extend the usability of the welding robot.

Robo-flex Advanced is a robotic welding cell extended with additional modules. The latter can be installed, if necessary, on any of the three fixing points on the Robo-flex Basic version. The extension is possible with three modules at the same time or with four external robotic axes.

ADVANTAGES

Accessible to every user including small businesses
Suitable for small and large series
High flexibility of the welding robot
High productivity

Possibility of modular extension
Easy moving of the cell
Very favourable price
Easy control and programming

Figure: Robo-flex Advanced

Keywords:

Smart Automation and Robotics
Welding Robot
Flexible Production
Internet of Things
Automated Intelligence
Production management
Industry 4.0 ready

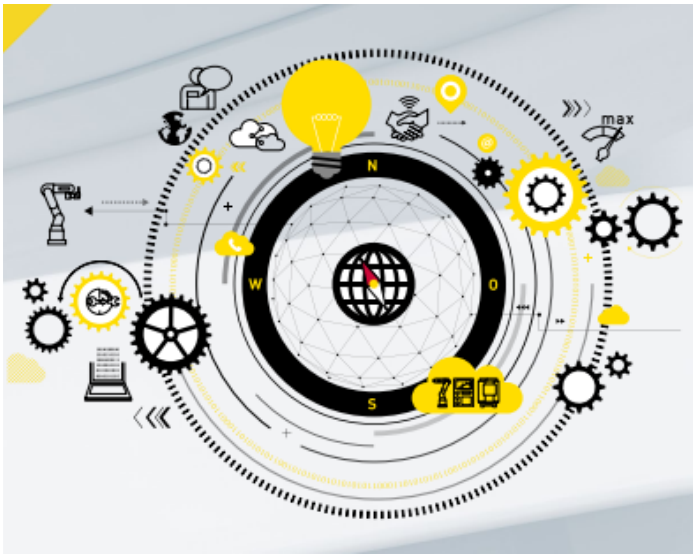


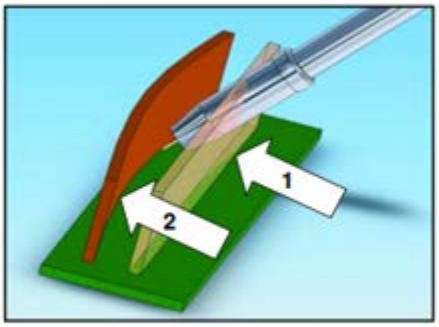
Figure: Smart Automation and Robotics

Example of Product/Service usage:

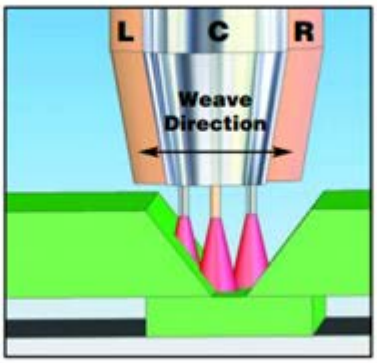
In the example presented below, the buyer of the unit is a manufacturer of axial flow fans that are installed in ventilation systems for ventilation of buildings, in fire protection, in underground garages and other industrial applications.

The specifics of the buyer's products are cones which are welded by the so-called TAST function that allows the robot to follow the joint independently and at the same time correct it - no correction is needed from the programmer or robot operator.

TAST Overview



1. Original programmed path
2. TAST used to compensate for part warping or inaccurate fixturing.



Current Feedback (A):		
L	C	R
220	180	160

TAST measures welding current at the sides of the joint during weave motion and makes adjustments to the weld path automatically.

Improvement areas covered by the Product/Solution:

- Increased speed of production operations

- Decreased manufacturing costs
- Improved information for production decisions
- Improved agility and responsiveness in the production process
- Improved product quality
- Improved information for business analytics
- Improved remote monitoring capabilities
- Improved safety

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology
- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Company logo
- Attachment 2: Product presentation
- Attachment 3: Video about SF solution (https://www.youtube.com/watch?time_continue=14&v=Khvl06QnPjo)

Product/service technological focus:

- Industrial Manufacture
- Construction Technology

Market availability:

Available on the market since 2015

1.5 SMIP - Smart Information platform

Smart Factory solution SMIP – Smart Information platform

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Type of organization:
SME

Market sectors:

- Internet of things (Smart Energy, Smart City, Smart Factory)
- Information Systems for Public Administration (back-office processes, e-business with citizens)
- Geographic Information systems (GIS applications related to space and spatial planning)
- Logistic and transport (cargo handling and storage, mobile applications for field work)

Services provided:

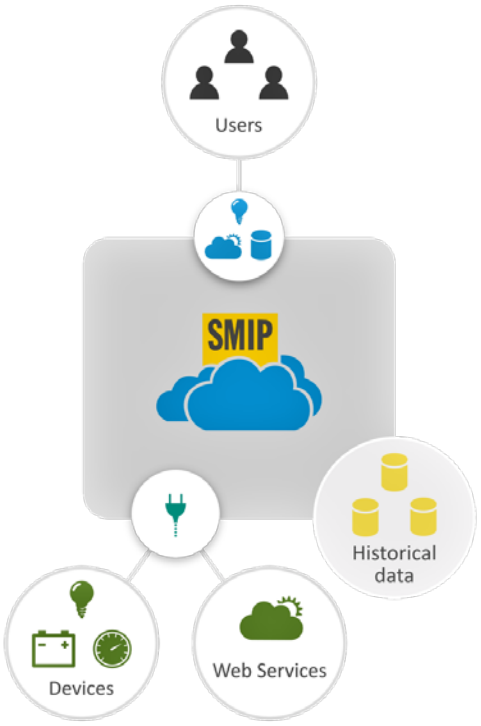
- Services (SaaS)
- Consulting and project management
- Research and development

Type of solution:
Service

SMIP platform overview

SMIP is a web based IoT platform that can connect a variety of smart devices, applications and users. It is used to visualize, monitor, store and manage
data from devices or other data sources (such as web services…)

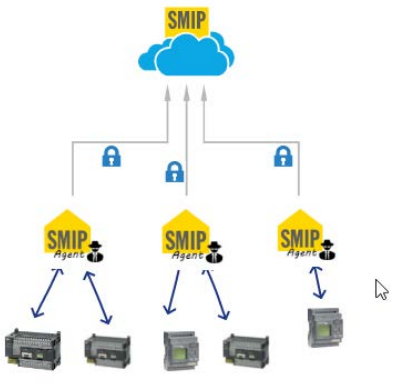
SMIP platform is a highly modularized system that consists of:



- Running custom content tailored to specific device types.
- Real-time data visualization from devices and other data sources.
- Logging data from devices and other data sources.
- Manipulating obtained data or calling external modules for data manipulation (e.g., machine learning, generate predictions, generate optimizations...).
- Historical data visualization.
- Alarming, reporting and messaging.
- Secure data access based on users, realms, roles, privileges and user-to device ownership relations.
- Web Application container running SMIP management applications and custom applications tailored to specific user needs.
- Powerful administration tools supporting different levels of administration privileges.
- Look & Feel customization.
- Full internationalization (i18n) support that enables localization of all content in SMIP including SMIP's system applications and messages.
- Appropriate time zone handling of timestamped (historical) data.

SMIP Agent (edge gateway)

SMIP Agent is an IoT gateway running a custom version of the SMIP platform tailored for embedded devices. Its main functionalities are:

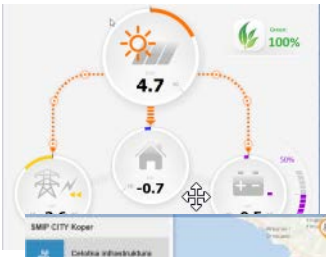


- **device connectivity:** connects to (local) devices (sensors, controllers...) through various interfaces (Ethernet, USB, CAN, RS-485...) and implements various protocols (Modbus RTU, Modbus TCP/IP, W-MBUS...). Support for new protocols, devices, etc. is continuously expanding.
- **service connectivity:** may connect to various (REST-ful) WEB services like weather services, smart grid energy optimization services, etc.
- **cloud connectivity:** primarily connects to SMIP cloud, but may connect to other clouds like IBM Bluemix, Microsoft Azure, Amazon Alexa, etc., if required.
- **communication encryption:** all communication with the cloud uses TLS 1.2 encryption

- **certificate trust store updates:** a local SMIP Agent's trust store can be updated when needed (future-proof TLS connections to clouds with newer certificates) from SMIP cloud
- **alarm generation:** SMIP Agent can generate configurable alarms and send them to the cloud or other gateways
- **scriptable logic and scheduler:** SMIP Agent runs custom scripts that use normalized data from various sources. Designed for the needs of edge computing of tomorrow
- **remote maintenance:** software upgrades, configuration (content) upgrades, system and performance statistics (CPU load, memory consumption, I/O byte transfers and timings,)

Keywords:
SMIP, IoT cloud, SaaS, smart devices, smart products, IoT gateway, edge computing

Example of Product/Service usage:
As mentioned above SMIP is an IoT platform upon which we can build a variety of IoT solutions. In the last couple of years, we used SMIP as a foundation in several applications spanning across different IoT areas:

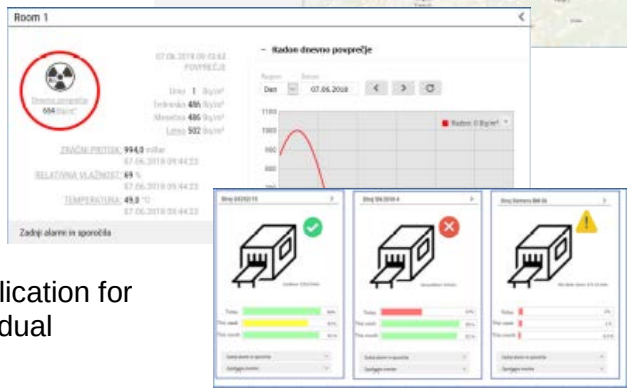


Smart Energy:

- **HEMS** – Home Energy Management System
- **BEMS** – Building Energy Management System

Smart cities

- **SMIP City** (pilot project) – a system for monitoring data generated in the urban environment (traffic counters, environmental measuring stations, parking lots...)



Smart buildings

- **SMIP Sense** - an indoor air quality monitoring system (radon, CO_2, oxygen, humidity, temperature, air pressure...)

Smart factories

- **SMIPeR Machine Monitoring** – an application for the continuous monitoring of each individual machine in the production line

Improvement areas covered by the Product/Solution:

- Lower energy costs
- Improved information for production decisions
- Improved agility and responsiveness in the production process
- Improved maintenance/uptime
- Improved information for business analytics

- Improved remote monitoring capabilities
- Developed visualization capabilities

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology
- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Company logo
- Attachment 2: Service presentation
- Attachment 3:
- Platform overview, features, reference projects, demos are available on https://www.smipcloud.com/

Product/service technological focus:

SMIP is a general focus technology platform that can be used in any kind of IoT project involving collection of data from spatially dispersed devices.

SMIPeR Machine Monitoring technological focus:

- Industrial Manufacture
- Information Processing & Systems, Workflow
- IT and Telematics Applications

Market availability:

SMIP as a platform has been available and in use since late 2015. SMIP Sense and SMIPeR products are on the market since 2018.

1.6 InFrame Synapse MES

Smart Factory solution InFrame Synapse MES

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Type of organization:

SME

Market sectors:

- Digital economy

Services provided:

- Consulting
- Research and development
- Services

Type of solution:

Product

Smart Factory description:

InFrame Synapse MES system is a powerful Industry 4.0 tool for digitization of production lines in factories. It is modular and scalable to tailor various needs of different productions.

Service oriented architecture enables fast integration with other IT systems (like ERP, WMS or shop floor IT systems). InFrame Synapse enables factory managers and line manager to make quick, informed decisions about their processes with all the data from the machine, workers and other systems available at their fingerprints.

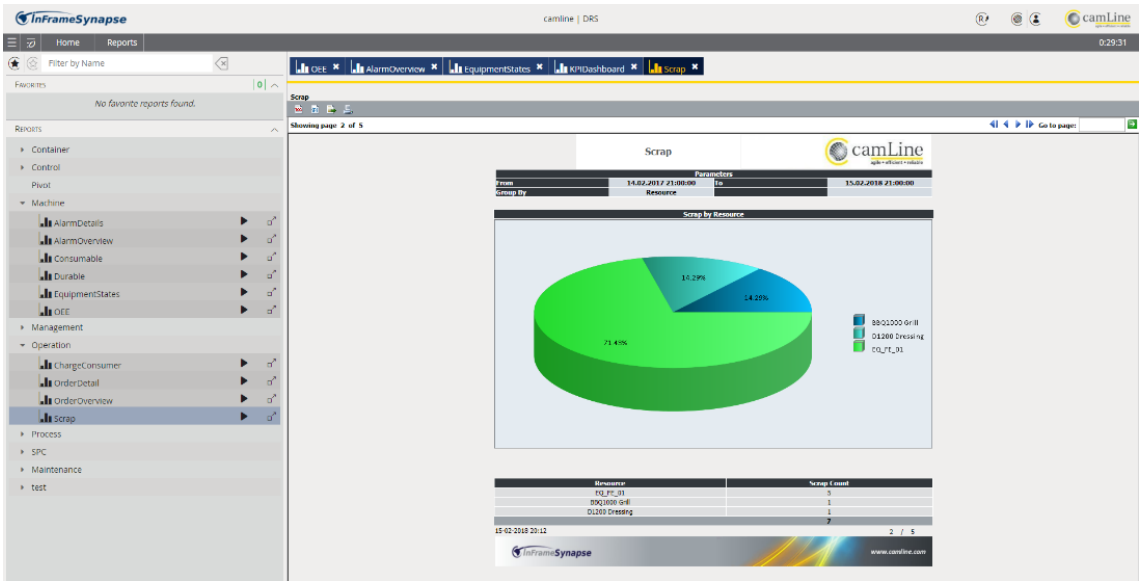


Figure: InFrame Synapse MES

Keywords:

Factory management
Production management
SaaS

Example of Product/Service usage:

InFrame Synapse MES system can be implemented in factories that have discrete manufacturing production. Targeted companies should employ 40-50 employees, or with more machines. The systems handles work orders, recipes (machine parameters), alarm management, quality management in production, scrap detection and prevention, operator control, automated machine data capture and full production traceability which is becoming more and more important in the manufacturing sector. System allows companies to start manufacturing paperlessly.

The system is modular therefore it can be implemented as a small-scale solution that focuses on most important manufacturing issues and can later grow to full-scale solution for a full smart production support with all the machines and work places within the production integrated with the InFrame Synapse MES system.

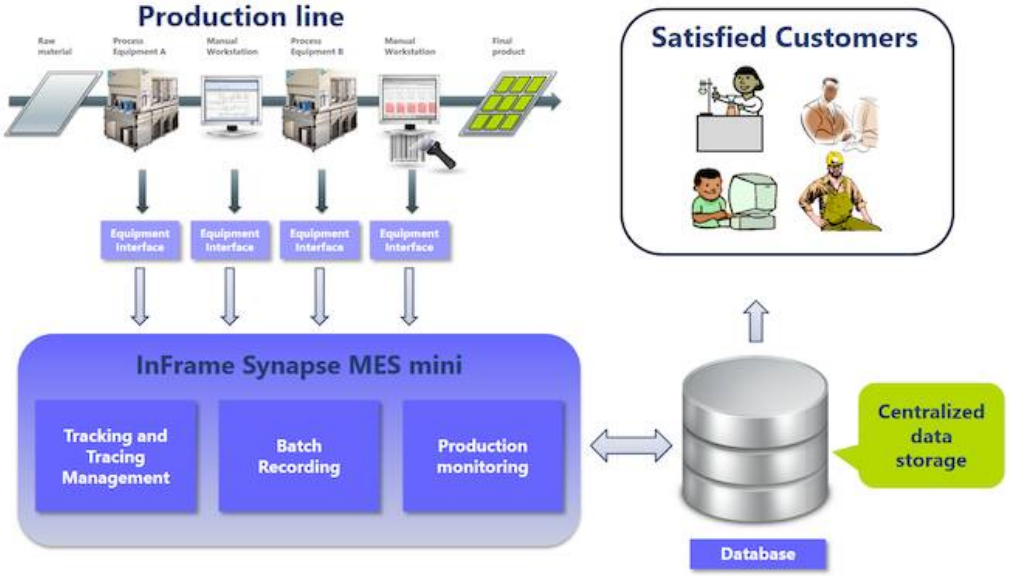


Figure: InFrame Synapse MES after implementation

Improvement areas covered by the Product/Solution:

- Increased speed of production operations
- Decreased manufacturing costs
- Improved information for production decisions
- Improved agility and responsiveness in the production process
- Improved information for business analytics
- Improved remote monitoring capabilities
- Developed visualization capabilities

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology

Other relevant information about the product/service:

- Attachment 1: Company logo
- Attachment 2: Product presentation
- Attachment 3: Video about SF solution (https://www.youtube.com/watch?v=8CxCWIx3kLA)

Product/service technological focus:

- Industrial Manufacture
- Electronic circuits, components and equipment
- Information Processing & Systems, Workflow

Market availability:

Available on the market since 2016.

1.7 Robotic solutions

Smart Factory solution Robotic solutions

DESMAN d.o.o.
Kolodvorska ulica 5, 9241 Veržej,
Slovenia
Contact person:
Franc Dešman
Tel. +386 41 907 337

Type of organization:

SME

Market sectors:

- Automotive industry
- Electrical and electronic engineering industries

Services provided:

- Services
- Education/Training

Type of solution:

Service

Smart Factory description:

Our services include robot commissioning, simulation, online and offline programming. We follow factory standards for BMW (L3, L7, L8) Scania, Audi (WASS), and Daimler (Integra 5).

Keywords:

Industry 4.0
Robot commissioning

Example of Product/Service usage:

- Robot Commissioning: ABB IRC5 and KUKA KRC2/4, Off-line programming and simulation
- Experience with applying robot applications: Handling, Welding, Glueing, Nutwelding, Screwing and other.

- Installing, adjusting and testing communication interfaces I/O (profinet, interbus) for robot and PLC communication
- Assisting and Support in debugging for automatic operations
- Providing procedure optimisation for meeting quality demands
- Cycle time optimisations with adjusting robot paths and logic
- Provide technical support in developing and improving processes in off-line cell simulation

Figure: Robot commissioning

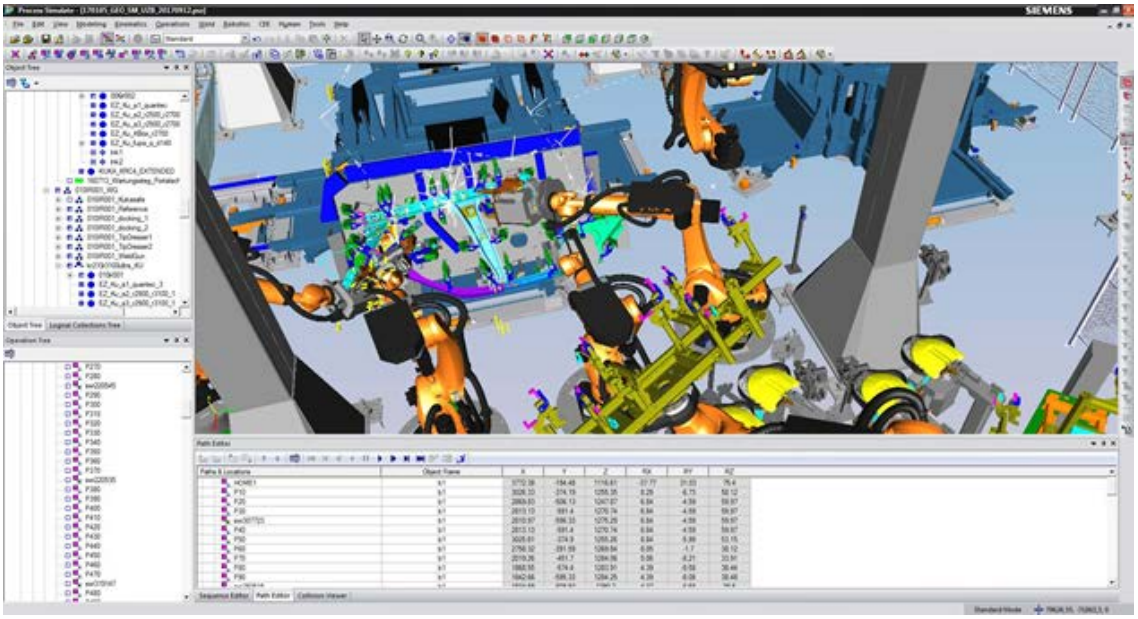


Figure: Process simulate

Improvement areas covered by the Product/Solution:

- Increased speed of production operations
- Improved agility and responsiveness in the production process
- Improved product quality
- Improved maintenance/uptime

Product/Solution is related to the following type of implementation:

- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Service presentation
- Attachment 2: Demonstration video
- Attachment 3:

Product/service technological focus:

- Automotive industry
- Industrial Manufacture
- Other Industrial Technologies - Robotics

Market availability:
Available on the market since 2015.

1.8 HRM 4.0

Smart Factory solution HRM 4.0

KADRING d.o.o.
Trg svobode 26, 2310 Slovenska Bistrica, Slovenia
Contact person:
Urška Kukovič Rajšp
Tel. +386 40 602 491

Type of organization:

SME

Market sectors:

- Automotive industry
- Electrical and electronic engineering industries
- Raw materials, metals, minerals and forest-based industries

Services provided:

- Consulting
- Services
- Education/Training

Type of solution:

Software and Service

Smart Factory description:

HRM 4.0 is a result of the cooperation of one of the largest human resources agencies in Slovenia with an innovative computer house, the goals of which were complete digitization of all administrative processes and development processes in the field of employee management. The solution is based on excellent user experience in web technology, ease of use, easy connectivity (SOA, REST API), mobility and flexibility. The basic goal of the application is to effectively support development of personnel, which requires the following conditions: Relief of routine work with appropriate IT support, empowerment of managers and easy to access knowledge bank for managing strategic HRM functions (talent development, management by objective, building competences, annual interviews, measuring commitment, etc.). HRM 4.0 is a HR program, which supports the implementation of the strategic HR function and enables the introduction of the processes necessary for the transition to industry 4.0. The program offers

leaders and HR personnel support in the field of employee development and at the same time automates an important part of routine tasks.

- **Timesaving HR solution**

By automatization of standard HR tasks in the field of recruitment, training and HR administration, HRM 4.0 saves time and gives a great overview of the entire company. Is particular the one-time entry of data needed for many activities is indispensable for HR optimization and making a shift to strategic HRM.

- **All important documents in one place**

All HR documents and other documents, needed for HR management and providing safety at work, are safely stored in one place. Changes in the system and in the documents are traceable in time. HRM 4.0 is also a great solution for making your HRM paper-free.

- **Excellent analytics**

Personnel overview, analysis of competences of specific teams or individuals, personnel statistics and other important information are supported by excellent analytics, based on OLAP cubes.

- **Mobility**

HRM 4.0 can be used on mobile devices and therefore easily accessed everywhere. It was specifically designed for usage in different manufacturing facilities.

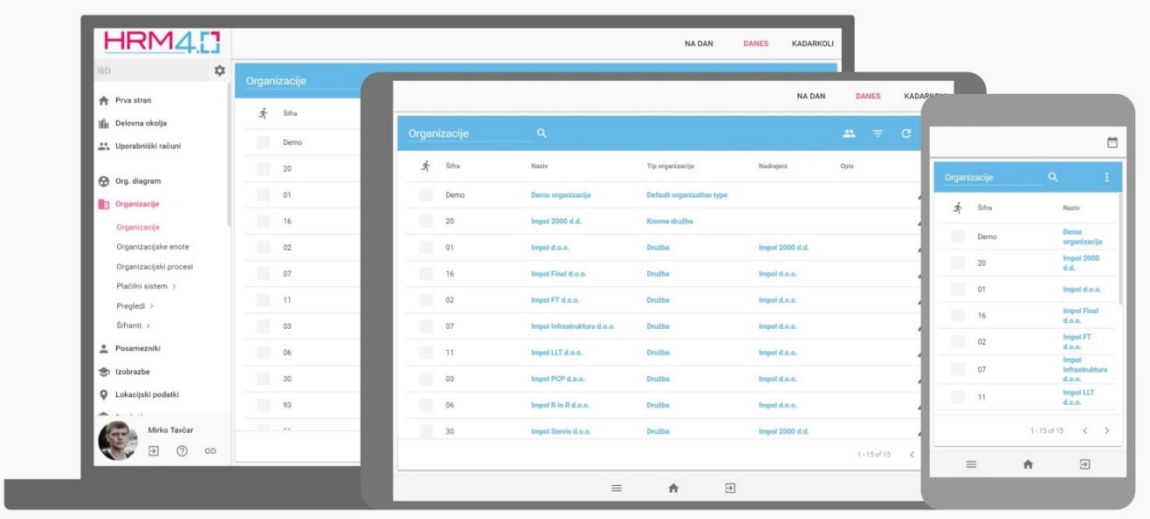


Figure: HRM 4.0

Keywords:

Industry4.0
Digitalization
HRM

Example of Product/Service usage:

- Development of competences

HRM enables the development of personnel through targeted management, monitoring of activities, competence development, knowledge management, performance measurement (360-degree appraisal), monitoring of company dynamics (measurement of organizational climate, questionnaires, forums) and promotion of innovation (reporting of useful proposals, innovations, implementation follow-up).

- Training

An overview of all training (training, which is obligatory due to legal requirements, and other training and skills development), automatization of alerts, received on e-mail, before the expiration of training validity (for obligatory training – especially connected to safety at work). Automatization of invitations to training, certificates and a good overview of all gained skills and competences.

- Measuring employee's satisfaction

On-line questioners can speed up the process of measuring employee's satisfaction. Pre-entered questions can guide HR professionals and leaders when constructing a questionnaire, tailored to company's specific needs.

- Safety at work

HRM enables companies to master the field of occupational safety (all records in one place, medical examinations – automated alerts when the validity of certain documents expires and new medical check-ups are needed, work accidents – all necessary documents in one place, incidents – employees can report incidents, which occur in the workplace and can lead to endangered safety at work; to goal is to identify risks for employee's health and safety and implement effective measures).

- Quality Assurance

By maintaining properly qualified employees through timely and efficient training and specifically set goals, HRM 4.0 can contribute to achieving specifying quality standards – set for manufacturing or services.

Improvement areas covered by the Product/Solution:

- Increased speed of production operations
- Decreased manufacturing costs
- Improved information for production decisions
- Improved agility and responsiveness in the production process
- Improved product quality
- Improved coordination with customers
- Improved compliance with customer specs or regulatory requirements
- Improved information for business analytics
- Improved safety

Product/Solution is related to the following type of implementation:

- Implementation of the human resource management systems

Other relevant information about the product/service:

- Attachment 1: HRM 4.0 logo
- Attachment 2: Company logo
- Attachment 3:

Product/service technological focus:

- Information Processing & Systems, Workflow
- Education and Training
- Safety
- Technology, Society and Employment

Market availability:

Available on the market since 2017.

1.9 Mikro-Pro Production Tracking system

Smart Factory solution Mikro-Pro Production Tracking system

EOCEN d.o.o.
Kajuhova ulica 5, 2000 Maribor, Slovenia
Contact person:
Samo Sagadinj
Tel. +0386 41 786 954

Type of organization:

SME

Market sectors:

- Digital economy
- Electrical and electronic engineering industries

Services provided:

- Consulting
- Education/Training
- Engineering
- Manufacturing
- Policy
- Research and development
- Services

Type of solution:

- Product
- Service

Smart Factory description:

The MikroPro Production Tracking system provides the best way of capturing and processing data from the production process and automating individual processes in production.
The system consists of the following solutions:

- Tracking operations
- Tracking the machine
- Tracking the product
- Quality
- Shipping
- Planning

- Maintenance

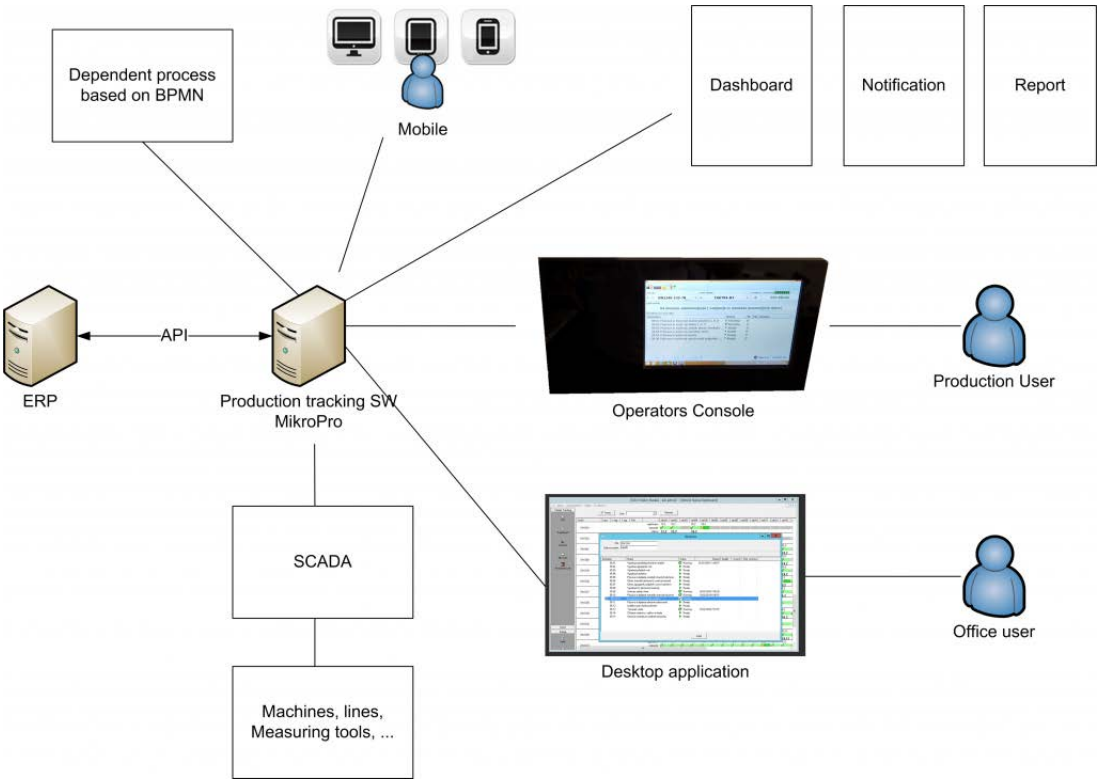


Figure: Scheme of the system mpPTS

It can be used as an extension of the ERP or as an independent system for managing production. Data is collected manually and automatically.
Manual data entry is done via the User Console, and automatic data acquisition is carried out via the SCADA system, where the system connects to the machines to ensure non-stop data exchange.
Process automation is carried out in combination with fixed or portable bar code readers, fixed or portable readers of rfid chips, equipment production with bar codes or rfid chips, installation of various basic and smart sensors, smart cameras, etc.
The solution is compatible with most of the industry standards (ISO, LEAN, TPM, Industry 4.0).

Main features of the system:

- Modular process-based system compatible with BPMN
- Dashboard & real-time monitoring features
- Notification features
- Reporting features
- Active Organization chart
- Calendar for recourses
- Audit trail
- Multilanguage
- API for communication with other systems

The Production tracking module in mpSystem is connected to the existing ERP system and is tracking single operations in manufacturing and assembly process:

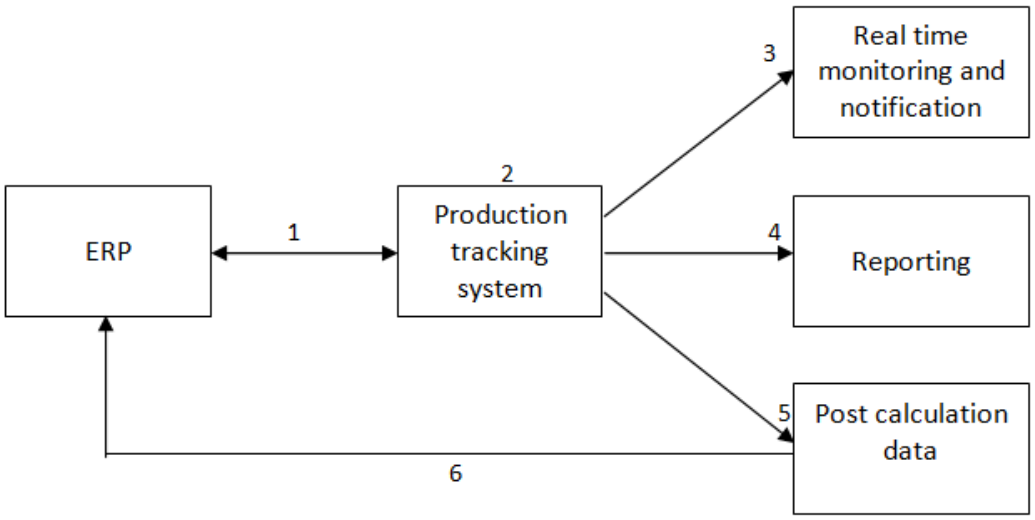


Figure: Production tracking module scheme

1 - By connecting the system to the existing ERP system we achieve a maximum level of automation.

2 - Tracking operations means:

- Tracking the start and finish of operation edited by Production staff
- Tracking products technical parameters edited by Production or Quality staff
- Tracking operation durations and exact working hours of workers
- SCADA system to communicate with machines in both ways (sending & receiving data)
- Tracking issues and issue are solved by issue solving process

3 - Real time monitoring and notification means:

- Captured data in analyzed and presented in dashboards or KPI
- Notification engine is used to notify specific individuals if predefined data of duration, quality or other measured elements is out of barriers

4 - Reporting means:

- Creating custom single work order or operation reports
- Creating custom process reports
- Creating custom staff reports
- Creating custom reports for manufactured item & material
- Creating custom work-centers reports
- Creating electronic production documentation in PDF and signed with digital signature

5 - Post calculation data is the captured data that can be sent to post-calculation processes that are being executed in ERP or manually.

Basic features:

- Installation of specific “Operators consoles” that enable Production staff to edit data
- Designing technological procedures
- Launching tool
- Registering operator on Operation console
- Adapted retrieval of work orders
- Tracking execution of tasks / operations (ready, running, hold, finished)
- Editing quality data
- Editing input-output
- ISSUE solving process
- SCADA system to communicate with machines in both ways (sending & receiving data)

Keywords:

Quality assurance
Improving efficiency (OEE, DLE)
Automated data capturing & processing (IoT, GS1)
Real time monitoring & Automated reporting
Process automatization (Industry 4.0)
e-commerce (bpmn)

Example of Product/Service usage:

- Vehicle assembly & Manufacturing
  - Metal Car part manufacturing
  - Wood Car and VAN part manufacturing
    - Operations tracking
    - Machines tracking
    - Quality tracking
    - Analytics
    - Efficiency of technology
    - Efficiency of HR
    - Reporting
    - Real time monitoring
    - Integrated problem-solving process (bpmn)
  - API to ERP
- Food industry
  - Production tracking
  - Scaling, moulding, backing, frosting and packing)
  - Ingredients tracking in bowls,
  - Tracking of logistical units
  - Manging LOT, serial no. Secondary serial no of end products, best before
  - API to ERP

Improvement areas covered by the Product/Solution:

- Implementation of the novel technology
- Implementation in the production processes

Product/Solution is related to the following type of implementation:

- Improved coordination with suppliers
- Increased speed of production operations
- Decreased manufacturing costs
- Lower energy costs
- Improved information for production decisions
- Improved agility and responsiveness in the production process
- Improved product quality
- Improved coordination with customers
- Improved compliance with customer specs or regulatory requirements
- Improved maintenance/uptime
- Improved information for business analytics
- Improved remote monitoring capabilities
- Improved safety

Other relevant information about the product/service:

- Attachment 1: Company logo
- Attachment 2:
- Attachment 3:

Product/service technological focus:

- Food quality and safety
- Technologies for the food industry
- Information Processing & Systems, Workflow
- IT and Telematics Applications
- Industrial Manufacture

Market availability:

Available on the market since 2002.

2 Smart Factory solutions from Austria

2.1 EVOLARIS - Live-Video-Assistance-System called EVOCALL

Smart Factory solution EVOLARIS – Live-Video-Assistance-System called EVOCALL

EVOLARIS next level GmbH
Hugo-Wolf-Gasse 8-8a, A-8010 Graz, Austria
Contact person:
Dr. Christian Kittl
Tel. +43 316 35 11 11

Type of organization:

R&D

Market sectors:

Aeronautics industries
Automotive industry
Electrical and electronic engineering industries
Mechanical engineering

Services provided:

Engineering
Research and development

Type of solution:

Product

Smart Factory description:

By using the EVOLARIS Live-Video-Assistance-System named EVOCALL, the problem-solving process can be influenced positively. EVOCALL is able to replace non-effective communication channels. Besides, in combination with a “work-shadowing” approach, the on-site presence of experts as well as the repair times can be reduced.

eAWARD Winner 2017; https://evocall.evolaris.net/

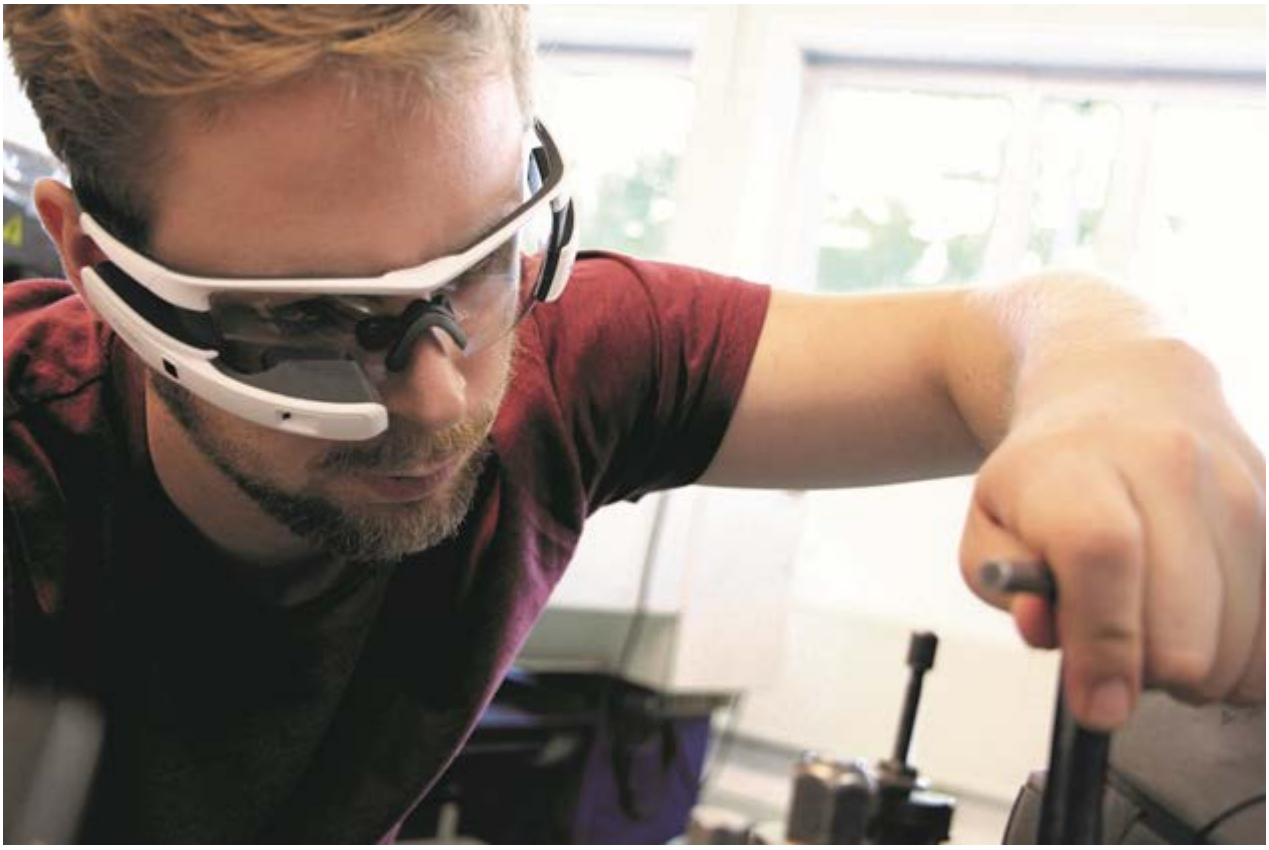


Figure 1: EVO-Call Data googles

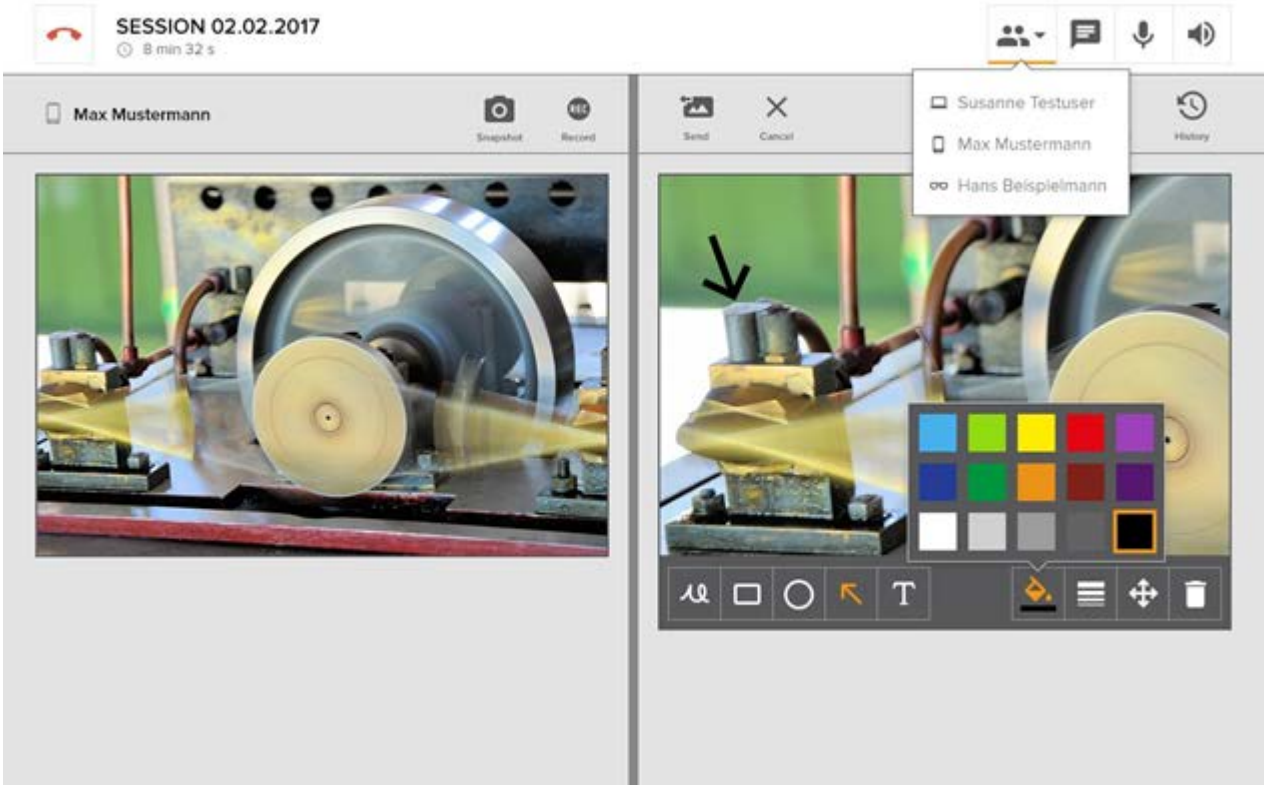


Figure 2: Visualisation of EVO-CALL Session

Keywords:
WebRTC solution,
Internet of Things
audio-visual support,
reduced repair time,
reduced on-site presence,
positive influenced problem-solving process

Example of Product/Service usage:
The starting point for the implementation of EVOCAll for a company interested would be a proof of concept with EVOLARIS consisting of: an initial workshop to identify the processes and stakeholders with the highest impact potential, training and hands-on experience of the smartglass-based solution; assistance for integrating the solution into the internal IT environment; 3 monthly test licenses
The solution was implemented with two lead customers, TGW logistics and AVL List. After a first trail with a single device at each site, a test phase with approx. 10 devices took place, evaluating the solution regarding the stability and performance (e.g. by testing it in a live-like setting between AVL HQ in Graz, Austria, and a AVL subsidiary in the US) and regarding the acceptance of the solution by various employees, which was measured via qualitative interviews.

Improvement areas covered by the Product/Solution:
Improved coordination with suppliers
Increased speed of production operations
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved maintenance/uptime
Developed visualization capabilities

Product/Solution is related to the following type of implementation:
Implementation of the novel technology

Other relevant information about the product/service:
Attachment 1: Company logo
Attachment 2: Product logo
Attachment 3: Product presentation
Attachment 4: Video about SF solution
(https://www.youtube.com/watch?v=XQIwruEjxj0)

Product/service technological focus:
Information Processing & Systems, Workflow
Plant Design and Maintenance

Market availability:
Available on the market since 2017.

2.2 ABF - OneBase – MFT (material flow control), intralogistics solution

Smart Factory solution ABF – OneBase – MFT (material flow control), intralogistics solution

ABF – Industrielle Automation GmbH
Deggendorfstrasse 6, 4030 Linz, Austria
Contact person:
Christian Hiebl
Tel. +43 676 83041 218

Type of organization:

Large company

Market sectors:

Aeronautics industries
Automotive industry
Electrical and electronic engineering industries
Construction
Mechanical engineering

Services provided:

Engineering

Type of solution:

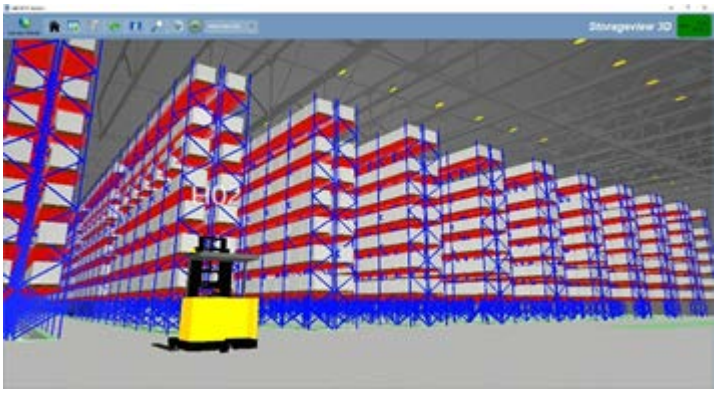
Product

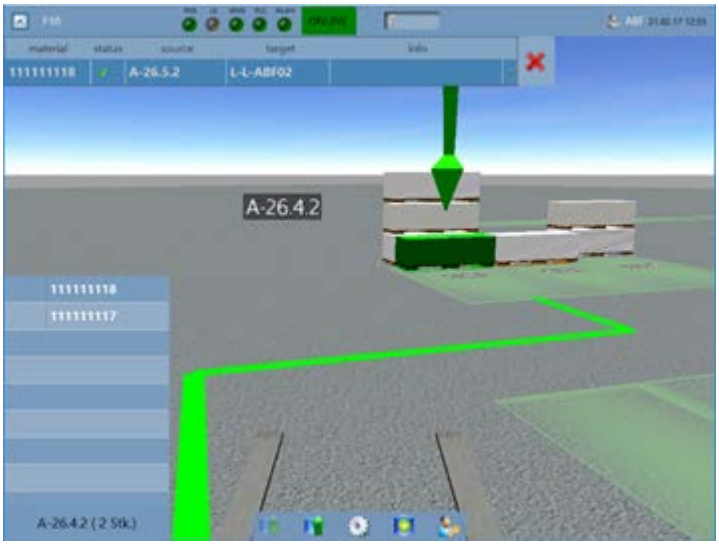
Smart Factory description:

By this industry independent intralogistics solution integrates a high-performance warehouse management system with continual material tracking for the in-plant logistics processes. With a multitude of modules, this flexible, total solution forms the basis for modern logistics. The material movements are posted automatically and the products get continuously tracked through the warehouse. Hereby the operator has an exact and complete overview where each and every piece of material is in the logistics chain at any time.
Optimization algorithms and a dynamic, adaptive set of rules automatically ensure the ongoing calculation of the necessary transport orders for quick processing of all the required in-plant

material transports. This optimized real-time procedure leads to efficient usage of the available warehousing and transport capacities and assures the efficient material flow.

