Hogeschool van Arnhem en Nijmegen
HAN University of Applied Sciences

Smart Production Centre

for Advanced Automotive Applications

SPC | 3A

(Fieldlab for Light Weight Automotive Mass Produced Parts)

Jointed effort HAN/Business/Government

Auteur: P. Verschut

SPC | 3A

HAN

HAN Automotive Research

Automotive Trends

- "Lightweight Design" = Composites or Hybrids ➔ **Energy**




But…

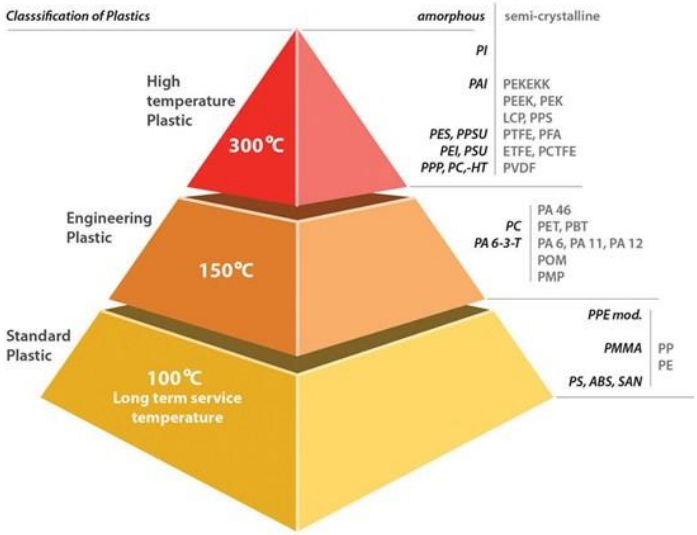
- Small series ➔ Mass production ➔ 24/7 ➔ **Autonomous**
- *Technology carrier* ➔ ***"Smart Production Cell"***

Expected productline

Automotive ⇔ Composites + Hybrid

M&P developments:

- **Structural parts**
- Thermoplastic composites
- “Engineering Plastics” (PP, PA, PPA, PPS, PEI)
- Glass and carbon reinforcements,
- Continueus (High rate) processing
- Mass production (**1 million product per year** and more…)
- 99,.. % reliability on delivery



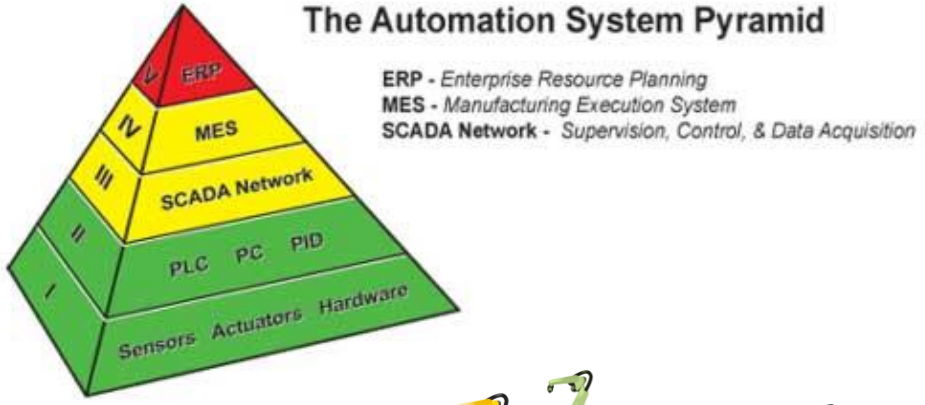
Examples:

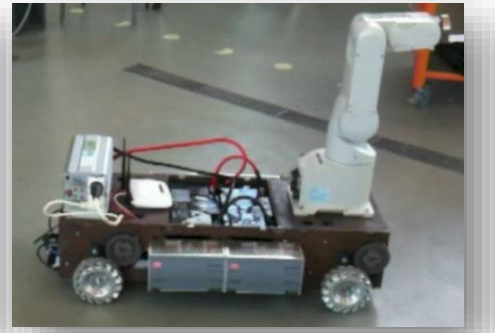
- Links
- Damper
- Brackets
- Knuckle
- Structural beams
- Impact structures
- Bumper crash bar
- Springs
- Motor- and gear parts
- Enz.

