smart industry
DUTCH INDUSTRY FIT FOR THE FUTURE

ELECTRONICS & APPLICATIONS
14 T/M 16 MEI 2019 JAARBEURS UTRECHT

Design for Cobotics

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VARIASS

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Variass is an EMS system supplier in
high technology solutions for tomorrow's markets:
industry, medical, defense and security.

Accelerators in optimizing development and production

What we do

Veendam
Electronic
Manufacturing
Services (EMS)

Drachten
High Tech
System Supplier

VARIASS

Smart Industry

- Zero defect
- High productivity & flexibility
- Low volume, high variety, high complexity

Smart Industry

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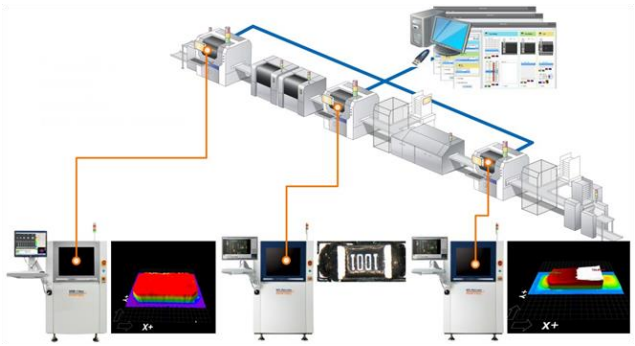
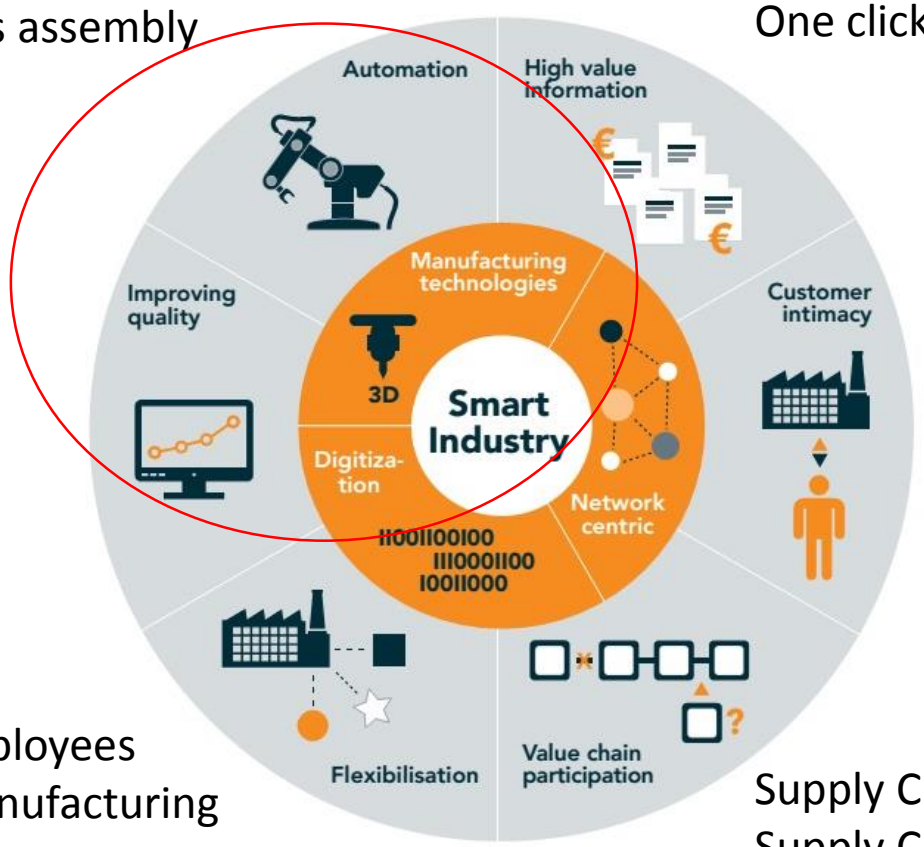
Automated electronics assembly
Cobots
3D printing

Big (smart) data
One click setup





Smart Instructions
Risk prediction models
RFID traceability

Early involvement / DfX
Development support

Multifunctional employees
Quick Response Manufacturing

Supply Chain Resilience
Supply Chain management (data)

Bron: Smart Industry – Dutch Industry fit for the future

Redenen voor cobotisering

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- Cobots zijn collaborative robots
- Samen met de mens een taak uitvoeren

vind ik leuk

Wat is duurzame inzetbaar-heid?