The ABF intralogistics solution is probably the most modern RTLS material tracking solution including a highly optimized warehouse management system.
In comparison to warehousing solutions based on barcodes or RFID technology the RTLS based OneBase – MFT solution can be realized with very high accuracy (X, Y, Z coordinate within the warehouse) and offers by this the highest possible grade of digitalization and automation of the customer's intralogistics processes.





Keywords:

WebRTC solution,
Internet of Things
audio-visual support,
reduced repair time,
reduced on-site presence,
positive influenced problem-solving process

Example of Product/Service usage:

The solution can be useful for any industrial production facilities and logistic centres that are handling big material units (e.g. steel coils or steel heavy plates, wood products) or storing products in pallets, containers, lattice boxes. The high grade of standardization allows to use the solution in different kind of industries. It also applies to different means of transports no matter if manually or automatically operated.

The solution has very good scalability features. Roll-out to the customer's other facilities as well as internationalization is supported.

The solution was implemented e.g in a steel wire rod production or crane warehouse.

MFT in a crane warehouse:
https://www.youtube.com/watch?v=qCnquzsHqwM

MFT in a steel wire rod production:
https://www.youtube.com/watch?v=xkJG1aGwkxc

Improvement areas covered by the Product/Solution:

Improved coordination with suppliers
Increased speed of production operations
Improved information for production decisions
Improved agility and responsiveness in the production process
Developed visualization capabilities
Improved safety
Lower energy costs
Decreased manufacturing costs

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment 1: Company logo
Attachment 2: Product presentation
Attachment 3: Product description
Attachment 4: Product Folder
Attachment 5: Video about SF solution
(https://www.youtube.com/watch?v=qCnquzsHqwM)

Product/service technological focus:

Process control and logistics
Packaging / Handling
Energy efficiency
Transport Infrastructure

Market availability:

Available on the market since 2014.

2.3 Tablet Solution – Work Held Voice Assistant

Smart Factory solution Tablet Solution – Work Held Voice Assistant

Tablet Solutions GmbH
Rotensterngasse 5, 1020 Vienna, Austria
Contact person:
Benjamin Schwärzler, MSc
Tel. +43 1 992 90 28

Type of organization:

SME

Market sectors:

Aeronautics industries
Automotive industry
Construction
Digital economy
Electrical and electronic engineering industries
Mechanical engineering

Services provided:

Engineering
Manufacturing

Type of solution:

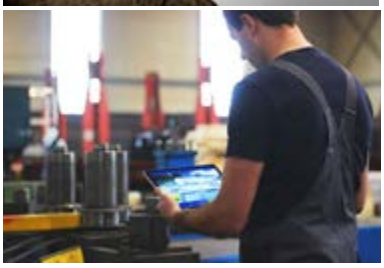
Product

Smart Factory description:

WorkHeld seamlessly connects field technicians with their project coordinators in the head office. Construction plans, checklists and work orders are continuously updated and defects can be reported immediately. WorkHeld enables all involved parties to always be up to date on the project progress.







Keywords:

AI, Artificial Intelligence,
Voice Assistant,
NLP natural language processing
NLU natural language understanding
Speech Recognition.

Example of Product/Service usage:

We developed a new form of interaction for workers and technicians with low IT skills. WorkHeld seamlessly connects field technicians with their project coordinators in the head office. Construction plans, checklists and work orders are continuously updated and defects can be reported immediately. WorkHeld enables all involved parties to always be up to date on the project progress.

Novel Technology: AI based voice assistant similar to Amazon Alexa or Apple Siri build with NLP (natural language processing) and Speech to Text Technologies.
Voice Assistant that runs on smartphones and tablets and can be connected to headsets.
Use Cases:

- For industrial services
- For maintenance
- For installation & initiation
- For production

Improvement areas covered by the Product/Solution:

Improved coordination with suppliers
Increased speed of production operations
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved maintenance/uptime
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation
Attachment 3: Video about SF solution (https://vimeo.com/204891114)
Attachment 4: Video Demonstration (https://vimeo.com/236757707)

Product/service technological focus:

Information Processing & Systems, Workflow
Plant Design and Maintenance

Market availability:

Available on the market since 2015.

2.4 XiTrust – Sequre QR tage

Smart Factory solution XiTrust – Sequre QR tage

XiTrust Secure Technologies GmbH
Grazbachgasse 67, 8010 Graz, Austria
Contact person:
Gerald Wagner

Type of organization:

R&D

Market sectors:

Digital economy
Electrical and electronic engineering industries

Services provided:

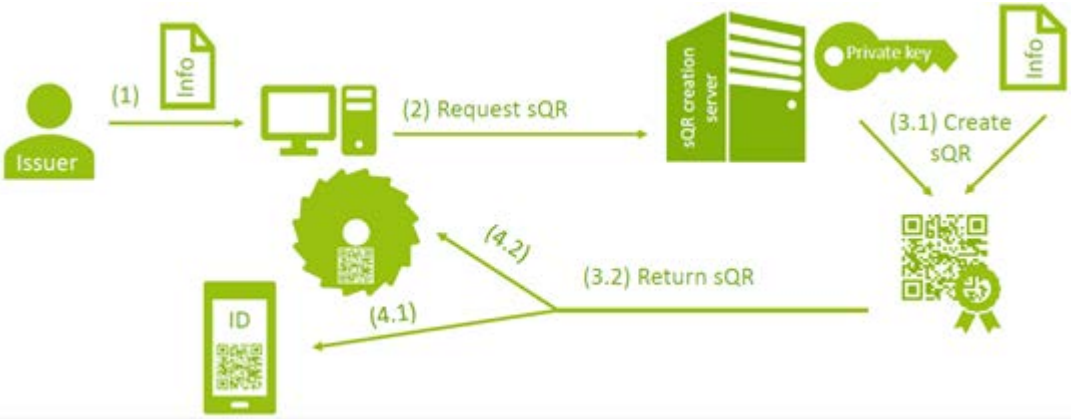
Engineering
Research and development

Type of solution:

Product

Smart Factory description:

The sQR features another level of security and offers new possibilities regarding the use of QR codes with respect to authentication. Basically, the sQR contains information such as the ID, name of a person or machine, respectively. This information is electronically signed to ensure data integrity. An APP which is able to check the validity of this signature has been developed. Additionally, it is also possible to encrypt the information of the QR Code and to decrypt it with the corresponding public key within the APP. After the information is decrypted and the signature is validated, the APP provides a possibility to verify the real identity of a person or a machine. In case of a person, there is the additional possibility to compare a photo and in case of a machine, additional information regarding the location of the machine can be provided.



Simplified demonstration:

- Issuer enters information into the client application and sends a new sQR Code generation request (2)
- (3.1) Creation server computes signature with private key for the given data and creates and returns the sQR code (3.2)
- sQR code is embedded into software (4.1) or applied to physical objects (4.2)

Keywords:

Signed and encrypted QR code
Remote qualified signature

Example of Product/Service usage:

The Austrian research project Assist 4.0 gives a Insight into the smart factory of the future. Complex maintenance work are coordinated irrespective of location and equipped with mobile devices. The maintenance of an industrial on the other end of the world is possible immediately, without the need for only a highly trained service technician on board the aircraft
to have to bet on. The transmission of the required Data is reliably secured. In the research project Assist 4.0 we will work out how the Smart Factory of the future is already working.
The project, in which AVL List, Infineon Technologies and leading KNAPP are involved, is testing all those technologies that production staff on site with support from of digital assistance systems such as mobile terminals and data glasses will in future be able to cope with malfunctions, maintenance and remote maintenance. For the safety of the data transmission, XiTrust Secure Technologies is integrated.

Improvement areas covered by the Product/Solution:

Improved coordination with suppliers
Increased speed of production operations
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved maintenance/uptime
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation

Product/service technological focus:

Information Processing & Systems, Workflow
IT and Telematics Applications
Telecommunications, Networking

Market availability:

Available on the market since 2002.

2.5 Plasmo - Quality Assurance Solutions for automated production processes and additive manufacturing applications

Smart Factory solution Plasmo – Quality Assurance Solutions for automated production processes and additive manufacturing applications

PLASMO
Dresdner Straße 81 – 85, 1200 Vienna, Austria
Contact person:
Sabine Seidl

Market sectors:

Aeronautics industries
Automotive industry
Electrical and electronic engineering industries
Mechanical engineering

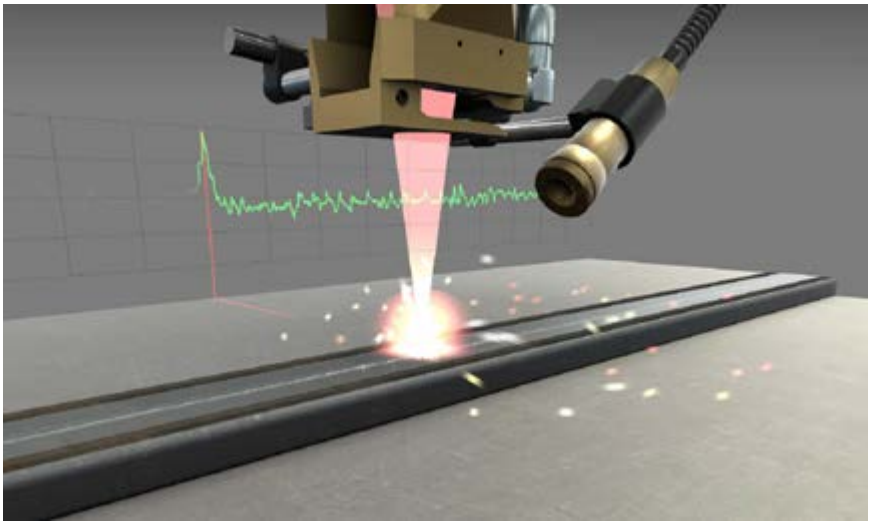
Services provided:
Engineering

Type of solution:

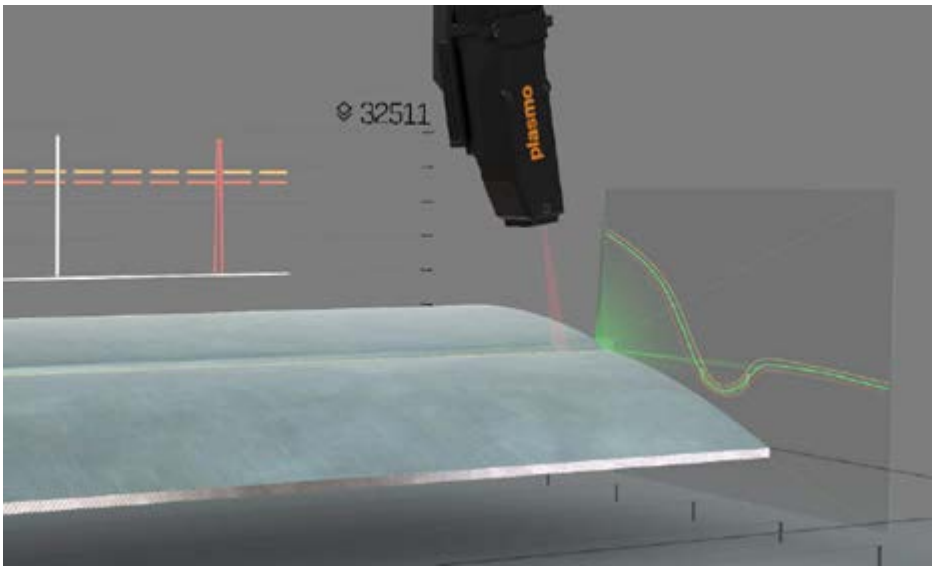
Product

Smart Factory description:
plasmo offers quality assurance solutions that enable our customers to implement a secure, efficient and cost-optimized production mainly in automated metal working industry. plasmo has a large clientele of top global companies established in different industries (automotive, steel, mobility, aerospace industry, suppliers etc.).

The plasmo portfolio ranges from monitoring of welding and laser brazing processes, control of weld seams, geometric shapes and surfaces up to tailored solutions in the field of machine vision and analysis software. Plasmo has an own business field for AM monitoring activities.
In addition plasmo plasmo builds on know-how including the following disciplines: hardware development, software development, optical sensors, laser technique, machine and computer vision, mechatronics, physics and mathematical algorithms as well as deep learning. All solutions and customisation procedures are implemented at plasmo. For all solutions plasmo provides a global service and training network.



Monitoring of automated welding



Seam inspection

Keywords:

Quality Assurance
Process Control
Process Monitoring
AM

Example of Product/Service usage:

THE VOLKSWAGEN PLANT in Emden has successfully installed the plasmo profileobserver compact image processing system for the series monitoring of the rear and roof seams and the water channel in the production line of the Passat B8 model.

Worldwide, the Kendrion Group develops and manufactures high-quality precision electromagnetic and mechatronic components for automotive and industrial applications and integrated into the laser welding process for several components of the processobserver. The processobserver non-destructively monitors the process in order in real time to show possible deviations from the normal range.

Improvement areas covered by the Product/Solution:

Improved coordination with suppliers
Increased speed of production operations
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved maintenance/uptime
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation
Attachment 3: Use Cases VW and Kendion
Attachment 4: Video about SF solution
(https://www.youtube.com/watch?v=1TAoDoKoPvI)

Product/service technological focus:

Food quality and safety
Technologies for the food industry

Market availability:

Available on the market since 2014.

2.6 PROFACTOR – X Rob - easy robot configuration

Smart Factory solution PROFACTOR – X Rob – easy robot configuration

PROFACTOR GmbH
Im Stadtgut A2, 4407 Steyr-Gleink, Austria
Contact person:
Dr. Wolfgang Heidl
Tel: +43 7252 885 252

Type of organization:

R&D

Market sectors:

Aeronautics industries
Automotive industry
Electrical and electronic engineering industries
Mechanical engineering
Medical devices

Services provided:

Engineering
Research and development

Type of solution:

Product

Smart Factory description:

XRob enables users with minimal training experiences to create robotic processes in a new and effective way. XRob assists the user by simple, recipe-based programming with a single user interface. Robotic applications therefore are economically viable even with small batch sizes and a wide variety of variants.

The integrated features offer simple operation and fast creation of a robot process, even for non-experts. The user interface of XRob is customized for each user and allows a simple and intuitive use for both, classic and collaborative robot systems.
Robot sensors and tools are configured together. All this saves time during product changeover, creation of variants and trainings. Besides industrial applications, XRob is also used in the engineering environment, where high flexibility is particularly important.

The benefits are:
»» Easy & fast configuration – no programming skills required
»» Fast retooling for a high number of variants
»» Intuitive process creation within a few minutes
»» Easy integration into existing workflows and processes
»» Versatile and expandable
»» Supports popular robot systems of various brands

Keywords:
Flexible robotics

Human machine interaction
One interface
Easy-to-use features
Automatic path planning
Fast configuration of complex processes

Example of Product/Service usage:
The systems developed by PROFACTOR enable a co-operation between the human operator and the robot e.g. during a screwing process.
The flexibility of the system also makes it possible to be used for smaller batch sizes, which only need robotic support during e.g. the screwing process, as a low-cost automation solution. In the XRob system, it is possible to teach new screwing tasks in less than a minute.

Key references are:

- 3D inspection of castings
- Crankshaft handling
- Acoustic inspection
- Inline 3D inspection stations for motors
- Screwing assistants for engines and transmission parts

Main application fields are:

- Machine Tending
- Bin Picking
- Assembly
- Screwing
- Sorting
- Coating
- Inspection

With its partners, PROFACTOR develops customized pilot plants and prototypical plants for the evaluation of the latest robotic technologies.

PROFACTOR Solution Competence

- Feasibility studies and concept design
- Customized software development and licensing
- OEM software/hardware packages for system integrators
- General contractor for pilot and special applications

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Decreased manufacturing costs
Improved agility and responsiveness in the production process
Improved product quality
Improved maintenance/uptime
Improved safety

Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment 1: Company logo
Attachment 2: Product logo
Attachment 3: Product presentation
Attachment 4: Product presentation
Attachment 5: Video about SF solution
(https://www.youtube.com/watch?v=RnLznMFj5Y8&t=1s)

Product/service technological focus:

Industrial Manufacture
Plant Design and Maintenance
Packaging / Handling
Other Industrial Technologies

Market availability:

Available on the market since 2013.

2.7 Business Upper Austria - Industry 4.0 Maturity Model

Smart Factory solution Business Upper Austria – Industry 4.0 Maturity Model

FH OÖ
Franz-Fritsch-Straße 11 4600 Wels
Austria, Austria
Contact person:
Manuel Brunner, MSc.
Tel: +43 664 80484 33293

Type of organization:

R&D

Market sectors:

Digital economy
Electrical and electronic engineering industries
Mechanical engineering

Services provided:

Research and development

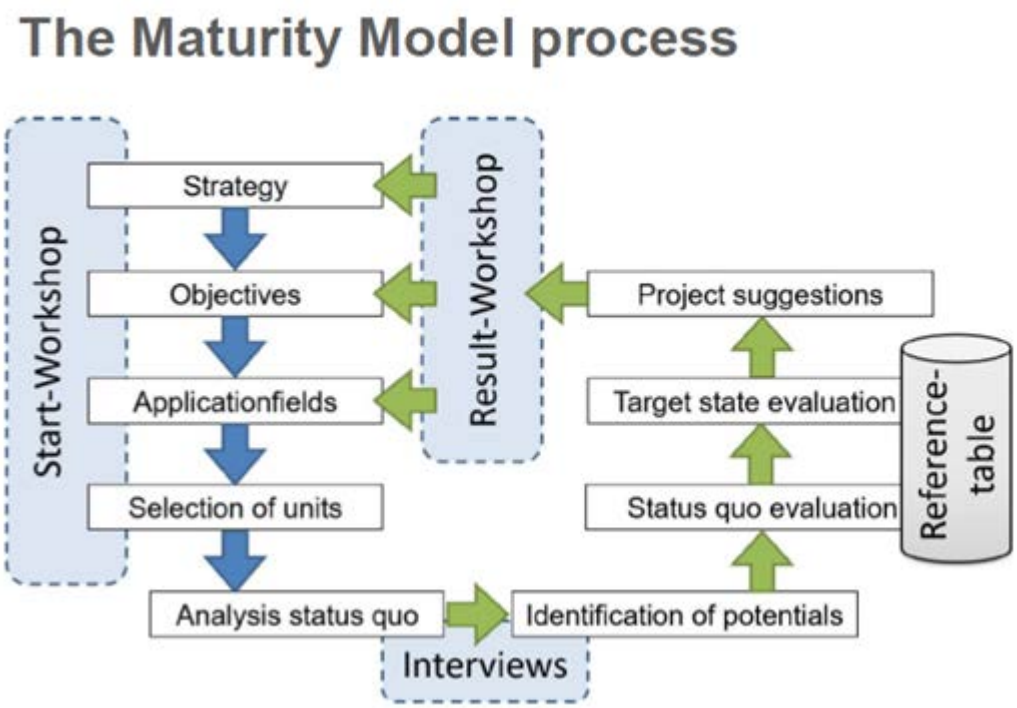
Type of solution:

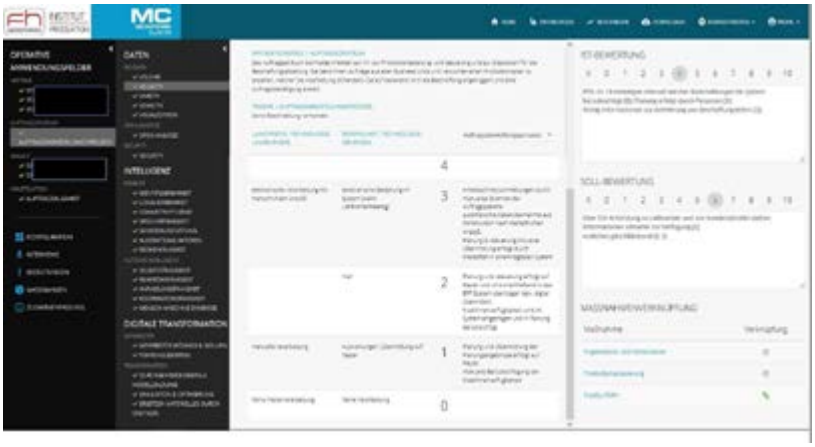
Service

Smart Factory description:

The Maturity Model is a structured methodology to evaluate the Industry 4.0 status quo of a company, create a tailor-made vision and derive an individual road map to get from status quo to the vision.

This model is a new approach to structure the technological change process through Industry 4.0 in a company and realized as a software cloud application on license. Production processes, organizational processes, machines, software applications can be investigated with the model and the outcome will lead to cost efficiency and process optimization. Enclosed to the software tool is a benchmark database where all investigations are saved anonymous.
The maturity model is the first known approach to describe the Industry 4.0 status of an entity with 24 criteria including a derivation of a road map for implementation.





Software interface

Keywords:

Industry 4.0,
Internet of Things
Strategy
Target state evalution
Project suggestions

Example of Product/Service usage:

Since the launch of the Model (01/2017) it was used in 16 companies.
The beneficiaries get a detailed road map for implementation of Industry 4.0. Thus save money, be more flexible and getting ideas of new business models.

References are:

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Improved information for production decisions
Improved agility and responsiveness in the production process
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation

Product/service technological focus:

Information Processing & Systems, Workflow
IT and Telematics Applications
Industrial Manufacture

Market availability:

Available on the market since 2017

2.8 LCM - Digital Platform – SyMSpace

Smart Factory solution LCM – Digital Platform - SyMSpace

Linz Center of Mechatronics
Altenbergerstraße 69, 4040 Linz, Austria
Contact person:
Johann Hoffelner

Type of organization:

R&D

Market sectors:

Aeronautics industries
Automotive industry
Biotechnology
Chemicals
Construction
Digital economy
Electrical and electronic engineering industries
Food industry
Healthcare industries
Mechanical engineering
Medical devices
Pressure equipment and gas appliances
Raw materials, metals, minerals and forest-based industries
Space
Textiles, Fashion and creative industries

Services provided:

Engineering
Research and development
Services

Smart Factory solution

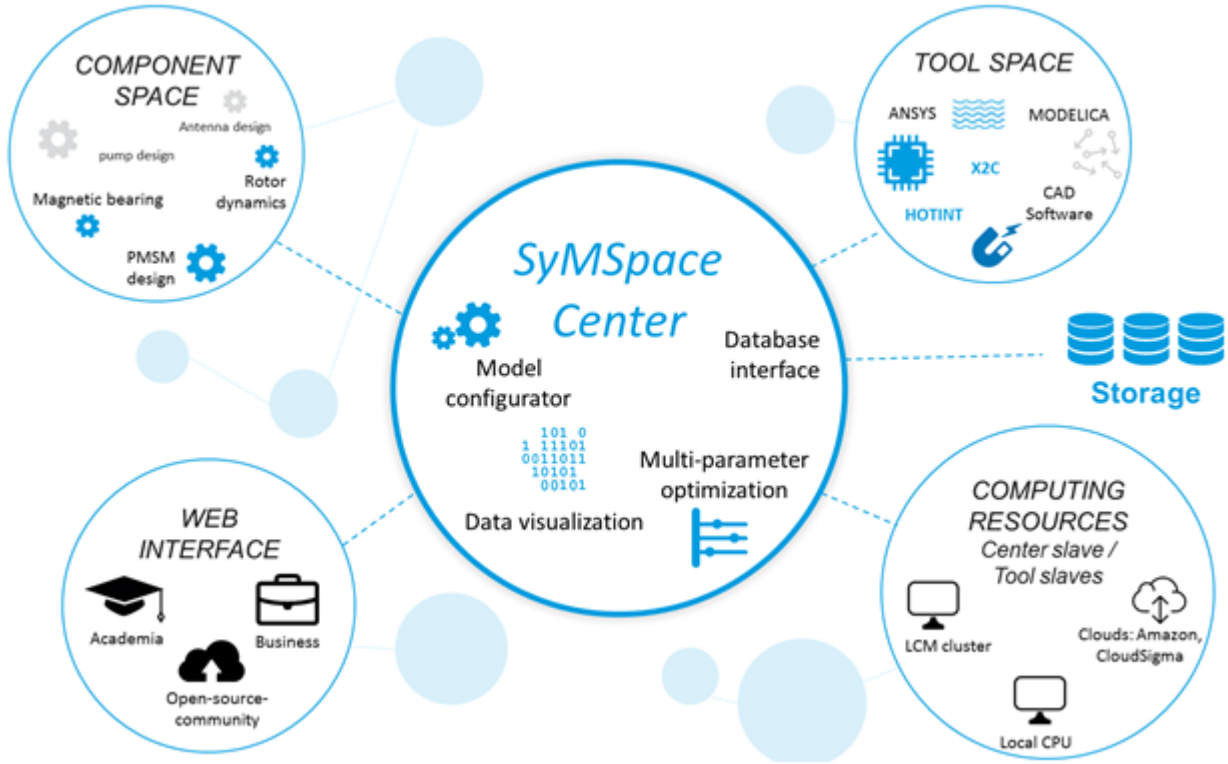
Digital Platform – SyMSpace

Product/Solution webpage:
https://www.lcm.at/project/symspace-der-system-model-space-von-lcm /

Type of solution:
Product

Smart Factory description:
SyMSpace is an easy-to-use software platform for the digital development and optimization of mechatronic components and systems. For different technical challenges, SyMSpace allows setting up an automated workflow consisting of construction – simulation – optimization. SyMSpace is cloud-based and thus available to the user at a pay-per-use basis at any time without own expensive infrastructure. With only a few clicks, computing resources can be easily allocated and individually customized.
All consumed services are centralized in one single account, clearly arranged and simple.
Applications

- Development of mechatronic components and systems
- Optimization of mechatronic components and systems
- What‘s the benefit?
- Reduction of expensive development time
- Reduction of costs in the prototype phase
- Reduced „time-to-market“
- Recalculation of performance data
- Optimized design for production
- Demand-oriented product development
- Attractive pricing models „Pay per Use“
- Modular design – extend functionality step by step
- Easy integration of existing software tools
- Direct result transfer (digital twin) into a finished product
- Cloud or local - no expensive hardware required.



Keywords:

digital development, optimization of mechatronic components and systems
automated workflow

Example of Product/Service usage:

Intensive computation? Our Cloud Space has got that covered.
SyMSpace is available for both worlds: local installation or, for computing-intensive optimization, or simply for getting a fresh, performant environment each time, LCM offers the Cloud Space. Once registered, create your cloud cluster with three clicks. Log on to your fresh installation of SyMSpace and start working on a cost-efficient pay-per-use basis. No local installation, no hardware invest, no software maintenance. You will receive one centralized bill from LCM, holding all your expenses – from licenses to cloud fees.

Improvement areas covered by the Product/Solution:

Improved coordination with suppliers
Increased speed of production operations
Decreased manufacturing costs
Lower energy costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved product quality
Improved compliance with customer specs or regulatory requirements
Improved maintenance/uptime
Improved remote monitoring capabilities

Improved safety

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation
Attachment 3: Product brochure
Attachment 4: Video about SF solution, video about digital twin
(https://www.youtube.com/watch?v=XfLYqrVnzz8&t=31s)
(https://www.youtube.com/watch?v=hPljFh-mfWc)

Product/service technological focus:

Agriculture
Technologies for the food industry
Medicine, Human Health
Electronic circuits, components and equipment
Electronics, Microelectronics
Information Processing & Systems, Workflow
IT and Telematics Applications
Telecommunications, Networking
Energy efficiency
Energy production, transmission and conversion
Energy storage and transport
Renewable Sources of Energy
Aerospace Technology
Construction Technology
Design and Modelling / Prototypes
Industrial Manufacture
Packaging / Handling
Plant Design and Maintenance
Process control and logistics
Traffic, mobility
Transport and Shipping Technologies
Amplifier, A/D Transducer
Electronic measurement systems
Measurement Tools
Recording Devices
Other Industrial Technologies

Market availability:

Available on the market since 2015

2.9 RHP - 4M System - Direct Metal Deposition

Smart Factory solution RHP – 4M System – Direct Metal Deposition

RHP-Technology GmbH
2444 Seibersdorf,
Austria
Contact person:
DI Michael Kitzmantel
Tel: +43 2255 20600

Type of organization:

R&D

Market sectors:

Automotive industry
Construction
Electrical and electronic engineering industries
Space Industry
Mechanical engineering

Services provided:

Engineering
Research and development

Type of solution:

Product

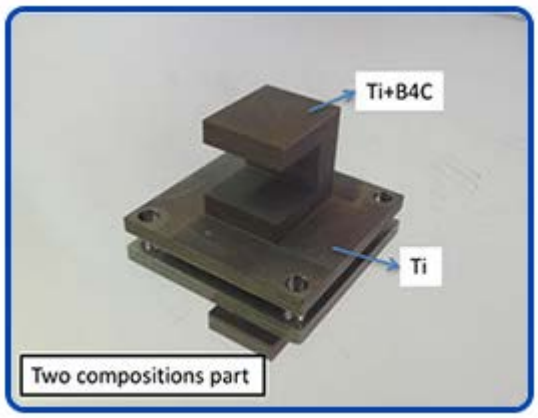
Smart Factory description:

In space industry large structures like struts, housings, kinematic mounts, suspension arms for rovers, thruster elements made from different materials are usually manufactured by conventional machining leading to 90% scrap to get the final part
"4M-SYSTEM" (Machine for Multi-Material Manufacturing) aims to develop an industrial "plug&play" capable machine with which 3D components in the order of one to several meters can be manufactured from aerospace relevant materials such as titanium, aluminium and their alloys.

Plasma arc as energy source

Our system is based on a plasma-arc process, with which we manufacture individual 3D components using CAD-controlled 5-axis handling.

Special features are the generation of multi-material materials and gradient structures as well as fast build-up rates.



Keywords:

3d printing
Metal
Plug&play capable machine
Material
4M
mould
manufacturers
metallic powder
plasma torch, European Space Agency
hydropower

Example of Product/Service usage:
Indeed, space has been a key driver of this technology. Components used in space generally need to be lightweight and not very large, which means that the additive manufacturing concept is very interesting in terms of cost savings and lead time reduction. Starting with a big block of metal for example means that the amount of material that sometimes needs to be subtracted by machining to produce the part you need can be up to 90 %.

The additive manufacturing concept pioneered by the 4M project by contrast only uses the amount of metallic powder needed to build up the object required and only a residual amount of material needs to be finally taken off through subsequent machining.

The 4M System can create parts for space missions, manufacturing tools and industrial moulds.

The results are currently being analysed at the feasibility level by the European Space Agency, and the process could have potential in the manufacture of turbine parts for hydropower generation.

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Decreased manufacturing costs
Lower energy costs

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation
Attachment 3: Product brochure

Product/service technological focus:

Aerospace Technology
Construction Technology
Industrial Manufacture

Market availability:
Available on the market since 2017

2.10 SCCH - Predictive Analytics Message Board

Smart Factory solution SCCH – Predictive Analytics Message Board

Software Competence Center Hagenberg GmbH
Softwarepark 21, 4232 Hagenberg im Mühlkreis, Austria
Contact person:
Bernhard Freudenthaler

Type of organization:
R&D

Market sectors:
Industrial Manufacture
Electrical and electronic engineering industries
Construction Technology
Aerospace Technology

Services provided:
Research and development
Consulting
Engineering

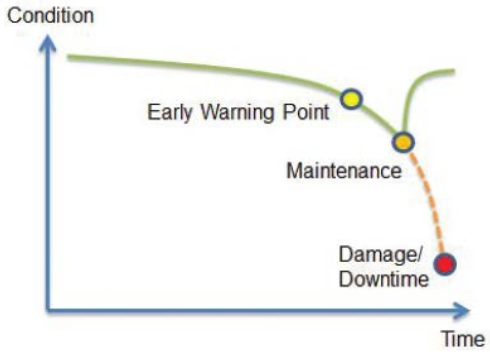
Product/Solution webpage:
https://www.scch.at/en/das-topics-details/FDI-en

Type of solution:
Service

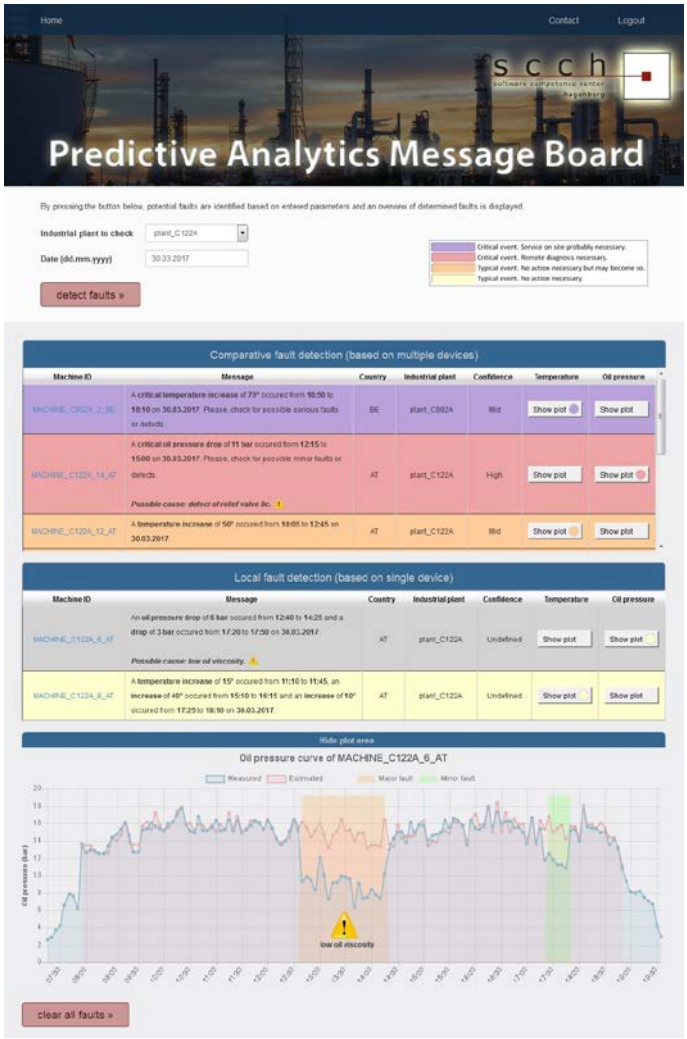
Smart Factory description:
With the Predictive Analytics Message Board, SCCH presents its methods for implementing predictive analytics and predictive maintenance. The use of data mining and machine learning methods enables efficient fault prediction models and allows predictive maintenance strategies. The key here is the combination of expert knowledge and data-based fault prediction models. The application spectrum of these methods ranges from the process industry & production, through energy management, to the manufacture and maintenance of machines and plants. This increases plant availability with reduced use of resources.

The use of predictive maintenance strategies is promising in many areas:

- Increased plant availability because fault prediction promotes early detection of damages and reduced down time.
- Reduced material and energy costs because maintenance is not bound to predefined schedules but instead conducted as needed.
- Improved planability of maintenance via state monitoring.
- Heightened operational security by avoidance of dangerous damages.



Searching for the early warning point



Visualization of the Predictive Analytics Message Board

Keywords:

Predictive Maintenance
Fault Detection
Fault Diagnosis
Fault Prediction
Benefits: Increased plant availability, early detection of damages, reduced downtimes, reduced material costs, improved planability of maintenance

Example of Product/Service usage:

The Predictive Analytics Message Board was researched/developed and used in different projects, e.g. the following:

COMET-Project *inFADIA*

- Industrial fault detection, diagnosis and prediction
- http://www.scch.at/en/das-projects-details/comet-project-inFADIA

Project *PROSAM*

- Intelligent Fault Prognosis Systems for Anticipative Maintenance Strategies
- FFG, ICT of the future - 2nd call
- http://www.scch.at/en/das-projects-details/prosam-en

Project *AutoDetect*

- Automated fault detection, diagnosis and prediction using robust learning algorithms
- Innovatives Oberösterreich 2020, call “Digitalization“
- http://www.scch.at/en/das-projects-details/autodetect-en

Project *Smart Maintenance*

- Resource intelligent maintenance strategy for the production of the future
- FFG, Production of the future – 4th call
- http://www.scch.at/en/das-projects-details/smart-maintenance-en

Manufacturing plants are subject to wear and tear. In the worst case, without countermeasures this can lead to component failure and unplanned shutdowns of the plant, but can also lead to a reduction in product quality, restricted operating conditions or increased energy consumption.

Wear and tear therefore requires an appropriate maintenance strategy with a package of reactive or preventive measures to minimise economic and ecological consequences. Preventive measures include e.g. condition monitoring systems.

Approaches for the derivation of a cost-optimized asset management strategy took into account

- information from selective condition monitoring data,

- a combinatorial data analysis, i.e. of current machine data (e.g. current consumption, power consumption) and stored plant history data (fault database), process and product data (e.g. quality features, number of faulty parts, fault characteristics), and
- fault analysis and prediction.

Industrial surveys show that traditional methods (current consumption measurement, lubricant analysis, temperature measurement) are particularly well established, e.g. acoustic measurement methods are even less frequent.

Through the combinatorial application of these methods, Smart Maintenance's approach goes far beyond the traditional established methods and is also part of a superordinate asset management strategy.

The other project partners were the Montan University Leoben - Chair of Economics and Management Sciences (coordinator), Messfeld and the industrial partners BMW Motors and BRP-Rotax.

Improvement areas covered by the Product/Solution:

Improved maintenance/uptime
Decreased manufacturing costs
Improved information for production decisions
Increased speed of production operations

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation
Attachment 3: Brochure – Software for Industry 4.0

Product/service technological focus:

Information Processing & Systems, Workflow

Market availability:

Available on the market since 2017.

2.11 Pro²Future: Modular Production

Smart Factory solution Pro²Future: Modular Production

Pro2Future GmbH
Altenberger Straße 69, 4040 Linz, Austria
Contact person:
Dr. Georg Weichhart
Tel: +43 664 60 885-355

Type of organization:

R&D

Market sectors:

Aeronautics industries
Automotive industry
Digital economy
Electrical and electronic engineering industries
Mechanical engineering

Services provided:

Engineering
Research and development

Type of solution:

Product

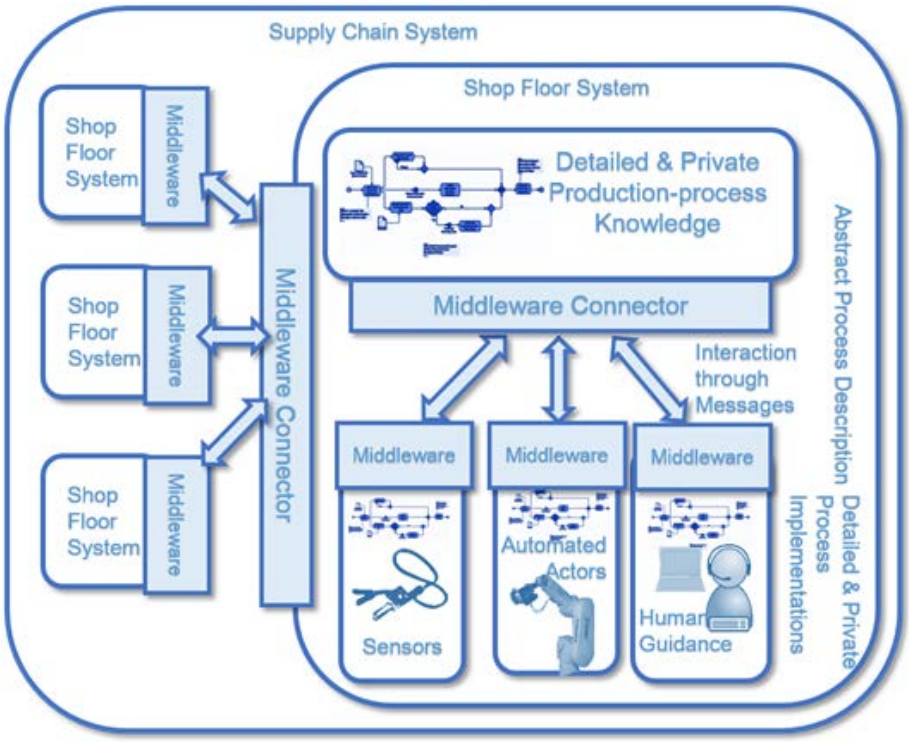
Smart Factory description:

Manufacturing enterprises of the future are networked and built around sensor-networks und algorithms of artificial intelligence. Sustainable decisions are made by teams of human and artificial actors in order to adapt to changing environmental conditions. The enterprise is a complex adaptive system where actors share work and tasks and communicate. In this context, cognitive robotic systems collaborating with humans are of importance.

The solution is a middleware based approach to support communication of modular and autonomous, intelligent mechatronic systems.

To do so a message based approach for a scalable system of networked shopfloor systems and software systems is taken. Modularity and loose coupling is required to support adaptation of these systems.

Overall, model based approaches to support artificial intelligence and communication as cognitive function are researched.



PRO2Future Middleware

The presented demonstrator shows an approach for detailed production planning by means of distributed artificial intelligence. Software agents arrange the cheapest possible time slots for the orders on the required production machines and optimise the punctuality of the orders.

Keywords:

Internet of Things
Interoperabily

Shop scheduling
combinatorial optimisation problems
Automated Production Process planning integrated with Process Modelling
Semi-automized process planing

Example of Product/Service usage:
The competitiveness of manufacturing companies is increasingly determined by the availability of plants and systems. For this reason, the importance of an efficient and high-quality maintenance grows rapidly. For both, breakdowns (unplanned) as well as for preventive maintenance activities (planned), downtimes must be kept short by rapid and perfect response. In other words, the right measures must be implemented at the right time using the right resources and without causing additional rework. Due to an increasing system complexity, it becomes more and more difficult to detect signs for the need of preventive maintenance as well as to derive the best possible time-slot and the ideal scope of maintenance. Subsequently, maintenance must be scheduled considering the availability of all required skills, the adherence to constraints and objectives (e. g. costs) and further executed within the given time-budget meeting all planned deadlines. Upon detection of deviations to the plan (e. g. additional tasks, longer durations, problems during recovery), affected maintenance tasks have to be altered and re-scheduled

Improvement areas covered by the Product/Solution:
Increased speed of production operations
Improved agility and responsiveness in the production process
Improved product quality

Product/Solution is related to the following type of implementation:
Implementation of the novel technology

Other relevant information about the product/service:
Attachment1: Company logo
Attachment 2: Product presentation
Attachment 3: Video about SF solution
(https://www.youtube.com/watch?v=hYF8rieUYi0)

Product/service technological focus:
Aerospace Technology
Automotive industry
Construction Technology
Digital economy
Industrial Manufacture
Mechanical engineering

Market availability:
Available on the market since 2017.

3 Smart Factory solutions from Bulgaria

3.1 INVENT

INVENT

RFID Bulgaria Ltd.
Sofia 1113, 25, Charles Darwin str., office 2, Bulgaria
Contact person:
Bisser Stoyanov
Tel. +359 2 444 27 47

Type of organization:

SME

Market sectors:

Electrical and electronic engineering industries

Services provided:

- Engineering
- Manufacturing

INVENT

Type of solution:

Product

Smart Factory description:

INVENT is a solution for contactless inventory taking, based on the modern RFID (Radio Frequency Identification) technology. RFID is based on “reading” information from a microchip which is embedded in a compact label or tag. Such a label is affixed to every single asset or item. A specialized mobile terminal is used for scanning. It reads the tags very fast, from a big distance and even without direct line of sight.

INVENT is a stand-alone solution designed specifically the inventory taking process. It is compatible with every accounting software or ERP, based on file exchange or low-level integration.

Figure: INVENT

Keywords:

RFID technology
auto-identification
web services,
mobile apps

Example of Product/Service usage:

The implementation process has only 3 steps:

1. Import the asset data from your program.

INVENT allows flexible data management of assets that you handle with existing software. For this purpose, import - export of files. Virtually any accounting or warehouse program works seamlessly with INVENT.

All fields that describe the asset - type, location, date of issue / acquisition, number, etc. are accepted. The program allows easy searching, sorting, editing and filtering on criteria you specify.

2. Marking assets with non-contact labels.

Once you submit data about available assets in Excel, we process and prepare the labels.

Each label prints the necessary data (inventory number, name, serial number, etc.) and the chip is coded for INVENT. You get ready-to-stick labels - sorted by location or other criterion you specify.

The information printed on the label is not necessary for the operation of the system - it only makes it easier for you to identify assets and stick to the proper labeling of the right asset.

Together with the labels, you also receive a database of fully processed data - ready to work with INVENT.

Such a tagging procedure (which is undoubtedly the only embarrassment in the implementation of INVENT) is made easier.

3. Inventory.

The inventory is done using a mobile reader. It is only necessary to select the location in which it is located and a list of units of inquiry is loaded on the mobile terminal screen.

Asset scans are divided into the following categories:

• Found - which are kept in the current location and found during scanning;

• Missing - not found when scanning with the terminal;

• Others - who are in a different location but are found in the current (moved). The screen shows the location where they are taken.

INVENT allow data from the inventory to be processed and transferred back to the accounting program, where all changes (asset shifts in new locations, missing, duplicate, etc.) are automatically reflected. Thus, slow procedures for describing asset movement "by hand" in the accounting program are avoided.

Easy to implement, available as an on-premise installation as well as cloud service. Not too complex – just focusing on the specific area which need improvement of the identification. Cost effective. The implementation is 2 hours for one person. Can be used as a service, when installed on our cloud server. Another option is installation at the customers' infrastructure. Than MS SQL server and IIS is required. For the mobile application – it is installed on Android or iOS phone and can work either connected to the server or in offline mode.