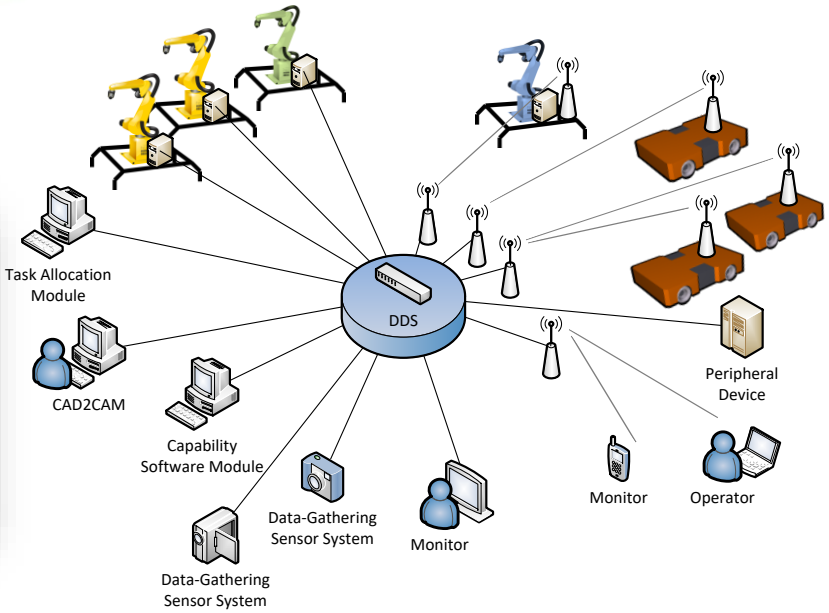
…but it is also….

Flexible <u>Production Area</u>.

- ***Flexibility in different <u>Processes</u> and <u>Product Dimensions</u>.***
- ***Flexibility in <u>Interaction</u> between systems.***
- ***Flexibility in <u>Intelligence</u> and <u>Communication</u>.***
- ***Flexibility in <u>Safety</u> systems.***
- ***Flexibility in <u>Sensor</u> implementation.***
- ***Flexibility in <u>Mobility</u> for Multipurpose/Multifunction capability.***







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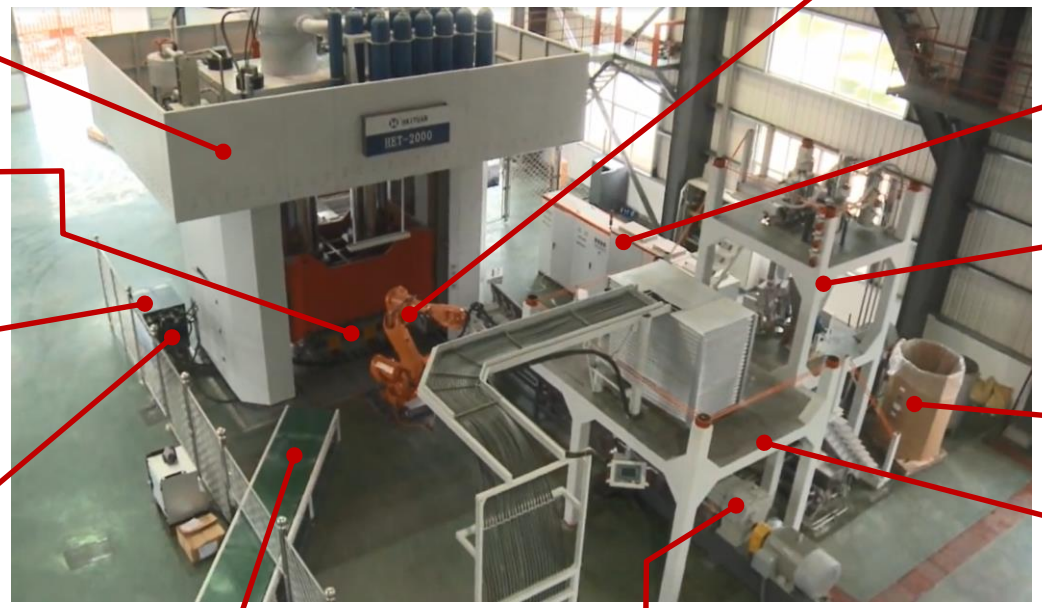
Smart Production Cell

