

NÁRODNÉ FÓRUM PRODUKTIVITY 2022

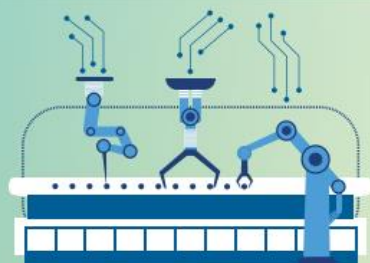
Industry 5.0

Ing., Marian Filka
Siemens, s.r.o.

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Industry 4.0

Digitalisation is ...



...
TRANSFORMING
European
industry



...
ACCELERATING
production
processes



...
CHANGING
the role of
workers

This transformation is Industry 4.0

Industry 5.0



Industry 5.0

Enabling Technologies for Industry 5.0

Results of a workshop with Europe's technology leaders

Julian Müller

The technologies supporting the concept of Industry 5.0 include:

- **Human-centric solutions and human-machine-interaction** technologies that interconnect and combine the strengths of humans and machines.
- **Bio-inspired technologies and smart materials** that allow materials with embedded sensors and enhanced features while being recyclable.
- **Real time based digital twins and simulation** to model entire systems.
- **Cyber safe data transmission, storage, and analysis technologies** that are able to handle data and system interoperability.
- **Artificial Intelligence** e.g. to detect causalities in complex, dynamic systems, leading to actionable intelligence.
- **Technologies for energy efficiency and trustworthy autonomy** as the above-named technologies will require large amounts of energy.

15.0 – Human centric



	Global Anthropometric Databases	Detailed Human scaling control	Occupant Posture prediction	Comfort Assessment	Whole Body Posture Prediction	In-depth human Performance Tools	Task Simulation Builder	Mocap Support	HTC Vive Immersive Support
Jack for NX									
Process Simulate Human					 + Bracing & Forces				With PS VR
VisJack									
Classic Jack (legacy application)		 Segmented figures only					 Limited functionality <2018	 Limited functionality <2018	



15.0 – Human centric

What are the key capabilities of PS Human?



Accurate Figures

Deformable Skin

Disembodied hands

Global Anthropometry

Detailed Scaling



Rapid Posturing

Whole body prediction

Force influence

Bracing influence

Motion prediction



Simulation Creation

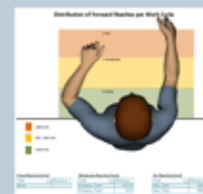
High level command wizard

Empirical posture and motion prediction

Refine and re-use

Ergonomic reports

Timing reports



Ergonomic Analysis

Strength capability

Low back injury risk

Strain Index

Posture analysis (RULA, OWAS)

Lifting analysis (NIOSH)