Figure: INVENT system

Improvement areas covered by the Product/Solution:

Lower energy costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved maintenance/uptime
Improved information for business analytics
Improved remote monitoring capabilities
Improved safety

Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment1: Company and product logo
Attachment 2: Product presentation
Attachment 3: Video about SF solution (https://youtu.be/NDdHj2MKPrk)

Product/service technological focus:

Electronic measurement systems
Measurement Tools

Market availability:

Available on the market

3.2 Virtual Engineering Center (VEC)

Smart Factory solution Virtual Engineering Center (VEC)

Technical University – Sofia
Sofia 1113, 25, Charles Darwin str., office 2, Bulgaria
Contact person:
Prof. D-r Eng. Georgi Todorov
Tel. +359 2 444 27 47

Type of organization:

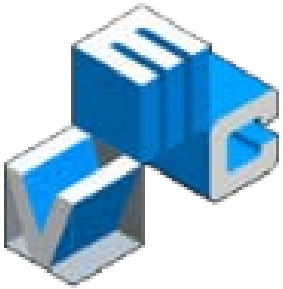
University

Market sectors:

Automotive industry
Biotechnology
Construction
Electrical and electronic engineering industries
Mechanical engineering

Services provided:

Education/Training
Engineering
Research and development
Services



Virtual Engineering Center (VEC)

Type of solution:

Service

Smart Factory description:

Virtual Engineering Center (VEC) is a Centre of Excellence for Technology Development and Transfer

Provides Industry 4.0 oriented services to ICT and mechatronics industry: Product Design & 3D Modeling in mechatronics and robotics; Virtual and Augmented Reality (VR & AR); Simulation: Virtual Prototyping (VP) And Engineering Analyses and optimization; Product Lifecycle Management (PLM) / PDM software development; Additive manufacturing, Rapid prototyping and tooling.

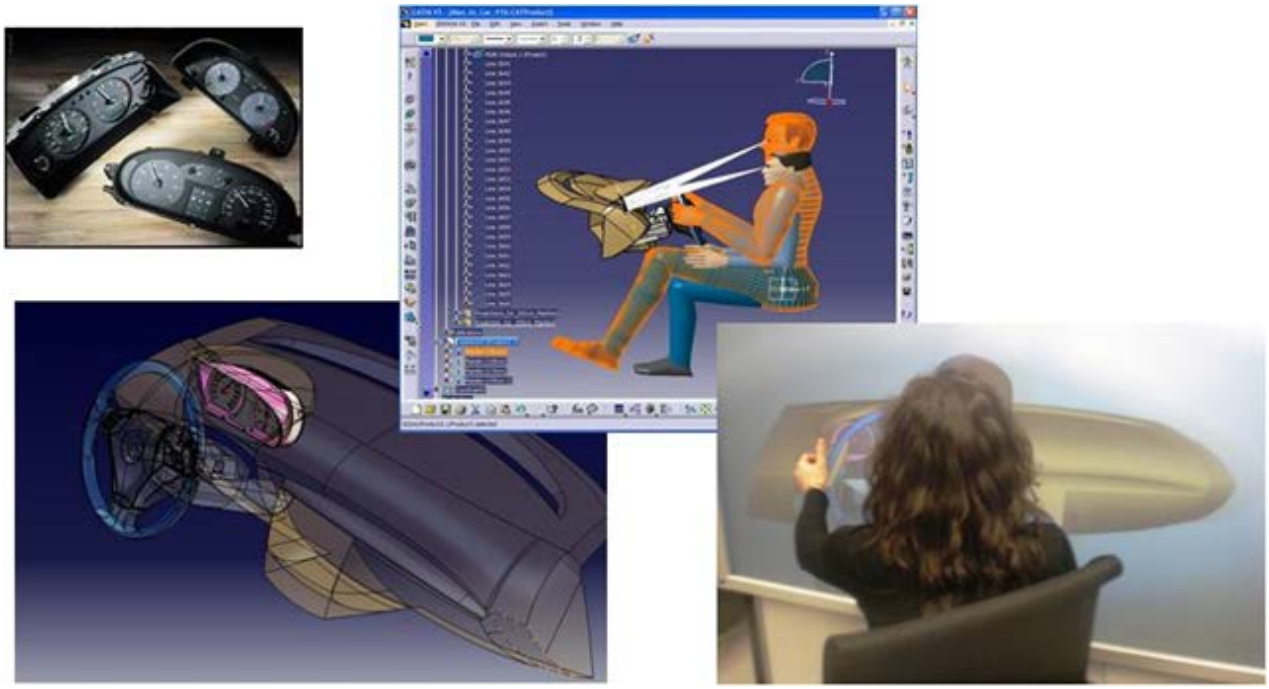


Figure: VEC

Keywords:

3D Modelling and Design;
Engineering Analyses;
Rapid Prototyping;
Virtual and Augmented Reality

Example of Product/Service usage:

Virtual Engineering Centre @ Technical University – Sofia, integrates several research labs in Technical University Sofia (Computer Visualization, Virtual Reality Lab, CAD/CAM/CAE Lab, Lab for System Design and Assembly Automation, Mechatronics Lab, Lab for Complex Automation of the Discrete Manufacturing).

It provides services through R&D projects with industrial partners and government institutions as well.

VEC explores and develops novel technologies that are introduced in production processes to achieve cost efficiency.

Provided service in Product Design & 3D Modelling is directed to develop innovative products for industrial partners in the fields of mechatronics and robotics. The development includes conceptual design, detailed design, simulations (engineering analyses), technical documentation

and prototyping. VEC provides various services in the field of Rapid Prototyping (RP) and Tooling (RT), using modern prototyping systems.
Another field of services is related to Virtual and Augmented Reality technology application for industrial purposes. Education and training in above described fields is another provided service in VEC.
All VEC services are oriented towards new product development processes. Research and development activities are directed to innovative technologies as RP&RT and their various applications (as in medical implants for instance).

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Decreased manufacturing costs
Lower energy costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved product quality
Improved coordination with customers
Improved compliance with customer specs or regulatory requirements
Improved information for business analytics
Improved safety
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: University and product logo
Attachment 2: Product presentation
Attachment 3: Video about SF solution (https://youtu.be/7cVDQ8vf_P0)

Product/service technological focus:

Construction Technology
Design and Modelling / Prototypes

Market availability:

Available on the market

3.3 Green Monitor

Smart Factory solution Green Monitor

Interconsult Bulgaria
1309 Sofia 7, Indzhe Voivoda Str. , Bulgaria
Contact person:
Nikolay Penov/ Stoyan Boev
Tel: +359 2 920 11 20

Type of organization:

SME

Market sectors:

OTHER (Business Software

Services provided:

Consulting
Services

Green Monitor
Online Maintenance and Manufacturing Support

Type of solution:

Product

Smart Factory description:

Green Monitor - Software for Real-Time Monitoring and Predictive Maintenance of Machines
In a factory, Green Monitor collects raw data from a machine's control systems (or retrofitted sensors), transforms it into actionable information through mathematical calculations, and visualizes it in user-defined dashboards and instruments. Green Monitor helps everyone in the manufacturing hierarchy—from Machine Operator to Factory Manager—to monitor the information they need to contribute to an efficient production process.

Keywords:

Software
Improve production planning,
Improve efficiency
Effectiveness of operations

Example of Product/Service usage:

The product was created as a result of Innovation Norway project: №BG10-0008 and with collaboration with Trondheim Technical University. Green Monitor is gathering information from machines and internal system and visualizing the data with different dashboards.
Most of the providers of IoT software focus on one type of CNC machines. Our solution tries to obtain data from different machines by using adapters from the controllers. Green Monitor uses neuron networks to improve accuracy of the linear movements of the CNC machines. The product is mainly focused on improvement of the service of the CNC machines.
Green Monitors tries to reach zero downtimes of the machines. By servicing the machines regularly, scrap is greatly reduced.
Thanks to predictive maintenance risk of contractual obligations is reduced.
The service can be implemented on site and on the cloud. Part of the product is always implemented on site. Typical implementation concerns installation of the product, developing drivers for CNC controllers, integrating the product with existing ERP and Mesh systems and developing KPIs, which are important for the client.
Every SME follows different KPIs aside from the KPIs assigned for the machines. SMEs have the opportunity to have visualised data on custom dashboards depending the company's strategy.
The product can be extended to provide information for predictive and preventive maintenance.
Can be connected to legacy software systems and it will be hosted in the cloud.
From condition monitoring to online monitoring.
From condition-based maintenance to predictive maintenance.
Resulting in improved efficiency and sustainable production in High cost countries as Norway.

Figure: The picture above shows a special widget that allows companies to see key KPI's for a given machine.

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Decreased manufacturing costs
Lower energy costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved information for business analytics
Improved safety
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment1: Company and product logo
Attachment 2: Product presentation

Product/service technological focus:

Electronic measurement systems
Energy efficiency
Waste Management
Water Management
Safety

Market availability:

Available on the market

3.4 PRIM.BG

Smart Factory solution PRIM.BG

ANTIPODES LTD.
Sofia 1421 Bulgaria46 Chervena Stena str., Bulgaria
Contact person:
Dimitar Giulev
Tel: +359 2 964 11 05

Type of organization:
SME

Market sectors:
OTHER (Business Software)

Services provided:
Consulting
Services
Other (BPM systems, ERP systems, CRM system)

Type of solution:
Service

Smart Factory description:
PRIM.BG – Cloud-based ERP system
An ERP system that combines CRM, sales, purchases, logistics management and finance, all organized in the way, the successful companies work. The product is web based and works on all kind of devices. It is developed on Perl/ Angular JS and MySQL as database. It is easily scalable

and currently used by one of the biggest enterprises in Bulgaria.

Keywords:

Software
Cloudbased,
ERP as a service

Example of Product/Service usage:

Awareness

The system enables managers to effectively manage information flows and daily business processes such as sales, orders, warehouse logistics, financial documents, and so on

Control

The monitoring of all ongoing events in the system provides unified, and more importantly - vital information about the company. At the same time, this control over the business processes allows for always informed management decisions

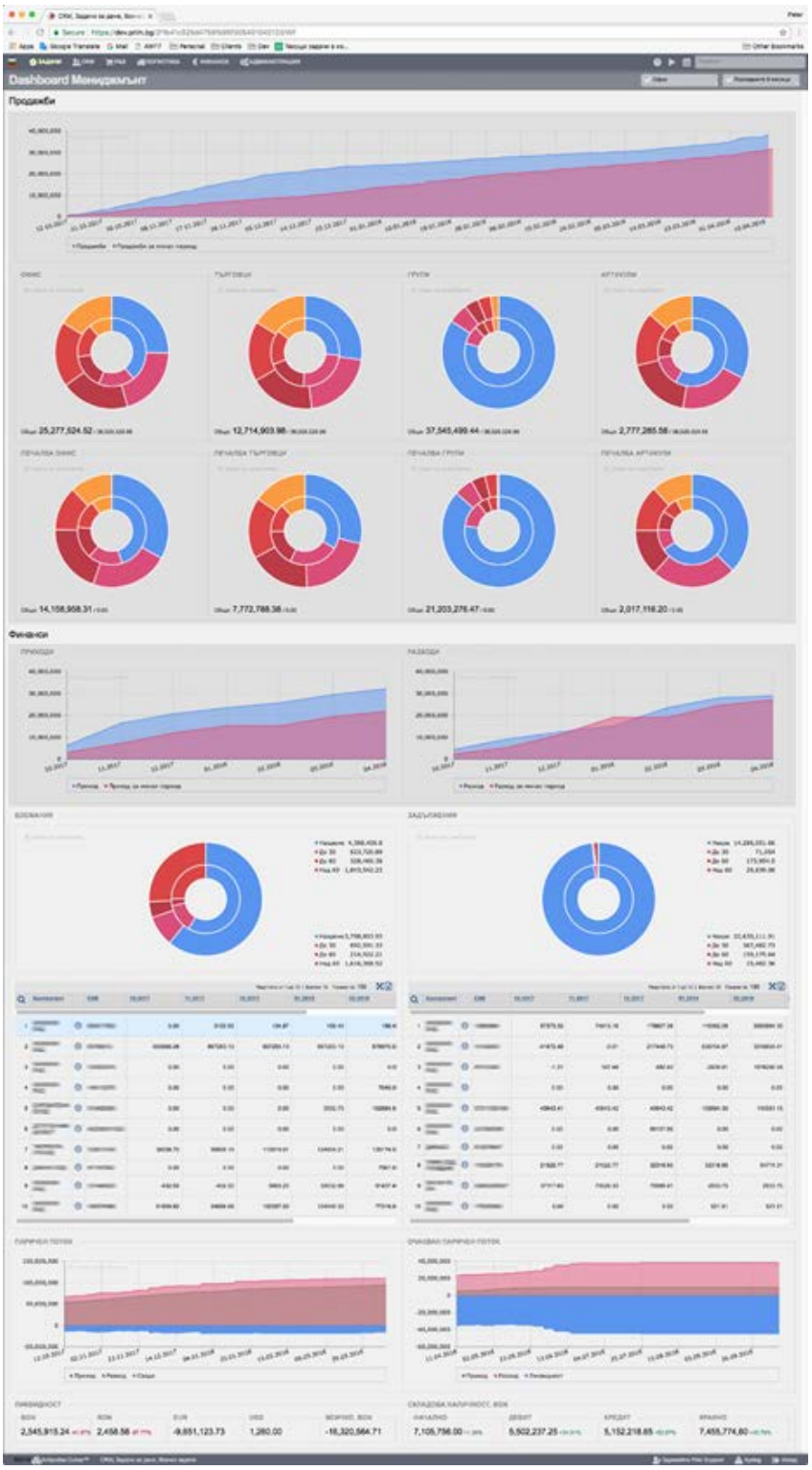
Streamlining

A key advantage of using the system is the optimization of the company's entire business, achieved by increased staff productivity, a significant reduction of mistakes and generally by reducing the time needed to complete any task

Growth

PRIM.BG is a software platform for small and medium businesses. We offer a solution that brings all the benefits of large and expensive ERP systems, but with streamlined processes and interfaces, to help smaller companies start quickly, yet be able to up the complexity when they need it

PRIM is an evolution of our Antipodes. Cubes™ERP system and is used by many customers. Now we are just making it available to greater audience by offering it as a service. We are still making small adjustments to make it easier for smaller companies to start using it.



Improvement areas covered by the Product/Solution:

Decreased manufacturing costs
Improved information for production decisions

Improved agility and responsiveness in the production process
Improved information for business analytics
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment1: Company and product logo
Attachment 2: Product presentation

Product/service technological focus:

Electronic measurement systems
Measurement Tools

Market availability:

Available on the market

3.5 Building Management System

Smart Factory solution Building Management System

"Bulsource Consulting" ltd.
Ferdinandova str./blvd. 60, 8000 Burgas, Bulgaria
Contact person:
Stoyan Nikolov
Tel. +35989 783 4295

Type of organization:

SME

Market sectors:

OTHER (IT-software)

Services provided:

Consulting
Education/Training
Engineering
Research and development
Services

Type of solution:

Product

Smart Factory description:

The product is addressed to all smart buildings, businesses which would like to have monitor and control of the systems installed and work within in single interface. The system is Easy cost-effective integration with personal touch to every detail. For now the system is used only in Burgas and Sofia, Bulgaria. The system is perfect for buildings that want to report energy efficiency. Hotels, office and business buildings, Smart Buildings, commercial and entertainment buildings, manufacturing buildings and etc. With the right use of the management system, it could return the investment for 36 months. One of the main advantages of the system, along with the reduction of the total cost of servicing and maintenance of buildings in the building providing comfort, security, safety and security, is the predictability of events of different nature and detailed archiving of events from all interconnected subsystems.

Keywords:

Smart,
Automation,

Integration,
Management

Example of Product/Service usage:

The system is open (modular), allowing for easy expansion / upgrading of components (controllers, I / O modules, etc.) and information open to work with different protocol compatible devices. The building automation system is configured to allow building systems to work in the most efficient way possible to best serve the needs of staff, staff and the environment, now and in the future. The system is completely open without any restrictions, and behind it is a young, experienced team who would personally pay attention to every detail of the implementation of such a system. Much more efficient than the main competition on the market.

Improvement areas covered by the Product/Solution:

Improved maintenance/uptime
Improved remote monitoring capabilities
Improved safety

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation

Product/service technological focus:

IT and Telematics Applications
Energy efficiency
Electronic measurement systems
Measurement Tools

Market availability: Developed

3.6 ReCheck

Smart Factory solution ReCheck

ReCheck BV.
Urmonderbaan 22, Gate 2 6167RD Geleen Netherlands
Contact person:
Emiliyan Enev

Type of organization:
SME

Market sectors:
OTHER (IT-software, blockchain)

Services provided:
Information Processing & Systems, Workflow
IT and Telematics Applications

Type of solution:
Product

Smart Factory description:
Providing blockchain infrastructure for traceability, authentication and digitalization in various industries. ReCheck offers API solutions for utilizing the value of blockchain in business solutions with minimum friction. ReCheck offer technology tools that protect product authenticity and give digital life of physical products. With ReCheck businesses can register content on blockchain and create unique identities of items. Then the companies can use these identities to run smart contracts and execute transactions in secure and transparent environment (for example transactions related to authentication, traceability, product documentations, ownerships, etc.). ReCheck is technology partner of organisations that want to utilise blockchain in their operations and provides infrastructure to run pilots and test hypotheses about the value of blockchain in certain operation.

Keywords:
Agile development.
Scrum.
Kanban.
CD/CI.
Unit Testing.

Block Chain.

Example of Product/Service usage:
By applying knowledge and expertise in blockchain technology and development of smart contracts**. Used w**ithin the EU**. Appropriate to use in** Industrial enterprises, Private businesses, Logistic companies, Art Galleries and Collectors**.** Digitalisation of product documentation, automation of operations related to authentications, decreasing labour costs by executing smart contracts. **By the f**ull traceability of products across supply and value chains **the quality of the productions is ensured**. **The system is implemented easily by m**obile Application, Web Application, Physical data carrier (electronic tag), access to blockchain network**. Some of the benefits of ReCheck are** Next level of Trust for data, assets and transactions, Increased value of goods, Paperless documentation, Transparency and Tracking, Authenticity verification. The blockchain technology offers the highest level of encryption protection of ID.

Improvement areas covered by the Product/Solution:

Lower energy costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved maintenance/uptime
Improved information for business analytics
Improved remote monitoring capabilities
Improved safety
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment1: Company and product logo
Attachment 2: Product presentation
Attachment 3: Video: https://www.youtube.com/watch?v=-2dUCU7Fo5w

Product/service technological focus:

Electronic measurement systems
Measurement Tools

Market availability:

Available on the market

3.7 Black Sea Smart Alliance

Smart Factory solution Black Sea Smart Alliance

CryptoVarna NGO
1 Sofia str, Varna 9000, Bulgaria
Contact person:
Galin Dinkov

Type of organization:

Business support organization

Market sectors:

OTHER (IT-software, blockchain, IoT, ect.)

Services provided:

Consulting
Education/Training
Engineering
Manufacturing
Research and development
Services

BLACKSEA

Smart Alliance

Type of solution:

Service

Smart Factory description:

We've created an union of companies and experts from different aspects of the Smart Technologies, working together on projects for:

- Smart Agriculture
- Smart City
- Smart Ports

The tech is based on:

- Internet of Things sensors (IoT)
- Low Power Wide Area Networks (LPWAN)
- Blockchain Technology
- Smart Contracts
- Cloud Systems
- Renewable Energy

Part of the solutions are:

- Remote fire-alarm system with autonomous and battery powered smoke-detectors, mobile app for control, secure audit log in blockchain and lots more features.
- Agriculture solution for monitoring and optimizing plantations, fields and silos including solar power supply, wide variety of sensors (humidity, temperature, …), LPWAN transmitter, gateway, Cloud platform, CMS, mobile app and the ability to collect, analyse data with Machine Learning and implement. optimized settings to achieve better and bigger production.
- Smart City Infrastructure - covering the City of Varna with LoRa WAN and Blockchain. This will be used for data collection from public sensors and for public services such as mobile parking usage and reservation, public records and micro payments.

Keywords:

Novel technology,
Comprehensive smart solutions,
Cost effectiveness,
Internet of Things sensors (IoT),
Low Power Wide Area Networks (LPWAN),
Blockchain Technology,
Smart Contracts,
Cloud Systems,
Renewable Energy,

Example of Product/Service usage:

The technical solutions in the alliance involve, Internet of Things sensors (IoT), Low Power Wide Area Networks (LPWAN), Blockchain Technology, Smart Contracts, Cloud Systems, Renewable Energy, combining them makes the alliance unique in the world of the Smart Technology and Industry 4.0 service providers. Most of our competitors either produce hardware equipment for smart solutions or offer specific product for a single market. We combine all necessary technologies to offer a complete solution for the digital transformation of entire industry. And we have the knowhow and the experts for that.

Improvement areas covered by the Product/Solution:

Lower energy costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved maintenance/uptime
Improved information for business analytics
Improved remote monitoring capabilities
Improved safety
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company and product logo
Attachment 2: Product presentation
Attachment 3: Video:
https://www.youtube.com/playlist?list=PL6B6CjaJIvV2Myat3i1Et0r902ISe3DbIt

Product/service technological focus:

Agriculture
Micro- and Nanotechnology related to agrofood
Electronics, Microelectronics
Telecommunications, Networking
Energy efficiency
Industrial Manufacture
Electronic measurement systems
Measurement Tools
Other Industrial Technologies
Creative products
Creative services
Education and Training

Market availability:

Available on the market

3.8 Mimirium

Smart Factory solution Mimirium

Mimirium Ltd.
26 Bratya Shkorpil Str., Office 8, Varna, Bulgaria
Contact person:
Georgi Hristov
Tel: +359 888 800 488

Type of organization:

SME

Market sectors:

OTHER (IT-software, blockchain, IoT, ect.)

Services provided:

Consulting
Education/Training
Engineering
Manufacturing
Research and development
Services

Smart Factory solution

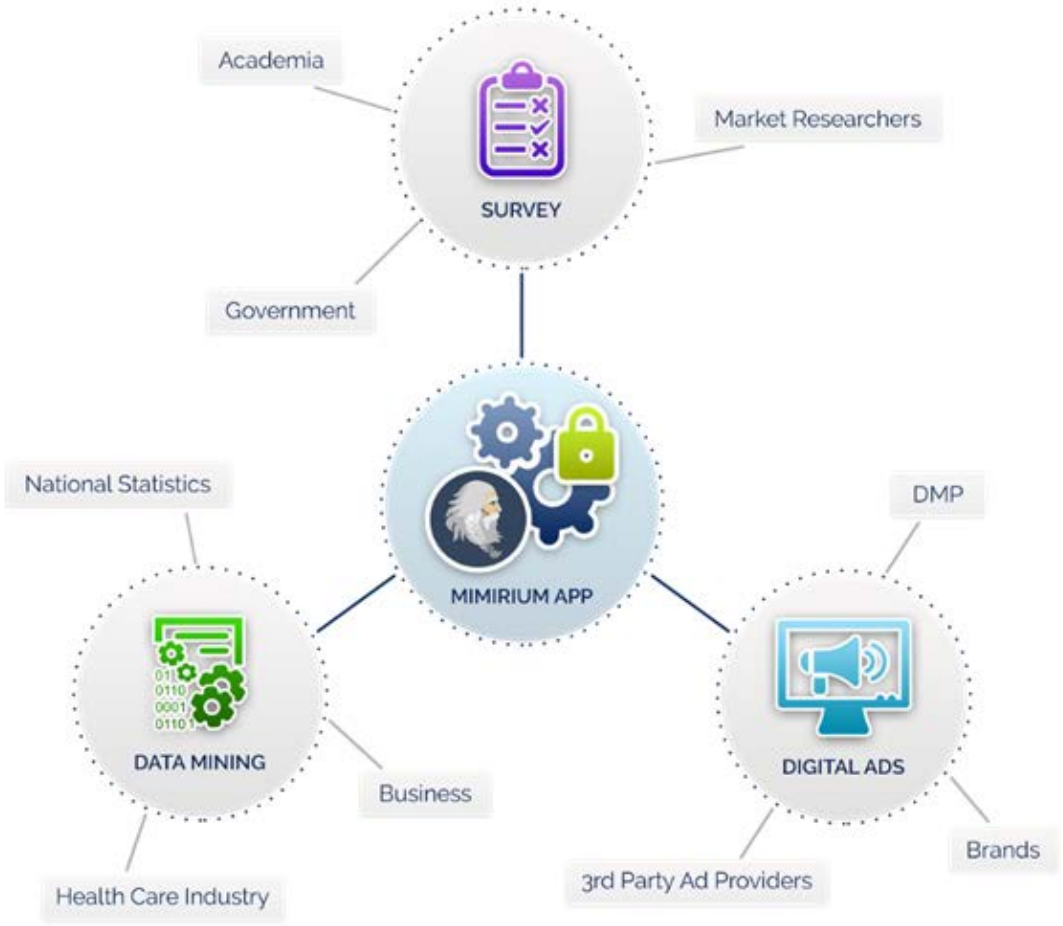
Mimirium
Distributed User-Owned Personal
Database with Anonymous Business Interface

Type of solution:

Product

Smart Factory description:

Mimirium is a software that collects user information and stores it securely on his devices. All users running that software form a distributed network database which can be used to extract aggregated anonymous information. For his participation the user earns rewards in the form of cryptocurrency. The system allows the business to perform powerful targeting being 100% GDPR compliant. The software utilizes modern cryptographic techniques, blockchain and machine learning.



Keywords:

Software,
Cryptocurrency,
GDPR compliant,
Perfectly Secure,
User Incentives,
Lower Cost for the Business

Example of Product/Service usage:

Mimirium is one of a kind software for Smart Statistics. It combines the innovations in the Machine Learning along with the Distributed Computing and the Blockchain thus solving the problems with the Big Data storage, user privacy and huge computational needs.
We create the first real case of perfectly distributed, anonymous and secure database which support queries and lot more.

Figure. Mimirium network – data collection model

Improvement areas covered by the Product/Solution:

Improved maintenance/uptime
Improved information for business analytics
Improved safety
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company and product logo
Attachment 2: Product presentation

Product/service technological focus:

Information Processing & Systems, Workflow
IT and Telematics ApplicationsCreative products
Creative services

Market availability:

Available on the market

3.9 UPI - Unified Platform for Innovations

Smart Factory solution UPI- Unified Platform for Innovations

INATO Ltd.
26 Bratya Shkorpil Str., Office 8, Varna, Bulgaria
Contact person:
Lyubo Blagoev
Tel: +359 888 365 477

Type of organization:
SME

Market sectors:
OTHER (IT-software, blockchain, IoT, ect.)

Services provided:
Consulting
Services

Product/Solution webpage: No

Type of solution: Product

Smart Factory description:
UPI isn't a conventional tool for complicated software systems building. UPI is a comprehensive environment for runtime-modelling of IoT collaboration, supported by machine learning, Natural sub-Language Processing and so on. The UPI- environment has a unique internal architecture- Semantic Network Based Architecture- SNBA. The main novelty in UPI-based systems is that the humans and machines in Smart Factories are presented as a collaborating object with different degree of intelligence. Now it can be pointed out two directions of Smart systems development- IoT platforms building and some approaches for AI elements building.
The UPI-approach combines those two directions in a common comprehensive environment with unique Semantic Network Based Architecture. Decreases the cost of Smart systems building with more than 40-50%.
UPI introduces a new approach for quality estimation- this is a semantic approach which is more informative and understandable.
The risk is extremely reduced by using decentralised approach for software building.

The UPI-environment can be used for Smart systems building.
The UPI-development process needs only UPI-environment and base software development tools which can be used free of charge in the mode of decentralised programming.

Keywords:

Smart systems,
Cryptocurrency,
IoT,
Collaboration,

Example of Product/Service usage:

The heart of Smart Factory is a Smart Control System which consists of collaborating sub-systems with high degree of autonomy and elements of Artificial Intelligence.
The UPI-approach for Smart Control System building uses full model presentation of concepts, data and processes in the environment with SNBA. This decreases the system's cost, provides powerful tools for risk management and the level of system quality is measured by the human feeling of semantic collaboration with the machines. High effective development process without limitations of the complexity and further development of AI-elements ensuring smart functionality.

Improvement areas covered by the Product/Solution:

Improved coordination with suppliers
Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved product quality
Improved coordination with customers
Improved maintenance/uptime
Improved information for business analytics
Improved remote monitoring capabilities
Improved safety

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment1: Company and product logo
Attachment 2: Product presentation

Product/service technological focus:

Information Processing & Systems, Workflow
Measurement Tools
Standards
Other Industrial Technologies

Market availability:

Available on the market

4 Smart Factory solutions from Croatia

4.1 IoT Digital Transformation in Production Process

Smart Factory solution IoT Digital Transformation in Production Process

X-LOGIC d.o.o.
Duzice 12, HR-10000 Zagreb,
Croatia
Contact person:
Zdenko Marincic
Tel. +385 98 733391

Type of organization:
SME

Market sectors:
Electrical and electronic engineering industries

Services provided:
Engineering
Research and development

Type of solution:
Product

Smart Factory description:
IoT Digital Transformation in Production Process is intended for automation and optimization of production process. It consists of HW and SW part. HW part refers to CPU with communication module which receives and aggregates data from various industry sensors via wireless communication in each stage of production process and transfers this data to server. SW part consists of database and server application for monitoring and visualization.

IoT Digital Transformation in Production Process solution is introducing new technology with intension to help production companies to improve its production process and optimize cost. It automates the whole production process with latest state-of-art technology.

Figure 1: CPU with communication module

Figure 2: Software for monitoring and visualization

Keywords:

Internet of Things
Digital Transformation

Production management
PaaS

Example of Product/Service usage:

IoT Digital Transformation in Production Process is applicable to any production process in industry where monitoring of certain parameters is essential in every stage of the process. In our case X-LOGIC's IoT Digital Transformation is used in production of power transformers.

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved information for business analytics
Improved remote monitoring capabilities
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation of the novel technology
Implementation in the production processes

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: IoT Digital Transformation in Production Process presentation

Product/service technological focus:

Electronic circuits, components and equipment
Electronics, Microelectronics
Information Processing & Systems, Workflow
IT and Telematics Applications
Process control and logistics

Market availability:

Available on market since May 2018.

4.2 BusinessQ

Smart Factory solution BusinessQ

Qualia poslovna rješenja d.o.o.
Ilica 144, 10000 Zagreb,
Croatia
Contact person:
Hrvoje Smolić
Mobile: +385 (91) 2010075

Type of organization:

SME

Market sectors:

Biotechnology
Chemicals
Digital economy
Electrical and electronic engineering industries
Food industry
Maritime industries
Textiles
Fashion and creative industries
Retail

Services provided:

Consulting,
Research and development,
Services (business intelligence, data science, machine learning, data visualization, blockchain, IIoT)

Type of solution:

Product/solution

Smart Factory description:

Qualia BusinessQ is a business intelligence, data visualization and data discovery software.
With our partners we are building a comprehensive IT solution for the customers - Manufacturing Intelligence, in accordance with its needs and requirements. Such a solution belongs to the "Smart factory" category and refers to the domain we call Industry 4.0.
We design and IT solutions for collecting, managing, analyzing, displaying, and reporting industrial data within the BusinessQ software. Data is collected from different sources and from different

industrial levels: individual machines, process lines, drives and business levels. The collection process can be local within a factory or remote with multiple geographic positions.

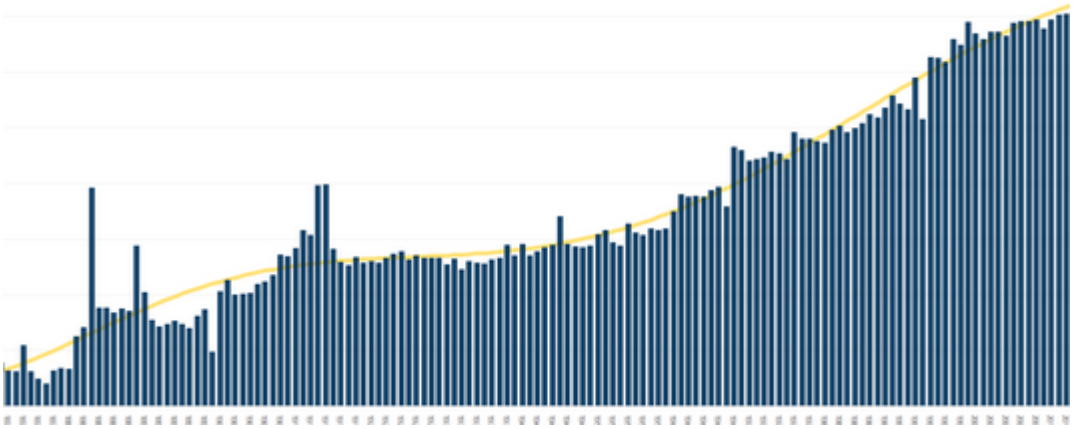


Figure 3: Analytical data of collected information

Our information-based solution based on analytical data processing supports visualization of information (Key Performance Indicators, Control Panel ...). Displaying and reporting is tailored to the responsibilities and obligations of employees in the system. From operator and technician in operation, process engineer, employee at business level to executive director. The goal is to provide every employee at their level of responsibility with timely information, anticipate and initiate the action that is expected of him.

The focus is on the use of collected data, with improvements in time utilization, performance and reliability in production.

Our Solution helps customers to efficiently manage production, raise product quality levels, and gain greater control of their operations.

Keywords:

Industry 4.0
IIoT
Smart Factory
business intelligence
data visualization
analytics
Operational visibility
Lean Manufacturing
Manufacturing execution system (MES)
Overall equipment effectiveness (OEE)
Key performance indicator (KPI)

Example of Product/Service usage:

Our solution and BusinessQ product can be implemented basically in any type of industry. First step is to ensure that all relevant data from machines is collected in the database. Next step is data optimisation and visualization in BusinessQ.

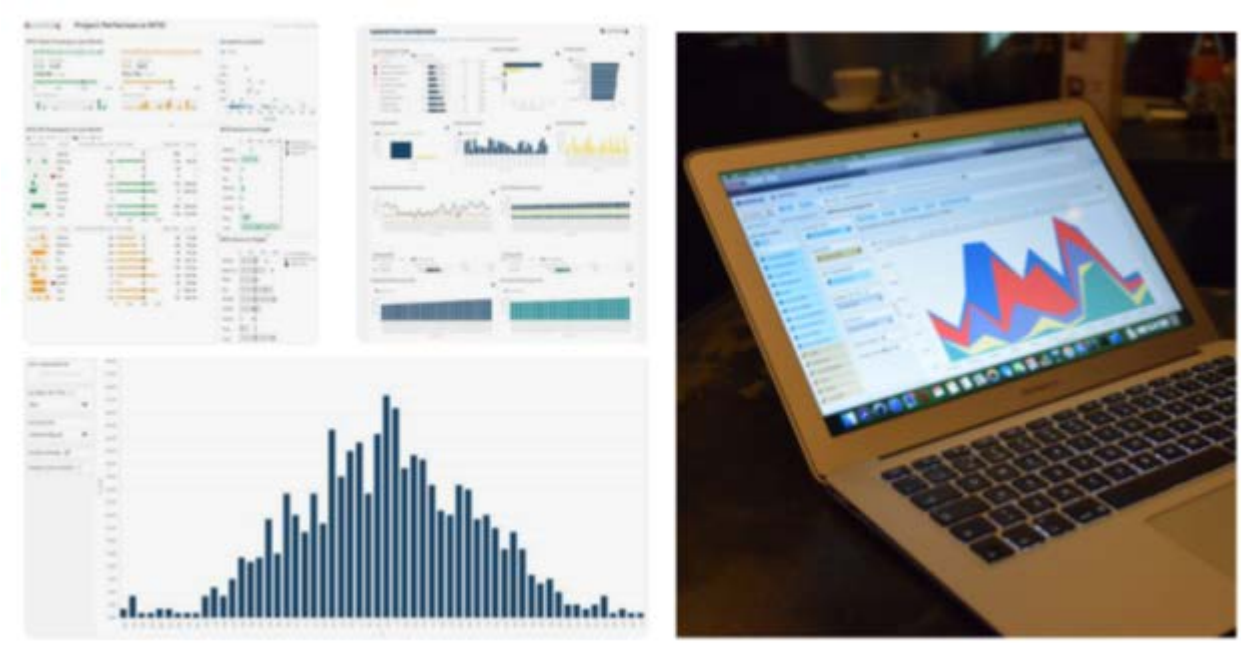


Figure 4: Statistical data

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Decreased manufacturing costs
Lower energy costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved maintenance/uptime
Improved information for business analytics
Improved remote monitoring capabilities
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: BusinessQ overview
Attachment 2: BusinessQ architecture
Attachment 3: Logos
Attachment 4: additional materials: https://bit.ly/2KAiGGO

Product/service technological focus:

No focus, any industry is suitable for BusinessQ advanced industry analytics

Market availability:

BusinessQ software is available on the market since 2012

4.3 MECODES

Smart Factory solution MECODES

CADCAM Group d.o.o.
Štoosova ulica 1, 10 000 Zagreb,
Croatia
Contact person:
Eva Doboš
Tel. +385 95 503 5331

Type of organization:

SME

Market sectors:

Aeronautics industries
Automotive industry
Defense industries
Maritime industries
Mechanical engineering

Services provided:

Consulting
Education/Training
Engineering
Research and development
Services

Type of solution:

Product

Smart Factory description:

MECODES, developed by CADCAM Group is a unique software solution for collaboration throughout the entire electro-mechanical product development process.

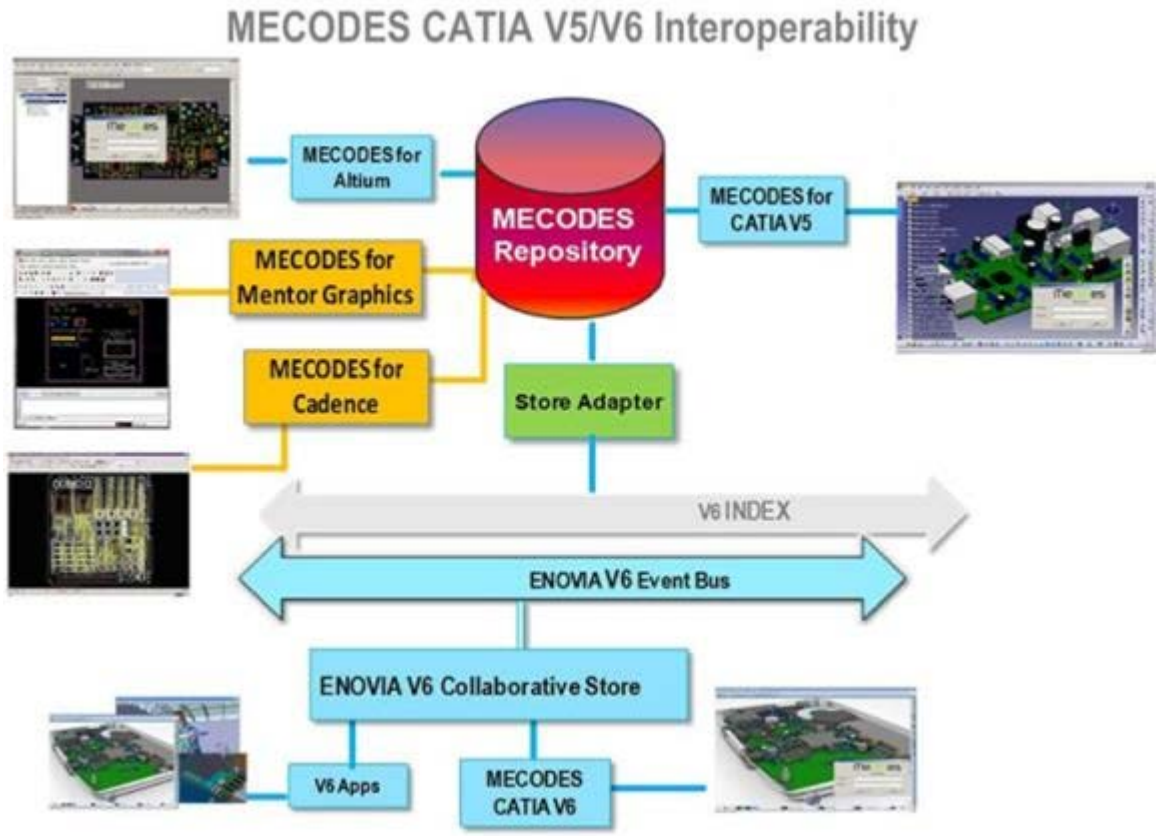


Figure 5: MECODES interoperability with various software

MECODES Collaboration Suits consist basically of two integrated subsystems which are essential for a successful collaboration: the Information Repository and the EDMD/IDF client for CATIA V5.

Table: MECODES Collaboration Suits subsystems

ECAD/MCAD Collaboration	Collaboration suite
The MECODES solution suite consists of: • MECODES EDMD for CATIA V5 and Mentor Graphics Expedition Enterprise and PADS collaboration created on the new recommendation EDMD (ProSTEP iViP Association).	• MECODES Collaboration Suits consist basically of two integrated subsystems which are essential for a successful collaboration: The Information Repository and the EDMD/IDF client for CATIA V5
	PDM

• MECODES for CATIA V5 and Altium V9 integration established on the IDF V3 industry standard and enhanced by customized XML schema. • MECODES CADENCE Multi-Layer import in CATIA V5 based on new IDF3++ standard	• Project repositories with document management capabilities • Management of multiple revisions of the same unit of information (project documents, exchange documents
Design	
MECODES replaces conventional design methodologies by multi-domain collaboration for Mechatronic. Addresses major challenges in cros domain designs: • integration of the lifecycles from different domains • integrated collaboration and communication to manage the dynamics of changes across mechatronic domains • provide an integrated System preventing delays and increased cost of the final product design	
Communication environment	**Common library**
• Environment enhanced with messaging capabilities • Chat & voice enabled workspace • User presence detection system • Messaging client with file transfer capabilities	• Common library with custom specific components • Integrated library management tool with 2D/3D component view • MECODES include more than 2000 3D electronical library components
Mechatronic BOM	**Floating license**
• Complete BOM with mechanical and electrical components and parts ready for further processing	• Optimal license usage • License locked in MECODES environment • User administration tool

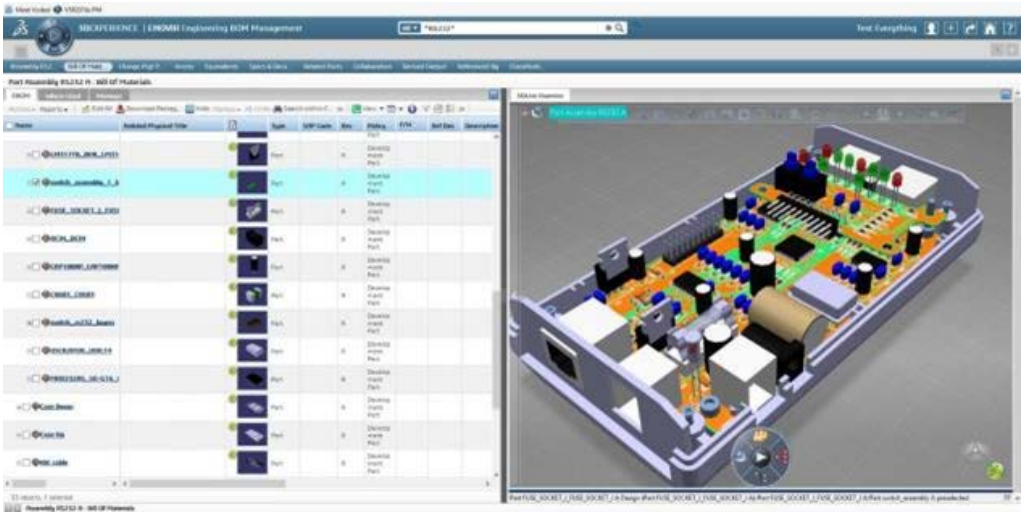


Figure 6: Mecodes on the 3DEXPERIENCE platform

Keywords:

Collaboration
Electro-mechanical product
Development

Example of Product/Service usage:

Improved design quality, faster development processes and reduced rework by collaboration
Optimized and shortened development cycles by integration
Increased product and process innovation through communication
Advanced product analysis of cross-discipline results by 3D product representations
Decreased time-to-market by resolving hurdles through communication within the entire product development process
Accelerated return-on-investment by the faster introduction of new products to the marketplace

Improvement areas covered by the Product/Solution:

Implementation of the novel technology

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved product quality
Improved coordination with customers

Other relevant information about the product/service:

Attachment 1: MECODES logo
Attachment 2: MECODES presentation
Attachment 4: MECODES video (https://bit.ly/2zoQ4v2)

Product/service technological focus:

Aerospace Technology
Design and Modelling / Prototypes

Market availability:

Available on the market since 2012.

4.4 Web*ERPINS

*Smart Factory solution Web*ERPINS*

ININ informaticki inzenjering d.o.o.
Dr. Mile Budaka 1, 35000 Slavonski Brod, Croatia
Contact person:
Igor Majdandžić
Tel: +385 35 40 50 60

Type of organization:

SME

Market sectors:

Automotive industry
Chemicals
Construction
Digital economy
Electrical and electronic engineering industries
Mechanical engineering

Services provided:

OTHER: ERP solution for production companies with focus on planning/scheduling/ monitoring/managing/automation

Type of solution:

Product

Smart Factory description:

Web*ERPINS is a modern business information system intended for managing business processes and traceability from inquiries for a service or a product to production resource assurance, initiating and monitoring the production process, quality assurance and product delivery. Many built-in functionalities significantly facilitate the everyday process of creating and tracking daily activities, and timely reporting.

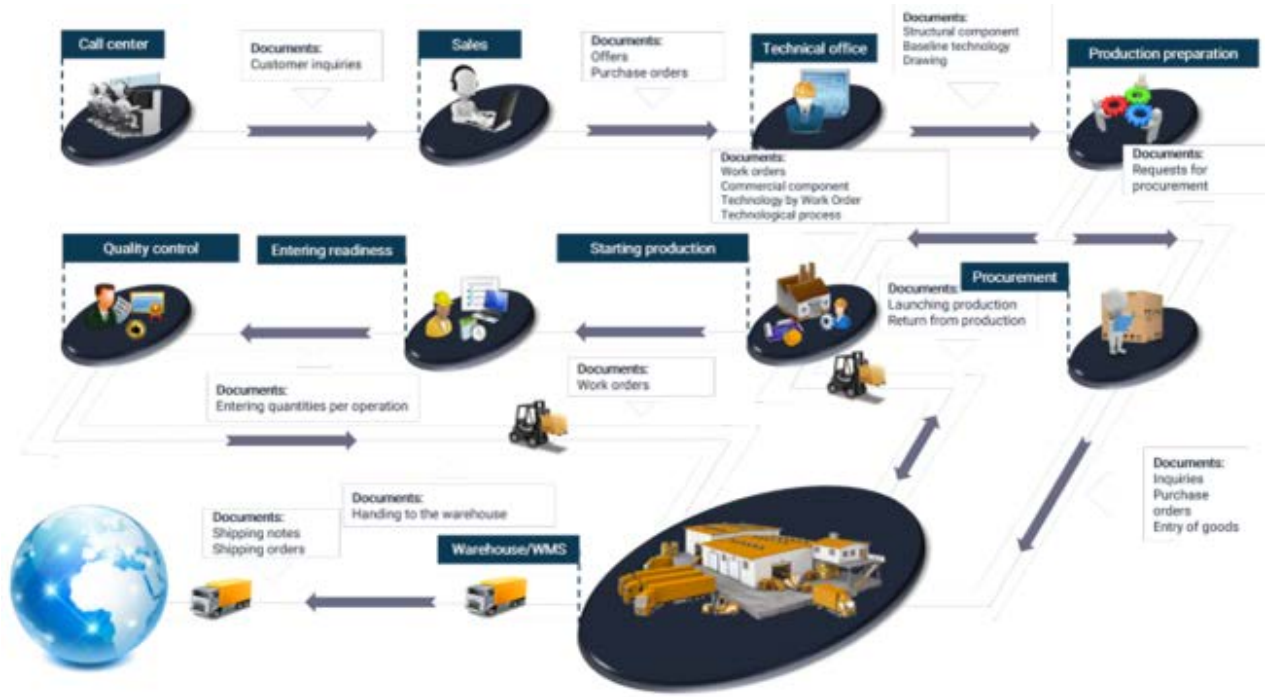


Figure 7: web*ERPINS

Keywords:

ERP system
Software for manufacturing
Planning and Scheduling
Warehouse management system
Tasks and documents integration and management

Example of Product/Service usage:

The system is primarily intended for production and service companies that need to automate and integrate business processes, and efficiently manage business resources while generating the required supporting documents. In accordance with specific demands for various types, there are options for metal, electrical, chemical, casting and woodworking production, and service activities.