(continuous processing)

Press

Mould (Design)

Safety



Copyright HYM Group

Heating

Transport

Extruder

Robotics

Controlling

Mixer/Dryer

Storage

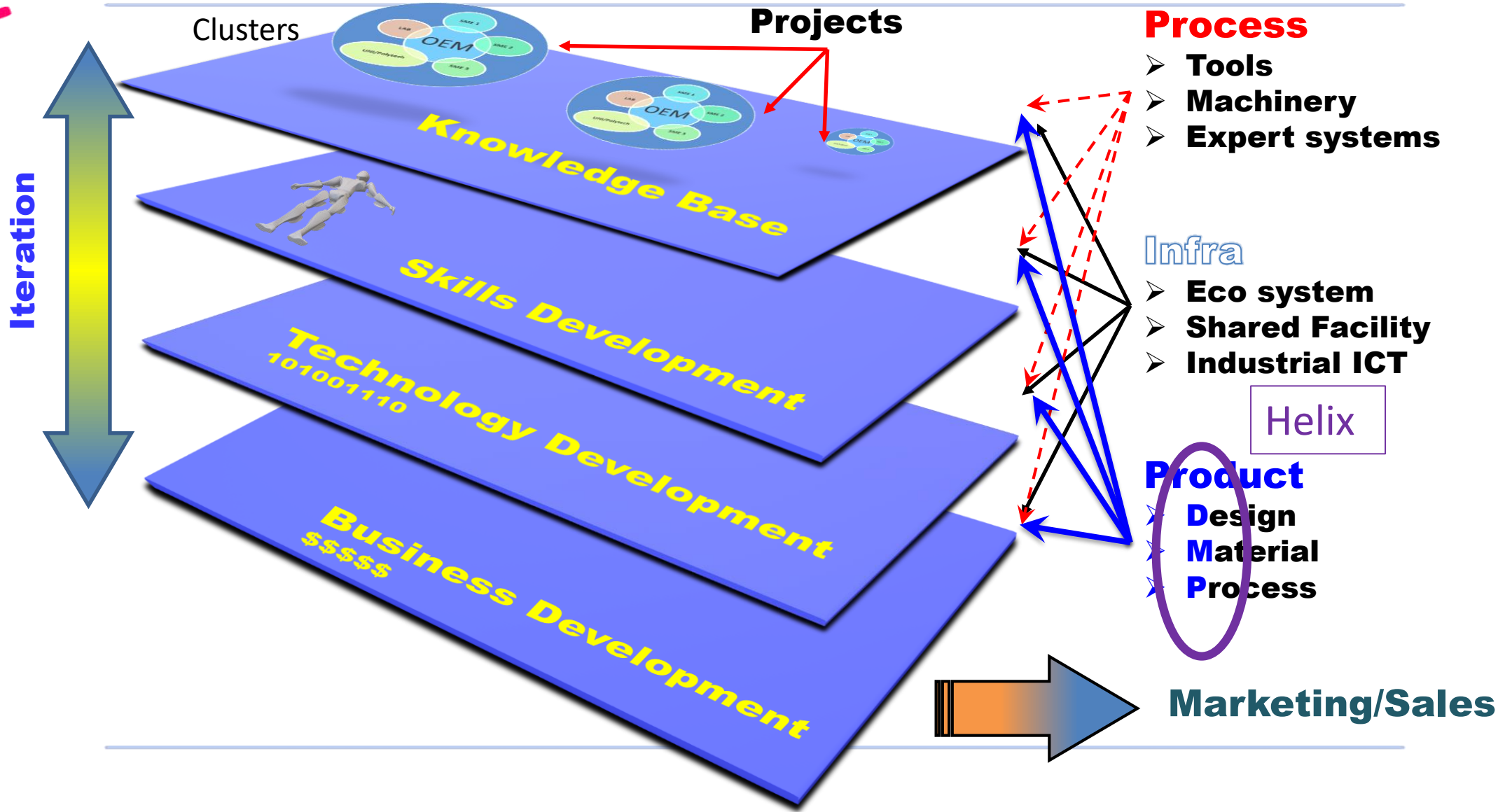
Hopper

IoT platform

… and Big Data

HAN

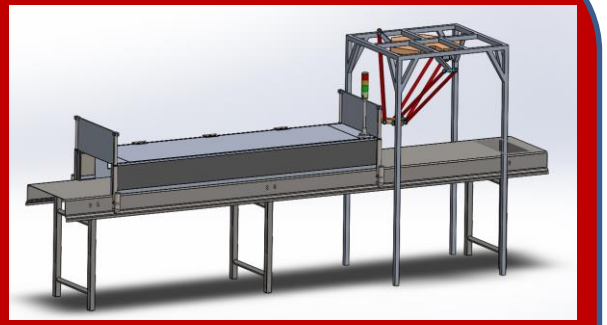
SPC | 3A Model


Clusters
Projects
Iteration
OEM
Knowledge Base
Skills Development
Technology Development
101001110
Business Development
$$$$$
Process
Tools
Machinery
Expert systems
Infra
Eco system
Shared Facility
Industrial ICT
Helix
Product
Design
Material
Process
Marketing/Sales

Proces georiënteerde activiteiten

Pers

- Analoog ⇔ digitaal
- Nieuw hydraulisch systeem (ventielen en pomp)