Kijk voor onze whitepaper over cobots op www.variass.nl

Soldeercobot

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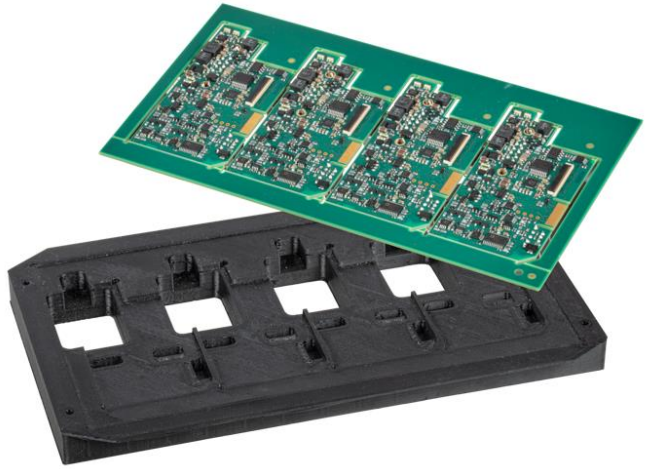

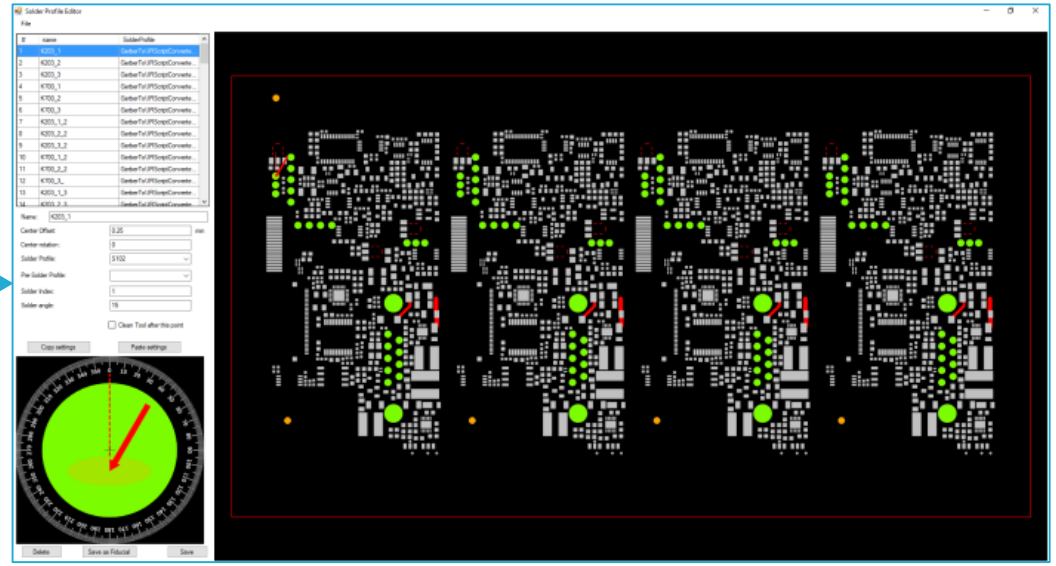

Bepaling “Wie doet wat?”