Improvement areas covered by the Product/Solution:

Implementation in the production process

Product/Solution is related to the following type of implementation:

Improved coordination with suppliers
Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved product quality

Improved coordination with customers
Improved compliance with customer specs or regulatory requirements
Improved information for business analytics
Improved remote monitoring capabilities
Developed visualization capabilities

Other relevant information about the product/service:

Attachment 1: Company logo
Attachment 2: Short presentation

Product/service technological focus:

Industrial manufacturing
Process control and logistics

Market availability:

Available on the market

4.5 Decentralised indoor climate systems

Smart Factory solution Decentralised indoor climate systems

Hoval d.o.o.
Puškarićeva 11E 10 250 Lučko,
Croatia
Tel**:** +385 1 4666 376

Type of organization:

SME

Market sectors:

Construction
Electrical and electronic engineering industries
Mechanical engineering
Pressure equipment and gas appliances

Services provided:

Consulting
Education/Training
Engineering
Services

Type of solution:

Product

Smart Factory description:

The key part of any planning process is the right selection of the ventilation system, no matter if we talk about the renovations or the new buildings. **Hoval indoor climate systems** are flexible, efficient and comfortable. They create an ideal climate and ensure a good air quality in large spaces, while minimising energy consumption. Unlike centralised systems, **decentralised** ones **have a modular structure** in which one system contains multiple and possibly different indoor climate units. Therefore, **maximum adaptability and flexibility** is ensured in all phases: from planning, installation, operation to maintenance.

Figure 8: Decentralised system solution (source: Hoval)

The indoor climate systems are installed on the ceiling or in the roof, distributed throughout the interior. They inject **enough amount of fresh and clean air** into the interior from above using the patented vortex air distributor. In addition, the occupied area is thoroughly ventilated without unpleasant draughts, which boosts the employee productivity. Also, the system is **duct-free** which offers many advantages in terms of space requirements, hygiene and efficiency.

Figure 9: RoofVent® RH roof unit (source: Hoval)

Figure 10: TopVent® DKV unit

Hoval decentralised systems are masters in **energy saving** thanks to their patented vortex air distributor, called Air-Injector. Compared to the other systems, it requires 25-30% smaller air flow rate to achieve the desired conditions, which **reduces operating costs**. Plus, temperature stratification is reduced, which means less heat loss through the roof.

Specifically developed **control and regulation** for Hoval indoor climate systems reliably ensures achieving the full potential of decentralised units and optimal use of resources, while keeping operating costs low.

Some of the main advantages are:

- Adaptable, zone-based control concept
- The userfriendly Plug&Play principle of the units;
- Simple and rapid commissioning;

- Automatically controlled and optimal air distribution thanks to Air-Injector;
- Optimal energy utilization and cost-efficient operation.

Keywords:
Decentralised system
Ventilation units
Indoor climate systems
Ideal climate
Energy saving

Example of Product/Service usage:
Pannonian wood competence centre in Virovitica, known as **the heart of Croatian timber and wood-processing industry**, is one of the most significant EU projects of Virovitica-Podravina County. The centre is built on the principles of Green Buildings and it ensures perfect working conditions and comfortable indoor climate thanks to the installed Hoval decentralised units.

On the top of the plant-covered roof are placed **two RoofVent® roof ventilation units**, which blend perfectly into the surroundings and give added value to the whole "green" story.

Figure 11: RoofVent RH units on the green roof
(source: Pannonian wood competence centre gallery)

Inside the centre are installed **two TopVent® recirculation air units** which are mounted on the ceiling. They guarantee that in the production hall is always plenty fresh air, good climate and working conditions. Also, the whole system is duct-free, so it fits perfectly in the infrastructure as there are no ventilation ducts which would interfere in the production work.
Thanks to the complete **Hoval decentralised system**, Pannonian wood competence centre achieves the highest energy efficiency, operating costs reduction, while simultaneously having a good impact on the environment. Even though the installed system is barely noticeable, there is always constant supply of fresh air, ideal temperature and climate conditions in the hall, without unpleasant draughts. Finally, the overall system enables easy maintenance and control which gives added value to the investor.

Figure 12: TopVent DHV unit inside the hall
(source: Pannonian wood competence centre gallery)

Improvement areas covered by the Product/Solution:

Lower energy costs
Improved compliance with customer specs or regulatory requirements
Improved maintenance/uptime
Improved information for business analytics
Improved remote monitoring capabilities
Improved safety

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment 1: Company logo
Attachment 2: Product presentation
Attachment 3: Video about Air Injector (https://bit.ly/2KYyijj)
Attachment 4: Video about industrial ventilation systems (https://bit.ly/2KQdj5N)

Product/service technological focus:

Carbon capture and energy
Energy efficiency
Other Industrial Technologies
Environment
Safety

Market availability:

Available on the market since 2015

4.6 Smart High-Speed Motorized Spindle

Smart Factory solution Smart High Speed Motorized Spindle

HSTEC d.d.
Zagrebačka ulica 100 23000 Zadar, Croatia
Tel. +385 23 205 405
Fax. +385 23 205 406

Type of organization:

SME

Market sectors:

Automotive industry
Electrical and electronic engineering industries
Mechanical engineering

Services provided:

Engineering
Manufacturing
Research and development
Services

Type of solution:

Product

Smart Factory description:

HSTec is an innovative development and production company with many years of experience in the field of high-speed motorized spindles, industrial automation and robotics.
The concept of product development is based on the principles of open innovation and special prototype production. Of great importance are the continuous improvement and adoption of new technologies and the collaboration with scientific research institutions.
The founding of the company in 1997 was realized in cooperation with the German company Bosch-Rexroth (formerly INDRAMAT), a world-renowned company in the production of electric motor drives and the company SAS Zadar known for the production of special machine tools and systems.
HSTec offers a wide range of customized motorized spindles, direct driven units, special machine tools and assembly machines, as well as the implementation of robotic cells for various applications.

A flexible team of leading mechanical and electrical engineers continually launches new product development and offers creative and comprehensive solutions in the field of industrial automation. In addition to the core business activities, development and manufacturing of innovative products, HSTec has become the regional market leader in service, repairs and optimization of motorized spindles.

HSTec especially emphasizes its orientation to the needs and satisfaction of its customers, the introduction of new technologies and the achievement of the highest standard of professionalism in project performance and documentation, and the expansion to the new markets and the creation of new products and services. The company applies and continually improves the efficiency of a quality management system in accordance with the requirements of the international standard ISO 9001: 2015. The quality of the managerial activities, the more efficient connectivity between the departments, as well as the business process control are all achieved through the ERP-PLM business information system.

The long-term vision is to contribute to the development of the new concept - Industry 4.0 on a global scale, which aims to create smart products and factories by integrating ICT technology and digitizing different sensor systems as a path to improving the quality and efficiency of production processes.

HSTec's development team of mechanical and electrical engineers offers custom made solutions, advises the customer, improves and automates existing manufacturing processes in various industries. Our strengths are our expertise and know-how and we are proud to be a part of the new concept of developing intelligent and networked systems by creating smart products. Integration of sensor technology, ICT technology, electronic data loggers and vision systems into our products gives us the benefit of developing highly technological and innovative drive systems, custom made assembly machines, machine tools, and robotic cells.

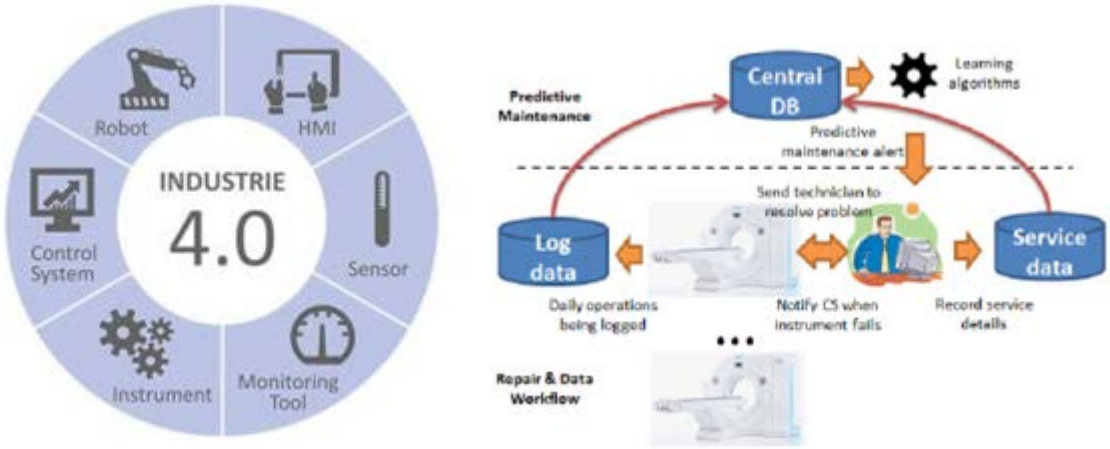


Figure 13: Smart High-Speed Motorized Spindle scheme

One of the product example is a machine tool component - the motorized spindle. Motorized spindles are the rotating axes of the machines and represent the main machining component. With integration of various adequate sensors and data logger inside of the spindle, the spindle becomes a smart product with ability to collect all the relevant data and parameters of the machining process, as well as to connect and to communicate to other machines. This is especially important at establishing the machine network in a manufacturing process and at predictive machine maintenance.

Keywords:

smart products
sensor and ICT technology
electronic data loggers
machine tool component
high-speed motorized spindle

Example of Product/Service usage:

The smart high-speed motorized spindle is used in a machine tool for various machining applications, such as: grinding, turning, boring. The machining process data are collected via various sensors, after which the data are analyzed in real time and stored in internal memory. The spindle can be connected to the main server or to other machines and is able to communicate and send alarm or error reports. It is possible to track the spindle temperature, vibration and speed in real time, enabling the user to monitor the errors, alarms, mechanical condition of the machine and predictive maintenance of the machine.

The smart high-speed motorized spindle is ready to be used in Smart factories and can provide following characteristics connected to the concept Industry 4.0: self-awareness, self-predictiveness, self-maintenance and self-organization.

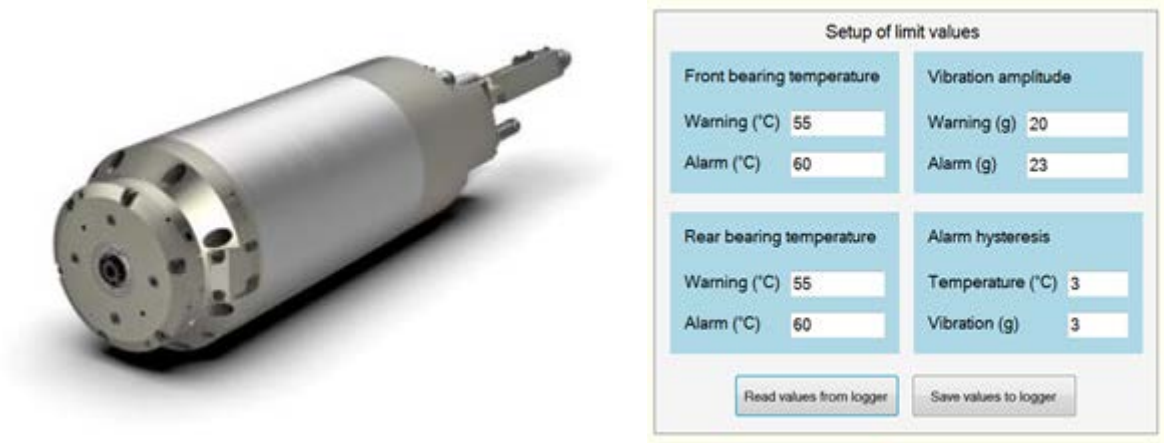


Figure 14: Smart high-speed motorized spindle

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Decreased manufacturing costs
Lower energy costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved product quality
Improved maintenance/uptime
Improved information for business analytics
Improved remote monitoring capabilities

Improved safety

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment1: Company LOGO
Attachment 2: Company and products presentation

Product/service technological focus:

Design and Modelling / Prototypes
Industrial Manufacture

Market availability:

Available on the market since 2010

4.7 PROEL Factory Monitoring

Smart Factory solution PROEL Factory Monitoring

Proton EL d.o.o.
Štefanovečka 10, 10040 Zagreb, Croatia
Contact person:
Andrija Puškaš
Tel. +385 91 234 0320

Type of organization:

SME

Market sectors:

Electrical and electronic engineering industries

Services provided:

Engineering
Research and development

Type of solution:

Product

Smart Factory description:

PROEL Factory Monitoring is the solution for monitoring and optimizing key processes in the manufacturing industry. This software/hardware solution is developed and planned for each client individually, since the need of each factory is different.
PROEL Factory Monitoring combines the modern IT solution technologies which utilize all the data from machine sensors (product counters, speed monitoring…), measuring devices (electrical power measurements, water consumption, gas consumption, temperature…) and industrial cameras (for counting and quality control).
This solution provides real-time monitoring of energy consumption, machine productivity (KPI) and provides powerful production analysis tools for planning and production management. Wider application of this solution is used for smart building (hotels, sport facilities, buildings…)
This type of SaaS is the first step to complete factory monitoring and Industry 4.0.

Keywords:

Factory monitoring
Power management
SaaS
KPI

Production optimization

Figure 17: PROEL Factory Monitoring solution

Example of Product/Service usage:
PROEL Factory Monitoring can be used to analyse the complete power network of the factory (in this case the data centre). System is design together with customer to provide the best functionality.

Figure 18: PROEL Factory Monitoring software

System can be used to track the production in real time. System features include:

Energy consumption (electrical, gas…)
Machine productivity (KPI, maintenance planning)
Interface to business platforms (ERP)
E-mail and SMS notifications and reports (PDF, CSV)
Data security (system protection)
Remote system access (web applications, mobile access…)
On-line system modification (no need to stop the production to make system modifications)
Data storage and backtracking of previous productions
Alarming tools

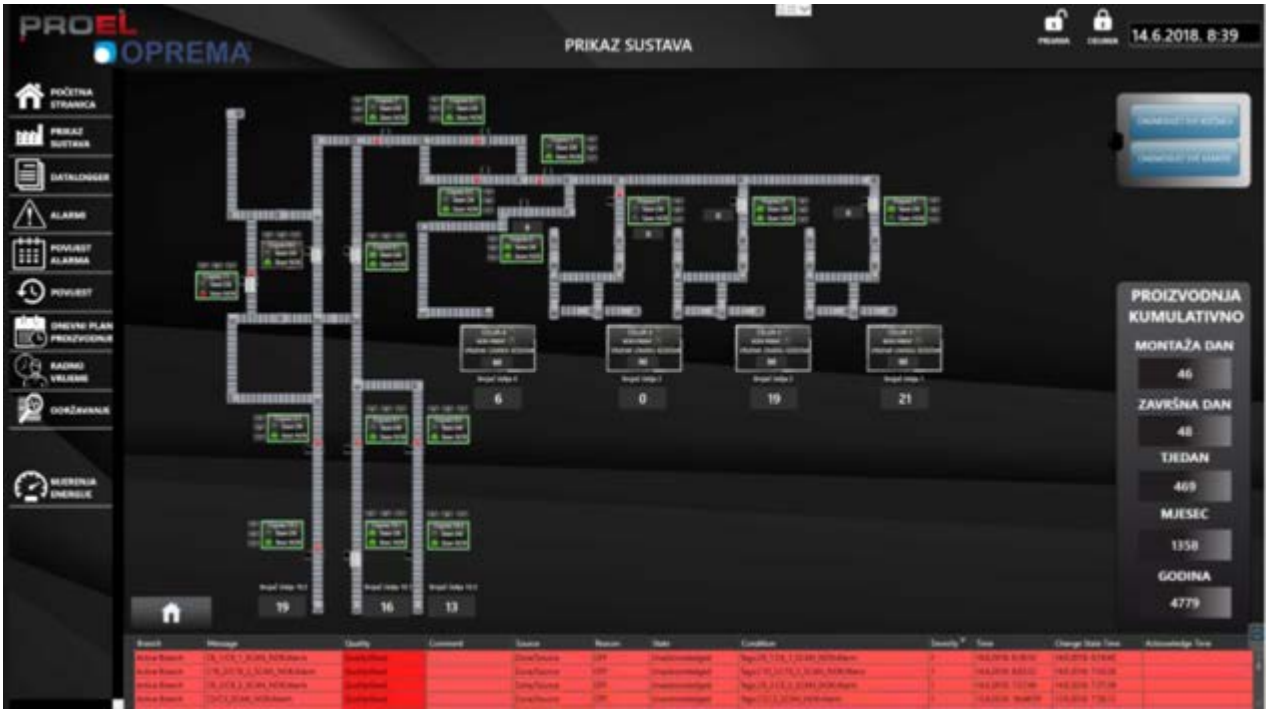


Figure 19: PROEL Factory Monitoring software

The solution can be implemented in the existing factories by using the client's existing IT and hardware infrastructure and/or adding new. This solution is suitable for all factories which use automatic machinery for material production and/or have high cost of energy resources and need a precise energy and production planning. Return of investment for factories is usually less than 12 months (project dependent).

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Lower energy costs
Improved agility and responsiveness in the production process
Improved information for business analytics
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment1: Company Logo
Attachment 2: Product Presentation
Attachment 3: Company Profile Presentation

Product/service technological focus:

Information Processing & Systems, Workflow
Energy efficiency
Industrial manufacturing

Market availability:

Available on the market since 2015

4.8 Smart Communications & IoT for Manufacturing

Smart Factory solution Smart Communications & IoT for Manufacturing

Micro-Link d.o.o.
Jaruščica 9a, 10000 Zagreb,
Croatia
Contact person:
Ivana Janković Šafarić
Tel. +385 1 3636884

Type of organization:

SME

Market sectors:

Electrical and electronic engineering industries

Services provided:

Consulting
Education/Training
Engineering
Manufacturing
Services

Type of solution:

Product
Service

Smart Factory description:

Micro-Link smart factory solution offering include the main 3 portfolio components:

1. **Private communications network for manufacturing**

   Production companies need an integrated communications platform to maximize workforce productivity, improve worker safety, and reduce downtime.
   For the needs of employee communication at the factory, a private mobile network (PMR) is being implemented, providing advanced features and ATEX certifications with secure and efficient communication and ultimately reducing the total cost of communication.

2. **Wi-Fi network in manufacturing plants and warehouses**

   Warehouses and production facilities, due to many metal obstacles such as warehouse gifts and large machines, challenge the quality coverage of Wi-Fi signals in all areas. Additional challenges also cause frequent changes in the space itself (such as current

warehouse capacities or movable shelves), but also endless end-user orientation changes, whether they are barcode scanners or tablets.
By implementing professional Wi-Fi solutions, we provide coverage for large production facilities and / or warehouses with the optimum number of access points to increase barcode efficiency or access the Internet through Wi-Fi.

3. IoT (Internet of Things) applications in manufacturing

With the focus on process optimization and rationalization of maintenance costs, IIoT (Industrial IoT) applications open up unmatched possibilities in automation, smart manufacturing, tracking the position of goods and machines and their status or general conditions in the plants.

These solutions are fully customized, according to requirements of concrete client and their manufacturing plant, to achieve optimal communication and data transfer for automatization of the manufacturing process.
These three solutions components can be implemented as a full package, or applied fully independently, based on concrete situation in the factory and the challenges the customer is facing in the production process.

Keywords:

smart communications
smart manufacturing
digital radio technology
private mobile communications
unified communications
Wi-Fi
RFID
barcode scanners
IoT (Internet of Things)
IIoT (Industrial Internet of Things)
sensors
warehouse radio communications

Improvement areas covered by the Product/Solution:

Implementation of the novel technology
Implementation in the production processes

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Decreased manufacturing costs
Lower energy costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved product quality
Improved maintenance/uptime

Improved information for business analytics
Improved remote monitoring capabilities
Improved safety
Developed visualization capabilities

Product/service technological focus:

AGROFOOD INDUSTRY

- Food quality and safety
- Technologies for the food industry

INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

- Aerospace Technology
- Construction Technology
- Design and Modelling / Prototypes
- Industrial Manufacture
- Materials Technology
- Packaging / Handling
- Plant Design and Maintenance
- Process control and logistics
- Traffic, mobility
- Transport and Shipping Technologies
- Transport Infrastructure

OTHER INDUSTRIAL TECHNOLOGIES

- Other Industrial Technologies

PROTECTING MAN AND ENVIRONMENT

- Environment
- Safety
- Waste Management
- Water Management

Market availability:

Available on the market

4.9 IZIT d.o.o.

Smart Factory solution IZIT d.o.o.

IZIT d.o.o.
Fallerovo šetalište 22, HR-10000 Zagreb, Croatia
Contact person:
Amir Šećerkadić
Tel. +385 99 60 44 987

Type of organization:

SME

Market sectors:

Aeronautics industries
Automotive industry
Digital economy
Electrical and electronic engineering industries
Food industry
Healthcare industries
Maritime industries
Mechanical engineering
Medical devices
Textiles
Fashion and creative industries

Services provided:

Consulting
Education/Training
Engineering
Manufacturing
Research and development
Services

Type of solution:

Product
Service

Smart Factory description:

Offering both equipment and services in field of 3D modelling and 3D printing of plastic materials. We use the high-end machines of FDM and polyjet technology for 3D printing a wide range of different materials from ABS to high end thermoplastics.

Figure 20: 3D helmets

Keywords:

3D scanning
3D modeling
Reverse Engineering
3D printing

Example of Product/Service usage:

Making the part its best takes more than just a machine. It takes a team of attentive experts behind the technology, working to validate processes and collaborate with you. Backed by our production capabilities and decades in the industry, your project will be delivered to your requirements, on-time. Bring to life complex, detailed projects with an unparalleled design freedom. Move from a CAD design to a physical part in your hands and in front of your team quickly. Take advantage of faster lead times, reduced costs and a more efficient supply chain.

Whether you're looking for assistance in making small changes on your CAD or need more robust design solutions for your application, we have expansive services to make your project successful. Create products that leverage the power of additive manufacturing. Our designers help optimize CAD models for functionality, appearance and value for use with our 3D printing technologies.

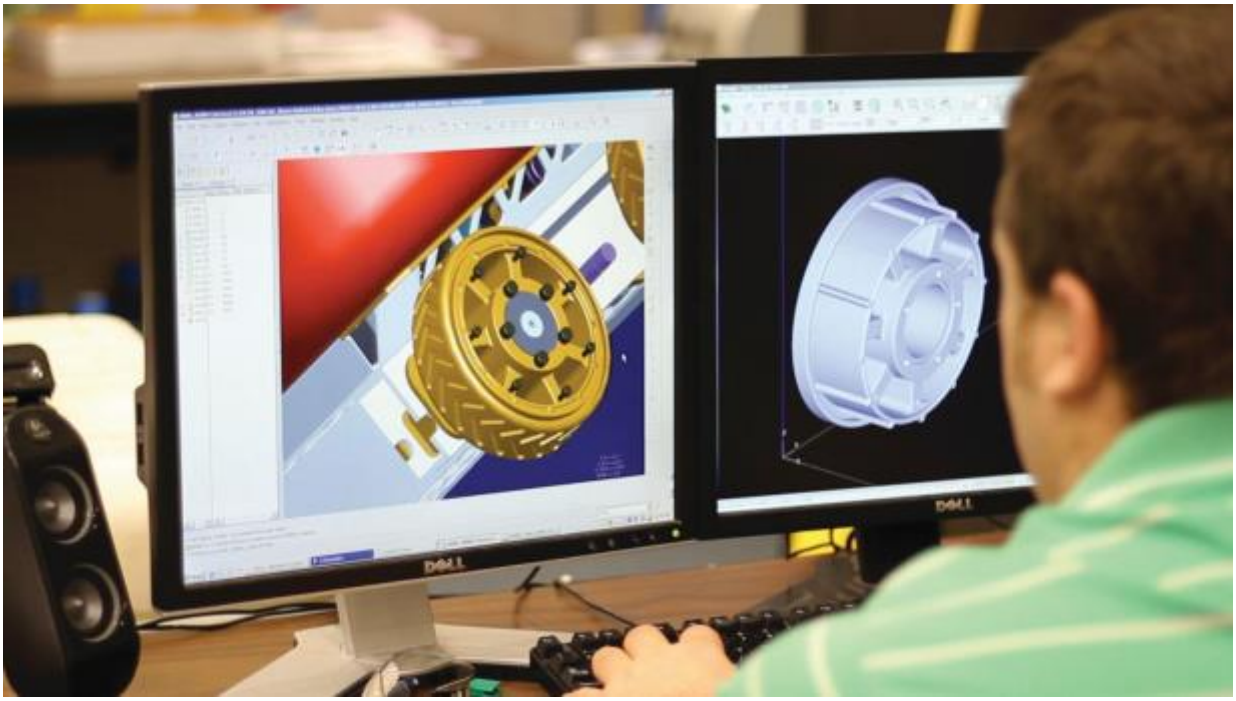


Figure 21: CAD models

Improvement areas covered by the Product/Solution:

Implementation of the novel technology
Implementation in the production processes

Product/Solution is related to the following type of implementation:

Improved coordination with suppliers
Increased speed of production operations
Decreased manufacturing costs
Lower energy costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved product quality
Improved coordination with customers
Improved compliance with customer specs or regulatory requirements
Improved maintenance/uptime
Improved safety
Developed visualization capabilities

Other relevant information about the product/service:

Attachment1: Company visual standard
Attachment 2: Company presentation

Product/service technological focus:

INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

- Aerospace Technology
- Construction Technology
- Design and Modelling / Prototypes
- Industrial Manufacture
- Materials Technology
- Packaging / Handling
- Plant Design and Maintenance
- Process control and logistics
- Traffic, mobility
- Transport and Shipping Technologies
- Transport Infrastructure

OTHER INDUSTRIAL TECHNOLOGIES

- Other Industrial Technologies

SOCIAL AND ECONOMICS CONCERNS

- Citizens participation
- Creative products
- Creative services
- Education and Training

Market availability:

Various market availability.

4.10 AIDA software suite

Smart Factory solution AIDA software suite

CODEL d.o.o.
Banatska 40, 10040 Zagreb,
Croatia
Contact person:
Marijan Sever
Tel: +385 1 2003 770

Type of organization:

SME

Market sectors:

- Aeronautics industries
- Automotive industry
- Electrical and electronic engineering industries
- Food industry
- Healthcare industries
- Mechanical engineering

Services provided:

- Consulting
- Engineering
- Manufacturing
- Research and development
- Services

Type of solution:

Product

Smart Factory description:

AIDA is unique system that integrates industrial machines, production process and data transmission with ERP system like SAP or other.

AIDA concept is based on group of small, independent and interconnected modules that are design to manage different part of industrial processes like communications, data transmission, system monitoring, machine control and other. Architecture based on multiple in depended modules provide AIDA application to be easily modified and upgraded to meet customer requirements.

AIDA application is designed to provide solution that is based on detailed and full process analysis which results in defining optimal technical, technological and communication requirements integrated to provide fully functional tool.

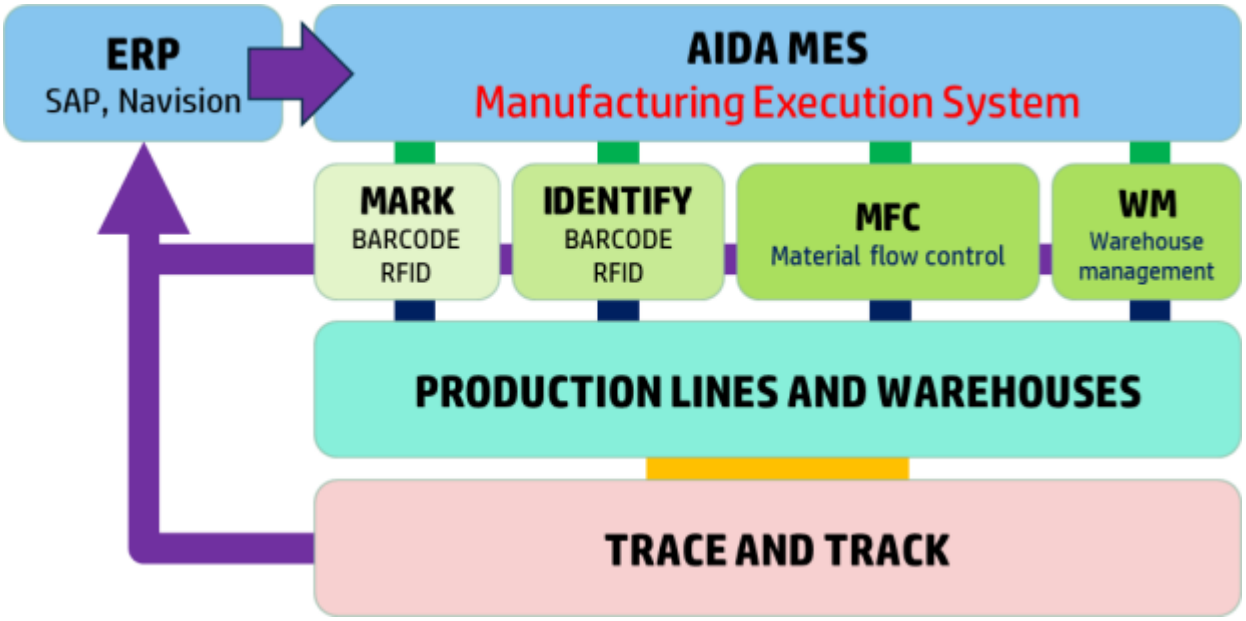


Figure 22: AIDA MES scheme

Although AIDA was originally designed for collection, processing and forwarding of data, during the application of the actual operating conditions, in AIDA were integrated modules with different functionality, so today AIDA consists of the following modules:

- AIDA-MES (AIDA Manufacture Execution Management)
- AIDA-MK (Marking module), Barcode printers and applicators
- AIDA-ID (Identification module)
- AIDA-TT (Trace and Track)
- AIDA-MFC (Material flow control)
- AIDA-WM (Warehouse management)

Keywords:

Vertical integration
SAP middleware
IDOC manager
Manufacturing Execution System
Real time serialization

Example of Product/Service usage:

AIDA is suitable for medium and big production plants for integration of industrial machines, production process and data transmission with ERP system like SAP or other, and also for for track and trace, as well as for quality management purposes.

Improvement areas covered by the Product/Solution:

Implementation of the novel technology
Implementation in the production processes

Product/Solution is related to the following type of implementation:

Improved coordination with suppliers
Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved product quality
Improved coordination with customers
Improved compliance with customer specs or regulatory requirements
Improved information for business analytics
Improved remote monitoring capabilities

Other relevant information about the product/service:

Attachment1: AIDA software suite presentation

Product/service technological focus:

Information Processing & Systems, Workflow
Industrial Manufacture
Packaging / Handling
Process control and logistics
Standards

Market availability:

Available on market

4.11 ThingWorx - Industry Innovation Platform

Smart Factory solution ThingWorx – Industry Innovation Platform

EAG Center Technologies d.o.o.
Oreškovićeva 6C, 10020 Zagreb, Croatia
Contact person:
Sofija Burazin
Tel: +385 98 372 791

Type of organization:

SME

Market sectors:

Mechanical engineering

Services provided:

Engineering
Consulting
Education/Training
Research and development
Services
Technology implementation

Type of solution:

Product
Service

Smart Factory description:

ThingWorx is more than an IoT platform; it provides the functionality, flexibility and scalability that businesses need to drive industrial innovation ─ including the ability to source, contextualize and synthesize data while orchestrating processes and delivering powerful web, mobile and AR experiences.

ThingWorx delivers a single, purpose-built industrial IoT platform. Industrial market-leaders are using ThingWorx to develop feature-rich industrial IoT applications. With ThingWorx, you can rapidly explore, prove and master the value of smart, connected operations and products, even if your organization is new to IoT.

ThingWorx can deliver rapid industrial innovation, including:

- Improve customer experience

- Drive new revenue streams
- Optimize business processes
- Differentiate product and service offerings

Keywords:

IoT
Industrie 4.0
Smart Connected Product

Example of Product/Service usage:

- Elisa and ThingWorx bring industrial IoT to the factory https://bit.ly/2m0nruu
- Vodafone brings industrial IoT solutions to Smart Cities https://bit.ly/2zt6BOG
- Ericsson and PTC form IoT partnership https://bit.ly/2KxDMkq
- Bell and Howell Selects ThingWorx Platform to Enable Smart, Connected Service https://bit.ly/2AImZHy

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved information for business analytics
Improved remote monitoring capabilities
Improved safety
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation of the novel technology
Implementation in the production processes

Other relevant information about the product/service:

Attachment1: Company and Product Presentation
Attachment 2: Company logo / Solution/product logo
Attachment 3: ThingWorx - datasheets

Product/service technological focus:

ELECTRONICS, IT AND TELECOMMS
Information Processing & Systems, Workflow Networking
INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT
Industrial Manufacture Packaging / Handling
Process control and logistics

Market availability:

Available on market since 2015

4.12 PAUK

Smart Factory solution PAUK

Vanado d.o.o.
Radnička cesta 47, 10000 Zagreb,
Croatia
Contact person:
David Burcar
Tel: +385 (0)99 2112 542

Type of organization:

SME

Market sectors:

Automotive industry
Electrical and electronic engineering industries
Mechanical engineering
Cosmetics
Defense industries
Food industry
Pressure equipment and gas appliances
Raw materials, metals, minerals and forest-based industries
Textiles, Fashion and creative industries

Services provided:

Education/Training
Engineering
Manufacturing
Research and development

Type of solution:

Product
Service

Smart Factory description:

Company Vanado specializes in development and implementation of systems for smart production management. Our product name is PAUK: **P**raćenje (tracking) **A**naliza (analysis) **U**šteda (savings) **K**ontrola (control).

Keywords:

Smart manufacturing software

cloud manufacturing execution system (MES)
cloud production, industry 4.0
industrial internet of things IIoT
custom-made software

Figure 23: Statistical data

Example of Product/Service usage:
Maximum visibility and control of entire manufacturing process in real time, at any moment, wherever you may be. Regardless of the industry branch and its size the most valuable asset a company owns is the right piece of information.
PAUK is a customized software application which optimizes business processes with a special emphasis on production monitoring, machine maintenance and efficient energy management.
It is implemented faster and smoothly into small and medium companies of various industries.
PAUK is accessed through web browsers on standard computers using each employee's password-based authorization within the system.

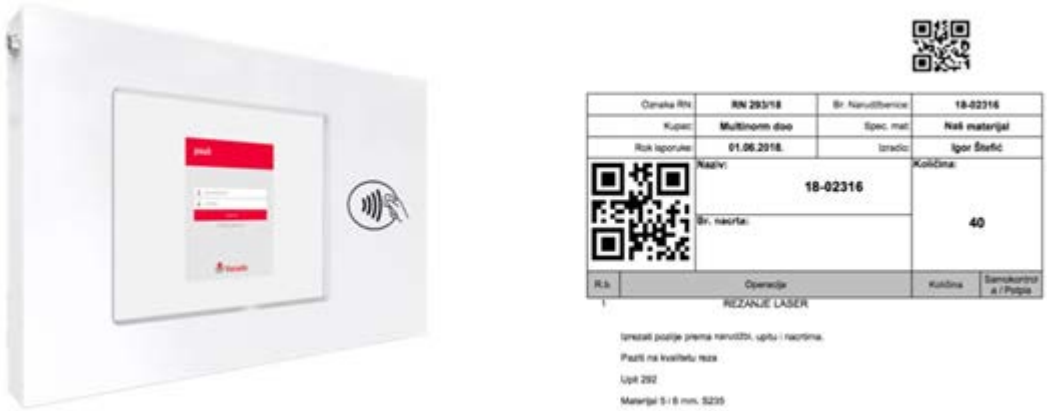


Figure 24: PAUK access process

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved information for business analytics
Improved remote monitoring capabilities
Improved safety
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation of the novel technology
Implementation in the production processes

Other relevant information about the product/service:

Attachment1: Company and Product Presentation
Attachment 2: Company logo / Solution/product logo
Attachment 3: ThingWorx - datasheets

Product/service technological focus:

ELECTRONICS, IT AND TELECOMMS
Information Processing & Systems, Workflow Networking
INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT
Industrial Manufacture
Packaging / Handling
Plant Design and Maintenance
Process control and logistics

Market availability:

Available on market since 2014

4.13 HTEUREP

Smart Factory solution HTEUREP

HT-EUREP d.o.o.
Vodovodna 20A, 10000 Zagreb,
Croatia
Contact person:
Renato Sladović
Tel. +385 91 9500 252

Type of organization:

SME

Market sectors:

Aeronautics industries
Automotive industry
Construction
Defense industries
Electrical and electronic engineering industries
Mechanical engineering

Services provided:

Consulting
Education/Training
Engineering
Manufacturing
Research and development

Type of solution:

Product
Service

Smart Factory description:

CAD/PLM – ERP Interface connects CAD/PLM systems with ERP system, thus enabling significant time savings and error elimination. Integrating these two systems synchronizes two previously separated worlds, makes data exchange simple and transparent, and reduces time engineers spend on entering BOM data in the ERP systems, reduces time spent on searching for products and removes error and data duplication and redundancy.

Currently it connects CATIA and SOLIDWORKS CAD applications, with or without ENOVIA PLM system to GOSOFT ERP system, with other combinations being planned or could be developed on request.

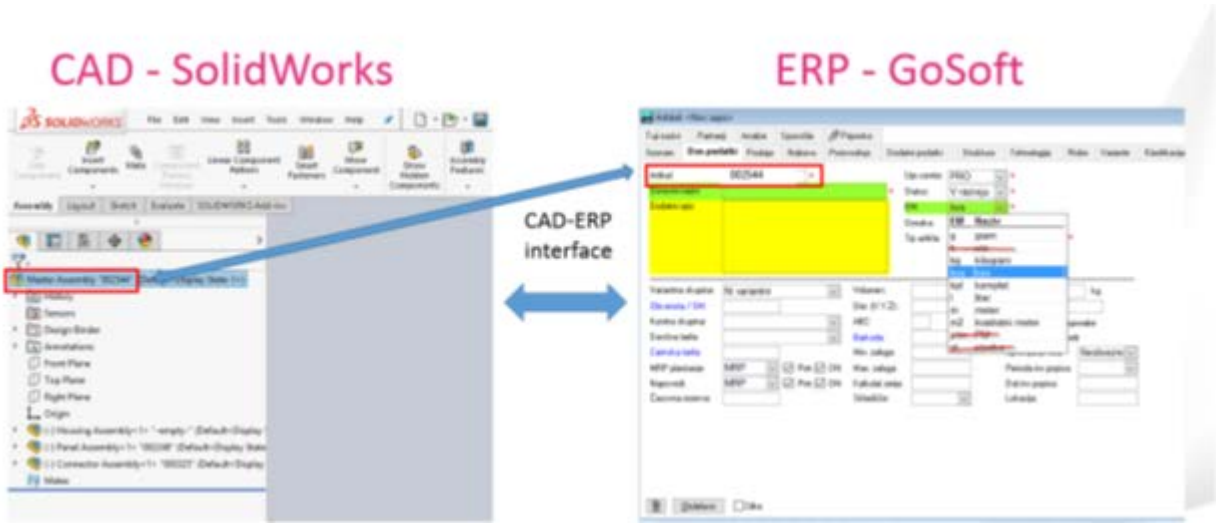


Figure 28: CAD-ERP interface

Keywords:

CAD Computer Aided Design
PLM Product Lifecycle Management
ERP Enterprise Resource Planning
Construction
Data Management
Bill of Material

Example of Product/Service usage:

Most production companies do not have their CAD or PLM system integrated with their ERP system. This way, product information has to be manually exchanged between systems which causes additional, unnecessary work and can easily cause errors and data multiplication.
By integrating these two systems, engineers have access to product data while doing construction work which improves use of existing parts, components and assemblies, and also the product data from current project is entered automatically into ERP system for further processing such as warehouse management, purchase etc.
Data duplication and redundancy is avoided and possibility of errors removed.

Improvement areas covered by the Product/Solution:

Implementation in the production processes

Product/Solution is related to the following type of implementation:

Improved coordination with suppliers
Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved agility and responsiveness in the production process

Improved product quality
Improved information for business analytics

Other relevant information about the product/service:

Attachment 1: HT- EUREP logo
Attachment 2: HT- EUREP presentation

Product/service technological focus:

Aerospace Technology
Construction Technology
Design and Modelling / Prototypes
Industrial Manufacture
Other Industrial Technologies

Market availability:

Available on the market.

4.14 Topomatika d.o.o.

Smart Factory solution Topomatika d.o.o.

TOPOMATIKA d.o.o.
Ilica 231, HR-10000 Zagreb,
Croatia
Contact person:
Tomislav Hercigonja

Type of organization:

SME

Market sectors:

Aeronautics industries
Automotive industry
Mechanical engineering

Services provided:

Engineering
Manufacturing
Research and development
OTHER – Quality Control and Testing

Type of solution:

Product
Service

Smart Factory description:

Topomatika d.o.o. deals with 3D digitization or 3D scanning, measurement and control of shapes, dimensions, displacement and deformations of objects ranging from ten millimeters to several tens of meters, reverse engineering, rapid prototyping and digital manufacturing.
For this purpose, we use the state-of-the-art three-dimensional optical measuring systems and software for:

- design and development,
- product quality control,
- design of models, tools and molds,
- copying parts and products,
- creating documentation, archiving and computer presentations

We are a competent team with many years of experience. We can help you to better, easier and faster implement your projects in: automotive industry, tooling, casting, polymers processing, sheet metal processing, shipbuilding, medicine, dentistry, architecture, archeology and many others.

Keywords:

3D measurement
3D scanning
Reverse Engineering
DSSP (Digital Shape Sampling and Processing)
Material and Component Testing
DIC

Example of Product/Service usage:

The 3D digitizer, for full-field measurements of surfaces, is utilized world-wide in the injection-molding and plastic-processing industry for form and dimension inspection of injection-molded parts.

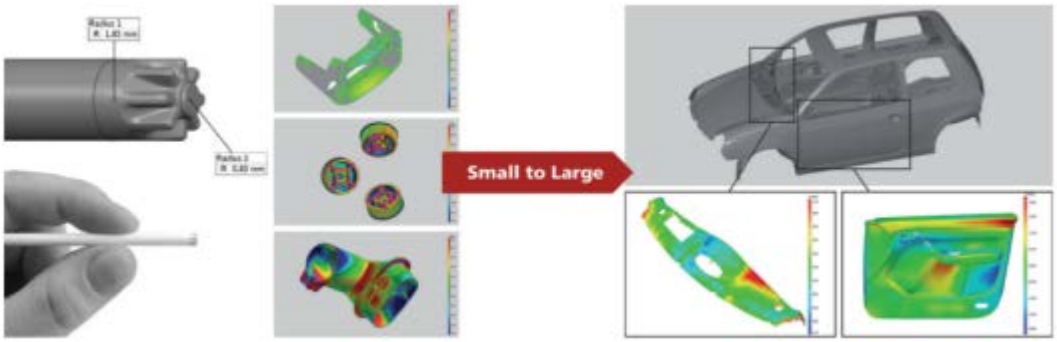


Figure 29: Application in automotive industry

Due to the 3D full-field color deviation plot, the evaluation of parts is considerably faster and much more efficient compared to conventional measuring methods. In particular warpage and shrinkage of injection-molded parts are fast and clearly displayed speeding up mold try-out and production control. Thus, the technology allows companies to keep pace with shorter product cycles and faster lead times.

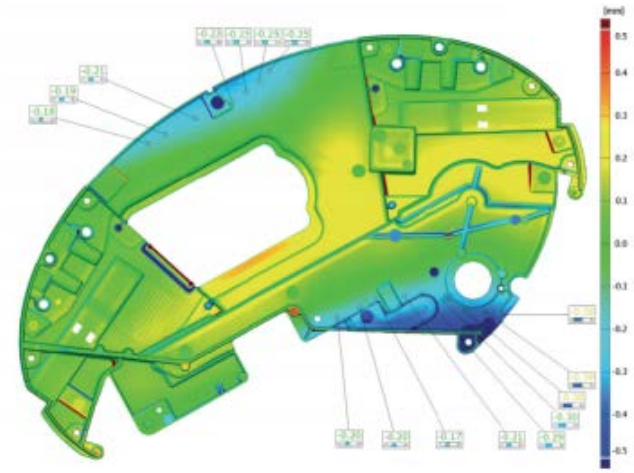


Figure: Optical 3D displacement and deformation measurement

Improvement areas covered by the Product/Solution:

Improved coordination with suppliers
Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved product quality
Improved coordination with customers
Improved compliance with customer specs or regulatory requirements

Product/Solution is related to the following type of implementation:

Implementation of the novel technology
Implementation in the production processes

Other relevant information about the product/service:

Attachment 1: Topomatika logo
Attachment 2: Topomatika presentation

Product/service technological focus:

Aerospace Technology
Design and Modelling / Prototypes
Industrial Manufacture
Materials Technology
Process control and logistics
Measurement Tools

Market availability:

Available on the market since 2000.

5 Smart Factory solutions from Czech Republic

5.1 Monarco HAT

Smart Factory solution Monarco HAT

REX Controls s.r.o.
Jeřabinová 30, 326 00 Plzeň,
Czech Republic
Contact person:
Jaroslav Sobota
Tel. +420 605 212 971

Type of organization:
SME

Market sectors:
- Manufacturing
- Mechanical engineering
- Automotive industry
- Electrical and electronic engineering industries

Services provided:
- Consulting
- Education/Training
- Research and development

Type of solution:
Product

Smart Factory description:
Monarco HAT is an add-on board which provides input-output interfaces following industrial automation standards for the Raspberry Pi (B+ and newer) minicomputer. It is designed according to the HAT (Hardware Attached on Top) specification. It enables collection of data from machines for its visualisation or evaluation.