- Beveiliging (Lichtschermen)
- Sensoriek (druk, flow, temp., rpm, verplaatsing,
- PLC besturing
- ProfiNet



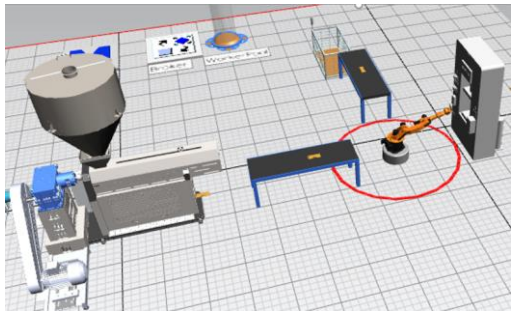
Oven/transport/opslag

- HT transportband
- Variabele snelheid
- Delta robot
- IR oven
- FLIR Camera's
- Omkasting / isolatie
- PLC besturing
- ProfiNet

Robotica

- Industrieel
- Vision system
- Gripper (-design)
- PLC besturing (eigen)
- ProfiNet

Infra oriënteerde projecten



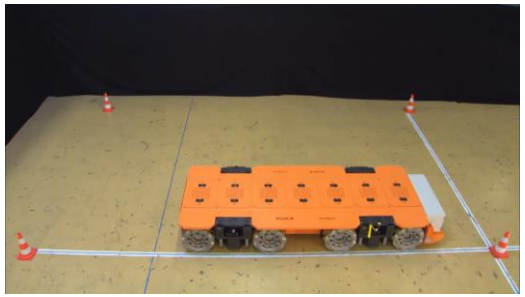
Digital Twin

- Hardware architectuur
- Proces voortgang t.b.v. “LFT Compression Moulding”
- ‘Green field’

➢ *Minor “Smart Industry”*
➢ *3 Lectoraten Lean + Smart Business + Automotive*
➢ *Curriculum*