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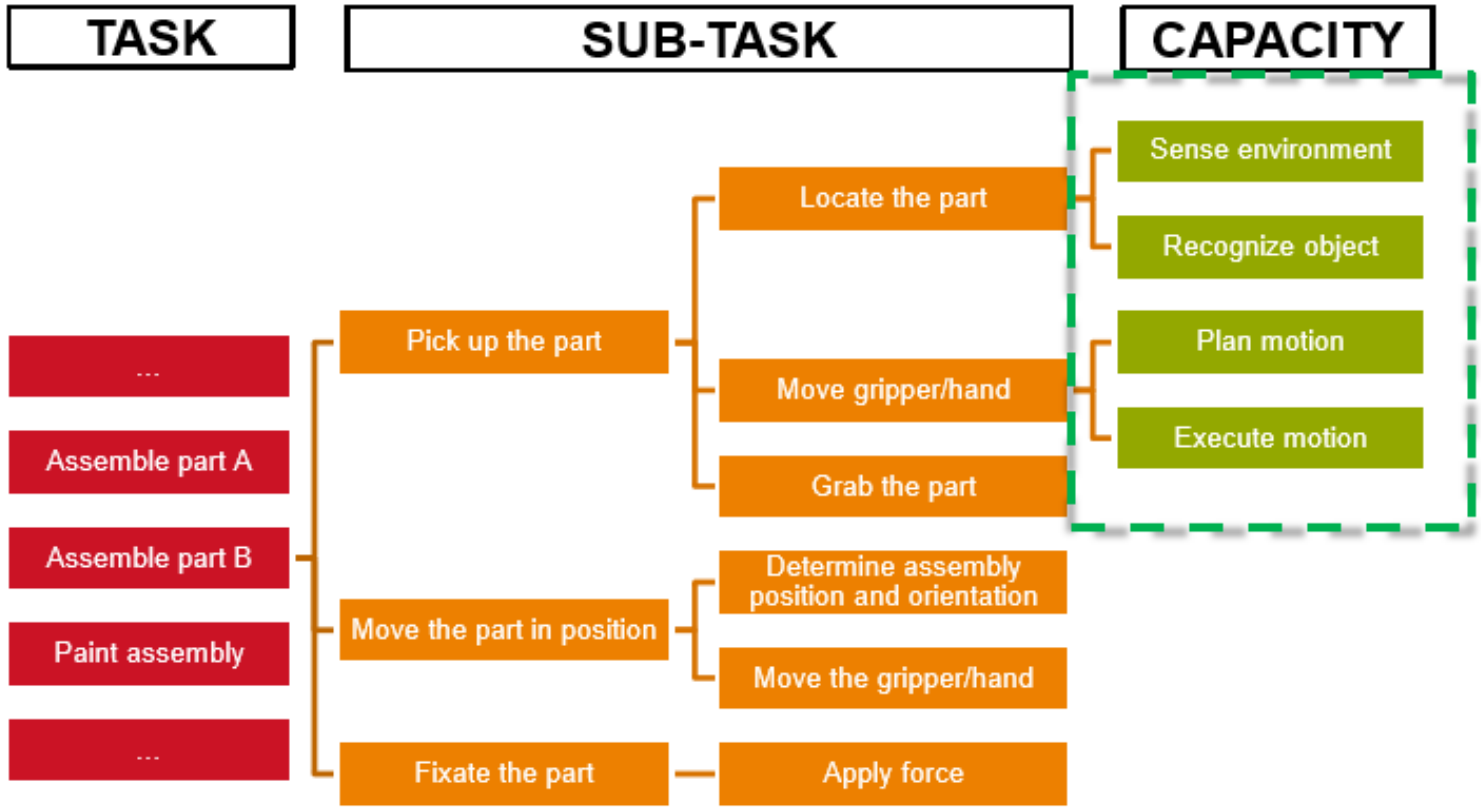