This product was created in response to the demand of SMEs for upgrading or retrofitting existing control systems of machines. Monarco HAT is based around ARM Cortex-M3 microcontroller (MCU) which provides a wide set of embedded peripherals missing on the Raspberry Pi itself. It offers PWMs for all digital outputs, versatile counters including quadrature encoder signal

decoders, digital-to-analog and analog-to-digital converters, and RS-485 communication etc. ARM MCU can also provide very deterministic IO timing compared to Raspberry Pi with Linux.

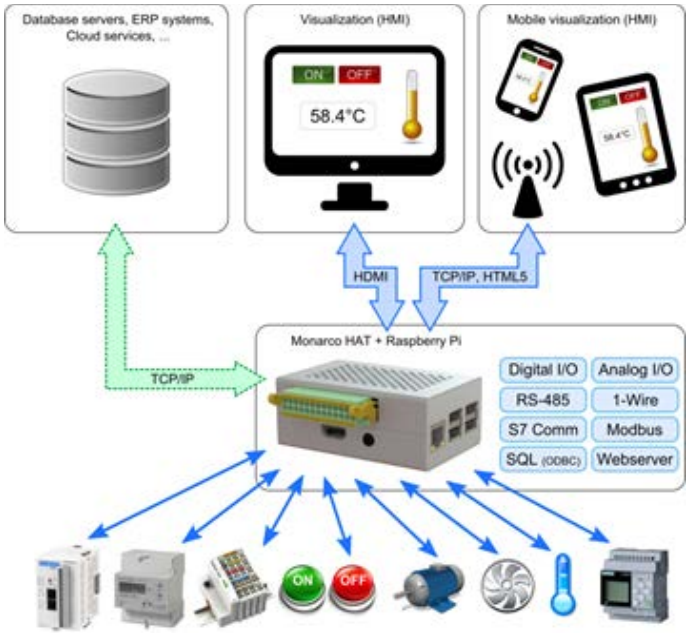


Figure: Functional scheme of Monarco HAT

Keywords:

Monitoring of machines
Monarco HAT
Raspberry Pi
REX control system

Example of Product/Service usage:

Below are the applications we had in mind when we designed the add-on board which we call the Monarco HAT.

- Reading and archiving data from standard industrial sensors.
- Monitoring of machines.
- Providing communication gateway between various devices.
- Feedback control in non-critical applications.

Here are a few examples of devices whose outputs can be handled by Monarco HAT digital inputs:

- utility meters (electricity, gas, water) with pulse output,
- standard quadrature encoders for position/velocity measurement,
- gear tooth sensors for position/velocity measurement,
- motor controllers with pulse/direction or quadrature position output,
- various industrial sensors (temperature, pressure, distance) with frequency output.

Improvement areas covered by the Product/Solution:

- Improved agility and responsiveness in the production process

- Lower energy costs
- Improved information for production decisions
- Improved remote monitoring capabilities
- Developed visualization capabilities

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology
- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Company presentation
- Attachment 2: Company logo
- Attachment 3: Monarco HAT logo
- Attachment 4: Promo Video link - Raspberry Pi as a 1-Wire data bridge for Siemens LOGO https://www.youtube.com/watch?v=rdosVtdxJac

Product/service technological focus:

- Industrial Manufacture
- Process control and logistics
- Electronic measurement systems
- Measurement Tools

Market availability:

Available on the market since 2016

5.2 Energy Monitoring and Management

Smart Factory solution Energy Monitoring and Management

Foxconn 4Tech s.r.o.
U Zámečku 27, 530 03 Pardubice,
Czech Republic
Contact person:
Pavel Vrba

Type of organization:

SME

Market sectors:

- Manufacturing
- Mechanical engineering
- Automotive industry

Services provided:

- Services
- Consulting
- Research and development

Type of solution:

Product, Software and service

Smart Factory description:

Foxconn 4Tech offers advanced solutions for energy measurement, optimization and management based on analysis and prediction of consumption in production or in commercial buildings using its own IoT devices, IoT industrial platform and predictive data analysis. We will help you get a detailed view of your energy consumption not only at the production hall or building level but also at the level of the line, room, machine, appliance and even individual product. Within one system, you will get an overview of electricity, water and gas consumption, as well as other environmental parameters such as temperature, humidity, CO_2 levels and more.

We offer the ability to link consumption data with order data from MES or ERP manufacturing systems to offer the option of distributing energy to a production batch or a single piece of product. Using advanced data analysis, we find places of inefficient use of energy. According to

the production plan, we can predict future energy consumption and design a strategy and production management to prevent the payment of penalties for exceeding the contracted limits.

What makes our solution different

Compared to competing energy-monitoring products available on the market, we offer a complete and affordable solution that besides standard data monitoring and visualization offers the following advanced features:

- Integrated predictive data analysis in real time
- XaaS in a cloud environment
- Link to production and other MES / ERP type information systems
- Utilization of the universal Foxconn 4Tech IIoT platform
- Versions differentiated by level of data analysis and integration with enterprise-wide systems

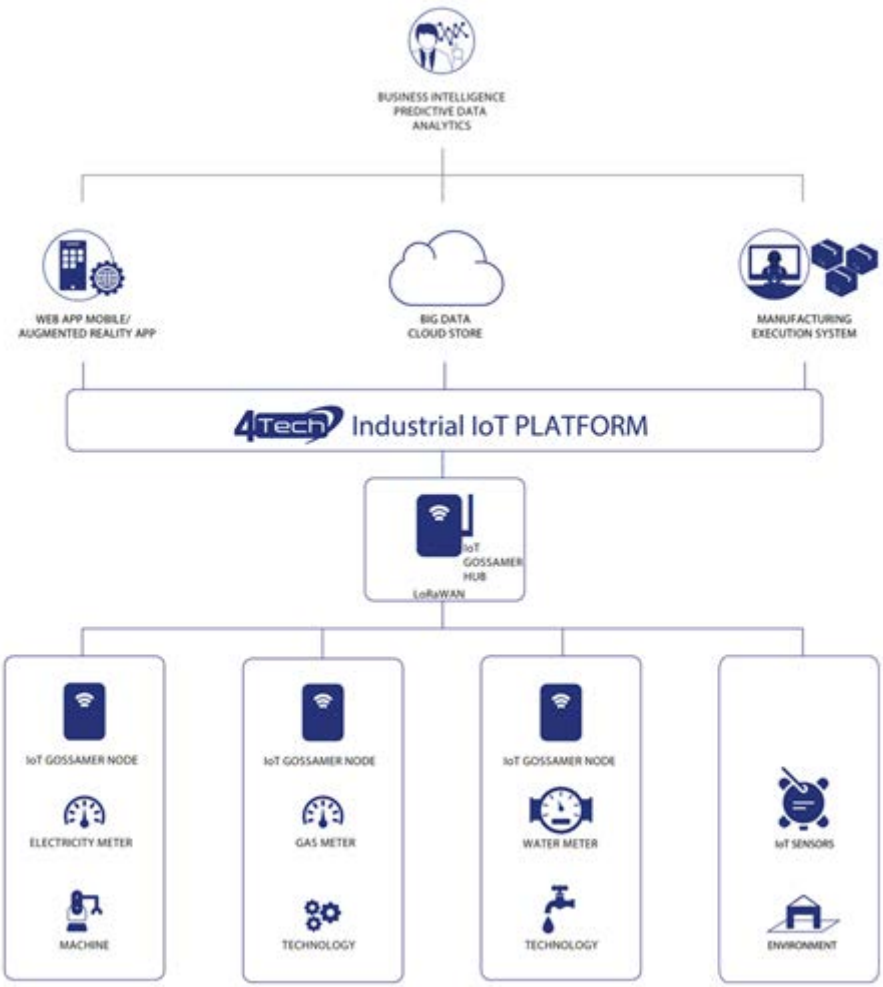


Figure: Foxconn 4Tech Ecosystem of energy control and prediction

Figure: Set for data gathering from machines - Gossamer NODE and Gossamer HUB

Keywords:

Monitoring of machines
Energy efficiency
IoT platform

Example of Product/Service usage:

- An overview of the use of energy, costs and potential savings in industrial plants and commercial buildings.
- Optimizing energy consumption using predictive data analysis.
- Monitoring of real-time electricity, water and gas consumption at factory, line, machine and product / building, floor, room.
- Managing consumption so that you do not incur penalties for exceeding the contracted quarter-hour maximum.
- Limiting the waste of energy resources helps to reduce the carbon footprint in production.
- Optimizing the contract with an energy supplier, reducing unnecessary costs for unused reserves.

Improvement areas covered by the Product/Solution:

- Improved agility and responsiveness in the production process
- Improved information for production decisions
- Efficiency
- Decreased manufacturing costs
- Lower energy costs
- Developed visualization capabilities

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology
- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Company presentation
- Attachment 2: company logo
- Attachment 3: Promo Video link - Industrial IoT Energy Monitoring & Management https://www.youtube.com/watch?v=aUPyROzZzxY

Product/service technological focus:

- Industrial Manufacture
- Process control and logistics
- Electronic measurement systems

Market availability:
Available on the market since 2016.

5.3 AI Machine Vision

Smart Factory solution AI Machine Vision

Foxconn 4Tech s.r.o.
U Zámečku 27, 530 03 Pardubice,
Czech Republic
Contact person:
Robet Šuhada

Type of organization:

SME

Market sectors:

- Manufacturing
- Mechanical engineering
- Automotive industry
- Electrical and electronic engineering industries

Services provided:

- Services
- Consulting
- Research and development

Type of solution:

Product, Software and service

Smart Factory description:

Artificial Intelligence (AI) is revolutionizing many areas of human life including business and industry. This revolution is driven mostly by utilizing so called Deep Neural Networks – algorithms initially inspired by the functioning of human brain. Fundamental discoveries in this field were recently made possible thanks to growing computing power, access to huge data sets and scientific advances how to “train” deep neural networks to perform very well on many real-world applications.

One of the areas where AI has a big impact is visual inspection of products and materials. Many factories and businesses still rely on human operators for visual control of quality and classification of material parts. These tasks were very hard, or even impossible, to automatize with “classical” approaches. But now, with the power of deep neural networks,

we can finally make huge progress in automatizing even these hard cases and save work for human operators.

What makes our solution different

We use the best algorithms developed by experts on artificial intelligence and we draw on their many years' experience with integrating machine visualization solutions in industrial processes. The models we design can work reliably in difficult and non-standard conditions and can, over time and with more collected data, improve. Part of our solutions is also design and integration of optical components (cameras, lighting, assembly) in production processes together with the development of the most modern neural networks for visual inspection and the accompanying classification software.

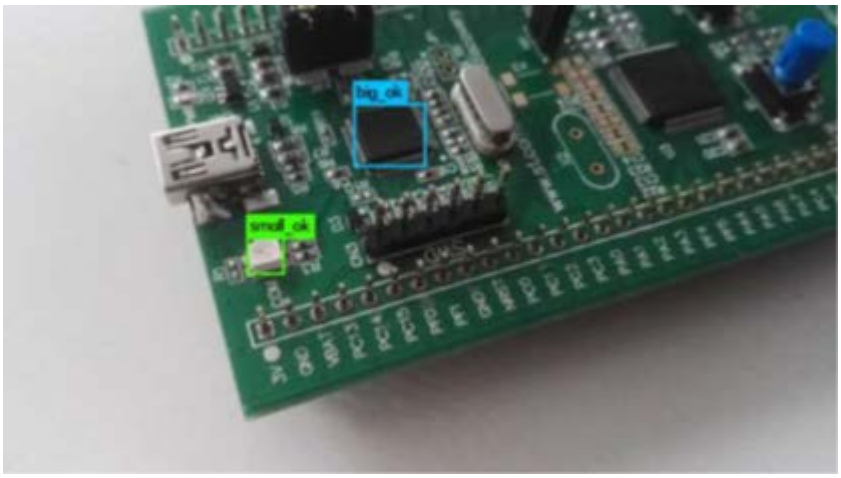


Figure: Chip component classification

Keywords:

Monitoring of machines
Energy efficiency
IoT platform

Example of Product/Service usage:

- Full-fledged, integrated solutions including hardware, software and deep-learning models
- Faster and highly accurate than human implementation
- Replaces human visual controls with an automated system
- Cuts costs for an optical equipment because it can work with cheaper cameras and in worsened lighting conditions
- Stable classification and detection during full work processes
- You will achieve outstanding accuracy for classification
- Saves operating time when implementing the solution and re-training components or processes change often
- Boosts process efficiency because it's faster and more thorough than humans are.

Improvement areas covered by the Product/Solution:

- Production process
- Improved agility and responsiveness in the production process
- Efficiency
- Improved product quality
- Decreased manufacturing costs
- Lower energy costs
- Developed visualization capabilities

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology
- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Company presentation
- Attachment 2: Company logo
- Attachment 3: Promo Video link - Machine Vision with Artificial Intelligence https://www.youtube.com/watch?v=WGBVJ6bdGw4
- Attachment 4: Promo Video link - AI Visual Inspection Application testing https://www.youtube.com/watch?v=AlQrbJ4s3-c

Product/service technological focus:

- Industrial Manufacture
- Process control and logistics
- Electronic measurement systems

Market availability:
Available on the market since 2017.

5.4 Virtual reality work instructions

Smart Factory solution - Virtual reality work instructions

Univesity of West Bohemia
Univerzitní 8, 306 14 Plzeň, Czech Republic
Contact person:
Marek Bureš
Tel. +420 606 050 830

Type of organization:
University

Market sectors:
- Manufacturing
- Mechanical engineering
- Automotive industry
- Electrical and electronic engineering industries

Services provided:
- Research and development
- Education/training
- Consulting

Type of solution:
Software and service

Smart Factory description:
If a company recruits new workers, they have to be trained and the faster they learn, the sooner they can effectively perform the necessary tasks. Virtual guides are not only suitable for training of new employees, but they can be effectively used if there is a wide range of products in the company. If the employees don't perform these processes daily, they do not need to remember the exact procedures and steps.
In addition to promptly training of new employees and thus increasing their performance, the errors are reduced or completely eliminated, and the resulting ease of work due to inappropriately mounted parts and subsequent removal of faulty components occurs. Virtual working instructions can be easily done in language versions and therefore are also suitable for foreign agency workers. There is also no possibility for operators when using virtual instructions

to skip a step and thus create a scrap. In the case of virtual instructions, every step after completion has to be confirmed by pressing the button and therefore can't be omitted by mistake.

The innovative nature of this solution is that it provides animated instructions for the operators training and work which makes their activities more efficient. The instruction can be performed as fully virtual or in mixed reality (augmenter reality). In industrial praxis the visualisation on LCD display or tablet, smartphone proved as satisfying. The system was developed with aid of Unity 3D software package.

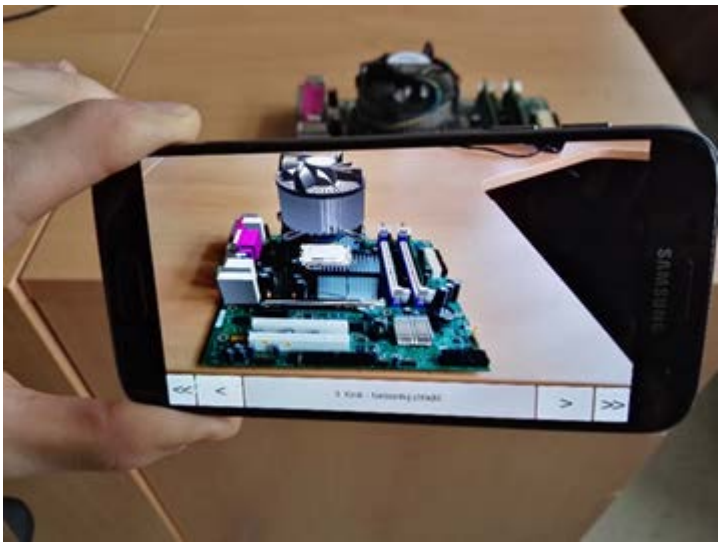


Figure: Augmented reality work instruction visualised by smartphone

Keywords:

Virtual work instructions
Augmented reality
Assistive technology
Operator empowerment

Example of Product/Service usage:

- Assembly work instructions
- Training manuals/instructions
- Maintenance instructions

Improvement areas covered by the Product/Solution:

- Increased speed of production operations
- Developed visualization capabilities
- Improved agility and responsiveness in the production process

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology

- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Company presentation
- Attachment 2: Company logo
- Attachment 3: Promo Video link - Augmented Reality Assembly Instructions https://www.youtube.com/watch?v=VoONyqt4Al8&feature=share

Product/service technological focus:

- Industrial Manufacture
- Process control and logistics

Market availability:

Available on the market since 2018.

5.5 Metal additive manufacturing

Smart Factory solution Metal additive manufacturing

Regional Technological Institute
Univerzitní 8, 306 14 Plzeň,
Czech Republic
Contact person:
Ing. Miroslav Zetek, PhD.
Tel. +420 377 638 787

Type of organization:

Research and Development

Market sectors:

- Manufacturing
- Mechanical engineering
- Automotive industry

Services provided:

- Research and development
- Consulting

Type of solution:

Service/Product

Smart Factory description:

The Experimental Machining Laboratory focuses on the advanced designing and manufacturing of cutting tools, including preparation of their microgeometry, detailed measurements and grinding of sculptured surfaces, polishing, flute shape analysis, design of the grinding wheel shape, 3D printing of metallic parts, design of supports for 3D printing, and optimization of 3D printing parameters.

For additive manufacturing an EOS M290 3D metal printer is utilized. This printer uses the principle of Direct Metal Laser Sintering (DMLS). The printed object is built from thin layers which are formed by melting by a laser. This allows the creation of components with any external, and in particular internal, forms, which cannot be produced using conventional methods. Tool steel MS1, Inconel 718 and stainless steel 316L are currently used for the manufacture of metal components in the laboratory.

Figure: EOS M290 3D metal printer

Keywords:

3D printing
Design of supports for 3D printing
Experimental Machining
Machining strategy
NC Programming and parameters optimisation

Example of Product/Service usage:

When additive manufacturing technology is used for the production, it is possible to reduce tool weight by more than 50 %, and optimise the internal cooling system for the rake and clearance faces which provide the following benefits:

- Use of a bigger cutting tool diameter than is normally possible.
- Increasing the cooling liquid speed or change of cooling principle (sputtering).
- Increasing the cutting tool life.
- Reducing the energy intensity of the machining process.
- Improving the workpiece surface integrity (roughness, stress, accuracy).
- Increasing the machine spindle safety and serviceability.
- Shortening the cutting tool production times.
- Reduction of the total machining costs.

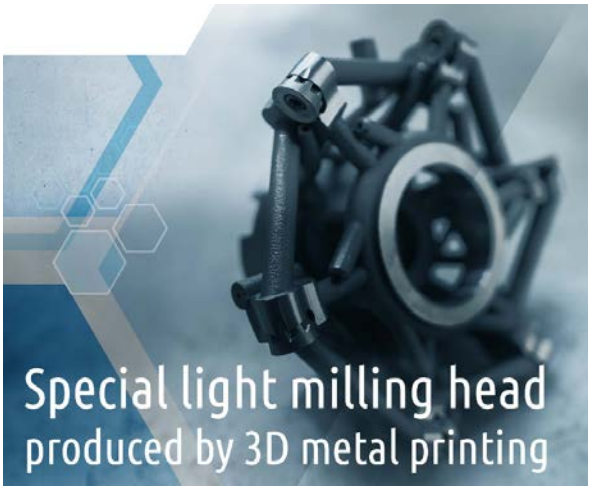


Figure: Revolutionary patented design of a milling head

Improvement areas covered by the Product/Solution:

- Increased speed of production operations
- Decreased manufacturing costs
- Improved product quality

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology
- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Company presentation
- Attachment 2: Company logo
- Attachment 3: Promo Video link - Special light milling head produced by 3D metal printing https://youtu.be/UZ37FXjmbV4

Product/service technological focus:

- Industrial Manufacture
- Machining

Market availability:

Available on the market since 2014.

5.6 Optimisation of products by numerical simulation methods

Smart Factory solution Optimisation of products by numerical simulation methods

Regional Technological Institute
Univerzitní 8, 306 14 Plzeň,
Czech Republic
Contact person:
Ing. Zdeněk Chval, Ph.D.
Tel. +420 377 638 741

Type of organization:

Research and Development

Market sectors:

- Manufacturing
- Mechanical engineering
- Automotive industry

Services provided:

- Research and development
- Consulting

Type of solution:

Service

Smart Factory description:

The Virtual Prototyping Laboratory focuses on virtual product development. It relies on the latest CAx tools for designing structures and for advanced computational analysis. Optimisation software enables the laboratory to develop effective structures and improve the utility value of existing solutions. The key activities are:

- Structural analysis
- Modal analysis
- Topology optimisation
- Rapid dynamic phenomena
- Composite materials

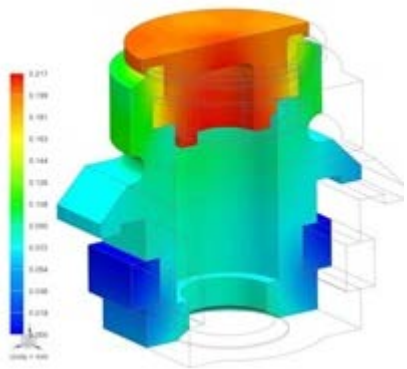
- Advanced machining simulations
- 3D printing with composite fiber
- Simulation of forming technologies
- Simulation of injection processes

Keywords:

Virtual prototyping
Topology optimisation
3D printing

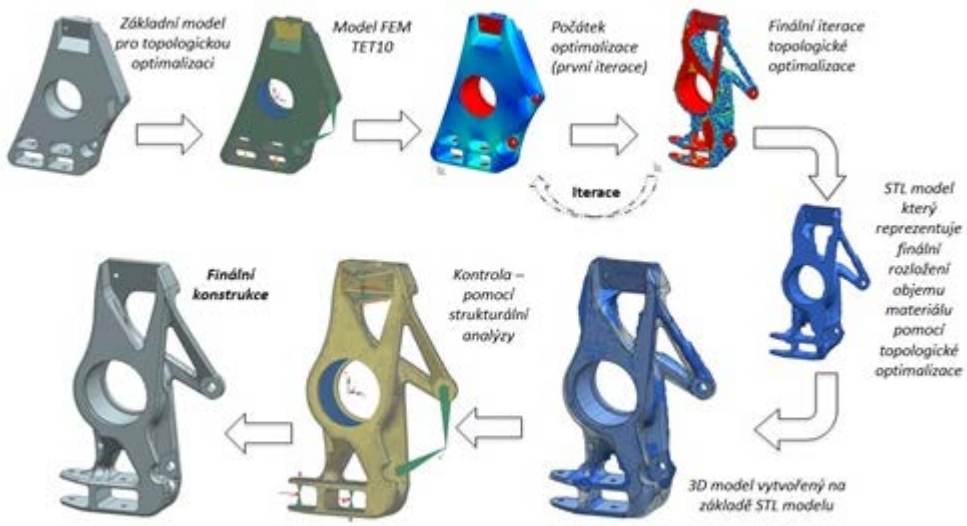
Example of Product/Service usage:

Structural analysis - Basic simulations which we perform are structural calculations which are limited to the field of linear statics. Typical examples include strength and deformation calculations of structures involving 2D elements or more sophisticated spatial models with 3D elements.

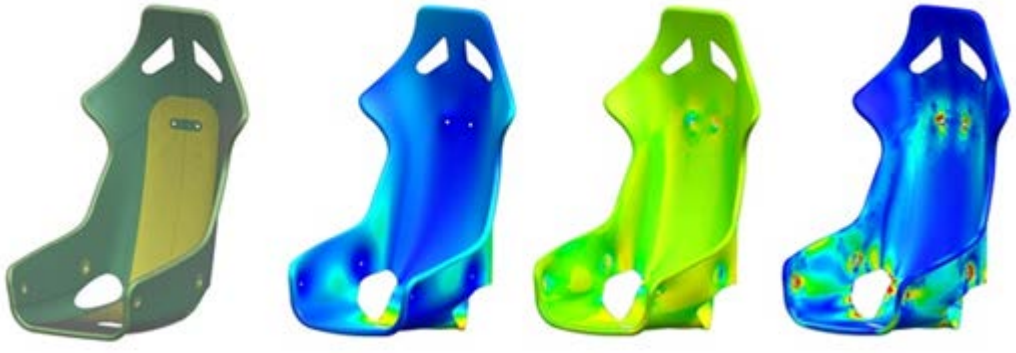


Modal analysis - Modal analysis is the second most frequent choice for verifying the design of a component and it is an essential starting point for developing components for operation under dynamic loads. The calculation identifies the first normal mode of the structural units. It is followed by dynamic calculations.

Topology optimisation - Topology optimisation is used to find the optimal material layout within a specified space in order to provide the optimum stress distribution across a structure.



Composite materials - Designing, optimizing and verifying existing structures made from composite materials. Analysis takes into account overlapping layers of individual materials, including calculation of distortion of the layers and the resulting direction of fibres in relation to the surface shape and coordinate system. This type of analysis can be carried out on components formed from uni-directional (e.g. wound) fibres and on multi-layered components formed from various materials or pre-impregnated fibres, including the implementation of an isotropic or orthotropic core.



3D printing with composite fiber - Creation and customization of product models for additive manufacturing. 3D printing of functional and very resistant components. The Markforged Mark Two printer prints nylon or nylon filled with short carbon fibres and is able to reinforce parts with continuous carbon, Kevlar or glass fibres.

Improvement areas covered by the Product/Solution:

- Decreased manufacturing costs
- Improved product quality

Product/Solution is related to the following type of implementation:

- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Company presentation
- Attachment 2: Company logo

Product/service technological focus:

- Industrial Manufacture
- Machining

Market availability:
Available on the market since 2014.

5.7 DCIxMES

Smart Factory solution DCIxMES

AIMTEC a.s.
Hálkova 32, 301 22 Plzeň,
Czech Republic
Contact person:
Daniel Choc
Tel. +420 377 225 215

Type of organization:
SME

Market sectors:
- Automotive industry
- Manufacturing
- Mechanical engineering
- Electrical and electronic engineering industries
- Food industry

Services provided:
- Consulting
- Research and development
- Services

Type of solution:
Software and service

Smart Factory description:
DCIx MES shows a detailed overview about the up-to-date production orders status, personnel and production facilities timesheets and activities, including adherence to technological procedures.
Service oriented architecture enables fast integration with other IT systems (like ERP, WMS or shop floor IT systems). DCIxMES enables factory managers and line manager to make quick, informed decisions about their processes with all the data from the machine, workers and other systems available at their fingerprints.

- **Digital picture of production status in each and every moment** - It allows to collect data from individual production facilities, assembly lines, and teams of workers. These data are being integrated into a single source, which provides data for operative management of production, production planning and purchases, improving efficiency and enhancing standards then.
- **Traceability** - It provides data that serve for complete backward and forward traceability. This can drill down to individual products, handling units, or production batches/lots.
- **Managing production process in accordance with technological procedure** - It controls production, so that sequence of production operations is observed, and the production takes place in accordance with specified conditions as per the technological procedure. At the same time it takes care of utilisation of production facilities in relation to production costs, utilisation of bottle necks, and optimum logistical flows.

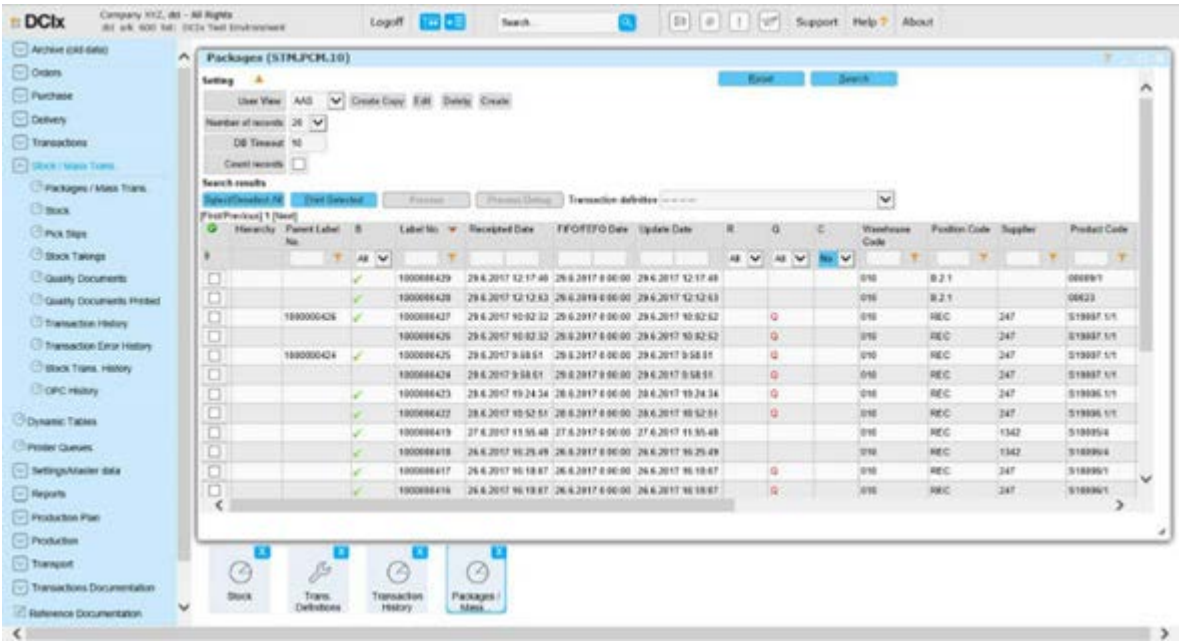


Figure: Example of DCIx interface

Keywords:

Factory management
Production management
Traceability
Maintenance
Visualization

Example of Product/Service usage:

- **Clear visualization** - Production status is evident without complicated computation and detection - using colours, symbols, and charts.

- **Graphical scheduling board** - Graphical board supporting operative management and evaluation of the production current status.
- **Maintenance** - Records keeping and management of machines and tools maintenance.
- **Qualifications** - Records keeping and management of workers qualifications.
- **Escalation** - Automated identification and notification of a specified event.
- **Traceability** - Forward and backward traceability of a production batch or a product.
- **Material record keeping** - Record keeping and management of material flows, including automated replenishment for individual workplaces.

Improvement areas covered by the Product/Solution:

- Increased speed of production operations
- Decreased manufacturing costs
- Improved information for production decisions
- Improved agility and responsiveness in the production process
- Improved information for business analytics
- Improved remote monitoring capabilities
- Developed visualization capabilities

Product/Solution is related to the following type of implementation:

- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Company presentation
- Attachment 2: Company logo
- Attachment 3: Video about SF solution https://www.youtube.com/watch?v=A3Z_5fL15NM

Product/service technological focus:

- Industrial Manufacture
- Process control and logistics
- Information Processing & Systems, Workflow
- IT and Telematics Applications

Market availability:
Available on the market since 2001

5.8 Robotic solutions

Smart Factory solution Robotic solutions

AXIOM TECH s.r.o.
Kamenná 2525, 760 01 Zlín,
Czech Republic
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Pavel Čejka
Tel. +420 565 651 116

Type of organization:
SME

Market sectors:
- Manufacturing
- Mechanical engineering
- Automotive industry
- Electrical and electronic engineering industries

Services provided:
- Services
- Consulting
- Research and development
- Education/Training

Type of solution:
Service

Smart Factory description:
Our services include robot commissioning, simulation, online and offline programming of industrial as well as collaborative robots.

Process Simulate (PS) Robotics is a digital simulation solution for verifying the production process using robots in a 3D environment. The Simulation 3D Environment is connected with Process Designer and Teamcenter Manufacturing, and is fully synchronized with their current metadata. The ability to use 3D product and resource data makes virtually verify, optimize and deploy complex manufacturing systems easier which is a result of faster startups and higher production quality.

Thanks to its connection with PS Human, PS Virtual Commissioning and PS Assembly offers a unique and scalable solution not only for off-line robot programming but also for simulation of entire production lines, including feasibility of assembly, deselecting control unit signals and verifying design and wiring functionality. PS Robotics covers a wide range of robotic applications from Pick & Place, packaging and assembly, spot, arc and laser welding, to milling, deburring, bonding, grinding, polishing, painting and laser and water jet cutting. Of course, it is possible to record the created programs into robots and also, the program from the robot can be loaded directly into PS Robotics, where it can be edited arbitrarily. With the use of virtual robot controllers, maximum simulation accuracy is achieved, and the robot program is then generated without the need for postprocessing. A major area of application is occupational safety. Thanks to the simulation of industrial robots in a single Process Simulate environment, it's also easy to verify that there are no dangerous situations in a machine / robot interaction in the workplace.

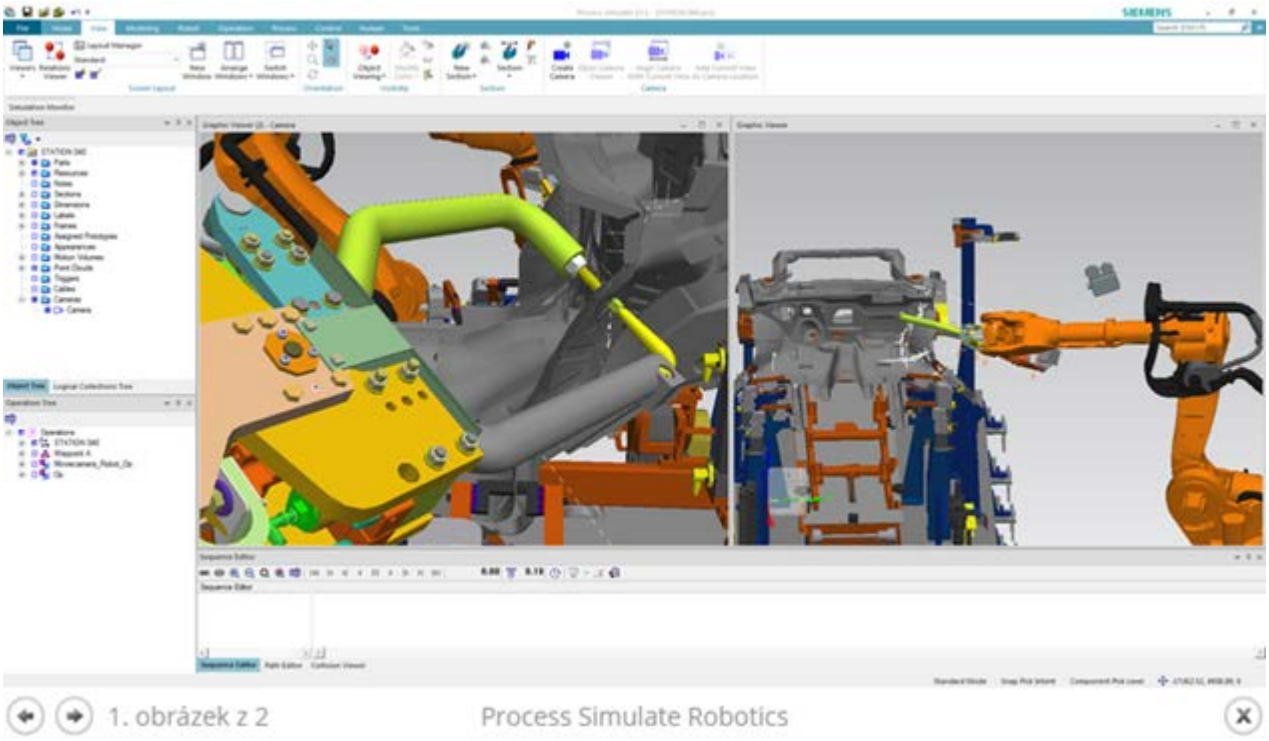

Figure: Simulation of welding robot in Process Simulate Robotics

Keywords:

Robot commissioning
Virtual verification
Work Safety
Performance

Example of Product/Service usage:

- Robot Commissioning, Off-line programming and simulation
- Experience with applying robot applications: Handling, Welding, Gluing, Screwing and other.
- Assisting and Support in debugging for automatic operations

- Providing procedure optimisation for meeting quality demands
- Cycle time optimisations with adjusting robot paths and logic
- Provide technical support in developing and improving processes in off-line cell simulation

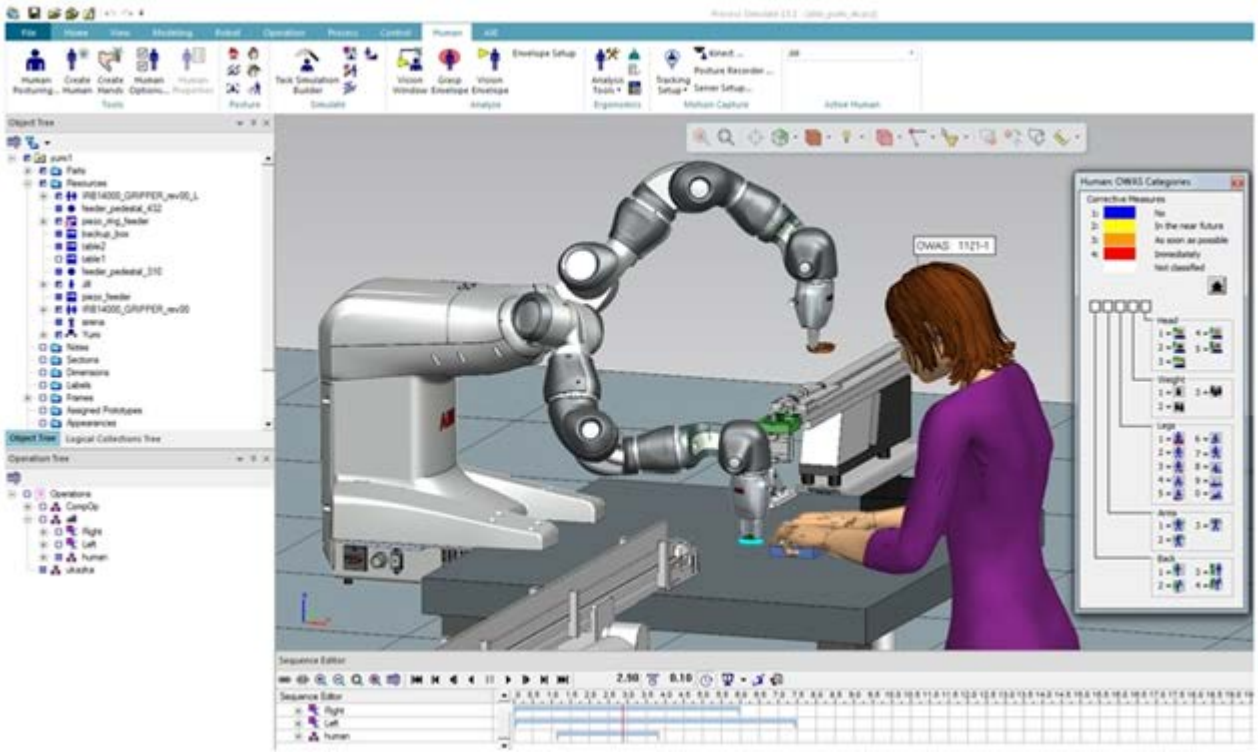

Figure: Simulation of man – robot environment in Process Simulate Human

Improvement areas covered by the Product/Solution:

- Efficiency
- Increased speed of production operations
- Improved maintenance/uptime
- Decreased manufacturing costs
- Lower energy costs
- Increasing production / assembly safety

Product/Solution is related to the following type of implementation:

- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Company presentation
- Attachment 2: Company logo
- Attachment 3: Video about SF solution - https://www.youtube.com/watch?v=x3coyPQNsjY

Product/service technological focus:

- Automotive industry
- Industrial Manufacture
- Process control and logistics

Market availability:
Available on the market since 1993.

5.9 FANUC Robotic Automation

Smart Factory solution FANUC Robotic Automation

ARC-Robotics s.r.o.
Obchodní 1279/1, 301 00 Plzeň,
Czech Republic
Contact person:
Michael Froněk
Tel. +420 371 004 531

Type of organization:

SME

Market sectors:

- Automotive industry
- Manufacturing
- Mechanical engineering
- Electrical and electronic engineering industries
- Food industry

Services provided:

- Consulting
- Research and development
- Services

Type of solution:

Product and Service

Smart Factory description:

Full customer service in robotics application is company's main target. The company is specialised in FANUC robots. FANUC is the number one in the automatic and industrial robotic market. FANUC develops high-tech product with characteristic such as "intelligence, "super-accuracy" and "highest functionality", which at the same time fulfil base company strategy – "highest reliability" in the product development. One third of Japanese FANUC employees works in R&D for FANUC products.

All FANUC products are developed and produced in Japan. That works thanks to fully automatic and robotic production lines. FANUC use wide range of robots in own production activities. With more than 1000 robots, which work in FANUC factories. Company FANUC installed high intelligent robots too, for better effectivity of production processes and assembly, and support increasing of technical and financial advantages of advanced automation in FANUC factories. FANUC effectively make advantage of own wide experiences in using own high-tech product in production plants and confirm that automation and robotic brings high efficiency and cost reduction into the production.

Figure: Palletisation with FANUC robots

Keywords:

FANUC
Robotic
Automation
Industry

Example of Product/Service usage:

- Various robots with wrist load from 2 to 1350 kg (handling with products, spot welding, cutting, polishing…)
- Palletizing, packaging, robot for pick& place application (including food industry)
- Welding robots and positioners
- Painting
- Off-line software FANUC Roboguide

- Application software
- Software options according to application

Improvement areas covered by the Product/Solution:

- Increased speed of production operations
- Improved agility and responsiveness in the production process
- Improved safety
- Decreased manufacturing costs
- Improved agility and responsiveness in the production process
- Efficiency

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology
- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Company presentation
- Attachment 2: Company logo
- Attachment 3: Promo Video link – FANUC CR-35iA – Collaborative Robot https://www.youtube.com/watch?v=tlgKsTMmywk

Product/service technological focus:

- Industrial Manufacture
- Machining
- Automotive industry
- Process control and logistics

Market availability:

Available on the market since 2011.

5.10 Collaborative Robotics

Smart Factory solution Collaborative Robotics

AMTECH, spol. s r. o.
Škrobárenská 506/2, 617 00 Brno,
Czech Republic
Contact person:
Tomáš Ševčík
Tel. +420 736 532 881

Type of organization:

SME

Market sectors:

- Automotive industry
- Manufacturing
- Mechanical engineering
- Electrical and electronic engineering industries
- Food industry

Services provided:

- Consulting
- Research and development
- Services

Type of solution:

Product and Service

Smart Factory description:

Company Amtech is a main implementer of collaborative robots from Universal Robots and Mobile Industrial Robtos the Czech Republic. If the purchase of collaborative robot is not viable the Amtech is able to rent the robot which can cooperate with the worker and is easy to program them. It can be deployed on a wide range of applications in all industry sectors. It is possible to use it for taking material from the boxes, servicing the injection press, inserting into CNC, assembling, screwing, welding, palletizing, rolling, classifying or pressing.

Figure: Collaborative robot UR3

Or you can rent mobile collaborative robots (also known as AGV) especially type MiR 100, MiR 200 or MiR 500. You can transport anything anywhere with those robots.

Figure: Mobile collaborative robot MiR200 and MiR500

Collaborative robots (cobots) are helping bridge the skills gap in manufacturing operations from small and mid-sized companies to huge multinationals.

Keywords:

Automation
Robotic
Industry
Universal Robots

Example of Product/Service usage:

- Screwing
- Palletizing
- Rolling
- Pressing
- Taking material from the boxes
- Assembling

Improvement areas covered by the Product/Solution:

- Increased speed of production operations
- Improved agility and responsiveness in the production process
- Improved safety
- Decreased manufacturing costs
- Improved agility and responsiveness in the production process
- Efficiency

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology
- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Company presentation
- Attachment 2: Company logo
- Attachment 3: Promo Video link – Easy automation with collaborative robots https://www.youtube.com/watch?v=pIcxOGo7ieU
- Attachment 4: Promo Video link – Transport Anything Anywhere with MiR Robots https://www.youtube.com/watch?v=0IFP8M1BRPg

Product/service technological focus:

- Industrial Manufacture
- Machining
- Automotive industry
- Process control and logistics

Market availability:

Available on the market since 2015.

5.11 Real Time Location System

Smart Factory solution Real Time Location System

Sewio Networks s.r.o.
JIC, INMEC, Purkyňova 649/127,
612 00 Brno,
Czech Republic
Contact person:
David Prycl
Tel. +420 775 111 781

Type of organization:
SME

Market sectors:
- Logistics
- Manufacturing
- Automotive industry

Services provided:
- Consulting
- Services

Type of solution:
Product and Service

Smart Factory description:
A real-time location system (RTLS) grants the knowledge of the exact position of forklifts, vehicles and operators at any given time. Based on previously collected data, an RTLS allows to analyse traffic and enables to identify and eradicate workflow bottlenecks, saving time and money.
Navigation and tracking functions make it possible to keep constant track of all monitored objects. The logistics process will be faster and smoother, as a result of an optimization process based on previously collected data. With RTLS Sewio, all they have to do is take a look at the tracking statistics to find out. As the data can be accessed quickly, they can easily implement improvements to his business processes, which enables improved asset utilization and cost optimization. RTLS Sewio has an Acces Control which helps you to keep an eye on your equipment, trolleys or employees with RTLS and establish software zones. There software zones are not physically visible, but if a person enters them, the

program automatically registers and tracks their movements. You can also bolster security and lower the risk of workplace accidents with a RTLS by accurately predicting real-time asset and staff collisions. Safety should come first in the list of workplace priorities. As a result, RTLS platform may be used to develop a speed control function to bolster security. The program evaluates, for example, that a forklift is moving too fast in controlled zone and automatically slows it down. It can also predict collisions and prevent them by bringing the cart to a standstill. Using RTLS platform may help to automatically identify and to track the location of particular worker and sends the relevant task directly to the worker´s tablet. This helps save the time it takes for employees to walk from one part of the warehouse to another in order to receive their next task. Moreover, employees are directed effectively to a new task. When RTLS detects a truck blocking the nearest aisle, the worker is automatically navigated to a different route in order to reduce time.

Figure: RTLS-TDoA Kit

Keywords:

RTLS – Real-time location system in industry
Warehouse
Traffic

Example of Product/Service usage:

- Development of competences
- Lower risk of workplace accidents
- Control tracking statistics
- Keep constant track of all monitored objects
- Knowledge of the exact position of forklifts, vehicles and operators at any time

Improvement areas covered by the Product/Solution:

- Increased speed of production operations
- Decreased manufacturing costs
- Improved information for production decisions
- Improved agility and responsiveness in the production process

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology
- Implementation in the production processes

Other relevant information about the product/service:

- Attachment 1: Company presentation
- Attachment 2: Company logo
- Attachment 3: Promo Video link – Fleet management system powered by Real time location system
  https://www.youtube.com/watch?v=gdNKdxrJryY
- Attachment 4: Promo Video link – RTLS - TDoA Kit video install guide
  https://www.youtube.com/watch?v=uPJ7uCVNxlg

Product/service technological focus:

- Industrial Manufacture
- Machining
- Automotive industry
- Process control and logistics

Market availability:

Available on the market since 2014.