Fatigue + Metabolic

Physical Demands Summary



Motion Capture / Immersive Capability

Optical Systems

Inertial Systems

Whole and partial body

Gloves

Partner Interface

Virtual Reality



15.0 – Human centric

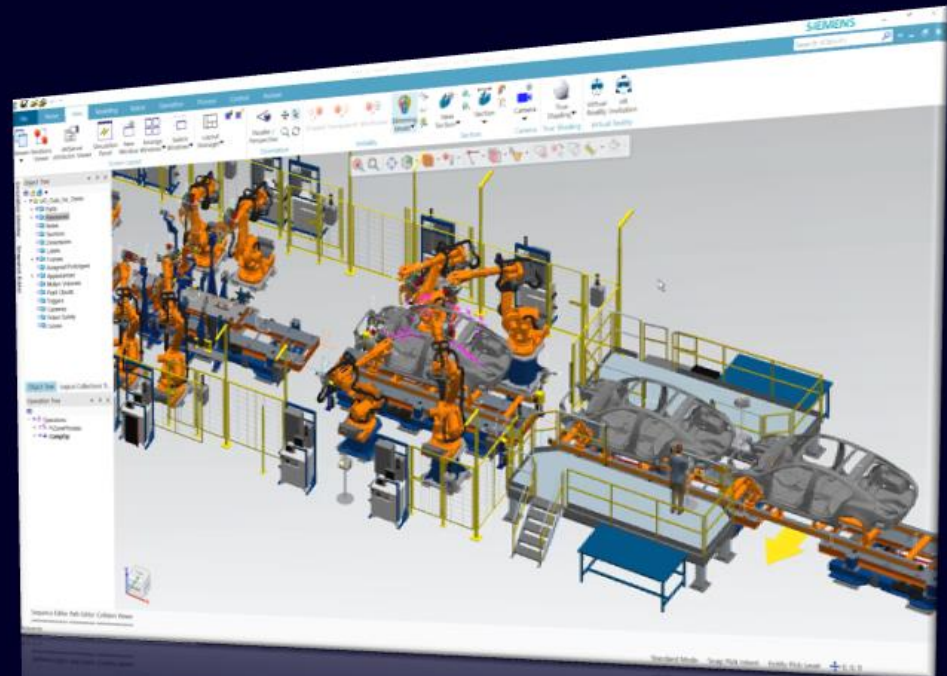
Process Simulate Virtual Reality

- Easy to deploy – consumer-hardware (500€-1500€)
- **No data preparation/data-export-import.**
One-click-solution!
- Intuitive access to 3D-planning, great for **integrating none-CAD-experienced users** into planning process
- Realistic and true to size visualization
- Reflecting the active simulation in PS, with all functions and data
- Interaction with the VR is fed back to simulation: object-placement, robot-guidance, etc
- Enables **Multisite-collaboration**

Improved alignment through collaboration

Easily integrate contributors from shop-floor

Easy to use – Training in minutes



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15.0 – Human centric



Process Simulate Augmented Reality

- AR supported step by step work instructions
- Export from Process Simulate
- Teamcenter connection optional
- Reduce assembly errors
- Shorten onboarding time
- Enhance productivity
- Facilitate inspection
- Automate work instructions creation

I

Planning-Information to Shop-floor

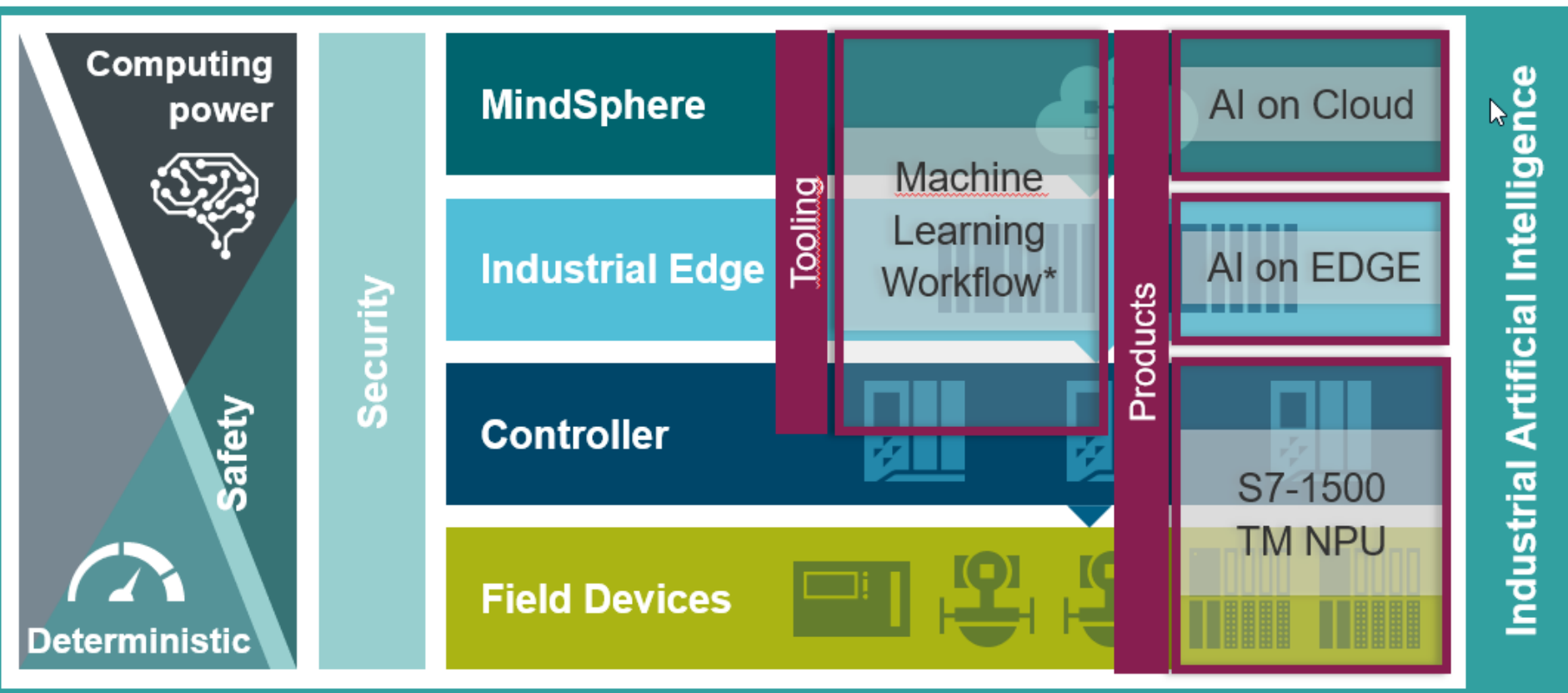
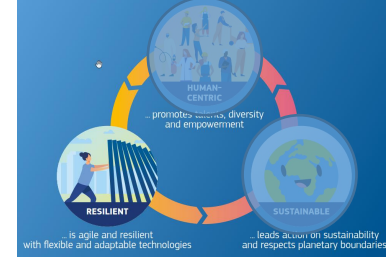
Facilitate inspection