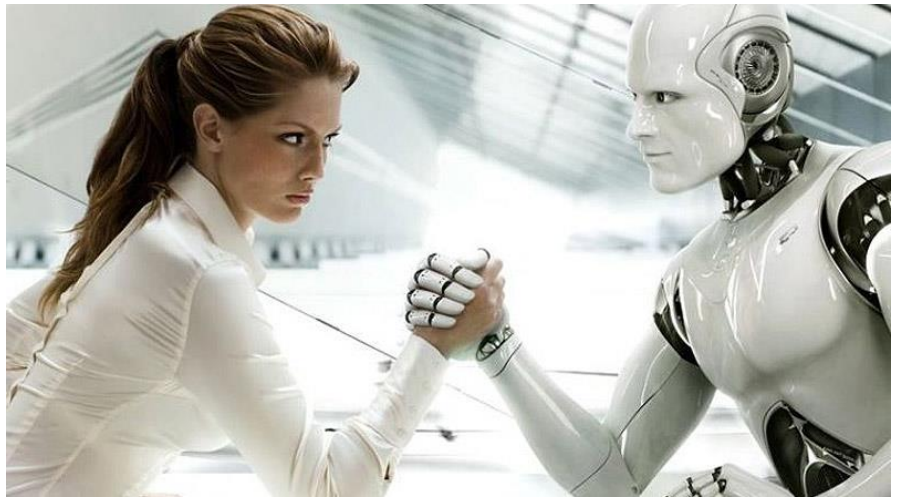

Bron: interaction analysis, TNO, 2018

Mens of robot?

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100 % mens ⟷ 100 % robot

Exoskelet	Exoskelet met extra functies	Look alike	Humanoid	2/1 Armige cobots	1 Armige robots	Machine

“7H15 M3554G3 53RV35 7O PR0V3 H0W 0UR HUM4N M1ND5 C4N D0 4M4Z1NG 7H1NG5. 1N 7H3 B3G1NN1NG 17 WA5 H4RD BU7 N0W Y0UR M1ND 1S R34D1NG 4U70M471C4LLY W17H0U7 3V3N 7H1NK1NG 4B0U7 17. B3 PR0UD 70 B3 HUM4N!”

Innovatiecluster
high tech systems Drachten

Berenschot

Mens en cobot?

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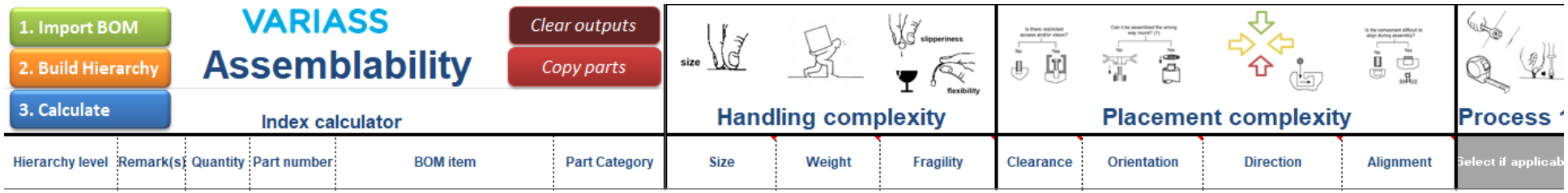
- Vergelijkbaar vanuit assemblage oogpunt
- Digitaal model voor bepaling mate van assembleerbaarheid



Component → Plaatsing → Proces → Mate van assembleerbaarheid

Component: grootte

- ~1-100 cm3
- Zoveel mogelijk dezelfde component afmetingen
- Integratie ringen op bout