6 Smart Factory solutions from Germany

6.1 cubu:S

Smart Factory solution cubu:S

Schnaithmann Maschinenbau GmbH
Fellbacher Str. 49, 73630 Remshalden – Grunbach,
Germany
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Volker Siebert
Tel. +49 (0) 7151 / 97 32 - 0

Type of organization:
SME

Market sectors:
Mechanical engineering

Services provided:
Engineering
Manufacturing
Research and development

Type of solution:
Product

Smart Factory description:
cubu:S is an intelligent and networkable infrastructure for manual workstations, primarily for assembly, packaging and order picking. The system was developed to support the employees at the assembly station to minimize possible user errors.

The technical solution is that a motion sensor from consumer electronics was integrated into the system. By combining it with a commercially available beamer and a PC, it was possible to design a flexible system with minimal hardware requirements.
A completely new kind of human-machine interaction is realized in the system itself. The use of “intelligent” component containers opens up unimagined possibilities for flexibility along the entire value chain.
The individual work steps are projected onto the assembly table. The "Pick-by-Light" principle is used to visualize the component removal from the correct container.

Keywords:

employee support
assembly assistance system

Example of Product/Service usage:

A profile system with many possibilities: The flexible profile system offers a huge basic range for all material flow and handling tasks in workshops, warehouses and offices. The entire spectrum ranges from individual components and simple racks to the provision of materials to custom-made multifunctional workstations.

Today's production lives from rapid changes. Especially at workplaces, the question arises: With which system can I remain flexible in the end? This can only be answered individually. Accordingly, fast, tried-and-tested solutions are needed. These should be able to be implemented independently of the location, should remain as adaptable as possible and should always be able to cope with the dynamics of production. This is all possible with cubu:S

Figure: cubu:S

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Improved agility and responsiveness in the production process
Improved product quality
Improved maintenance/uptime

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment1: Company logo

Attachment 2: Video demonstration https://www.youtube.com/watch?v=vE8h1qb7J3w

Product/service technological focus:

Industrial Manufacture

Process control and logistics

Market availability:

Available on the market since *unknown*.

6.2 Schlauer Klaus

Smart Factory solution Schlauer Klaus

OPTIMUM datamanagement solutions
Hirschstraße 12-14, 76133 Karlsruhe, Germany
Contact person:
Wolfgang Mahanty
Tel. +49 (0) 721 / 570 44 95-0

Type of organization:
SME

Market sectors:
Mechanical engineering

Services provided:
Engineering
Manufacturing
Research and development

Type of solution:
Product

Smart Factory description:
The intelligent database supported image processing software "Smart Klaus" was developed as an assistance system that offers a perfect solution to these challenges. Where RFID and barcodes reach their limits, industrial image recognition plays to its strengths along the entire supply chain - sometimes in combination with existing systems - or can even replace them with intelligent feature recognition.

The production process is thus facilitated.
One or more cameras record the passing products. The software checks the image for certain characteristics. Intelligent algorithms then recognize distinctive points and compare them with the database. On the basis of the stored characteristics, the "Schlaue Klaus" now identifies and checks the products. If the system detects an error, the "Schlaue Klaus" outputs a signal in the form of a tone or screen hint. The employee receives a note.

There are similar solutions which, like the “Schlaue Klaus”, support the worker. However, they all have other advantages and disadvantages. However, the “Schlauer Klaus” is the solution with the most functions and the best development.

Keywords:

Intelligent image processing for industry 4.0
assembly assistance system

Example of Product/Service usage:

The system masters the challenges of incoming goods inspection with speed and precision by recognizing the different parts in a flash or ensures direct cost savings when taking back products and components.
The “Schlaue Klaus” supports the employees in production and assembly to master the tasks within the shortest time and with absolute precision. The software solution guides the workers (by displaying the next step on the monitor), checks and confirms the individual steps and finally documents the results.
The image recognition program is particularly in demand in quality assurance for products with many features that have to be checked within a very short time, because it makes the complexity manageable and relieves your employees at the same time.
With the utmost care and reliability, the “Schlaue Klaus” is also in demand as a solution in order picking and outgoing goods inspection, which ensures higher customer satisfaction and thus also secure customer loyalty.

Figure: Schlauer Klaus 1

Figure: Schlauer Klaus 2

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Improved agility and responsiveness in the production process
Improved product quality
Improved maintenance/uptime

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment 1: Company logo
Attachment 2: Video of the “Schlaue Klaus”

Product/service technological focus:

Industrial Manufacture
Process control and logistics

Market availability:

Available on the market since 2015.

6.3 Zero defects production with RQM

Smart Factory solution Zero defects production with RQM

Pickert & Partner GmbH
Händelstraße 10, 76327 Pfinztal, Germany
Contact person:
Sven O. Rimmelspacher
Tel. +49 721 / 66520

Type of organization:
SME

Market sectors:
Other

Services provided:
Engineering
Research and development

Type of solution:
Product

Smart Factory description:
RQM is an integrated overall solution between ERP/PPS and Shop Floor:

RQM enables compliance & governance (laws, standards, customer requirements, organization), replaces islands with an integrated solution, supports continuous improvement (PDCA) and reduces quality costs.

RQM is a standard system for everyone, is further developed together with our customers (the RQM.Community) and is customizable and release-capable in the standard.

RQM links the areas of quality management and production management instead of looking at them in isolation.

This makes it possible to monitor, evaluate and react in real time. This avoids errors even before they occur. This is the only way to implement the right measures quickly.

This reduces costs and increases quality, which ultimately leads to greater customer satisfaction and competitive advantages.

RQM is the only system on the market that not only implements control loops and CIP to some extent, but makes them possible throughout.

Keywords:

Intelligent image processing for industry 4.0

Example of Product/Service usage:

The RQM allows the automatic marking of production parts.
RQM can read existing number codes or apply them to articles, e.g. via laser marking systems.

Figure: Auto-ID

Process parameters can be monitored for each operation. These can be visualized in real time.
If the process parameters match the specifications, the material is forwarded to the next operation.
If there is a discrepancy, an immediate reaction is possible.

Figure: Realtime process data monitoring

In addition to individual monitoring, several process data can also be monitored. These can also be visualized simultaneously.
Quality inspection in the form of random samples or a 100% inspection can be easily integrated into the running production process. All common inspection systems can be integrated into RQM. To ensure that only fault-free parts are processed, bad parts are immediately marked and rejected. Alternatively, the production process can also be actively stopped.
Important process parameters are visualized via an interface that can be displayed on any terminal device. Separate dashboards can be created for each area.
Assembly processes can be integrated without any problems.
Built-in batches and serial numbers are recorded and tracked. This guarantees complete documentation of all installed parts.
RQM offers a multitude of evaluation possibilities to trace different data at any time.
At any time there is a complete overview of all products.
This means that all production data is always in view, no matter when the parts were produced and delivered.
RQM supports companies on the way to a zero-defect production.

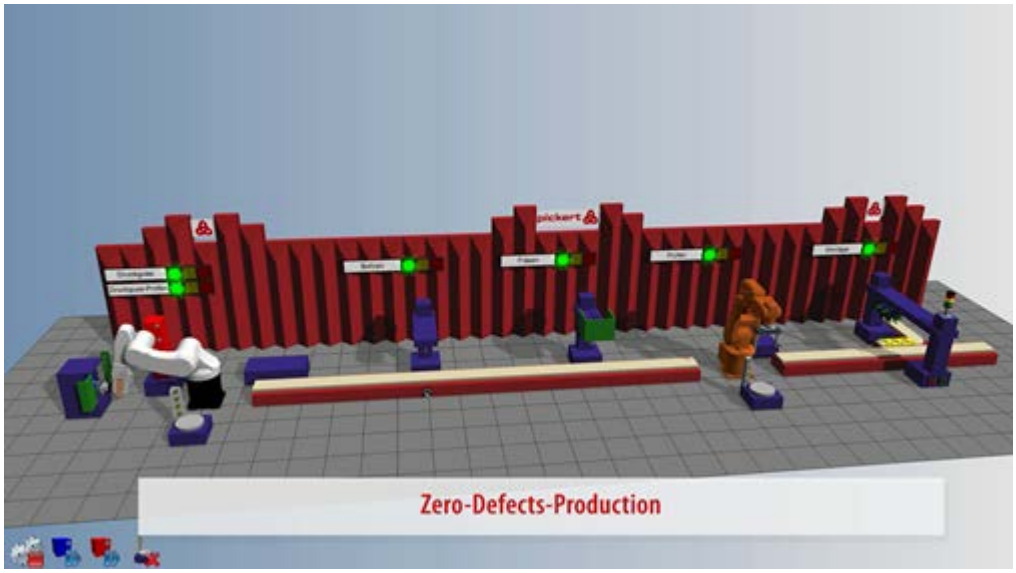


Figure: Zero-Defects-Production

Improvement areas covered by the Product/Solution:

Improved coordination with suppliers
Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved coordination with customers

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment 1: Company logo
Attachment 2: Video about the RQM
Attachment 3: Information material about RQM

Product/service technological focus:

Process control and logistics

Market availability:

Available on the market since *unknown*.

6.4 Mold ID

Smart Factory solution Mold ID

Balluff GmbH
Schurwaldstraße 9, 73765 Neuhausen a.d.F.
Germany
Contact person:
Sebastian Köhler
Tel. +49 7158 173-274

Type of organization:

Large company

Market sectors:

Electrical and electronic engineering industries

Services provided:

Engineering
Manufacturing
Research and development

Type of solution:

Product

Smart Factory description:

Mold ID is an intelligent solution with an RFID data carrier that is attached to each tool. This allows the tool to be provided with individual information, such as useful life and last location.

Keywords:

Plastics industry
RFID

Example of Product/Service usage:

In injection moulding processes, for example, the system is completed with a shot counter in the form of an inductive or optical sensor on the machine. In this way, the actual number of mechanical shots is recorded. An RFID read/write unit is mounted for communication with the data carrier of the tool in the machine. A central Mold ID unit with industrial PC in a separate control box controls this. A simple visualization for the machine operator is possible with the help of a SmartLight signal light, which is mounted in a clearly visible position. The current status of the tool is then displayed in the traffic light colours.

Figure: Mold-ID

Improvement areas covered by the Product/Solution:

Improved agility and responsiveness in the production process
Improved maintenance/uptime

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment 1: company logo
Attachment 2: Video about Mold-ID
Attachment 3: Information material about Mold-ID

Product/service technological focus:

Information Processing & Systems, Workflow

Market availability:

Available on the market since *unknown*.

6.5 aucobo system

Smart Factory solution aucobo system

aucobo GmbH
Schelmenwasenstraße 32, 70567 Stuttgart,
Germany
Contact person:
Michael Reutter
Tel. +49 711 99529630

Type of organization:

SME

Market sectors:

OTHER (Software)

Services provided:

OTHER (Mobile multi-machine operation, maintenance, intralogistics)

Type of solution:

Product

Smart Factory description:

The aucobo software optimizes the interaction between man and machine through industrial smartwatches. This makes communication in production mobile, simple and effective. The functionalities are designed in such a way that the software can be adapted to individual requirements even without programming knowledge.

Keywords:

Mobile multi-machine operation, maintenance, intralogistics

Example of Product/Service usage:

Mobile multi-machine operation: Machines provide information on statuses, error messages and tasks and enable multi-machine operation through effective self-organization in production.

Maintenance: Reliably receive maintenance and repair notifications directly from systems (MES, ERP, ...), machines or employees. Document solutions directly on the wrist and save time and unnecessary walking distances.

Intralogistics: Pick instructions and delivery notifications directly on the slope joint with confirmation and feedback functions. Document withdrawals directly by integrated scanner.

Improvement areas covered by the Product/Solution:

Improved information for business analytics
Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved maintenance/uptime

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment 1: company logo
Attachment 2: Video about aucobo system

Product/service technological focus:

Information Processing & Systems, Workflow
Industrial Manufacture
Plant Design and Maintenance
Process control and logistics

Market availability:

Available on the market since *unknown*.

6.6 drag&bot

Smart Factory solution drag&bot

c/o Fraunhofer-Institut für Produktionstechnik und Automatisierung (IPA)
Nobelstraße 12, 70569 Stuttgart, Germany
Contact person:
Martin Naumann
Tel. +49 711 970-1291

Type of organization:
SME

Market sectors:
OTHER (Software)

Services provided:
OTHER (Robot programming framework)

Type of solution:
Product

Smart Factory description:
drag&bot is an intuitive web-based software for easy setup, programming and operation of industrial robots. Our graphical user interface allows unexperienced users to generate a program sequence through drag&drop of reusable function blocks. No programming knowledge is required to step your company into the robotic automation era.

Keywords:
web-based, programming, industrial robots, drag&drop, robotic automation

Example of Product/Service usage:

Figure: Force-controlled robot assembly

Figure: Assembly in Automotive: Screwing a car door

Figure: Making a human robot collaboration for riveting

Figure: A safe soldering unit feasible for robot-human interactions

Improvement areas covered by the Product/Solution:

Implementation in the production processes

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Improved agility and responsiveness in the production process
Improved maintenance/uptime
Improved safety

Other relevant information about the product/service:

Attachment 1: Company logo
Attachment 2: Video about drag&bot

Product/service technological focus:

Information Processing & Systems, Workflow
Process control and logistics

Market availability:

Available on the market since *unknown.*

7 Smart Factory solutions from Hungary

7.1 Modular ERP System

Smart Factory solution Modular ERP System

ISeeSec Ltd. – Brics-SOFT
H-9400 Sopron, Szépvölgyi str. 9.
Hungary
Contact person:
Attila Zámbó

Type of organization:
SME

Market sectors:
Digital economy

Services provided:
Services

Type of solution:
Service

Smart Factory description:
ISeeSec Ltd. was established in 2012. The main activity of the company is the creation of different types of security systems. After the establishment they created for example vehicle tracking security system and IT system for restaurants. But from 2015th the main profile of ISeeSec Ltd. is the BiCS ERP system. This is an IT system which contains different modules like financial module, logistic module and storage management modul.

Keywords:
- ERP system
- Industry 4.0 ready information system

Example of Product/Service usage:
When developing the BriCS ERP system, the goal is to create a customizable, modular system of enterprise management systems that can be tailored to the highest possible extent, which can provide a lot of useful information to help the workflow and the leadership decisions.

The system can operate as a simple business management system and a complex corporate governance system depending on the customer's needs.
Advantages:
- querying and systematizing data, saving data
- Adapts to the customer's own and business needs
- a unified system that simplifies the whole company
- multilingual interface
- outstanding operational safety
- simple contact
- there is no IT dependency
- No downtime and data loss

Modules
- Store management
- Finance: Inbound and Outbound Accounts, Financial Planning, Liquidity Forecasting
- Accounting: account mirror, financial reports
- Process Management: Process Templates, Process Design
- Logistics: customer systems, delivery notes, freight planning
- Document management: registration, electronic contract management
- Individual registers: motor vehicles, property, insurance, investments
- Reporting system: customizable reports
- BriCSAPI: Gate for other IT systems

Improvement areas covered by the Product/Solution:

Implementation of the human resource management systems

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Improved information for production decisions
Improved information for business analytics

Other relevant information about the product/service:

Attachment1: Brics-Erp logo
Attachment2: promotional material
Attachemnt3: product presentation

Product/service technological focus:

ELECTRONICS, IT AND TELECOMMS:
- Information Processing & Systems, Workflow
- IT and Telematics Applications

Market availability: 2015

7.2 3D printing

Smart Factory solution 3D printing

MediTel Kft.
H-9700 Zanati str. 32-36,
Hungary
Contact person:
Joós Attila
Tel.: +36 30 330 2112

Type of organization:

OTHER: Business Support organisation

Market sectors:

OTHER: additive manufacturing

Services provided:

Education /Training
Manufacturing
Service
Research and Development

Type of solution:

Service

Smart Factory description:

Meditel Kft. is a new innovative enterprise which is based on more than one decade of business-development experiences. The service center specialized for the application and presentation of most recent manufacturing technologies.

Meditel's team consists of highly experienced economic-, engineering-, technological- and medical professionals, who are able to solve the most challenging tasks with open-mindedness and great openness.

The demonstration center has been evolved so all their interested people – such as leader of the company, professional who working in manufacturing, or young person who wants to learn – have the opportunity to experience and try the newest manufacturing and industrial technologies in the real form.

In the open days and trainings, they personally demonstrate to clients the new technology solutions of Industry 4.0, most recent tools of our age such as 3D printing, robot technology or virtual production planning.

Services:

- unique product development and manufacturing
- research & development
- prototype production
- precision scanning
- digital manufacturing technology – 3D printing (FDM printing, SLA printing)
- metal printing – with German production technology background
- manufacturing optimization
- robotics, robot programming
- education of 3D printing
- organization of open days for demonstration purposes
- technology audits – technology maturity testing

Keywords:

3D printing
3D scanning
digital shape and shape design
3D scanning and design at industrial level
Reverse engineering
CAD design, industry 4.0
C18.1.2 - Other printing

Example of Product/Service usage:

The service has been tested and validated in Hungary, Vas county.
Meditel could help a lot with taking the first step towards a quite modern technology like additive manufacturing to get to know it better and help (mainly) the local population to learn this valuable knowledge and use it.
The company is meant to be working in the additive manufacturing sector, 3D printing is the main direction.
Meditel has been working with 2 technological solutions, one of them is FDM technology and the other one is SLA technology.
There are several materials which they can use to find the best possible solution during the production.
Materials:

PLA	HT-PLA	Innoflesx	General Resin
ABS	Nylon	Ninjafelx	Castable Resin
PVA	PC	Laybrick	Durable Resin
HIPS	PP	Carbon Fiber	Dental LT Clear
CPE	PET	Woodfill	Dental SG Resin
CPE+	PRO1	Laywood	Tough Resin

TPU95A	ASA	T-Glass	Flexible Resin

The center uses 4 kind of 3D printer.

Prusa I3 MK2
Ultimaker 3 Extende
FormLabs Form 2

They are able to produce a standard print with a good quality, which is good to use as an illustrative prototype

Extreme Builder 1000

It is a big-size 3D printer and thanks for this, it is able to create a 600x600x720 product

3 Figure.: Ultimaker 3 Extended

4. Figure:Extrem Builder 1000

5.Figure: Formlabs Form 2

6.Figure: Prusa I3 MK2

The centre has received the ISO qualification.
The solution is in line with the existing risk management
The devices are available in the Center so there is an opportunity to rent them. The Centre also provides training to help in the use of the devices and gain more knowledge about advanced manufacturing.
Resources are necessary for implementation: cost calculation for the manufacturing, technical devices, human resources.

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Decreased manufacturing costs

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment10: Company logo
Attachment11: Presentation

Product/service technological focus:

Design and Modelling / Prototypes

Market availability: 2017

7.3 Special Purpose Machinery

Smart Factory solution Special Purpose Machinery

Vesz-Mont 2000 Ltd.
H-8248 Nemesvámos Huszárok str. 3.
Hungary
Contact person:
Horváth Norbert
Tel: +36 88 505 730

Type of organization:
SME

Market sectors:
Automotive industry

Services provided:
Manufacturing

Type of solution:
Service
Product

Smart Factory description:
The Vesz-Mont 2000 Ltd. is a continuously developing company since 1999. During the last 17 years they have gained great experience in the manufacture of special purpose machines, assembly lines and in any kind of automation task and also in laser and robotic applications.
In 2010 they realized that they need to provide wider service portfolio to their customers. They targeted technologies they were not proficient at the time. Focus was on laser technologies. They were looking for companies with this competency and they were able to keep moving on this path. Nowadays Vesz-Mont 2000 Ltd - one of the largest Special Purpose Machinery builder in Hungary. Their goal is to keep the current development in the future and gain more influence on foreign markets.

Keywords:
Special purpose machinery
advanced manufacturing
laser technology
C33.2 - Installation of industrial machinery and equipment

universal robot supplier

Example of Product/Service usage:
The main services of Vesz-Mont 2000 Ltd:

- Special purpose machines
- Universal collaborative robots
- HIWIN Linear technology
- Nikon Metrology System
- Wage measurement
- Engineering services
- CNC milling
- Water jet cutting
- Sheet-metal plant – laser cutting, bending, deburring
- Manufacture of welded machine frames
- Traditional machining tools.

When the company was founded, they were engaged in assembly technology for welded structures manufacturing. Shortly after the start, more and more difficult work was done, which led to rapid development.
Special purpose machinery is one of the main services of Vesz-Mont 2000 Ltd. The major content of the service is the complex design of purpose machines from the offer to production and integration which includes the creation of production process, the appropriate engineering solution, the mechanical design, and of course the electrical installation, programming and on-site assembly too. This service can be used in many industries such as car industry, health industry, food or furniture industry.
Out of the above-mentioned services sheet-metal plant-laser cutting, bending, deburring is also a core element in Vesz-Mont 2000 Ltd.'s life. Their sheet-metal plant is furnished to the industry today's requirements. Their universal laser cutting machine, CNC bending machine and automatic deburring equipment meet their customers requirements, and they undertake to design and weld frames up to 2500x2500x1000 mm. Vesz-Mont 2000 Ltd. also uses universal collaborative robots. The UR (Universal Robots) arms can be implemented in virtually any industry, in any process and by any employee. The UR robots can work collaboratively right alongside employees due to built-in force-sensing causing the robots to automatically stop operating when they encounter obstacles in their route. The robot can be programmed to operate in reduced mode when a person enters the work zone. It can be used in many areas like packaging and structure, screwing, injection molding, admissibility adaptation and welding. The service has been tested and validated in Hungary, West Hungary The target group of good practice are all companies that have production in their establishments. The applied technology is cost efficient compared to the old technologies. Buying or using the available technology of Vesz-Mont Ltd is the way to implement the innovative solution.

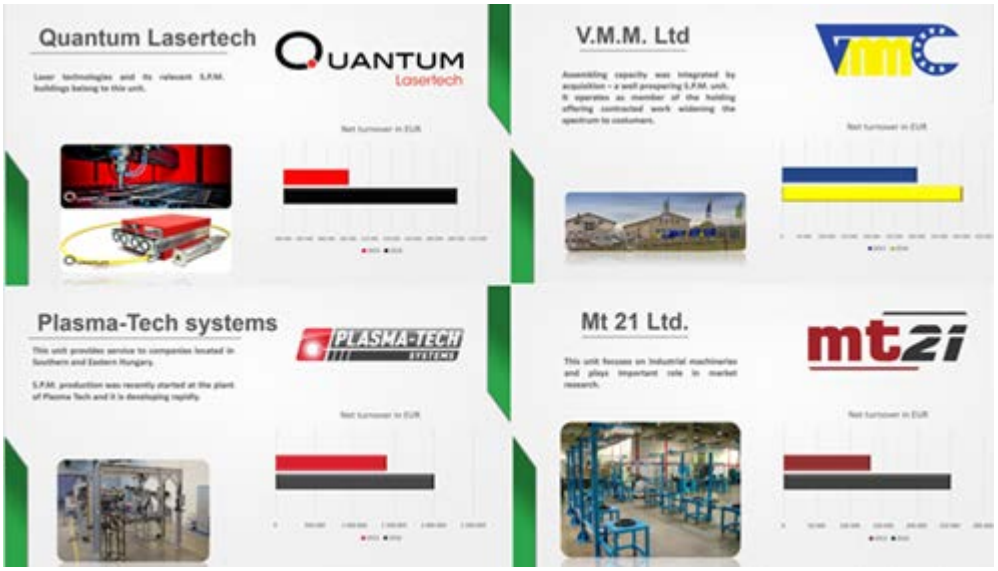
Improvement areas covered by the Product/Solution:

Improved maintenance/uptime

Product/Solution is related to the following type of implementation:

Implementation in the production processes

7. Figure: Quantum Lesertech from close



8. Figure: Quantum Lesertech

Other relevant information about the product/service:

Attachment12: Company logo
Attachment13:
https://www.youtube.com/watch?v=c0PqjNYEUQA
Attachment14: Presentation

Product/service technological focus:

INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

- Construction Technology
- Industrial Manufacture

Market availability: 2015

7.4 Custom-Made Devices

Smart Factory solution Custom-Made Devices

Borsodi Műhely Ltd.
H-9027 Győr, Juharfa str. 8.
Hungary
Contact person:
Horváth Szabolcs
Tel: +36 96 529 071

Type of organization:
SME

Market sectors:
Automotive industry

Services provided:
Manufacturing

Type of solution:
Service

Smart Factory description:
The main aim of the Borsodi Műhely Ltd. is to satisfy the procurers needs.
Borsodi Műhely Ltd. has professional experiences in the production of unique and precision accessories and gauges. Thanks for the continuous technological developments, the company has the most modern technologies and machines, and this guarantees a high level of quality.
The most important requirement is to provide the optimal solution for their partners. This may be carried out through the careful and through analysis of requirements and by taking into consideration the prevailing regulations, striving for optimal design and implementation.
For the perfect quality, Borsodi Műhely Ltd is ascertaining the quality of the raw materials in its own measuring laboratory.

Keywords:
high quality
custom component manufacturing
intership training
Industry 4.0
C25.1 - Manufacture of structural metal products
C25.1.1 - Manufacture of metal structures and parts of structures
S.P.M. – special purpose machinery

Example of Product/Service usage:

The main profile of Borsodi Mühely Ltd. is the design and implementation of custom-made devices, single -purpose machines and production lines.

With custom-made testing and measuring instruments it is possible to quickly qualify the work pieces. The further advantage for the custom-made tools that their operation does not require high expertise.

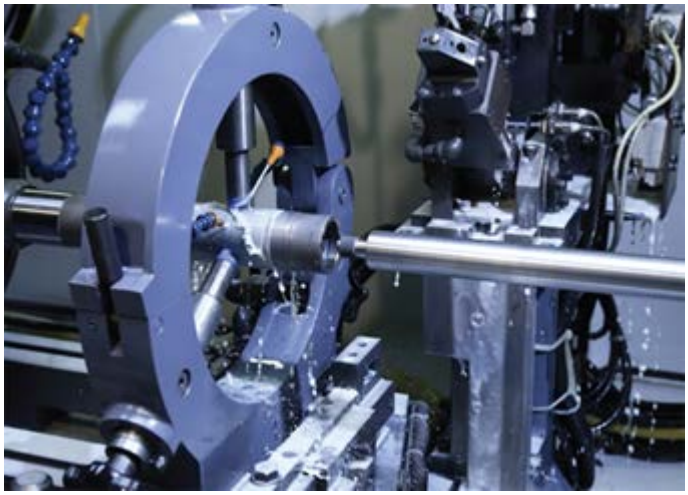
Based on the tasks we can differentiate main types:

1. The controllers can qualify the workpiece, i.e. with the help of this, it is easier to decide that the workpiece meets the standards or not.
2. Certification is verified with the help of numerical data which provided by the measuring equipment.

Borsodi Műhely Ltd. also undertake the implementation of geometric testing and measuring equipment and density tester.

Borsodi Műhely Ltd. also deal with the production of clamping, compass devices. The company has a huge experience in the design and production of mechanical and hydraulic clamping devices. The company collect all the necessary data – about the machine itself and about the production technologies – to be able to produce a good quality clamping device which is fitting to the customer requirements.

They are also undertaking the design and implementation of an assembly line.



9. Figure: Manufacture of precision parts spare parts

10. Figure: Machine, machine repair renovations and maintenance

Improvement areas covered by the Product/Solution:

Improved maintenance/uptime

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment15: Company logo
Attachment16: https://www.youtube.com/watch?v=ofWkJRx_E5A
Attachment17: https://www.youtube.com/watch?v=_JU_1_ZxCK4&feature=youtu.be
Attachment18:
http://www.borsodimuhely.hu/en/entrepreneur-of-year-2017-award_3682-n.html
Attachment19: product presentation

Product/service technological focus:

Industrial Manufacture

Market availability: 2015

7.5 Robotic Arm & Sensor Techniques

Smart Factory solution Robotic Arm & Sensor Techniques

MediTel Kft.
H-9700 Zanati str. 32-36,
Hungary
Contact person:
Joós Attila
Tel.: +36 30 330 2112

Type of organization:

OTHER: Business Support Organisation

Market sectors:

OTHER: Additive manufacturing

Services provided:

Education /Training
Manufacturing
Services
Research and Development

Type of solution:

Service

Smart Factory description:

Meditel Kft. is a new innovative enterprise which is based on more than one decade of business-development experiences. The service center specialized for the application and presentation of most recent manufacturing technologies.

Meditel's team consists of highly experienced economic-, engineering-, technological- and medical professionals, who are able to solve the most challenging tasks with open-mindedness and great openness.

The demonstration center has been evolved so all their interested people – such as leader of the company, professional who working in manufacturing, or young person who wants to learn – have the opportunity to experience and try the newest manufacturing and industrial technologies in the real form.

In the open days and trainings, they personally demonstrate to clients the new technology solutions of Industry 4.0, most recent tools of our age such as 3D printing, robot technology or virtual production planning.

Services:

- unique product development and manufacturing
- research & development
- prototype production
- precision scanning
- digital manufacturing technology – 3D printing (FDM printing, SLA printing)
- metal printing – with German production technology background
- manufacturing optimization
- robotics, robot programming
- education of 3D printing
- organization of open days for demonstration purposes
- technology audits – technology maturity testing

Keywords:

sensors
robotic arm
sensor technology
knowledge providing

Example of Product/Service usage:

Meditel Kft. other profile next to the 3D printing is the Robotic arm programming and equipped it with sensors.
Main objective is the integration employees with reduced working capacity to the labour market with Industry 4.0 technological solution. The Robotic arm enables the realization of repetitive workflows. The employee – implemented with the robotic arm – is able to work with (nearly) full value and speed. The aim is the development of a business model that offers a new, innovative Industry 4.0 technological solution – integration of the employees with reduced working capacity to the labour market with the help of robotic arm.
The aim of the sensor is that for example if the robotic arm perceives an automated guided vehicle (AGV), the robotic arm will be able to pick up the items from the AGV. Or imagine that there is a production line where we can find blue and red buttons and for example with the help of sensors the robotic arm will be able to pick up every red button from the line.
There are a thousand possibility with the combination of sensors and robotic arms. The only thing that is needed is the knowledge for programming robotic arm and sensors.
Meditel Kft. wanted to provide the appropriate knowledge for robotic arms and offer an opportunity to programming a sensor which is the most suitable together with the robotic arm during the production process of the customer's company.

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Decreased manufacturing costs

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment26: company logo
Attachment27: product presentation

Product/service technological focus:

Electronic circuits, components and equipment

Market availability: 2018

7.6 Software Development (Agrep System)

Smart Factory solution Software Development (Agrep System)

Adalon Solutions Ltd.
H-1138 Budapest, Madarász Viktor str. 47-49,
Hungary
Contact person:
Zénó Bundula
Tel.: +36 70 199 6892

Type of organization:
SME

Market sectors:
OTHER: ICT

Services provided:
Consulting
Services

Type of solution:
Service

Smart Factory description:
Adalon Solutions Ltd, was established in 2014. In the previous years the staff - with 10-15 years of professional experience – were able to solve the problems of micro-enterprises and multinational-companies. In the last years, Adalon Solutions Ltd. has been working successfully with SOHOs (Small Office Home Office) SMEs, large enterprises, online media enterprises, ICT-companies, start-ups, starter web shops, and state companies. The main services of Adalon Solutions Ltd. are the followings:

- Consultancy
- Software development
- Operation of the developed software

Keywords:

- Consultation
- Software development
- Agrep system

Example of Product/Service usage:

Adalon Solutions Ltd. has a new project. Within the framework of this project Adalon solutions Ltd. will be developing a system called: “Agrep System”.

“Agrep System” provides a solution for agricultural actors. This system is a niche application for agricultural entrepreneurs and primary producers. The “Agrep System” provides a unique IT solution with small investment cost. This system based on subscription, and any time you want you can resign your subscription

“Agrep System” has got 6 main modules:

1. Land and machine-registry module: database about the private and rented cultivated areas with the related information about it. This database also contains the information about the private, rented and leased machines and tools
   Database contains: growing data, deadlines (payment, contract renewal), general machine information, warnings related to machines and tools, and setting suggestions
2. HR module: contains all data which is related to the employees like: general data, documents related to the education, CV, overtime,
3. Land-rental management module: contains contracts, payment, and related warnings, other administrational data
4. Warehouse control module: include crop storage, component storage, sowing storage and possible to set notifications related to store data
5. Reporting module: maintenance work diary, financial statement, making legal statements, farming diary
6. Pesticide catalogue module: where you can find the list of legal pesticides (also includes: the application area of different pesticides, waiting time)

Improvement areas covered by the Product/Solution:

Implementation of novel technology

Product/Solution is related to the following type of implementation:

Improved information for business analytics
Improved remote monitoring capabilities

Other relevant information about the product/service:

Attachment28: company logo
Attachment29: product presentation

Product/service technological focus:

ELECTRONICS, IT AND TELECOMMS

- Information Processing & Systems, Workflow
- IT and Telematics Applications

Market availability: 2014

7.7 Automated Guided Vehicle (AGV)

Smart Factory solution Automated Guided Vehicle (AGV)

MediTel Kft.
H-9700 Szombathely, Zanati str. 32-36.
Hungary
Contact person:
Joós Attila
Tel.: +36 30 330 2112

Type of organization:

OTHER: Business Support Organisation Spin-off

Market sectors:

OTHER: Additive manufacturing

Services provided:

Education /Training
Manufacturing
Services
Research and Development

Type of solution:

Service

Smart Factory description:

Meditel Kft. is a new innovative enterprise which is based on more than one decade of business-development experiences. The service center specialized for the application and presentation of most recent manufacturing technologies.

Meditel's team consists of highly experienced economic-, engineering-, technological- and medical professionals, who are able to solve the most challenging tasks with open-mindedness and great openness.

The demonstration center has been evolved so all their interested people – such as leader of the company, professional who working in manufacturing, or young person who wants to learn – have the opportunity to experience and try the newest manufacturing and industrial technologies in the real form.

In the open days and trainings, they personally demonstrate to clients the new technology solutions of Industry 4.0, most recent tools of our age such as 3D printing, robot technology or virtual production planning.

Services:

- unique product development and manufacturing
- research & development
- prototype production
- precision scanning
- digital manufacturing technology – 3D printing (FDM printing, SLA printing)
- metal printing – with German production technology background
- manufacturing optimization
- robotics, robot programming
- education of 3D printing
- organization of open days for demonstration purposes
- technology audits – technology maturity testing

Keywords:

sensors
robotic arm
sensor technology
knowledge providing

Example of Product/Service usage:

Meditel Kft. - next to the 3D printing and Robotic arm programming - provides opportunity to learn how to use and operate an Automated Guided Vehicle (AGV). Meditel Kft owns a MiR100 – which is a unique collaborative robot is now used by manufacturers in a wide range of industries and sectors, to automate their in-house transportation. You can install Mir100 quickly and easily without changing the workplace layout. MiR100 is very user-friendly and it is easily programmed without prior experience. MiR100 autonomously picks up and unloads carts and is ideal for a wide range of towing jobs The towing capacity of Mir100 is 300kg. It is able to communicate with the help of Wi-Fi, Bluetooth or Internet. With the help of a fully charged battery it is able to run 10hours (20km). This solution offers fast ROI in as little as one year.

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Decreased manufacturing costs

Product/Solution is related to the following type of implementation:

Implementation in the production processes

Other relevant information about the product/service:

Attachment30: company logo
Attachment31: product presentation

Product/service technological focus:

Electronic circuits, components and equipment

Market availability: 2018

8 Smart Factory solutions from Romania

8.1 ASiS ERP

Smart Factory solution ASiS ERP

ALFA SOFTWARE S.A.
Patriciu Barbu Street, No 57, Cluj-Napoca, Romania
Contact person:
Pavel Cristian Gabriel
Tel. +40 730 020 203

Type of organization:
SME

Market sectors:
Retail & HORECA
Production, Distribution, Utilities and Construction

Services provided:
Engineering
Research and development
Services

Type of solution:
Software and cloud services

Smart Factory description:
ASiS ERP is a validated solution by 20 years of experience in the technology and business solutions sector, that can be used in different industries (retail, construction, distribution, utilities, HORECA), not only in production.
Updated throughout the time according to technological requirements, ASiS ERP is one of the most modern and adaptable integrated IT solution, 100% online, the first of its kind in Romania.

Keywords:
Universal availability
Flexibility and adaptability
Internet of Things
Production management

SaaS

Example of Product/Service usage:

The production solution described earlier was implemented in the company named Fibrex Co, from Crasna, Salaj county, Transylvania, Romania.

The service has been implemented at Fibrex Co, a manufacturer of bath tubs and swimming pools with the main purpose of implementing barcode traceability regarding operations made to products in the manufacturing process.

Using mobile phones in the production hall, working operators can record operations in real time, for each product, by scanning barcode labels for each operation. This way, operations completed can be seen in ASiS database.

At the end, after quality tests, a barcode is attached to the warranty certificate and if there are any flaws, by scanning this barcode, in ASiS can be seen the entire production history (operations made, people who made them, time).

ASiS solutions can be applied to mid-sized and large companies (regardless of their field of activity) that want to optimize their processes and to become more competitive in the market.

Improvement areas covered by the Product/Solution:

Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved product quality
Improved information for business analytics
Improved remote monitoring capabilities
Developed visualization capabilities

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo

Attachment 2: Product presentation

Attachment 3: Video about SF solution (YouTube Chanel)

https://www.youtube.com/channel/UCr3OVWm6fXYkAElxo9B7PLA

Product/service technological focus:

Information Processing & Systems, Workflow
Telecommunications, Networking

Market availability:

Available on the market since 2015

8.2 Palletized warehouse inventory scanning using drones

Smart Factory solution PALLETIZED WAREHOUSE INVENTORY SCANNING USING DRONES

Aptus Software S.R.L
Bd. Pipera no 1/II, 077190-Voluntari, Ilfov, Romania
Contact person:
Oskar Bara
Tel. +40 215 273 399

Type of organization:

SME

Market sectors:

Electrical and electronic engineering industries

Services provided:

Engineering
Research and development
Services

Type of solution:

Service

Smart Factory description:

Aptus has implemented an airborne data collection system to provide stock take (inventory). The system uses self-driving drones capable of navigating through the warehouse. Drones represent a lightweight, manoeuvrable flying device equipped with multiple propellers that have a building in barcode scanner used to obtain an accurate inventory report.

Keywords:

Computer vision
Warehousing and storage
Internet of Things
Drones

Example of Product/Service usage:

The product is adaptable and it is based on the customers' needs that wanted to be able to have a warehouse inventory system that would allow them to track the inventory in real time. The system makes use of self-driving drones equipped with custom barcode scanners. For this system to work it is really important to have the barcodes positioned properly and have them horizontally aligned and without creases.
The innovative nature of this solution is that the drones use a navigation system that makes use vision processing system and proximity sensors in order to navigate the drones within the warehouse. Traditional drones are used outdoors and they are managed using GPS positioning, but indoors drones don't have reliable access to GPS. Also, the GPS positioning has an accuracy of 1 meter.

Improvement areas covered by the Product/Solution:

Implementation of the novel technology

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Improved information for business analytics
Improved remote monitoring capabilities
Developed visualization capabilities

Product/service technological focus:

Information Processing & Systems, Workflow
Telecommunications, Networking

Market availability:

Available on the market since 2016

8.3 Cloud PLM

Smart Factory solution CLOUD PLM

MAGIC ENGINEERING S.R.L
Mugurului Street, No. 4, Ap. 1, OP 2
CP 131, 500047 Brasov, Romania
Contact person:
Attila PAPP
Tel. +40 268 337 141

Type of organization:
SME

Market sectors:
Mechanical engineering
Automotive industry

Services provided:
Education/Training
Engineering
Consulting

Type of solution:
Service

Smart Factory description:
Operational excellence requires harmony across design, production, distribution, people and processes. In MAGIC ENGINEERING, the innovation is driven by current technological needs coming from various industries: Aerospace & Defence, Transportation & Mobility, Engineering & Construction, Consumer Goods & Retail, Industrial Equipment, High-Tech.

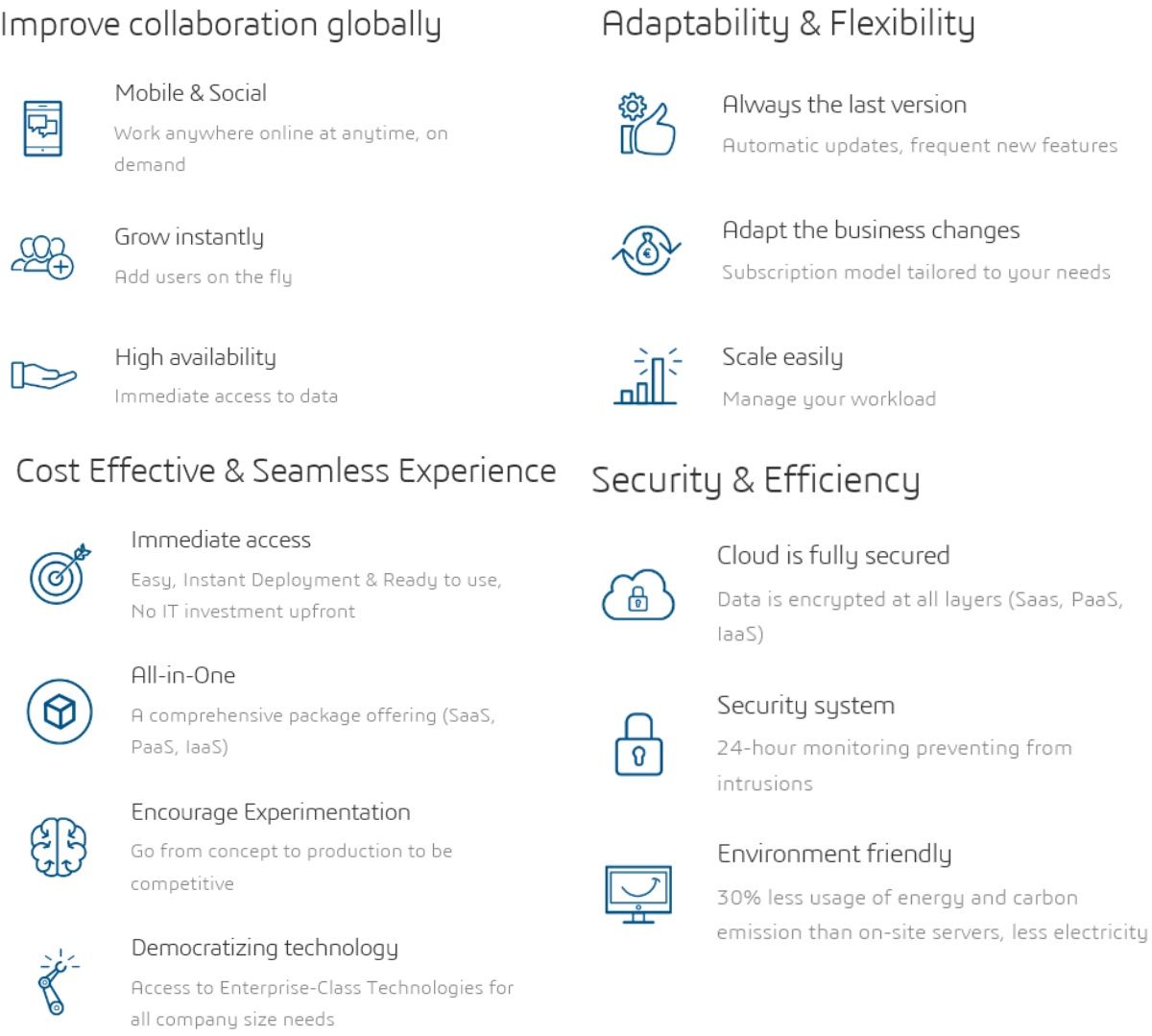
Keywords:
Digital manufacturing
Production optimization
Data collection
Manufacturing capabilities simulation

Example of Product/Service usage:

3DEXPERIENCE software platform can be implemented to a wide range of companies from different industries, without being tied specifically to a certain industry branch. It must be noted, however, that it initially requires a medium financial commitment and the organizational culture should be open to the use of new technologies. The on premise solution is costly because of IT infrastructure, but we can also deliver the cloud based solution, therefore avoiding any investment in servers.

Figure 3D experience architecture

The growing trends of the 4th Industrial Revolution - automation, IoT, artificial intelligence, big data analysis, networked communications, machine learning and cloud computing – mark a significant change in the way we work and how we engage with our customers. These emerging technologies are providing advanced and disruptive Industrial Equipment solutions that support the creation, production and delivery of sophisticated and efficient machinery, equipment and components. The era of the Internet of Things (IoT) is opening new business opportunities for industrial equipment (IE) companies. As profit margins are declining at the same time machine efficiency is increasing, manufacturers are seeking alternatives ways to reduce waste and costs. IoT is offering one path to this, by networking objects, adding sensors and capturing data that can be analyzed to improve machine productivity and reliability and reduce downtime. It is allowing IE companies to create 'pay as you go' services, opening new paths for competition and profitability. Facility of 3d Experience are :



Improvement areas covered by the Product/Solution:

Implementation of the novel technology

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved product quality
Developed visualization capabilities

Other relevant information about the product/service:

Attachment1: Company logo MAGIC ENGINEERING

Attachment 2: Product presentation
Attachment 3: Video about SF solution https://www.youtube.com/watch?v=hk-KiV35yeo
https://www.youtube.com/watch?v=Wf84u_A6P_8

Product/service technological focus:

Design and Modelling / Prototypes
Industrial Manufacture

Market availability:

Available on the market since 2016

8.4 Automated production line with industrial robots for manufacturing cardboard pallets

Smart Factory solution AUTOMATED PRODUCTION LINE WITH INDUSTRIAL ROBOTS FOR MANUFACTURING CARDBOARD PALLETS

INNO Robotics S.R.L
Traian Vuia Street, no. 212, Cluj-Napoca, Romania
Contact person:
Eng. Cosmin Ioanes, Phd
Tel. +40 364 805 073

Type of organization:
SME

Market sectors:
Mechanical engineering

Services provided:
Research and development
Engineering
Manufacturing

Type of solution:
Product

Smart Factory description:
The solution regarding the manufacture of cardboard pallets is fully automated and flexible and can be used to manufacture standard pallets or custom special size. Our solution supports Romanian exporters to implement and comply with the International Standards for Phytosanitary Measures No.15 (ISPM 15).
The entire solution is automatic after the parameters are being defined. Also, the quality of the produced pallets is constant. Optionally, the gluing system can be equipped with sensors that indicate the lack of glue in the fuel tank and vision system for online inspection of the pallet quality. Considering that the whole process is automated, the quality of the pallets is better than

in the case of a manual assembling line with human operators where the quality varies based on the human operators.

Keywords:

Automated production line
Assembling and palletizing
Flexible system
Cardboard products

Example of Product/Service usage:

The validation of the product was carried out both by the manufacturer (Inno Robotics) and the final customer. Products made on the assembly line have been analyses and tested for their quality and strength.