IoT platform

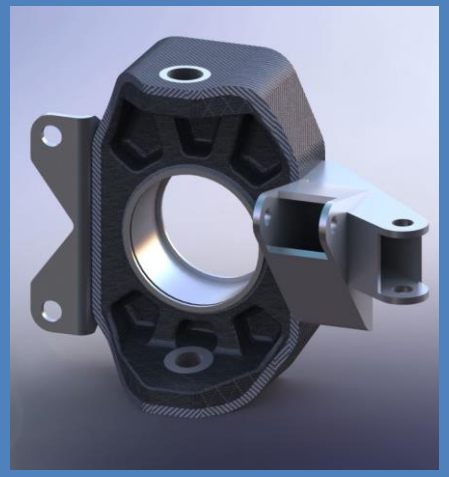
- Eerste platform geïnstalleerd.
- Sensoriek
- Beveiligde OPC UA communicatie
- Beveiligingsprotocollen
- Datamining ⇔ informatie
- Dashboard gecreëerd.
- Vooral monitoring.
- **Nieuw: Expert System**



AIV’s

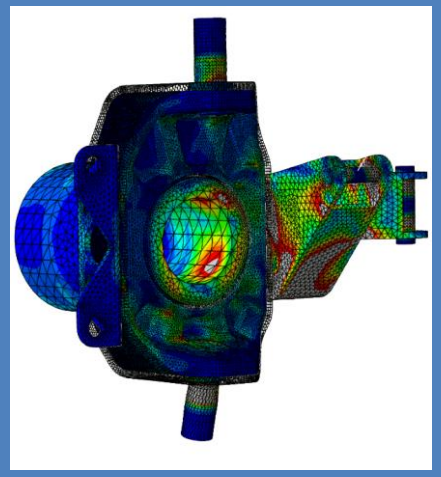
- Materiaal toevoer & Product afvoer.
- Gereedschap (mal) aan- en afvoer.
- Autonoom (floor mapping)
- Sensoriek (LyDar, e.a.)
- Lage snelheid / hoog gewicht

Product georiënteerde activiteiten



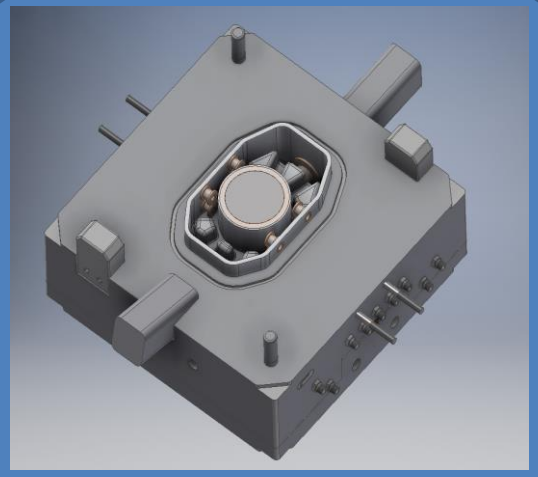
Fusee

- Eisenpakket
- Belastingen
- **D**esign (3D CAD)
- **M**ateriaal inzet (TPC)
- **P**roces beschrijving



Analyse

- Handsommetjes
- ABAQUS analyses
- Veiligheidsfactoren
  - “Design Rules”



Mould Technology

- Compression moulding
- Heat transfer
- Temperatuur wisselingen
  - materiaalkeuze
- Energy dissipation

SPC personele bezetting

- Hybride leer- en werkomgeving
  - Project onderwijs
- Diverse HBO's en MBO's
- Diverse disciplines, ….
- 2de, 3de en 4de jaars (13 studenten dit semester)
- 4 docentbegeleiders
- Bedrijven 'on-site'

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Vragen?

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Of bent u gewoon geïnteresseerd geraakt en/of heeft u gewoon een vraag achteraf:

Adres:
Industie Park Kleefse Waard
Westervoortsedijk 73 (gebouw TB) te Arnhem
Tel: 06-5524 0695
Email: peter.verschut@han.nl

HAN

Digital Twinning