Component: gewicht

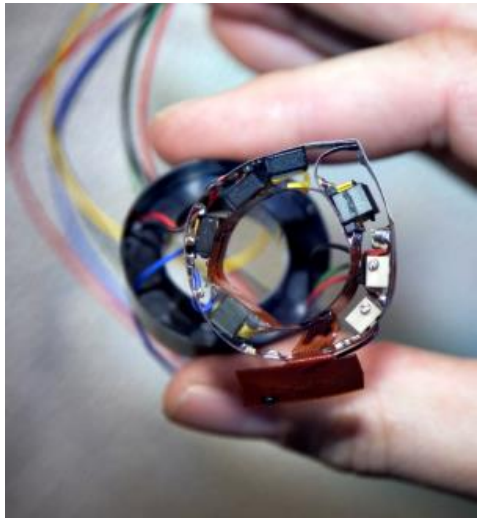
- Afhankelijk van payload cobot tot ~6 kg
- Zo laag mogelijk, ook voor ergonomie en veiligheid

Cobot factfile

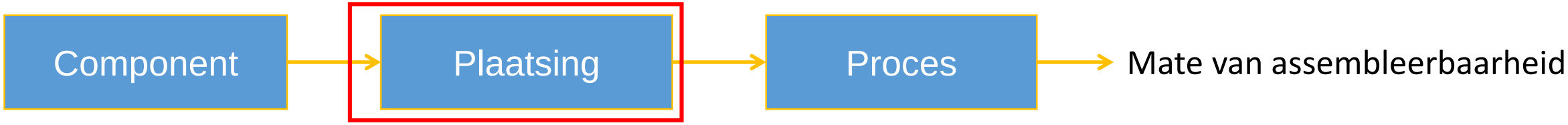
Brand	Model	Reach	Axes	Max payload
ABB	YuMi IRB 14000-0.5/0.5	500 mm	7 (each arm)	0.5 kg
Cobotix	Sawyer	1,260 mm	7	4 kg
Schunk	Powerball Lightweight Arm LWA 4P	730 mm	6	6 kg
Universal Robots	UR10 (also 5 kg and 3 kg models) Sold by RAR UK Automation; Geku Automation; others	1,300 mm	6	10 kg
Kuka	LBR IIWA 14 R820 (called flexFELLOW when mounted on a mobile pedestal; a 7 kg model is also available	820 mm	7	14 kg
Fanuc	Fanuc CR-35iA (a 7 kg model was launched at MACH 2016)	1,813 mm	6	35 kg

Component: gevoeligheid

- Zo robuust mogelijk
- Vermijden flexibele en glibberige items
- Vermijden uitstekende/scherpe delen
- Geen gelakte schroeven, niet in zichtdeel

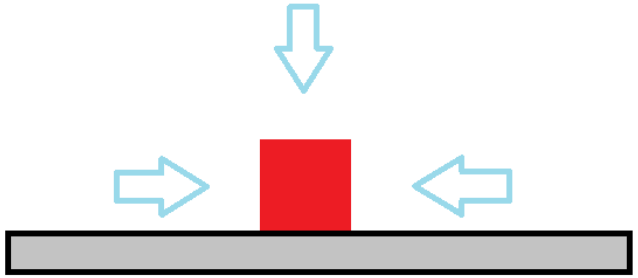


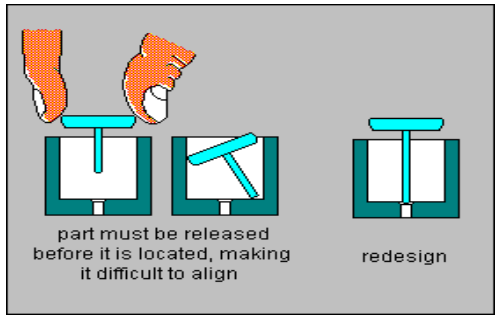
Design for cobotics

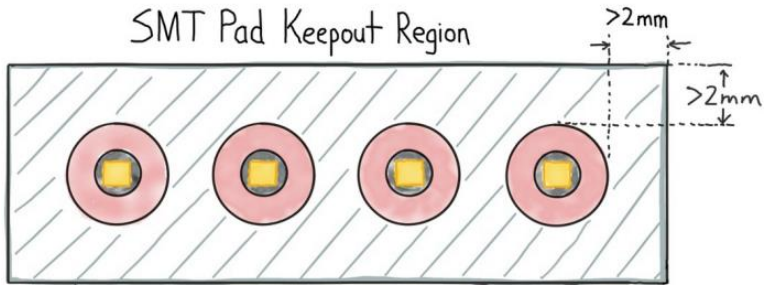


Plaatsing: bereikbaarheid

- Voorkeur van alle kanten te benaderen
- Clearance through hole solderen: minimaal >2 mm vanaf één zijde