The beneficiary is a manufacturer of wooden furniture and by installing the line, they have internalized the production process of the cardboard pallets. This internalization has led to customer`s independence from suppliers and offer a lot of flexibility to their packing systems. By being able to produce any type of pallet size, it can save the raw material used in the manufacturing process and it can optimize the way the goods are arranged in trucks by producing pallets that are the right size for their products. Another positive aspect was the elimination of the pallet storage space, the storage space for the raw material needed to create the pallets is three times smaller than the space in which the pallets were stored.

The production line combines robots (2x6R and 2x Fanuc Delta robots) with automatic raw material feeding systems. Therefore, in the case of the base cardboard, an automatic system was chosen, while a 6R robot was mounted for feeding the feet-frames to increase the flexibility of the system. The gluing system is automatic and the arrangement of the feet-frames on the pallet's base plate is completed by two Fanuc Delta robots that offer high work speed, precision and flexibility. The brazing process is completed with a mechanical press, after which the pallets are assembled in stacks according to the model requested by the customer. If the line is directly integrated into the packaging process of the final product, the last 6R robot can be removed. The system may be equipped with a vision system with option for counting for providing real-time data about the manufactured pallets.

Improvement areas covered by the Product/Solution:

Implementation of the novel technology
Implementation in the production processes

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved product quality
Developed visualization capabilities

Other relevant information about the product/service:

Attachment 1: Company logo

Attachment 2: Product presentation

Attachment 3: Video about SF solution

https://www.youtube.com/watch?v=VOc5RQow86M&feature=youtu.be

Product/service technological focus:

Design and Modelling / Prototypes

Industrial Manufacture

Plant Design and Maintenance

Market availability:

Available on the market since 2017

8.5 Clever packaging for productive automation

Smart Factory solution CLEVER PACKAGING FOR PRODUCTIVE AUTOMATION

Festo România
Str. Sfântul Constantin 17, București, 010217, România
Contact person:
Traian Stamate
Tel. +40 21 300 07 20

Type of organization:

SME

Market sectors:

Automotive industry
Chemicals
Cosmetics
Food industry
Healthcare industries
Mechanical engineering

Services provided:

Engineering
Manufacturing

Type of solution:

Product

Smart Factory description:

The packaging solution provided by Festo Romania S.R.L. completes the manufacturing chain with a system that transforms individual products to bundles and later to pallets, which in turn are fully wrapped and stored easily for the convenience of transport. The entire packaging process is made out of 6 stages grouped into two categories (secondary and tertiary packaging), which are detailed in the next section:

I. Secondary packaging:
- Labelling
- Erecting cartons
- Loading products into boxes

- Shrink wrapping

II. Tertiary packaging:
- Palletizing
- Wrapping pallets

This solution is highly customizable, flexible, energy efficient (due to the state-of-the-art motors, drives and handling units that it incorporates), fully automated and can be successfully applied to almost any manufacturing company, both with high or low fabrication flows.

Keywords:

End-of-line packaging
Smart packaging

Example of Product/Service usage:

The packaging process begins with the high-speed labelling of individual products, facilitating high productivity and modern cost-efficient labelling, due to the EMMS/E-AS servo motors with CMMP motor controllers, ensuring constant speed, process predictability, traceability and reliability. Thanks to the MTR-DCI motor unit and DMES electric axes, the label format can be quickly changed, and no additional complicated manual adjustments are necessary, the system is able to automatically detect the product's dimensions (edges) and self-calibrate the labelling roll. Next, the carton trays (in which the products are loaded) are erected using a VN vacuum generator, providing distributed vacuum for faster evacuation time, even with high volumes. The linear motion function at the erecting station is provided by the DGEA electric axes for assuring precision and durability for innumerable repetitions. The high-speed loading process is assured by the T-gantry EXCT cartesian handling unit with robotic functionality, for optimum use of the installation space. With over 90 picks/min it's highly dynamic but also precise – with the moving mass reduced dramatically by the stationary motors. The shrink-wrapping unit is equipped with VPPM proportional valves, which keep the wrapping film under the pre-set tension at all times. The temperature in the shrink tunnel is kept constant by the CPX-4AE-T analogue modules, which ranges from 200° C to 850° C. Electric toothed belt and heavy-duty spindle axes palletize the shrink-wrapped product bundles. Finally, the packaging process is completed with the wrapping of the whole pallet for convenient shipping.

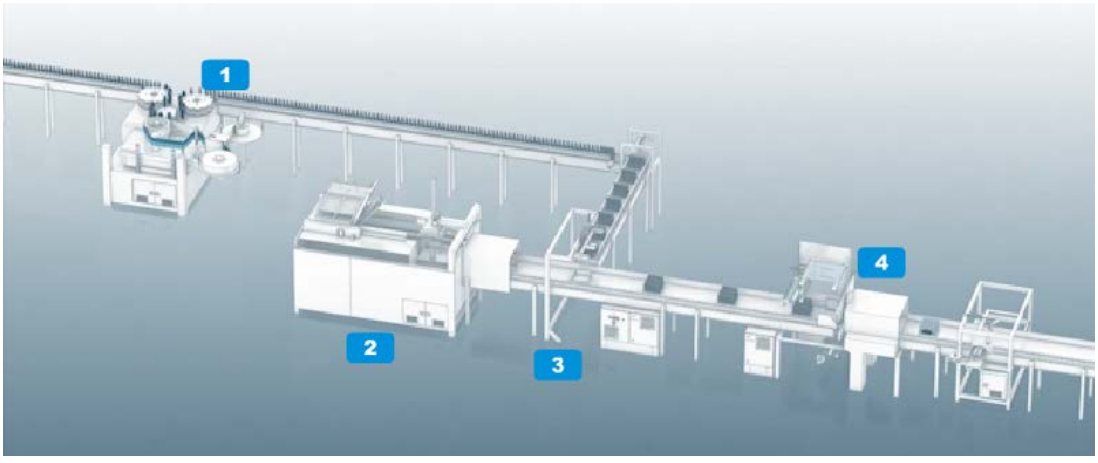


Figure FESTO secondary packaging

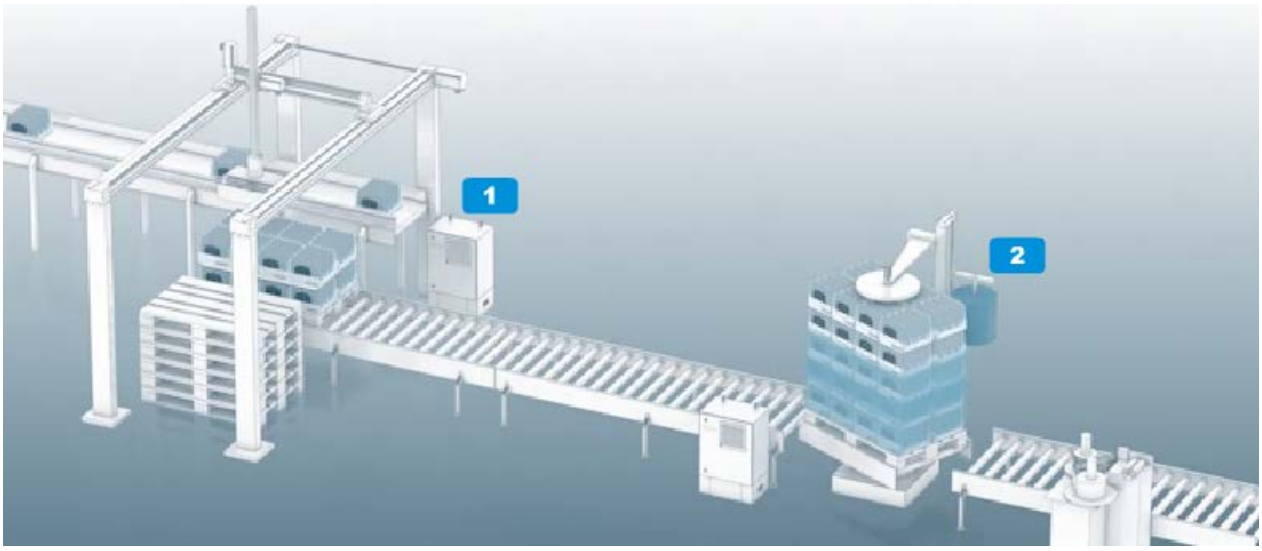


Figure FESTO Tertiary packaging

Improvement areas covered by the Product/Solution:

Implementation of the novel technology
Implementation in the production processes

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Decreased manufacturing costs
Lower energy costs
Improved agility and responsiveness in the production process

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation https://www.festo.com/cms/ro_ro/50252.htm
Attachment 3: Video about solution https://www.festo.com/cms/ro_ro/50256.htm
https://www.festo.com/cms/ro_ro/50257.htm

Product/service technological focus:

Industrial Manufacture
Packaging / Handling

Market availability:

Available on the market since 2016

8.6 Air cushion plate for fast and gentle transport

Smart Factory solution AIR CUSHION PLATE FOR FAST AND GENTLE TRANSPORT

Festo România
Str. Sfântul Constantin 17, București, 010217, România
Contact person:
Traian Stamate
Tel. +40 21 300 07 20

Type of organization:

SME

Market sectors:

Electrical and electronic engineering industries
Energy industry (manufacturing of photovoltaic cells)

Services provided:

Engineering
Manufacturing

Type of solution:

Product

Smart Factory description:

As opposed to rollers, air cushion plates provide virtually contactless transport of the modules and are thus perfect for gentle transporting of flat panel displays and photovoltaic substrates, as well as cell packs for electro-mobility. They make contactless handling of substrates easy, regardless of their size and weight.
Rails hold the modules gently in the air while an air gap sensor detects their flying height. The solution is designed to be energy-efficient thanks to an intelligent compressed air preparation unit.

Keywords:

Air cushion transport
Contactless transport
Scratch-free transport

Example of Product/Service usage:

The ATBT air cushion plates generate a thin air cushion on the fine surface, which enables the glass panels and delicate films used in the solar and electronics industries to glide evenly. The air cushion plate uses an air-permeable material with a microporous texture. This ensures an even, constant air flow with low compressed air consumption and allows thin-film modules, coated on both sides, to travel through the manufacturing process on an air cushion without contact.

Electric drives control the modules during the process, while suction cups made of special material don't leave any residue behind on the thin-film cells. A diagnostic module measures the exact distance between the glass and the air cushion plate and uses this to control the air consumption in an energy-efficient manner.

Whether for loading and unloading, intermediate buffers, lifting and centring, holding and clamping items using a vacuum or for use in inspection and test devices, precise X-Y-movement systems or photolithography devices – air cushion plates are the transport system of choice.

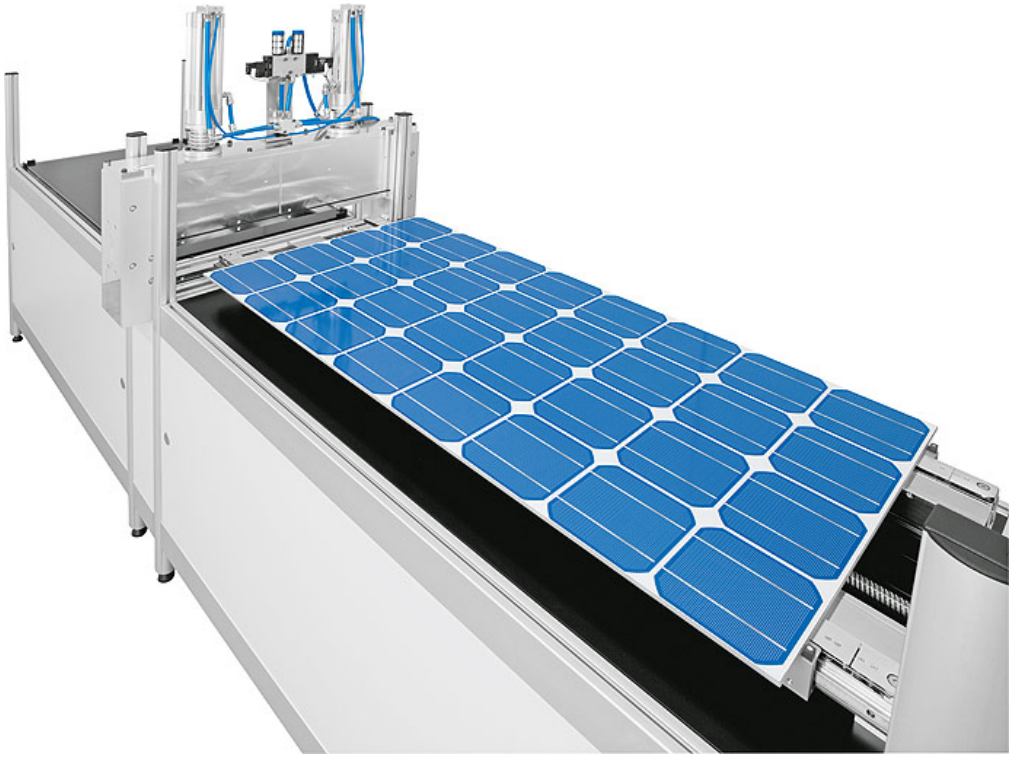


Figure Sliding fork: infinitely variable telescopic handling system for substrate transport

Improvement areas covered by the Product/Solution:

Implementation of the novel technology
Implementation in the production processes

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Lower energy costs
Improved agility and responsiveness in the production process

Other relevant information about the product/service:

Attachment1: Company logo

Attachment 2: Product presentation
https://www.festo.com/net/ro_ro/SupportPortal/Downloads/323292
Attachment 3: Video about solution https://www.festo.com/cms/ro_ro/18229.htm

Product/service technological focus:

Industrial Manufacture
Electronic circuits, components and equipment
Energy production, transmission and conversion
Energy storage and transport
Renewable Sources of Energy
Packaging / Handling

Market availability:

Available on the market since 2014

8.7 Cyber-physical factory training platform

Smart Factory solution CYBER-PHYSICAL FACTORY TRAINING PLATFORM

Festo România
Str. Sfântul Constantin 17, București, 010217, România
Contact person:
Traian Stamate
Tel. +40 21 300 07 20

Type of organization:

SME

Market sectors:

Aeronautics industries
Automotive industry
Electrical and electronic engineering industries
Mechanical engineering

Services provided:

Education/Training
Engineering
Manufacturing
Research and development

Type of solution:

Service

Smart Factory description:

CP factory is a unique cyber-physical research and training platform for Industry 4.0. It models all the elements of a real production plant, including manufacturing, logistics, EPR/MES, assembly line, quality assurance and lean production. It contains all the state-of-the-art key technologies that define the Industry 4.0 model (mobile and autonomous robotics, NFC, RFID, MES4 – SOA, web HMI, CP factory cloud) connected together through a CPS (cyber-physical system), thus creating a networked production system. Its selling point lies in the fact that it's a reconfigurable and flexible solution, which can be quickly converted, expanded and specially adapted to multiple training scenarios.

Keywords:

Technical education and training platform
Employee qualification
Practical knowledge transfer

Example of Product/Service usage:

CP Factory (Cyber-Physical Factory) reflects the new developments in Industry 4.0 network production and offers a modular Smart Factory system for teaching and research purposes. CP Factory illustrates the practical implementation of a networked factory and can be used to represent the entire value chain. The core of the system is its modularity, which enables great flexibility by combining modules in different configurations for training in a variety of applications. The use of standard interfaces for each application module allows the modules to be interchanged in just a few minutes. The platform enables training in the following scenarios:

- Fully automated production with logistics:
  - Logistics: packaging station and warehouse with mobile robotics
  - Manufacture of raw materials for the production line
  - Fully automatic production line with robot assembly cell and automatic warehouse
  - Vision/AR quality control of assembled products
- Partially automated production with manual workstations and intralogistics:
  - Logistics: goods incoming and outgoing
  - Intralogistics with mobile robotics
  - Production line with robot assembly cell and manual workstation for rework
  - Manual workstation for manual assembly

Among others, the scenarios are designed to develop competences for: Design, structure, and interactions of the CP Factory; Handling an adaptable production facility; Using big data; Using smart maintenance; Generating key production data; Analyzing typical system states.

Improvement areas covered by the Product/Solution:

Implementation of the novel technology
Implementation in the production processes

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Improved information for production decisions
Improved agility and responsiveness in the production process
Improved product quality

Other relevant information about the product/service:

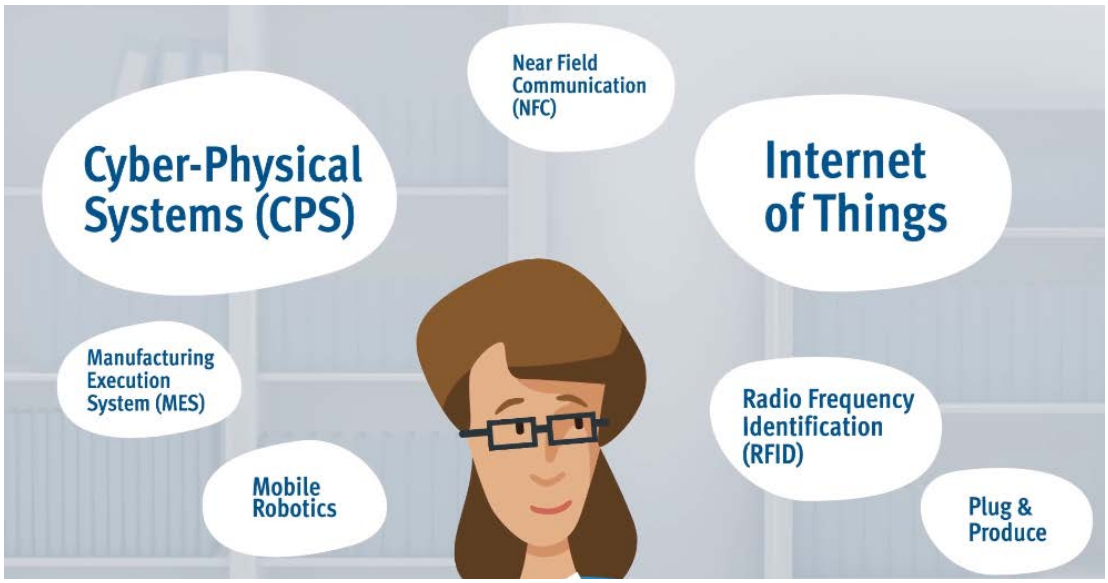
Attachment1: Company logo FESTO
Attachment 2: Product presentation https://www.festo-didactic.com/int-en/
https://ip.festo-didactic.com/I4.0QuickCheck/
Attachment 3: Video about solution https://youtu.be/w8BrJtdhSwQ
https://youtu.be/hjKC-XhwU1E
https://youtu.be/LeJoDtHkKJE

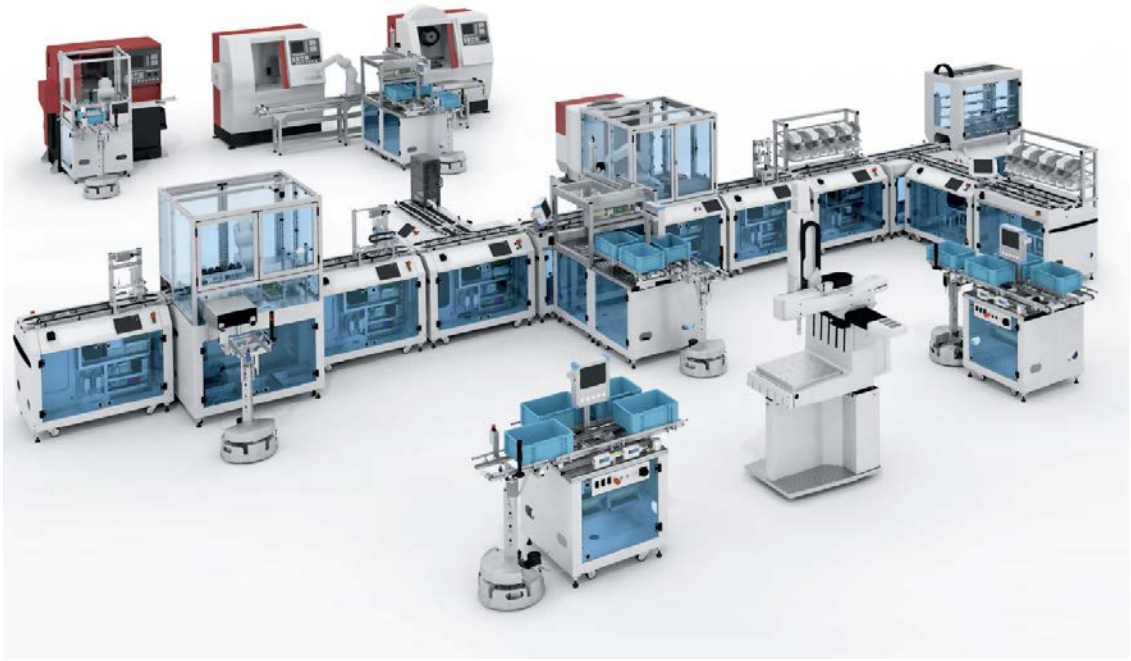
Product/service technological focus:

Information Processing & Systems, Workflow
Industrial Manufacture
Education and Training
Technology, Society and Employment

Market availability:

Available on the market since 2018





8.8 Bielomatik Lubrication

Smart Factory solution Bielomatik Lubrication

Boielomatik Romania
Taian Vuia, No 204, Cluj-Napoca
Romania
Contact person:
Florin Sabou – CEO
Tel. +40 741011 070

Type of organization:
SME

Market sectors:
Welding Machines and Lubrication Systems Production

Services provided:
Engineering
Production
Design
Industrial Services

Product/Solution webpage:
https://www.bielomatik.com/en/lubrication-systems.html

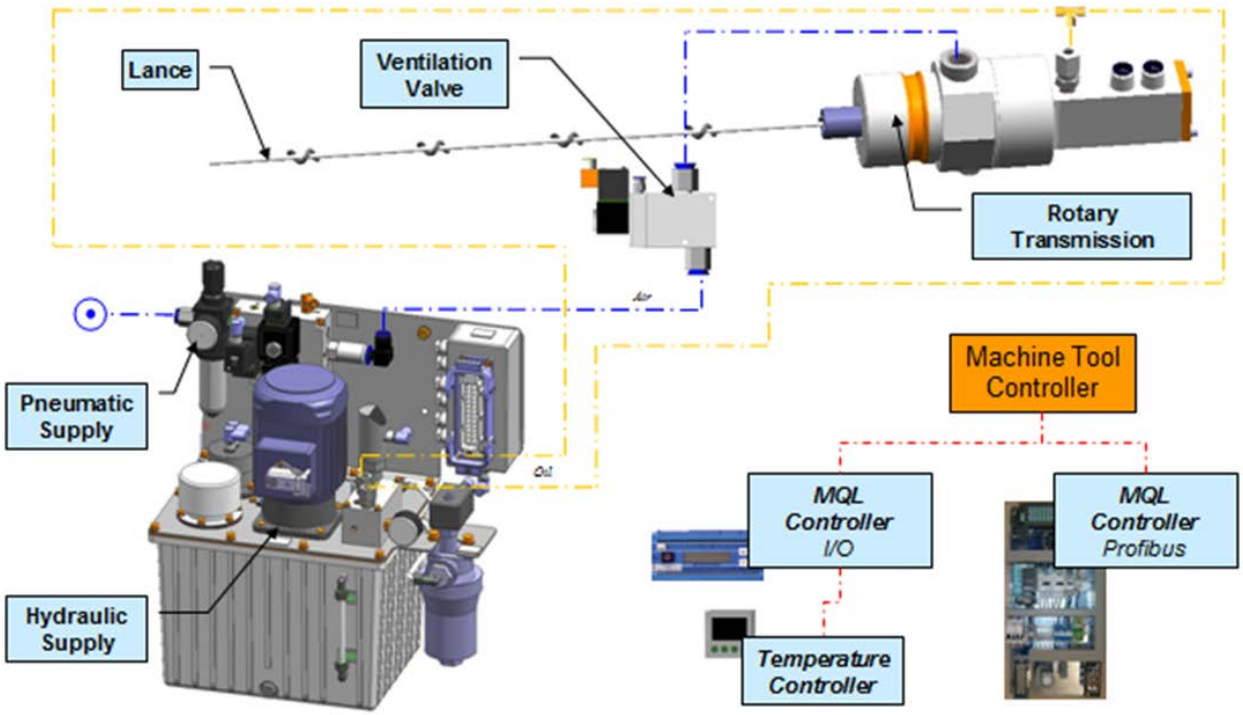
Type of solution:
Minimal lubrication systems

Smart Factory description:
For more than 70 years, bielomatik has been standing for engineering, design and construction of machines and manufacturing systems for plastic welding technology and lubrication systems. Systems and components for central lubrication technologies, as well as development and production of minimum quantity lubrication systems: **bielomatik is the only company** developing and offering 1- and 2-channel minimum quantity lubrication systems.
Equipment, machinery and complete manufacturing lines for plastic welding technologies.

Keywords:

Minimal lubricaton

Example of Product/Service usage:



CHARACTERISTICS

- Separate supply of oil and air via rotating lance (internal and external channel)
- Repeatability
- The bielomatik 2-Channel system is even suitable for highly dynamic processes with high spindle speeds, due to the process related fluid supply
- I/O Control system Profibus-Profinet

MOBILE **L**UBRICATION **U**NIT - Especially for machining of sandwich-materials

- Integraged control unit
- Oil supply time controlled
- Dosage from 5ml/h to 100 ml/h
- Oil-free air phase during process
- Connectable to all commercially available ADUs
- Interchangeable tank
- Magnets for wall fastening
- Flexible hose with an operating distance of 5m
- LED Signal for battery capacity and oil level
- Air pressure 6 bar

- Constant oil flow
- Reduced oil consumption, e. g. 5 … 100 ml/h
- Different parameters during one process possible
- Fast response time to change of parameters
- Quick battery change
- Quick and easy oil-refill (cartridge)
- Compact and handy design
- Easy programming
- Oil-free air-phase during process possible

Improvement areas covered by the Product/Solution:

- Increasing productivity due to shorter cycle times
- Longer tool life
- Lower costs of invest
- Extremly lower fluid consumption
- Elimination of fluid disposal costs
- Workpieces and chips remain dry
- Less problems with skin allergies
- Easy installation
- Easy operation
- Change from flood cooling to MQL possible
- Easy control of tool parameters
- For spindles up to 16.000 RPM
- Standard rotary unions
-

Product/Solution is related to the following type of implementation:

Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo

bielomatik

HIGHTECH WITH A HUMAN TOUCH.

Attachment 2: Product presentation

Attachment 3: Video about SF solution (YouTube Chanel)

https://www.bielomatik.com/en/lubrication-systems/minimal-quantity-lubrication/mql-2-channel.html

Product/service technological focus:

Information Processing & Systems, Workflow

Telecommunications, Networking

Market availability:

Available on the market since 2014

8.9 Augmented maintenance & remote assistance using smart devices

Smart Factory solution AUGMENTED MAINTENANCE & REMOTE ASSISTANCE USING SMART DEVICES

Aptus Software S.R.L
Bd. Pipera no 1/II, 077190-Voluntari, Ilfov, Romania
Contact person:
Oskar Bara
Tel. +40 215 273 399

Type of organization:

SME

Market sectors:

Electrical and electronic engineering industries

Services provided:

Engineering
Research and development
Services

Type of solution:

Service

Smart Factory description:

Aptus software developed and implemented an augmented reality maintenance system that is capable of offering real-time equipment assistance and maintenance for correcting faults and errors, calibrating or fine-tuning industrial machinery. The system can function both automatically (if maintenance steps are designed and configured previously) or by involving two parties, an operator on the factory floor and a maintenance expert, who remotely offers assistance from a different location, providing the operator with all the necessary steps (on the screen of a smart device – tablet, smartphone or smart glasses) for solving more complex issues, that normally need on-site service from qualified experts.

Keywords:

AR maintenance
Remote assistance

Example of Product/Service usage:

For completing an automated maintenance task, the system functions as follows: the target equipment's picture is loaded, and augmentation providing the steps for solving that particular problem are displayed as text label, image, 3D object, video or live data feed canvas. The steps can be designed with embedded workflow editor or interfaced with existing maintenance library. In the case of remote assistance, the system basically "teleports" the maintenance expert on-site, who completes the equipment service with the help of an operator that gets all the instructions on his smart device' screen, the backoffice expert has the possibility to mark objects on the operator view, this way live augmentation is triggered, or to directly share information with the operator through video, picture, audio, text or other files. By doing so, the solution is highly cost efficient, on one hand traveling time and expenses are avoided, but on the other hand production downtime is drastically reduced.
The remote terminal glass or tablet can perform barcode scan and/or voice confirmation and all the remote activity can be video recorded.

Improvement areas covered by the Product/Solution:

Implementation of the novel technology

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Improved agility and responsiveness in the production process
Improved maintenance/uptime
Developed visualization capabilities

Product/service technological focus:

Industrial Manufacture
Information Processing & Systems, Workflow
Telecommunications, Networking
Plant Design and Maintenance

Market availability:

Available on the market since 2018

9 Smart Factory solutions from Serbia

9.1 Modernisation of the textile cloth rubbering line

Smart Factory solution Modernisation of the textile cloth rubbering line

Informatika a.d.,
Jevrejska 32 Street, 11 000 Belgrade, Serbia
Contact person:
Milan Filipovic
Tel. +381 11 3215 220

Type of organization:

SME

Market sectors:

- Electrical and electronic engineering industries
- Automotive industry

Services provided:

- Education/Training
- Manufacturing
- Research and development
- Services

Type of solution:

Product

Smart Factory description:

Modernisation of the textile cloth rubbering line solution enables control of the thickness of the rubber fabric, tracking and controlling the speed of movement of the screen, monitoring and control of the rubbering textile fabric line and it consists of the following functional parts:

- System for preparation of the rubber fabric
- Laser measuring station
- System for monitoring and control the rubbering textile fabric line

Implementation of this system has made significant quality improvement of the rubber cloth, stability of quality with minimal variations, reduction in rubber and energy consumption, and reduction of the human impact in production process.

Implementation of this system connects existing production systems with new control and management technologies with minimal investment in finance and also in time for implementation

Keywords:
textile cloth rubbering line, rubber fabric

Example of Product/Service usage:

The TMS-03 laser station has its own control box with the programmable controller of the MicroInfo series of 'Informatika' production.

The management system is connected to Ethernet servers. The graphical framework of the system was created with the help of SCADA package 'InfoGraph Editor' of the company.

The product recording system is installed on an industrial computer that has a liquid crystal display. Graphic interface designed with SCADA package 'InfoGraph Editor', production of 'Informatika'.

Improvement areas covered by the Product/Solution:
- Implementation of the novel technology
- Implementation in the production processes

Product/Solution is related to the following type of implementation:
- Increased speed of production operations
- Decreased manufacturing costs
- Improved agility and responsiveness in the production process
- Improved product quality

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation
Attachment 3: Video about SF solution:

Product/service technological focus:
- Industrial Manufacture
- IT and Telematics Applications

Market availability:

Available on the market

9.2 CNC robotic packing, palletizing and welding

Smart Factory solution CNC robotic packing, palletizing and welding

ICM Electronics DOO
Vase Miskina Crnog 2, 21000 Novi Sad
Contact person:
Nenad Mićić
Tel: +381 21 518-458

Website and social media:

Contact details:

Nenad Mićić
Tel: +381 21 518-458
Tel: +381 21 518-777
e-mail: office@icm.rs

Type of organization:

SME

Market sectors:

Welding

Services provided:

Product/Solution webpage:

Type of solution:

Product

Smart Factory description:

ICM Electronics made a robotic welding system that is programmed through the PC and software for 3D modeling of parts. The traditional way of programming robots is with the help of a cone with which the robot learns how to move. Robot programming software reduced the programming time of the robot from several hours to a few minutes and made a robot suitable for companies that produce small series. Through conversation with customers, they realized that robotics does not pay off to many domestic companies because no one has a big series. While the robot is

programmed, a person can wipe half of the parts manually. For this reason, we started developing an application that will enable the robot to be profitable and to companies that do not have a series. This is a new technology that improves production processes in small-scale companies that can not provide welders or have problems with them.
In the computer software, the 3D model of the work to be welded is inserted. With a few clicks, the positions are marked where they need to be protected. The software automatically generates a robot program. The operator should just insert a piece on the table and load the program of robots that generated the software. Smart, fast, and easy programming of welding robots.
The solution is quite different because it accelerates and facilitates the robot programming process and makes the product more applicable to many customers.

Keywords:
Smart, fast, and easy programming of welding robots

Example of Product/Service usage:
This is a new technology that improves production processes in small-scale companies that can not provide welders or have problems with them. In the computer software, the 3D model of the work to be welded is inserted. With a few clicks, the positions are marked where they need to be protected. The software automatically generates a robot program. The operator should just insert a piece on the table and load the program of robots that generated the software. The robot, on average, replaces 9 welders. Companies that need 9 welders can return investments within a year.

Improvement areas covered by the Product/Solution:
- Implementation of the novel technology
- Implementation in the production processes

Product/Solution is related to the following type of implementation:
- Implementation of the novel technology
- Implementation in the production processes

Other relevant information about the product/service:
Attachment1: Company logo
Attachment 2: Product presentation
Attachment 3: Video about SF solution:

Product/service technological focus:
- Other Industrial Technologies

Market availability:
Available on the market

9.3 Time logger

Smart Factory solution Time logger

Time logger

JETI, S. Markovica Singera 11, 14000, Valjevo
Contact person:
Marko Tanasković
Tel: +381655220266

Type of organization:

SME

Market sectors:

- OTHER (management)

Services provided:

Service

Type of solution:

Product

Smart Factory description:

Solution for employee working time recording and analysis of the employee movement and activities during work time. Solution does not require any action from the employees – just that they have a smart phone. Experiences gained in SME helped to develop the product.

Technology is novel and it is a significant improvement compared to the state of the art technologies. It costs less, so it is cost efficient and improves the quality and reliability of the time stamping process.

Technical solution is a working time logger that is based on wi-fi. Essentially the base of the solution is a smart wi-fi router which records the time that mobile phones of interest have entered and exited the wi-fi range. In this way presence of employees in an area covered by the router can be tracked. Complete solution is made of a larger number of such devices that cover different areas of the premises and in this way cover the whole working space. These devices communicate between each other. Data that they log can be accessed by an administrator app that allows to organize the data (export different excel sheets) and do some elementary statistics with it.

Keywords:

- Working time recording based on mobile phones only (employs do not have to make any action to be recorded)

Possibility to track the activity and the movement of the employees within company premises

Example of Product/Service usage:
Alternative solutions are time recording with the help of badges and cards, where employees need to check in and check out each time they arrive to and leave work. Our solution relies on mobile phones instead, so it does not require additional cards and badges and no special action from the employees. This means that there is no way that the employees can forget to check in and check out (they do not have to think about it). In addition, possibility of cheating is reduced.
On the other hand, solutions for tracking the employee activity during worktime mainly rely on camera system. Statistical analysis of the data obtained from this system is hard as it requires manual analysis and labelling of the videos or expensive programs for automatic video processing. Our solution offers very effective and cheap opportunity to make statistical analysis of employee activity during work-time. Moreover, the system for work-time recording and activity monitoring is fused into one system which further reduces the cost.
Currently a prototype of the product has been made and a case study is being implemented in a higher educational institution in Serbia. Further deployments of the product in different sectors of industry are planned. Photo of the prototype is given below.

Improvement areas covered by the Product/Solution:
Implementation of the human resource management systems

Product/Solution is related to the following type of implementation:
- Improved information for business analytics

Other relevant information about the product/service:
Attachment1: Company logo
Attachment 2: Product presentation

Product/service technological focus:
- Measurement Tools

Market availability:
Available on the market only in Serbia

9.4 OSICE

Smart Factory solution OSICE

Vodena d.o.o.
Kralja Milana IV 19b/5, 34.000 Kragujevac, Serbia
Contact person:
Boban Stojanović
Tel. +381 69 1154375

Type of organization:

SME
University spinoff

Market sectors:

Digital economy
Electrical and electronic engineering industries
Hidro science

Services provided:

Research and development
Consulting

Type of solution:

Product

Smart Factory description:

OSICE is a Cloud service intended for solving complex optimization problems in the distributed computing environment. It provides all interested third parties, especially low resources stakeholders like SMEs, with the effective tool for the problem solving and decision making. This goal is achieved through the implementation of the optimization procedures based on evolutionary algorithms (EA) in Cloud computing environment and through the development of simple and intuitive application programming interface (API).

OSICE is an innovative ICT concept which will disrupt existing markets of optimization software and create new ones by enabling SMEs to utilize immense computational power of the Cloud for optimization problem solving and decision making, regardless their financial, technological and knowledge level.

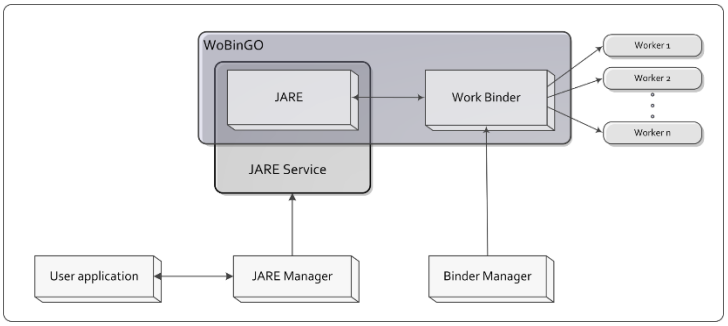


Figure - Logical architecture of OSICE - component view

Figure - *JARE Manager, user view. Monitoring the objectives in real time*

Keywords:

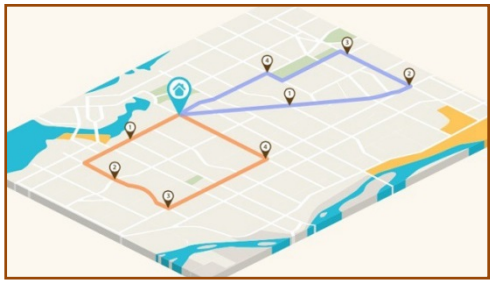
Optimization
Internet of Things
Service in Cloud environment

Example of Product/Service usage:

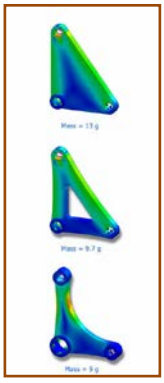
The key segment of our identified users are European SMEs, with 50-250 employees, in high-tech manufacturing sector and high-tech knowledge-intensive services sector, especially telecommunications, computer programming, consultancy and related activities, information service activities and scientific research and development.

These companies are already familiar with the benefits of business processes optimization, or optimization in design of products and services, and they are in the need for comprehensive, cost-effective and easy-to use optimization solution, or cost-effective alternative to existing in-house optimization solutions.

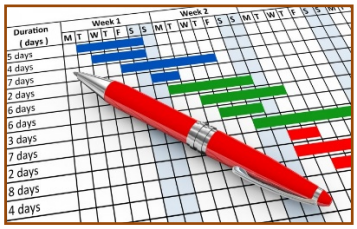
Implementation in simple optimization problembs:



Routing



Simple structural optimization



Scheduling

Implementation in Large-scale optimization problems:

Aerodynamics

Power production

Improvement areas covered by the Product/Solution:

Implementation of the novel technology
Increased speed of production operations
Decreased manufacturing costs

Product/Solution is related to the following type of implementation:

Access to Increased speed of production operations
Decreased manufacturing costs
Improved agility and responsiveness in the production process
Improved information for business analytics
Improved product quality
Improved information for business analytics
Developed visualization capabilities

Product/service technological focus:

Information Processing & Systems,
Design and Modelling / Prototypes,
Water Management

Market availability:

Available on the market

10 Smart factory solutions from Slovakia

10.1 The Digital Twin of an industrial Production line within the Industry 4.0 concept

Smart Factory solution The Digital Twin of an industrial Production line within the Industry 4.0 concept

Sova Digital, a.s., Bratislava
Bojnická 3, 831 04 Bratislava, Slovakia
Contact person:
Milan Lokšík
Tel: +421 2 4333 0643

Type of organization:

SME

Market sectors:

- Mechanical engineering
- Electrical and electronic engineering industries
- Automotive industry

Services provided:

- Consulting
- Manufacturing
- Research and development
- Engineering

Type of solution:

- Product

Smart Factory description:

This solution is strongly tied with the “Smart Factory” concept, as a novel technology. Digital twin collects and evaluates the information continuously, allowing, among other things, to shorten and streamline the production cycle, reduce the rise time of introducing new products, detecting inefficient settings of the underlying processes. The concept of the digital twin, therefore, is built on the principle known today as Industry 4.0.

The digital twin is formed by the physical production line and its digital “copy”. The major feature of this arrangement is the interface, through which data exchange takes place. The digital part is based on the simulation tool called Plant Simulation (PS) made by SIEMENS. The digital

simulation model of the production line was created in this environment. This model was a detailed virtual copy of the physical process.

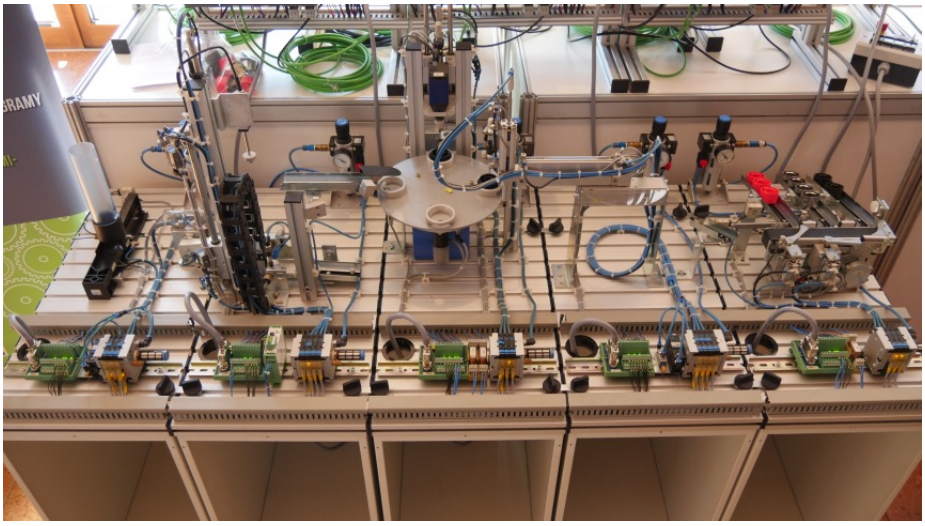


Fig. 1 – Digital Twin

Keywords:
Digital twin, Optimization of production, Genetic algorithm, Data collection

Example of Product/Service usage:
Embraco Slovakia s.r.o. started cooperation with the company Sova Digital a.s. in late 2016. Sova Digital offered integration of the digital twin (DT). A DT is essentially a functional system of continuous process optimization, which is formed by the cooperation of physical production lines with a digital "copy. It creates the digital factory environment, in which the company can optimize the operation directly through the production chain, manipulate parameters and production processes; adapting the product to market requirements.

From the costs perspective, the solution proved to be highly efficient, as it requires minimum intervention (only software and extra sensors when they needed) and further investments after implementation are not needed.
The solution led to a significant decrease in faulty and non-conforming products reported by customers, which, in turn, increased customer satisfaction.

Solution can be applied by other companies that are willing to integrate digital twin and the digital simulation model of the production line for continuous process optimization. The practice has a high degree of portability and can be adapted to companies operating in various industry branches. It must be noted, however, that it initially requires a medium financial commitment and the organizational culture should be open to the use of new technologies.

Improvement areas covered by the Product/Solution:

- Increased speed of production operations
- Decreased manufacturing costs
- Improved information for production decisions
- Improved maintenance/uptime
- Improved product quality
- Improved agility and responsiveness in the production process
- Improved remote monitoring capabilities
- Developed visualization capabilities

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation:
(http://default.sopk.sk/downloads/SFH/DD_milo.pptx)

Product/service technological focus:

- Industrial Manufacture
- Information Processing & Systems, Workflow

Market availability:

Available on the market since 2016

10.2 Collaborative robot integrated in industrial environment of Smart Factory

Smart Factory solution Collaborative robot integrated in industrial environment of Smart Factory

MATADOR Automation, s.r.o.
Továrenská 1 018 41, Dubnica nad Váhom, Slovakia
Contact person:
Ing. Maroš Mudrák
Tel: +421 908 948 928

Type of organization:
SME

Market sectors:
- Mechanical engineering
- Automotive industry

Services provided:
- Consulting
- Research and development
- Engineering

Type of solution:
- Product

Smart Factory description:

In 2014 company started to focus its activities on higher degree of robotics. Trends in this field showed that one of the most important integrations will be robots capable of cooperation with humans. Our company has own development and research capacities, that is why we created this solution.

Solution is fully compatible with Smart Factory and it follows the trends in Smart Factory. It is fully integrated with other systems and it can communicate with its environment in IoT meaning, but also in communication with humans.

Design of safe workplace with multi-axis robot, which can help the human operator, eventually it can replace him within difficult operations. Important is the repeatability and full integrity between operators without the necessity of safety barriers usage.

Fig. 2 – Collaborative robot integrated in ŠKODA AUTO a.s. Vrchlabí (Czech Republic)

Keywords:
Collaborative robot

Example of Product/Service usage:
Target customers are all industrial corporations, which perform assembly tasks or manipulation with parts performed by human operator. The solution can be used on any type of SME or large company. Implementation will increase the quality of production and reduce non-ergonomic work of human workers. This solution can be used in any type of production.

Quality is ensured by fully integration and repeatability of solution itself. Before implementation, very precise analysis of specific application is done. Consequently, safety risks and their elimination are evaluated and implemented.

It is needed to realize and accept the technology by the people, which will cooperate with the robot. They must accept him as a partner, not as a replacement. Every implementation is modified for specific environment and it needs full cooperation between integrator and customer, which better knows the specification of his environment.

This solution is specified by implementation of collaborative robots, which can be implemented near the human workers or they can directly cooperate their actions with humans in production

process. Integration of such solution will increase the quality of production operations and repeatability of production itself.

Improvement areas covered by the Product/Solution:

- Increased speed of production operations
- Improved agility and responsiveness in the production process
- Improved maintenance/uptime
- Improved product quality
- Improved safety

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Video about SF solution
(https://www.youtube.com/watch?v=c3GZ2Q0QLP8)

Product/service technological focus:

- Industrial Manufacture

Market availability:

Available on the market since 2014.

10.3 Bin picking solution for flexible Automation

Smart Factory solution Bin picking solution for flexible Automation

Photoneo s.r.o.
Jamnického 3, 841 05 Bratislava, Slovakia
Contact person:
Ján Žižka

Type of organization:
SME

Market sectors:
- Mechanical engineering
- Automotive industry
- Electrical and electronic engineering industries
- Food industry

Services provided:
- Consulting
- Research and development
- Engineering

Type of solution:
- Product

Smart Factory description:
Company has developed own 3D scanner called PhoXi Scan and own software for control of the robot based on ROS. Bin picking Solution is composed of these parts:
1. Robot
2. 3D scanner
3. Bin Picking SDK Software

The demanding needs on automation require nowadays complex systems which very often can be achieved only with the help of industrial robots. Therefore we cooperate with different robot producers and integrate their robots in to our production solutions. Bin picking by Photoneo is a new technology, which leads to autonomous bin picking workplace. Such workplace is an essential part of Smart Factory. Increasing the efficiency of robotic work cells is directly connected to autonomous robot problem. Such solutions are requested in Smart Factory. The robotic vision and 3D scanning systems become more and more important for automation solutions since the need

to automate even smaller production quantities and therefore create flexible automation solutions is growing.