Shorten Training efforts – Reduce errors



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I5.0 – Resilient - AI



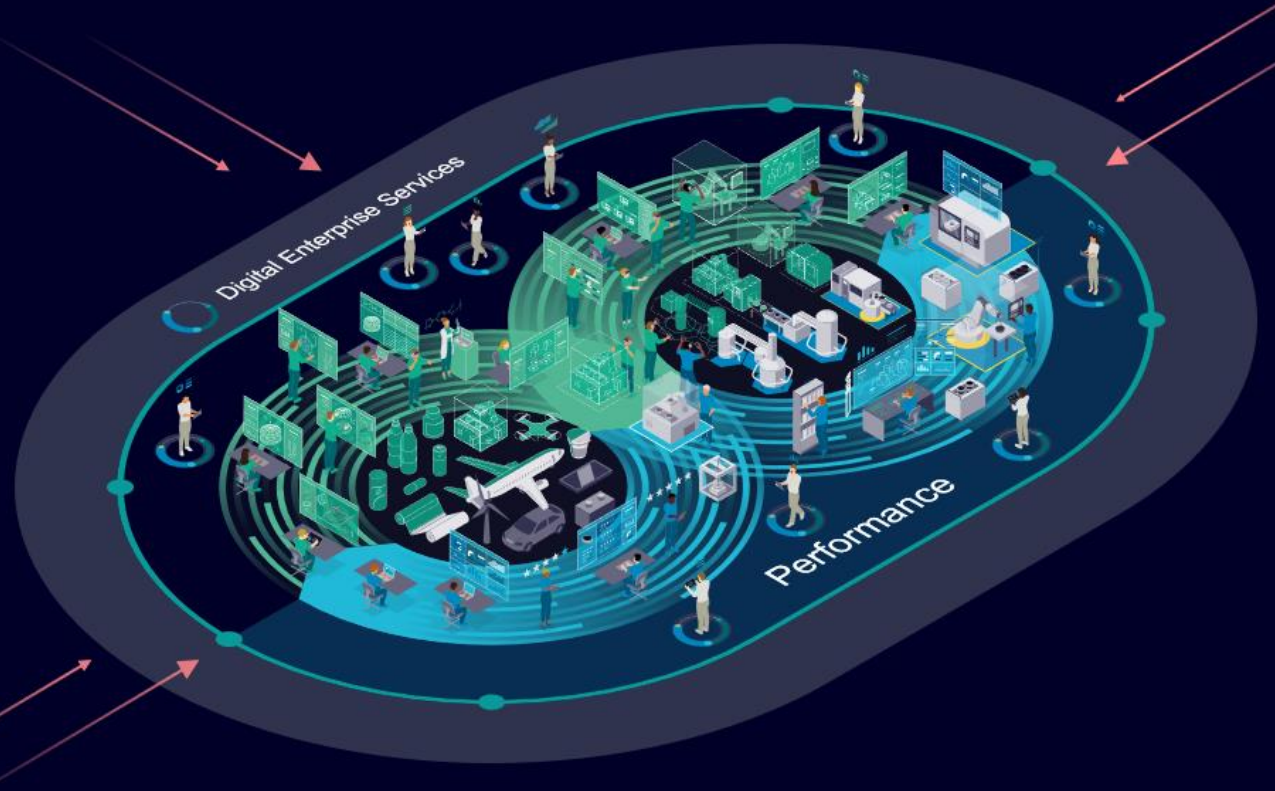
I5.0 – Resilient



Machines & automation systems are part of the IoT
This means OT/IT integration across all areas and layers