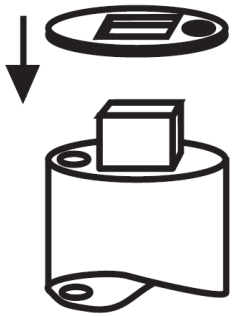


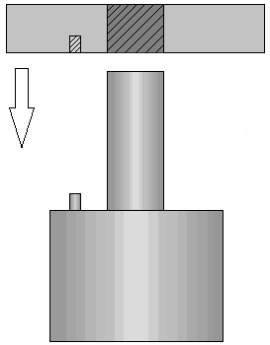


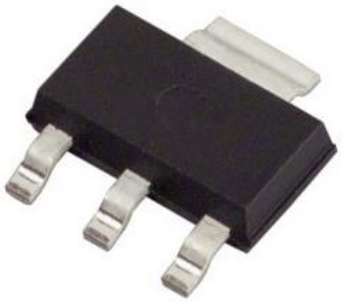


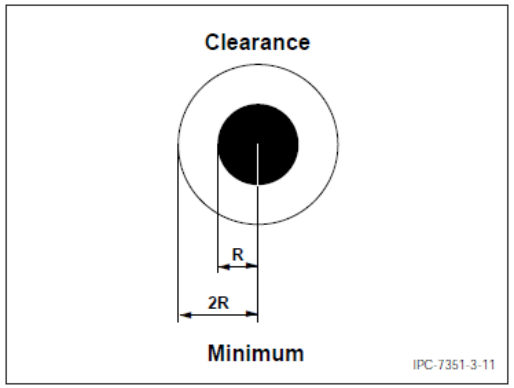
Plaatsing: oriëntatie

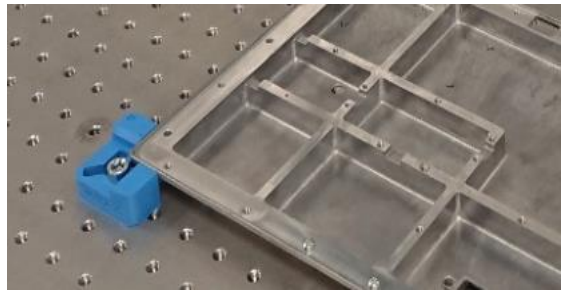
- Bewust asymmetrisch indien het fout kán maar niet mag
- Referentiepunten aanbrengen