Fig. 3 – Bin picking model

Our solution brings new approach (technology) to bin picking by robot. We are capable to analyse 3D data in bins and compare it with CAD model of the picked part. Analysis then decides which part is sizable for the robot. By the application of such procedure the robot is able to pick all the parts in bin without any help of human. This brings very effective solutions in industries, where assemblies or similar process are needed.

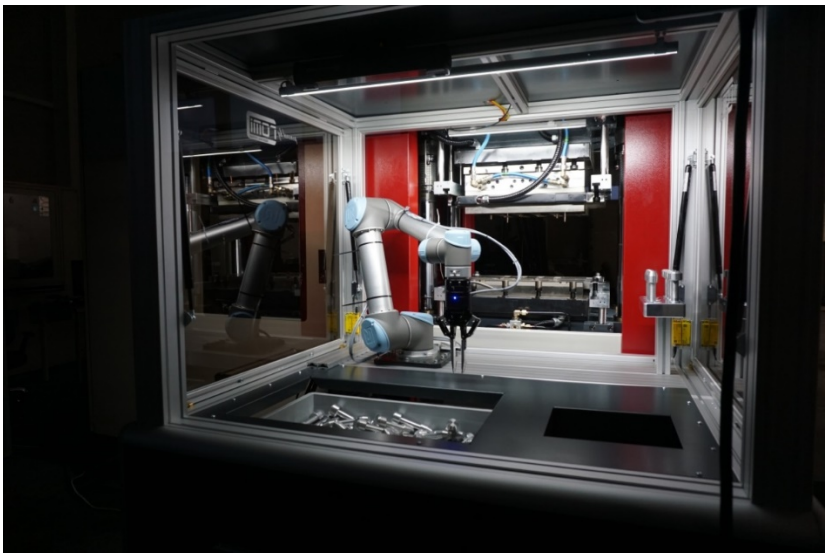


Fig. 4 – Bin picking in practice

Keywords:
Bin picking, Robotics, Scanner

Example of Product/Service usage:

Solution led to more efficient production and reduction of costs for human labour. Our good practice can be applied to any customer, which requires autonomous removing of components from the bins. First we will provide primary study of the workplace and then if all aspects of the customer are redeemable, we provide also the integration of solution including various types of robots. Application of bin picking is very easy. Created software solution allows it in three steps:

1. Insert CAD model.
2. Capture 3D scene.
3. Get localized results.

As any automation device, the primary costs are higher than recruit some human labour. However, if production volumes are also higher, then the costs are also reduced. Our customer must count with several months for implementation.

The solution can be implemented in a wide range of industrial companies (automotive, food, electronics). Our product can be also used as a smaller part of more complex system, when system requires:

1. 3D object recognition
2. Inspection of object placement
3. General inspection and analysis

Solution can be expanded by more appropriate software and new versions of PhoXi scanner.

Improvement areas covered by the Product/Solution:

- Increased speed of production operations
- Improved agility and responsiveness in the production process
- Improved maintenance/uptime
- Improved safety

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Video about SF solution
(https://www.youtube.com/watch?v=8aOiKJ5_QsU)
(https://www.youtube.com/watch?v=azsxHA2urdY)

Product/service technological focus:

- Industrial Manufacture

Market availability:

Available on the market since 2016.

10.4 Volumetric measurements by UAV

Smart Factory solution Volumetric measurements by UAV

UAVONIC s.r.o.
Galvaniho 17/B, 821 04 Bratislava, Slovakia
Contact person:
Juraj Dudáš

Type of organization:
SME

Market sectors:
- Mechanical engineering
- Automotive industry
- Electrical and electronic engineering industries
- Food industry
- Construction

Services provided:
- Consulting
- Research and development
- Engineering

Type of solution:
- Product
- Service

Smart Factory description:
Volumetric measurement by UAV devices is a modern method allowing for example inspection of outdoor storage with high capacity. This method can replace employees with standard measuring devices, which have higher inaccuracies and their usage is time consuming or there is a risk of potential injury. Volumetric measurements by UAV are composed of aerial pictures created by calibrated cameras or laser scanners. This data are consequently processed in software, which creates digital 3D model of measured material. Accuracy of this process is higher than the other standard measuring methods.

Fig. 5 – Volumetric Measurements by UAV

Our approach is characterized by novel technologies as precise cameras or laser scanners and by intelligent software solutions. It is clear that smart factory needs smart control and smart control is characterized by smart and precise measuring. Our approach brings novel approach to volumetric measurements in any segment of the industry.

Technical solution is characterized in two ways:

1. novel hardware – precise cameras with laser scanners
2. novel software – data fusion and fast volumetric measurements of high capacity storage

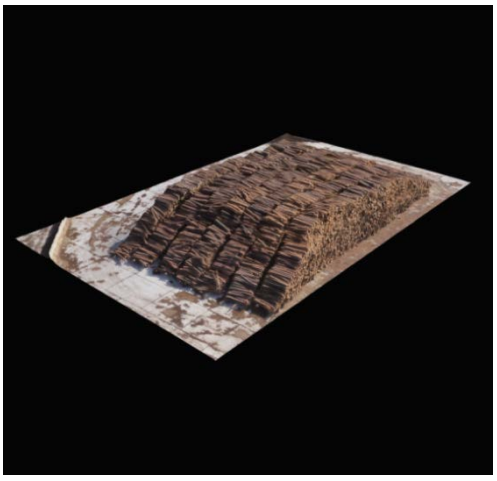


Fig. 6 – Volumetric Measurements by UAV

Keywords:
Volumetric measurements, Camera, Laser scanner

Example of Product/Service usage:

The solution can be used on any type of SME or large company also in Public institutions. For example: industrial enterprises, academic sector, agriculture, forestry, construction, environmental sectors etc.

Solution led to a significant optimization of logistics in company. It depends individually on the application and request of the customers. We are able to provide basic study for the customer and then the customer decides, if he/she is able to cooperate on such solution.

Impact of this solution is positive in the manner of control of whole producing process. Partner exactly knows, what amount of material he has available for production and consequently he can optimize whole logistic and save the costs.

System is limited by environment around the storage. If the storage is outside, our system is not able to measure when the weather is not suitable for the flight of UAV. Moreover, it is also limited in some dusty or in other ways disadvantageous for UAV technology.

Selling points – the real or perceived benefits:

1. Safety
2. High resolution
3. Costs saving
4. Time efficiency

Solution is dependent on used hardware and software. With the development of more precise sensors and more intelligent software the solution will acquire even more precise results.

Improvement areas covered by the Product/Solution:

- Improved coordination with suppliers
- Improved coordination with customers
- Improved remote monitoring capabilities
- Developed visualization capabilities
- Improved agility and responsiveness in the production process
- Improved maintenance/uptime
- Improved safety

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation: UAVONIC_VOLUMETRIC MEASUREMENTS BY UAV_V2.pptx, (https://uavonic.com/volumetric-measurements/)

Product/service technological focus:

- Industrial Manufacture
- Agriculture

- Technologies for the food industry
- IT and Telematics Applications
- Electronic measurement systems
- Measurement Tools

Market availability:
Available on the market since 2016.

10.5 Smallest passive contactless sensors of physical quantities in the world

Smart Factory solution Smallest passive contactless sensors of physical quantities in the world

RVmagnetics, a.s.
Hodkovce 21, 04 421 Hodkovce, Slovakia
Contact person:
Michal Borza
Tel: +421 918 885 538

Type of organization:
SME

Market sectors:

- Mechanical engineering
- Automotive industry
- Electrical and electronic engineering industries
- Construction
- Biotechnology
- Healthcare industries
- Pressure equipment and gas appliances

Services provided:

- Consulting
- Research and development
- Engineering

Type of solution:

- Product

Smart Factory description:
RVmagnetics bring to the market absolutely new generation of physical quantities sensors; based on microwire technology which offer to RVmagnetics´s partners create smart goods from their standard portfolio. RVmagnetics´s technology is ideal for IoT world and Industry 4.0

With RVmagnetics´s technology could be goods of our partners smarter, more effective, self-diagnosed and much more. The innovative nature of this solution is that it provides non-invasive testing, monitoring and measuring method for composites materials, which monitors the production process, application process and values from real use. With this technology partners can save the material costs, produce smarter goods and bring new added value for their partners.

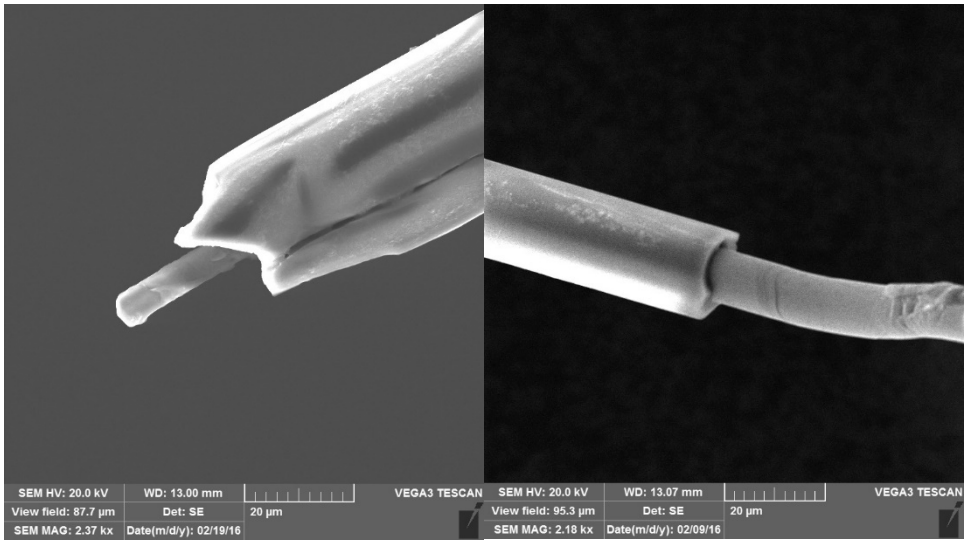


Fig. 7 – Smallest passive contactless sensor of the physical quantities

RVmagnetics provides as simple as possible solution which we offer to our partners. From the costs perspective, the solution can save up to 30% of material costs for selected sectors (composites materials), or provide new and high added value with minimum initial costs.

Unique solution based on revolutionary technology which brings high added value for our partner and their customers.

Benefits:

1. Small dimensions – microwires can be embedded into the various structures without changing of mechanical properties of the structure (e.g. glass- and carbon- fibre composites, polymers, Ti implants, etc.);
2. Multifunctionality – single microwires can sense temperature, stress and position at the same time
3. Glass-coating is biocompatible, protects metallic nucleus from corrosion, short-circuits etc.;
4. Contactless sensing because of magnetic nature;
5. Imperishable – when a microwire is broken, two sensors are obtained (like braking a magnet results in getting two magnets)
6. Small dimensions allow constructions of network of sensors;
7. Low energy consumptions – can be powered by little battery or photovoltaic cells;
8. Simple sensing process – no electronics is necessary inside the construction;
9. Production process allows to produce thousands of sensors in short time;
10. Real time data – 1000x/sec;

Keywords:
Sensors, Structural health monitoring, Non-invasive, Innovative, Magnetic, IoT, Industry 4.0.

Example of Product/Service usage:

This solution can be implemented to a wide range of companies. It must be noted, however, that it initially requires a financial commitment and the organizational culture should be open to the use of new revolutionary technologies.

Improvement areas covered by the Product/Solution:

- Improved coordination with suppliers
- Improved coordination with customers
- Improved remote monitoring capabilities
- Developed visualization capabilities
- Improved agility and responsiveness in the production process
- Improved maintenance/uptime
- Improved safety
- Lower energy costs
- Decreased manufacturing costs

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation: RVmagnetics_LDW PPT.pptx
Attachment 3: Video about SF solution: INTRO_RVmagnetics.mp4,
(https://www.dropbox.com/sh/i6yqas0q7cn5i1e/AADZwFi2B_vtxps_m3hUP3rla?dl=0)
Attachment 4: Product promo material: Leaflet RV.pdf

Product/service technological focus:

- Industrial Manufacture
- Agriculture
- Technologies for the food industry
- IT and Telematics Applications
- Electronic measurement systems
- Measurement Tools
- E-Health
- Industrial Biotechnology
- Construction Technology
- Materials Technology
- Physics
- Micro- and Nanotechnology
- Other Industrial Technologies

Market availability:

Available on the market since 2016.

10.6 Orange BOX

Smart Factory solution Orange BOX

B+R automatizace, spol. s r.o. - organizačná zložka
Trenčianska 17, 915 01 Nové Mesto nad Váhom, Slovakia
Contact person:
Juraj Bielesch
Tel: +421 907 174 055

Type of organization:

SME

Market sectors:

- Mechanical engineering
- Automotive industry
- Electrical and electronic engineering industries
- Food industry

Services provided:

- Consulting
- Engineering
- Services

Type of solution:

- Product

Smart Factory description:

Robust control systems B&R provided HW platform for data acquiring (productivity, quality, energy consumption, operating state, …) from machine in real time. These control systems perform data acquisition, their evaluation and display, and in consequence their transfer through communication standards as OPC UA, MQTT…. into superior control system, where analysis and reports are created.

OrangeBox allows upgrade to Smart factory of almost any production factory. It provides new communication technology OPC UA, MQTT, even for machines without own control system.
Results of consequent data analysis have immediate impact on arrangements for increasing the productivity, effectivity, quality and energetic effectivity of machines and lines. At the same time it allows to follow the effects of changes on individual parameters, watching the trends and compering them with historical data.

OrangeBox is IIoT device, which creates the gate between the machine and analytical tool (server, cloud, edge controller). Innovation of this solution lies in its configurability without the need of programming or IT knowledge about OPC UA or MQTT. Moreover, the knowledge of PLC programming is also not needed.

Fig. 8 – Orange Box

System is essential for objective analysis of productivity, effectivity, energy consumption, etc. whereby return is determined by quality and speed of established actions.

Quality monitoring, search for contexts and trends tracking are the basic elements of system. Depth of knowledge about the impact on quality is proportional to the number of monitored variables and factors.

Implementation of basic system is simple and a handy maintenance technician is sufficient for the implementation. In the case of more difficult implementations, system integrator is needed. Handy technician, necessary HW, available network infrastructure, system can be implemented in 1 hour.

After implementation of minimal configuration at a customer and after 2 days of measuring, this system was able to organizational actions, which increased overall utility of machine over 20%. Analysis brought surprising relations. Investment returns were defined on level of 3 weeks.

Keywords:
Quick implementation, Configurability, Simplicity, Flexibility

Example of Product/Service usage:
OrangeBox is configurable tool for measuring and evaluating the productivity, effectivity, and energy consumption, and it is suitable for predictive maintenance. Ideal tool for already existing production enterprises, view about OEE in real time (before once a shift or day). Frequently surprising detection of weak places in productivity, effectivity energy consumption and other unexpected relations.

The solution can be used on any type of SME or large company in all production enterprises. It was used for example in Slovakia, Germany and Austria.

Improvement areas covered by the Product/Solution:

- Improved information for production decisions
- Improved product quality
- Improved coordination with suppliers
- Improved coordination with customers
- Improved remote monitoring capabilities
- Developed visualization capabilities
- Improved agility and responsiveness in the production process
- Improved maintenance/uptime
- Improved safety
- Decreased manufacturing costs

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation: LDW PPT_OrangeBox.pptx (https://www.br-automation.com/en/downloads/#categories=catalogues-and-brochures/products/orange-box),

Product/service technological focus:

- Industrial Manufacture
- Agriculture
- Technologies for the food industry
- Measurement Tools
- Construction Technology
- Other Industrial Technologies

Market availability:

Available on the market since 2016

10.7 SMART Factory – TIA (Totally integrated automation)

Smart Factory solution SMART Factory – TIA (Totally integrated automation)

MERCHANT, s. r. o.
Štúrova 844/21, 927 01 Šaľa, Slovakia
Contact person:
Tomáš Mlynka
Tel: +421 944 094 455

Type of organization:

SME

Market sectors:

- Mechanical engineering
- Automotive industry

Services provided:

- Consulting
- Education/Training
- Research and development
- Services

Type of solution:

- Product

Smart Factory description:

Currently used production lines are designed to produce a particular product and transforming their production into another type of product is very demanding and financially unprofitable. This fact has the direct consequence of being unable to respond to changes in the market requirements in a sufficiently short time and to a reasonable extent.

The modular production system modifies this situation and provides a tool that can not only provide a prompt response to client requirements, but at the same time manage the production process autonomously and take the necessary measures. For example, automatically replace a malfunctioning module with a new module.

Keywords:

Smart factory, Industry 4.0, IoT, Production management, Autonomous production, Production efficiency, Production variability, Increasing the efficiency of production resources expended, Rapid adaptability of production to customer requirements, Modular production system, Collaborative Robotics

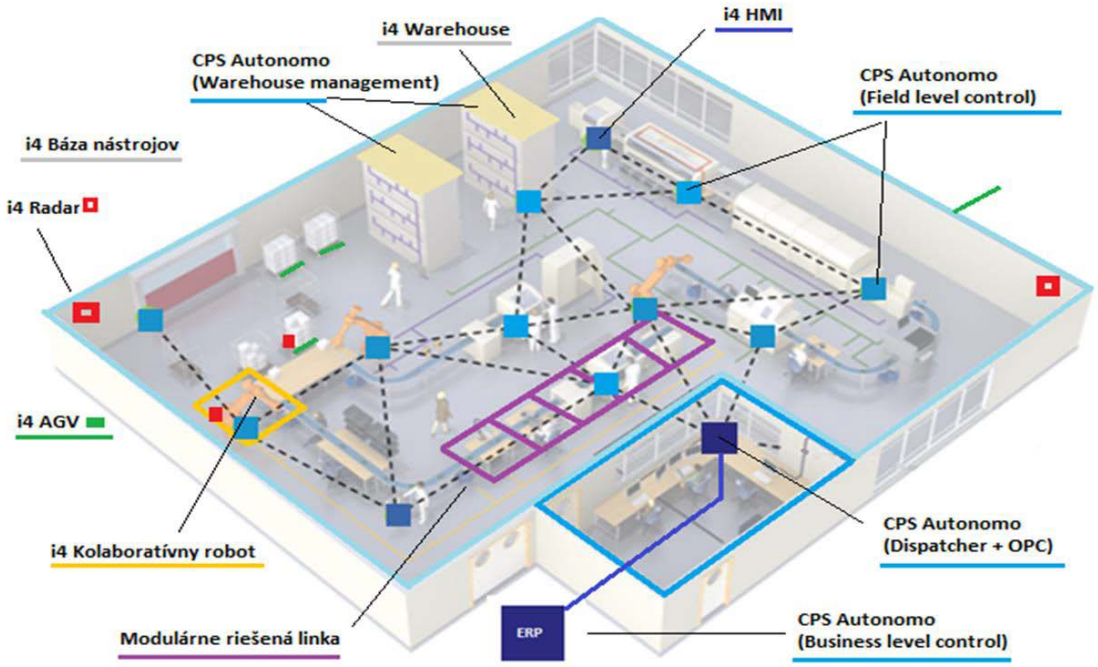


Fig. 9 – SMART Factory - TIA

Example of Product/Service usage:

Implementation of new technological processes in production systems with the aim of increasing efficiency, introducing modularity, using collaborative robots.

Improvement areas covered by the Product/Solution:

- Improved coordination with suppliers
- Increased speed of production operations
- Decreased manufacturing costs
- Improved information for production decisions
- Improved agility and responsiveness in the production process
- Improved product quality
- Improved coordination with customers
- Improved maintenance/uptime
- Improved information for business analytics
- Improved remote monitoring capabilities

Product/Solution is related to the following type of implementation:

- Implementation in the production processes

Product/service technological focus:

- Industrial Manufacture
- Plant Design and Maintenance
- Process control and logistics

Market availability:

Available on the market since 2019.

10.8 eDOCU SMART FACTORY

Smart Factory solution eDOCU SMART FACTORY

eDocu, a.s.
Sliačska 1/D, 831 02 Bratislava, Slovakia
Contact person:
Miroslav Hájek
Tel: +421 905 888 181

Type of organization:
SME

Market sectors:
Other – ITC and IoT, Smart Factory Solutions

Services provided:
Services (IT)

Type of solution:
Service

Smart Factory description:
We are introducing an innovative and simple platform called eDocu which is rather unique in terms of its substantiality, accuracy and functioning. It is easy to implement and customize onto your specific requirements. Moreover, the price-performance ratio is invincible.

The platform originates from our vision – linking things with information and is usable for solving various problems a factory might be facing. Thanks to its adaptability on every environment it is highly user friendly and manageable on an intuitive base. One of the biggest perks is that in order to benefit from the platform you do not need to have a special proprietary device, the only thing you need is a smartphone (or device with display) and the Internet connection. Since the whole solution is running on a cloud, the costs are limited. eDocu Smart Factory is the ultimate and widespreading solution for every manufacture willing to increase its profits.

This description provides a general overview to the eDocu Smart Factory solutions and consists of the below mentioned products (functionalities). Detailed description of each product (functionality) accompanies the specific (sub)solutions.

Keywords:

eDocu Smart Factory, SaaS, Internet of Things, Maintenance, Facility Management, Occupational Health and Safety, Archive

Example of Product/Service usage:
eDocu Smart Factory is applicable for implementation to every manufacturer and can adapt to every environment where there is ongoing production. The product itself does not matter as the system provides information connectivity of every material thing marked with the iTag (QR, BLE, NFC etc.). The solution is intended for increasing the cost efficiency since it optimises the overall management processes, administration such as archive, training of employees and their consequent certifications, providing an authenticity tool which increases the factory profits and last but not least oversees on the security within the facility.

The solution moreover saves the costs, facilitate the manpower and makes time management more efficient. Moreover, all information is safe, can be proven, linked to a respective thing and between each other.

The solution can be implemented in various ways: (i) Small scale: Implementation of one of the functionalities of a complex Smart Factory service; (ii) Medium scale: Implementation of 2 to 5 functionalities; (iii) Wide scale: Implementation of more than 5 functionalities. The more functionalities factory uses, the cheaper is the service.

Improvement areas covered by the Product/Solution:

Implementation of the novel technology
Implementation of the human resource management systems

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved product quality
Improved coordination with customers
Improved maintenance/uptime
Improved information for business analytics
Improved remote monitoring capabilities
Improved safety
Developed visualization capabilities

Other relevant information about the product/service:

Attachment 1: Company logo
Attachment 2: Product presentation: eDocu_workshop_Smart Factory HUB.pptx
Attachment 3: Product promo material: eDocu_Smart Factory.pdf

Product/service technological focus:

SOCIAL AND ECONOMICS CONCERNS - Technology, Society and Employment

PROTECTING MAN AND ENVIRONMENT - Safety

Market availability:

Available on market since 2015.

Smart Factory solution

eDocu Facility Management

Product/Solution webpage:

www.edocu.com

Type of solution:

Service (SaaS)

Smart Factory description:

eDocu Facility management is the system which helps you to manage facility and equipment information.It helps you check important terms, maintenance scale and other requirements. You are able to easily supervise observing your service contracts but also your subcontractors. Your technicians can effectively prepare for inspections and necessary performance on the spot having always the right equipment thanks to a direct and interactive connection of devices in the database. The devices have their iTags (QR, NFC, BLE, GPS) in order to secure the access to information and documents directly on the spot.

Keywords:

Facility Management, SaaS, Internet of Things

Example of Product/Service usage:

1. Right after task delivery, a technician disposes with detailed instructions, guidelines, schemes and directives concerning OHS connected with the task.
2. Once the technician is on the spot, he registers himself to the system and maps the current stage before entering into the task. While doing this, he receives the list of problems.
3. The technician creates a work record and uploads photo documentation.
4. The whole process is simplified by digital forms equipped with biometric signature.

Advantages:

- Reliable evidence of executed tasks
- Very simple creation of work records
- Decreased risk of fines and penalties
- Effective planning and task management
- Extended life of devices
- Decision making process of technicians based on all relevant information

Improvement areas covered by the Product/Solution:

Implementation of the novel technology

Implementation of the human resource management systems

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved information for business analytics
Improved remote monitoring capabilities

Other relevant information about the product/service:

Attachment 1: Company logo
Attachment 2: Product presentation: eDocu_workshop_Smart Factory HUB.pptx
Attachment 3: Product promo material: eDocu_Smart Factory.pdf

Product/service technological focus:

SOCIAL AND ECONOMICS CONCERNS - Technology, Society and Employment
PROTECTING MAN AND ENVIRONMENT - Safety

Market availability:

Available on market since 2015

eDocu Maintenance

Product/Solution webpage:

www.edocu.com

Type of solution:

Service (SaaS)

Smart Factory description:

System eDocu is a tool which links things with information and thus supports Total Productive Maintenance (TPM). It brings together maintenance rules, technical data from system SCADA, manuals, checklists, task lists, and activity reports needed to create eTPM (electronic TPM). So why do do not have to do quick decisions right on the spot. Let's rather do qualified decisions based on relevant and good information and decrease the error costs.

Keywords:

eDocu Smart Factory, SaaS, Internet of Things, Maintenance

Example of Product/Service usage:

1. SCADA systems sends alarming measurements on the welding machine which happens to be the most important part in manufacturing.

2. eDocu immediately creates a task linked with the responsible person or a group responsible for the proper functioning of the machine.
3. Once the technician comes to the machine, he can immediately start with maintenance since eDocu provides him with the complete history of maintenance on this device ad full service documentation as well as notes from other colleagues.
4. The maintenance is shortly successfully done. A work record as well as reminder for the next check are created right on the spot.

Advantages:

- Immediate access to relevant information in case of need
- Maintenance records created right on the spot
- Audio-visual records can be easily done and uploaded by a smartphone
- Error decrease during maintenance leads to better productivity

Improvement areas covered by the Product/Solution:

Implementation of the novel technology
Implementation of the human resource management systems

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved product quality
Improved coordination with customers
Improved maintenance/uptime
Improved information for business analytics
Improved remote monitoring capabilities

Other relevant information about the product/service:

Attachment 1: Company logo
Attachment 2: Product presentation: eDocu_workshop_Smart Factory HUB.pptx
Attachment 3: Product promo material: eDocu_Smart Factory.pdf

Product/service technological focus:

SOCIAL AND ECONOMICS CONCERNS - Technology, Society and Employment
PROTECTING MAN AND ENVIRONMENT - Safety

Market availability:

Available on market since 2015

eDocu Occupational Safety and Health (OSH)

Product/Solution webpage:

www.edocu.com

Type of solution:

Service (SaaS)

Smart Factory description:

eDocu OSH will help you to avoid work accidents and accusations of duty neglect and also helps you to obtain an informed consent. We will help you to reduce the number of injuries and improve legal security throughout active cooperation of your employees. Using self-control, an employee verifies whether he is or is not ready to do the task. In our system, you work with active reminders from expirations to revisions through testing and qualification obtaining all the way to first-aid-kit expiration.

Keywords:

eDocu Smart Factory, SaaS, Internet of Things, Occupational Health and Safety

Example of Product/Service usage:

1. Every employee has its own OSH saved under his personal profile in eDocu.
2. All due dates (e.g. employee retraining) are automatically reminded using email notifications.
3. An employee can log in into the database of classified technical equipment after scanning an iTag, where he finds whether he is or he is not permitted to manipulate with a machine.
4. In case of a work accident, an employee is navigated by eDocu on how to proceed, he is provided with a first aid by the helpdesk and he is able to register the event clearly.

Advantages:

- Minimal initial costs and massive savings thanks to cloud solution
- Maximal effectiveness in trainings validity, certifications, decrees or regulations
- Legal assurance in various inspections
- First aid in work accidents (registration, first aid etc.)
- Video training option in eDocu system

Improvement areas covered by the Product/Solution:

Implementation of the novel technology
Implementation of the human resource management systems

Product/Solution is related to the following type of implementation:

Improved remote monitoring capabilities
Improved safety

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation

Product/service technological focus:

SOCIAL AND ECONOMICS CONCERNS - Technology, Society and Employment
PROTECTING MAN AND ENVIRONMENT - Safety

Market availability:

Available on market since 2016

Product/Solution webpage:

www.edocu.com

Type of solution:

Service (SaaS)

Smart Factory description:

As your employee is the most valuable asset at your company, it is crucial to have right documentation about him. In eDocu, you store all necessary information about your employees. There are records of their practice, skills, certifications, trainings so the manager can immediately recognise whether his subordinate is suitable for the specific task. Just imagine that each employee, even though a candidate, has its own profile with all relevant data. The system automatically notifies you about contract expiration or e.g. need of requalification etc.

Keywords:

eDocu Smart Factory, SaaS, Internet of Things

Example of Product/Service usage:

1. Company is hiring a new employee and is able to see all his previous jobs, skills and trainings.
2. The system notifies the company a month in advance as the employee is supposed to undertake an OSH training.
3. An employee is given with the company cell phone and PC which are automatically linked to his profile. The company sees the current stage of all bequeathed devices.
4. All work records and skills are summarized in a profile of each employee. This simplifies creation of new teams which are convened in accordance with OSH regulations, qualification or trainings.

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Advantages:

- Simple and transparent database of employees
- Easily connected with asset or fleet management
- All employees information are recorded – trainings, skills, previous practice, contract, work records
- All information at disposal right on the spot

Improvement areas covered by the Product/Solution:

Implementation of the novel technology

Implementation of the human resource management systems

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Decreased manufacturing costs
Improved information for production decisions
Improved coordination with customers
Improved remote monitoring capabilities

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation

Product/service technological focus:

SOCIAL AND ECONOMICS CONCERNS - Technology, Society and Employment
PROTECTING MAN AND ENVIRONMENT – Safety

Market availability:

Available on market since 2018

eDocu Authenticity

Product/Solution webpage:

www.edocu.com

Type of solution:

Service (SaaS)

Smart Factory description:

With eDocu Authenticity you can very easily protect your product, minimize the risk of falsification and increase your profits. How can the system monitor the authenticity of products? There are many moments where a product falsification can occur from production, through distribution to the end customer. eDocu provides the companies with a simple solution – every product can by marked by iTag (e.g. QR code) and thus prove that your product is original. Providers, retailers and customer therefore have also access to information about your product by simple scanning the iTag. It is not possible to copy so it is easy to learn whether the product is original or a fake.

Keywords:

eDocu Smart Factory, SaaS, Internet of Things

Example of Product/Service usage:

1. Every product is marked with the unique QR code in time of its production.
2. Once the good is shipped to a purchaser, this event is recorded under the product QR code and delivery is electronically signed.

3. An end customer has all product information at disposal by scanning the QR code what also increase a value of the product. After its purchase, its status changes to „sold".
4. In case of QR falsification, the system recognizes a copy and a producer is immediately notified. The option to report a fake product is given to a customer as well in one click way

Advantages:

- Product increase in value – recorded lifelong cycle
- An attractive function for consumers – increase of sell
- Protection and branding development
- Consumer protection against fake purchase

Improvement areas covered by the Product/Solution:

Implementation of the novel technology
Implementation of the human resource management systems

Product/Solution is related to the following type of implementation:

Improved information for production decisions
Improved product quality
Improved coordination with customers
Improved remote monitoring capabilities
Improved safety
Developed visualization capabilities

Other relevant information about the product/service:

Attachment1: Company logo
Attachment 2: Product presentation

Product/service technological focus:

SOCIAL AND ECONOMICS CONCERNS - Technology, Society and Employment
PROTECTING MAN AND ENVIRONMENT - Safety

Market availability:

Not yet, however there is fit to market and conceptual solution. There is a possibility to customize the product based on the customer's needs.

Smart Factory solution

eDocu IoT

Product/Solution webpage:

www.edocu.com

Type of solution:

Service (SaaS)

Smart Factory description:

Nowadays, more and more companies need information form their machines or devices, right on the spot or remotely. We can monitor many rates or calibrations, e.g. list of malfunction records, temperature sensor, oil supply in the tank or diesel aggregate.

Just come closer to the device marked as BLE (beacon) and all technical information about it will be automatically displayed. Or, place your smartphone onto an NFC chip or scan the QR code and eDocu will bring you information from the system IoT, SCADA or BMS. You do not need a separate application for each type of device, you do not need to come to SCADA terminal or search for sensor in the technological schemes. Information are available via ordinary web environment.

Keywords:
eDocu Smart Factory, SaaS, Internet of Things

Example of Product/Service usage:

1. User wants to find out the temperature in the drying furnace.
2. The maintainer is next to the machine which does not have a display and he needs to know the malfunction history.
3. Manager needs to remotely find out the devices which need a filter.
4. Operator stands next to the stopped machine and does not know the cause of malfunction.
5. The Manager needs to know the maintenance on the specific device.
6. The maintainer needs to fill in a new compressed air value.

Advantages:

- Large touch display is not needed on every device
- No necessity for keeping separate apps for every machine
- No need for application at all – everything works on a smartphone

Improvement areas covered by the Product/Solution:

Implementation of the novel technology
Implementation of the human resource management systems

Product/Solution is related to the following type of implementation:

Increased speed of production operations
Improved information for production decisions
Improved information for business analytics
Improved remote monitoring capabilities
Developed visualization capabilities

Other relevant information about the product/service:

Attachment 1: Company logo
Attachment 2: Product presentation: eDocu_workshop_Smart Factory HUB.pptx
Attachment 3: Product promo material: eDocu_Smart Factory.pdf

Product/service technological focus:

SOCIAL AND ECONOMICS CONCERNS - Technology, Society and Employment
PROTECTING MAN AND ENVIRONMENT - Safety

Market availability:

Available on market since 2018.

eDocu Archive

Product/Solution webpage:

www.edocu.com

Type of solution:

Service (SaaS)

Smart Factory description:

eDocu Archive is a secure, appropriate and financially reasonable solution for your digital archive. You can manage the whole documentation in a digital archive all the way to a single document level.

All linked information (including work records and comments) are available alongside with other complex overview and searching functions. You can find a specific document in a system and update all information in a physical archive as well.

Keywords:

eDocu Smart Factory, SaaS, Internet of Things

Example of Product/Service usage:

1. Documentation of a new device is tagged with QR code and scanned. Physical original is stored in the external archive.
2. Document information are acquired by using OCR and uploaded together with scan and location of the original.
3. In case of need to check the documentation, the information is displayed within seconds accompanied by the original scan whilst the system monitors all overviews and changes.
4. In case the device is broken and it is necessary to finds a warranty, you are able to locate in in eDocu with an information where is the original version stored.

Advantages:

- Decrease of costs – no need to own a physical archive, smaller employees preoccupancy
- Increased security

- Various groups of users or third party can access to a different documents upon approval
- Faster access to a document

Improvement areas covered by the Product/Solution:

Implementation of the novel technology
Implementation of the human resource management systems

Product/Solution is related to the following type of implementation:

Improved information for production decisions
Improved information for business analytics

Other relevant information about the product/service:

Attachment 1: Company logo
Attachment 2: Product presentation: eDocu_workshop_Smart Factory HUB.pptx
Attachment 3: Product promo material: eDocu_Smart Factory.pdf

Product/service technological focus:

SOCIAL AND ECONOMICS CONCERNS - Technology, Society and Employment
PROTECTING MAN AND ENVIRONMENT - Safety

Market availability:

Available on market since 2015.

10.9 3Dimension supported by MYMEDIA

Smart Factory solution 3Dimension supported by MYMEDIA

3Dimenzia s.r.o.
Klincová 35, 821 08 Bratislava, Slovakia
Contact person:
Peter Svoboda
Tel. +421 940 859 947

Type of organization:

- SME
- R&D

Market sectors:

- Construction
- Toys
- Electrical and electronic engineering industries
- Food industry
- Mechanical engineering
- Medical devices
- Automotive industry

Services provided:

- Manufacturing
- Research and development
- Engineering
- Services

Type of solution:

Product
Service

Smart Factory description:

3Dimenzia, This Slovak company established in the large-sized 3D printing is entering the market with an innovative concept. One of their product - large 3D printer - has a printing volume of 1 meter cubic and circa 50 kg weigh. The competing 3D printers (with the same size of printing volume) weigh usually 500 kg or more. Naturally, this company has in their portfolio of smaller 3D printers, as well. The whole family of 3D printers is nowadays certificated and ready for selling.

The company is ready to meet the demands of clients in the field of 3D printing on an international scale. One of the fundamental principles of its functioning is a customer-oriented approach to address the individual needs of customers. Each assignment is treated as a unique project, enabling the company to achieve exceptional results supported by the satisfaction of the client.

This company can guarantee not only the functionality of the 3D model, but also places emphasis on aesthetic and attractive design with precise detail. Some examples of 3D printing products are available as a picture attachment of this cooperation profile. To capture a 3D model it is enough to have photography, visualization or a drawing. The team of 3D graphics ensures the quality of sculpted model and prepares it for production so that the resulting product is a perfect miniature of reality.

The typical use of 3D printer is to provide a 3D models of:
- buildings,
- visualizations of various products,
- cars, motorcycles, ships, aeroplanes,
- figures, busts,
- logos or promo materials,
- other 3D models and prototypes.

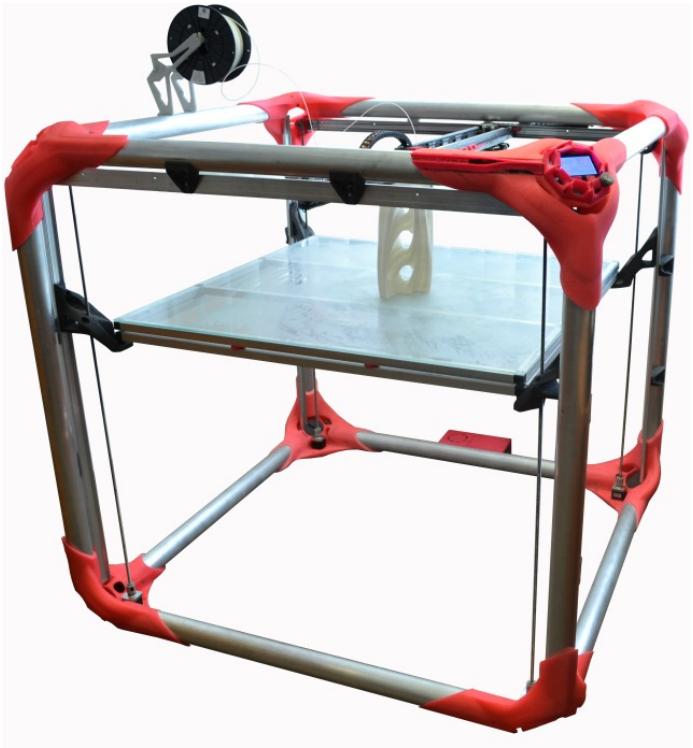


Figure: 3D Printer Quadron

Figure: Printed 3D models

Others innovative products of this modern company are interesting. Special carbon material for 3D printers, with very good properties. Developed in cooperation with Slovak Academy of Science and awarded by Ministry of Economy (2nd place in innovative act of 2017).

This company has prototype of building arm in size 1:10. Building arm in real size will be used for building real houses, parts of bigger buildings, etc.

They are making R&D on others product too, like excellent shell for robotic women, etc.

Keywords:
3D printing, Construction engineering (design, simulation), Design of Vehicles, Aeronautical technology / Avionics, Creative products

Example of Product/Service usage:
Presented 3D printer is suitable e.g. in architecture, automotive industry, aerospace industry, as well as in various fields of art, design, marketing, education, research, healthcare, etc.

Improvement areas covered by the Product/Solution:

- Increased speed of production operations
- Decreased manufacturing costs
- Improved product quality
- Developed visualization capabilities
- Improved compliance with customer specs or regulatory requirements

Product/Solution is related to the following type of implementation:

- Implementation of the novel technology

Other relevant information about the product/service:

Attachment 1: Company logo
Attachment 2: Product presentation: 3Dimenzia_LDW PPT
Attachment 3: Video about SF solution (https://youtu.be/upeLb-f6qD0)
Attachment 4: Product promo material: 3Dimension-Leaflet.pdf

Product/service technological focus:

Industrial Biotechnology
Electronic circuits, components and equipment
Electronics, Microelectronics
Aerospace Technology
Construction Technology
Creative products
Industrial Manufacture
Materials Technology
Other Industrial Technologies
Sports and Leisure
Creative services
Design and Modelling / Prototypes

Market availability:

Already on the market

10.10 INFOTECH - OPEN RTLS (REAL TIME LOCATING SERVICES) PLATFORM

Smart Factory solution INFOTECH – OPEN RTLS (REAL TIME LOCATING SERVICES) PLATFORM

INFOTECH, s.r.o
Tematinská 10, 851 05 Bratislava, Slovakia
Contact person:
Michal Ukropec
Tel: 0905 668 220

Type of organization:

SME
R&D

Market sectors:

Automotive industry
Electrical and electronic engineering industries
Food industry
Mechanical engineering
Other
- Logistic centres
- Warehouses

Services provided:

Consulting
Manufacturing
Research and development
Services
Other:
- Analysis of logistics and production processes
- IoT integration
- Mobile apps
- Custom hardware and software development

3D printing

Type of solution:

Product

Service

Smart Factory description:

Open RTLS is a technology set of hardware and software offering indoor location services.

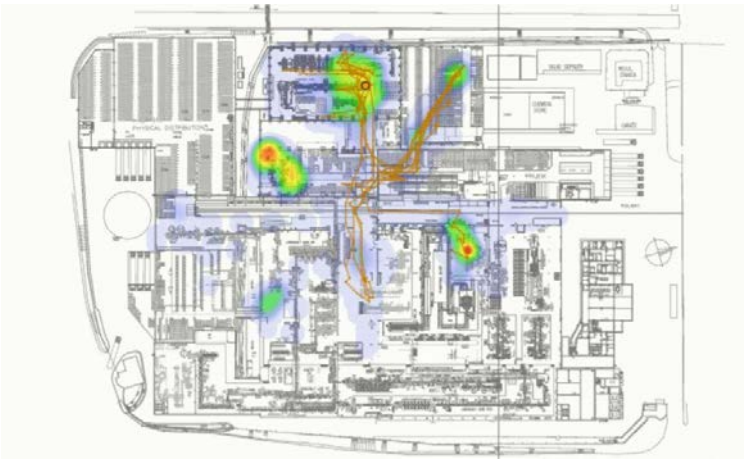
It allows to track, optimize and manage processes that were not possible to digitalize before:

- In internal logistics provides generational jump in fleet management of forklifts and tuggers, thanks to integration with IIoT (Industrial Internet of Things)
- Monitoring of the position of a lone worker in dangerous areas allows to apply better safety rules
- Application in facility management offers analysis of utilization of large office buildings, ensures access rights to data centers, integrates attendance systems and adjusts workspace for employees according to their preferences

Example of Product/Service usage:

Realtime visualization of the fleet

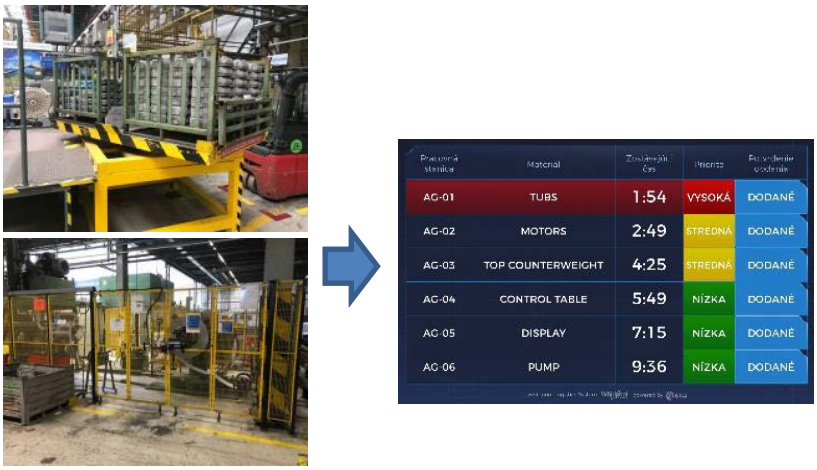
Reporting – spaghetti charts

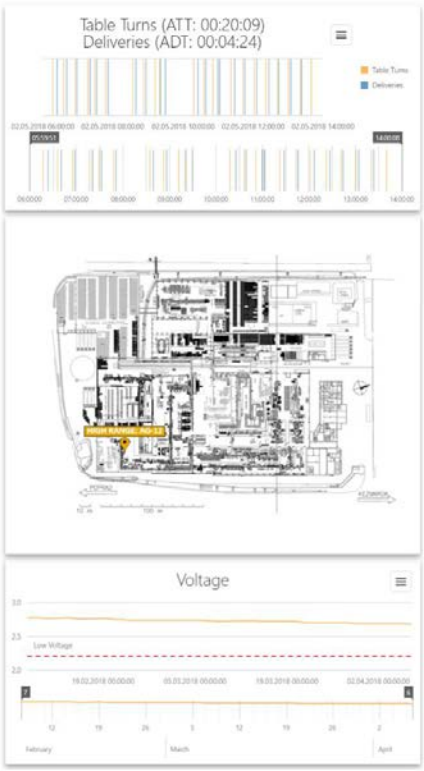


OEE - Overall Equipment Effectiveness

TV Screens

IoT integration





Keywords:

- RTLS - realtime locating services
- Internal logistics
- Lean management
- Asset tracking
- Digital twin
- iBleacon / BLE
- UWB - Ultra Wide Band
- RFID
- Safety
- Lone worker
- 3D visualization
- Process visualization
- Forklift
- Tugger
- IoT - Internet of things
- Smart factory
- Digital factory

Improvement areas covered by the Product/Solution:

- Implementation of the novel technology
- Implementation in the production processes
- Implementation of the human resource management systems

Product/Solution is related to the following type of implementation:

- Improved coordination with suppliers
- Increased speed of production operations

- Decreased manufacturing costs
- Lower energy costs
- Improved information for production decisions
- Improved agility and responsiveness in the production process
- Improved product quality
- Improved maintenance/uptime
- Improved information for business analytics
- Improved remote monitoring capabilities
- Improved safety
- Developed visualization capabilities

Other relevant information about the product/service:

Attachment1: Company logo

Product/service technological focus:

ELECTRONICS, IT AND TELECOMMS

- Information Processing & Systems, Workflow
- IT and Telematics Applications

ENERGY

- Energy efficiency

INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

- Industrial Manufacture
- Plant Design and Maintenance
- Process control and logistics
- Traffic, mobility
- Transport and Shipping Technologies

PROTECTING MAN AND ENVIRONMENT

- Safety
- Water Management

SOCIAL AND ECONOMICS CONCERNS

- Citizens participation
- Creative products
- Infrastructures for social sciences and humanities
- Socio-economic models, economic aspects
- Technology, Society and Employment

Market availability:

Available since 2016