OT/IT converge means:

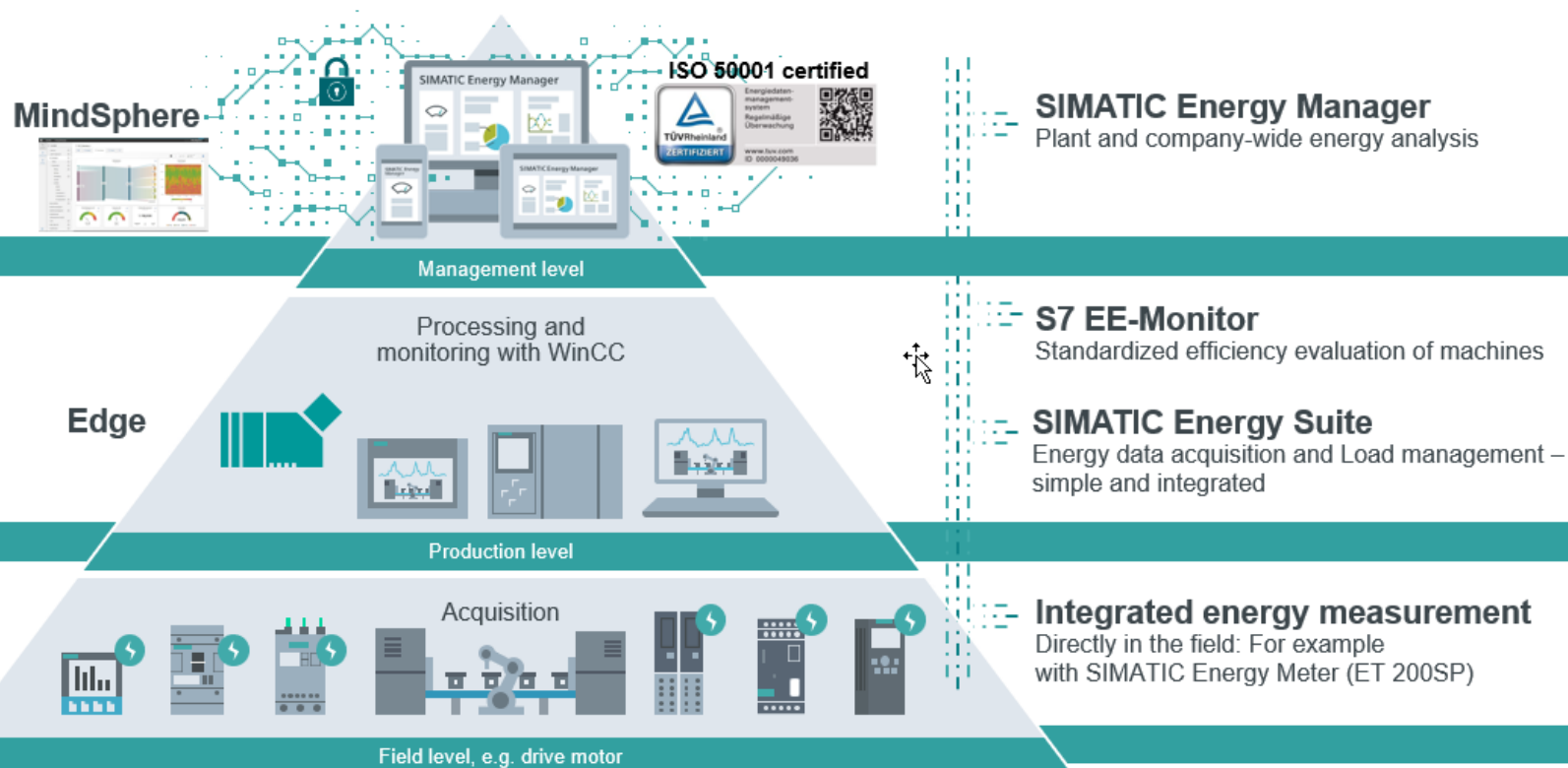
- 👍 More connectivity
- 👍 More data
- 👎 New cyber-risks



I5.0 – Sustainable



SIMATIC Energy Management – Transparency and efficiency from machine level to company level



Ďakujem za pozornosť

Otázky?

Filka Marian
Siemens s.r.o.