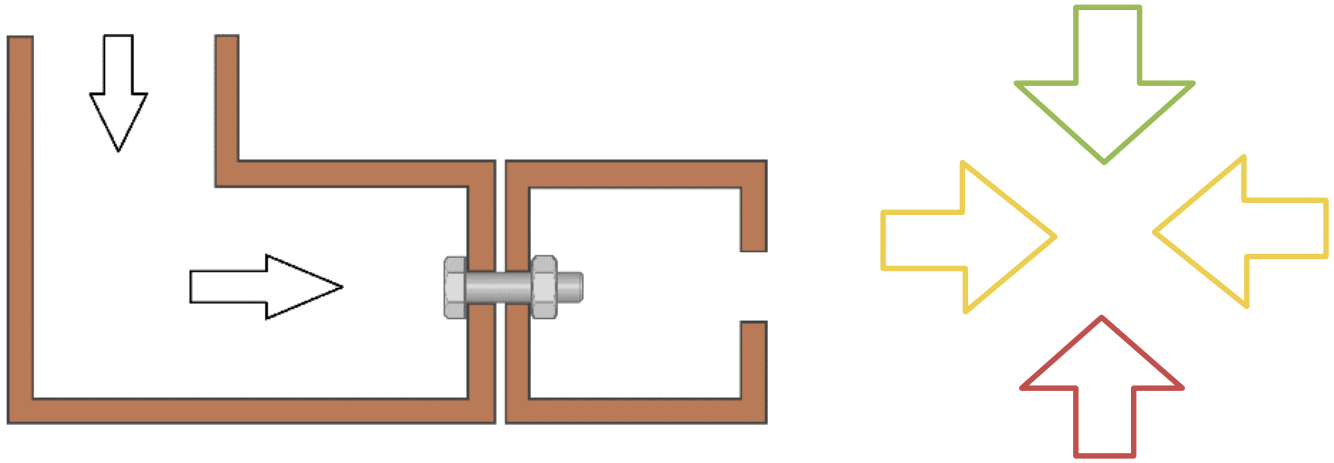






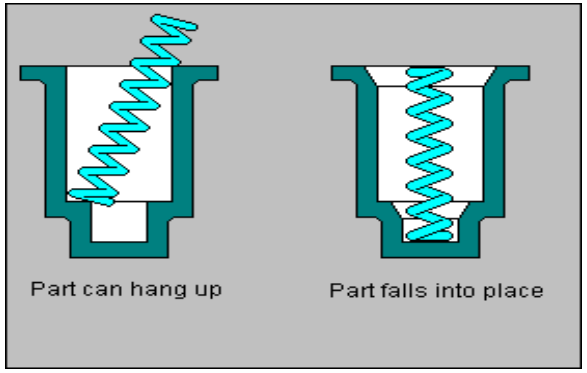
Plaatsing: richting

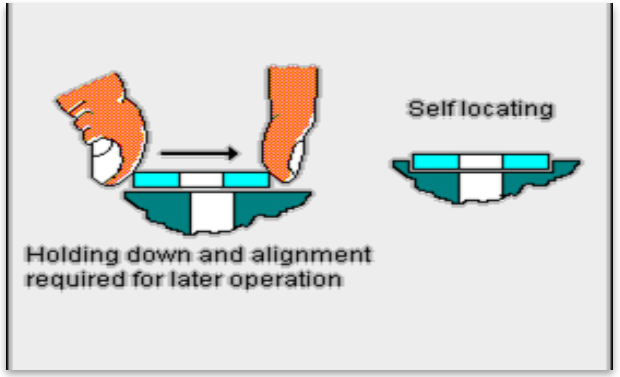
- Meervoudige assemblage richtingen vermijden
- Voorkeur met zwaartekracht mee assembleren

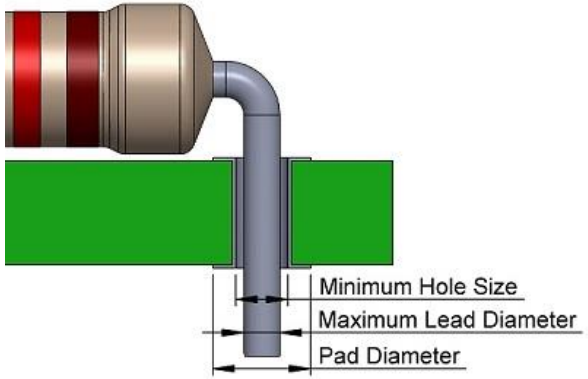


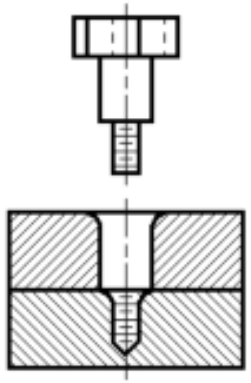
Plaatsing: uitlijning

- Aanbrengen zelfpositionering in ontwerp
- Voldoende toleranties
- Tapgat versus bout-moer









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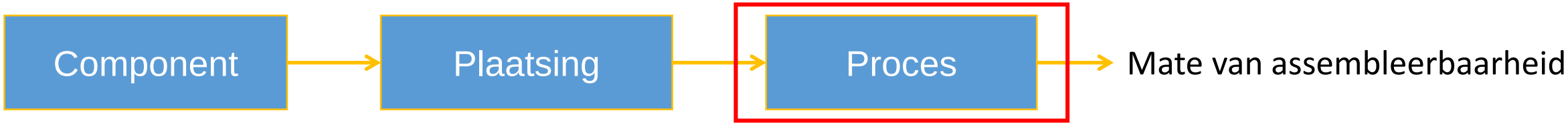

Proces

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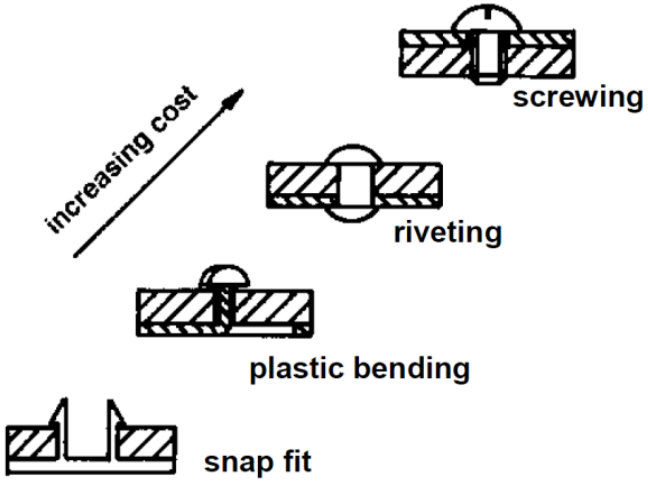
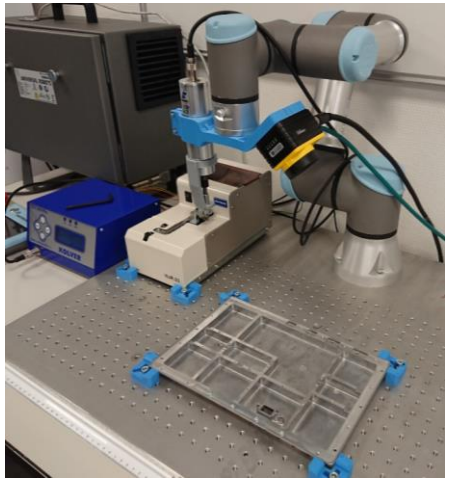
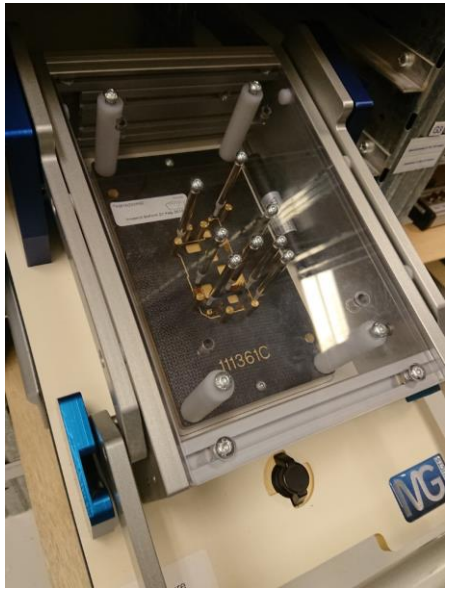
- Daadwerkelijke activiteit/ verbinding
- Meestal voert cobot één proces uit
  - Klikken (pick & place)
  - Schroeven
  - Lassen, solderen
  - Lijmen, kitten
  - Testen, meten, inspecteren
  - ….







Conclusie

- Maak de voordelen van cobots voor uw bedrijf mogelijk
- Houd hier rekening mee tijdens productontwikkeling

Meer informatie? Bezoek ons op 7C011

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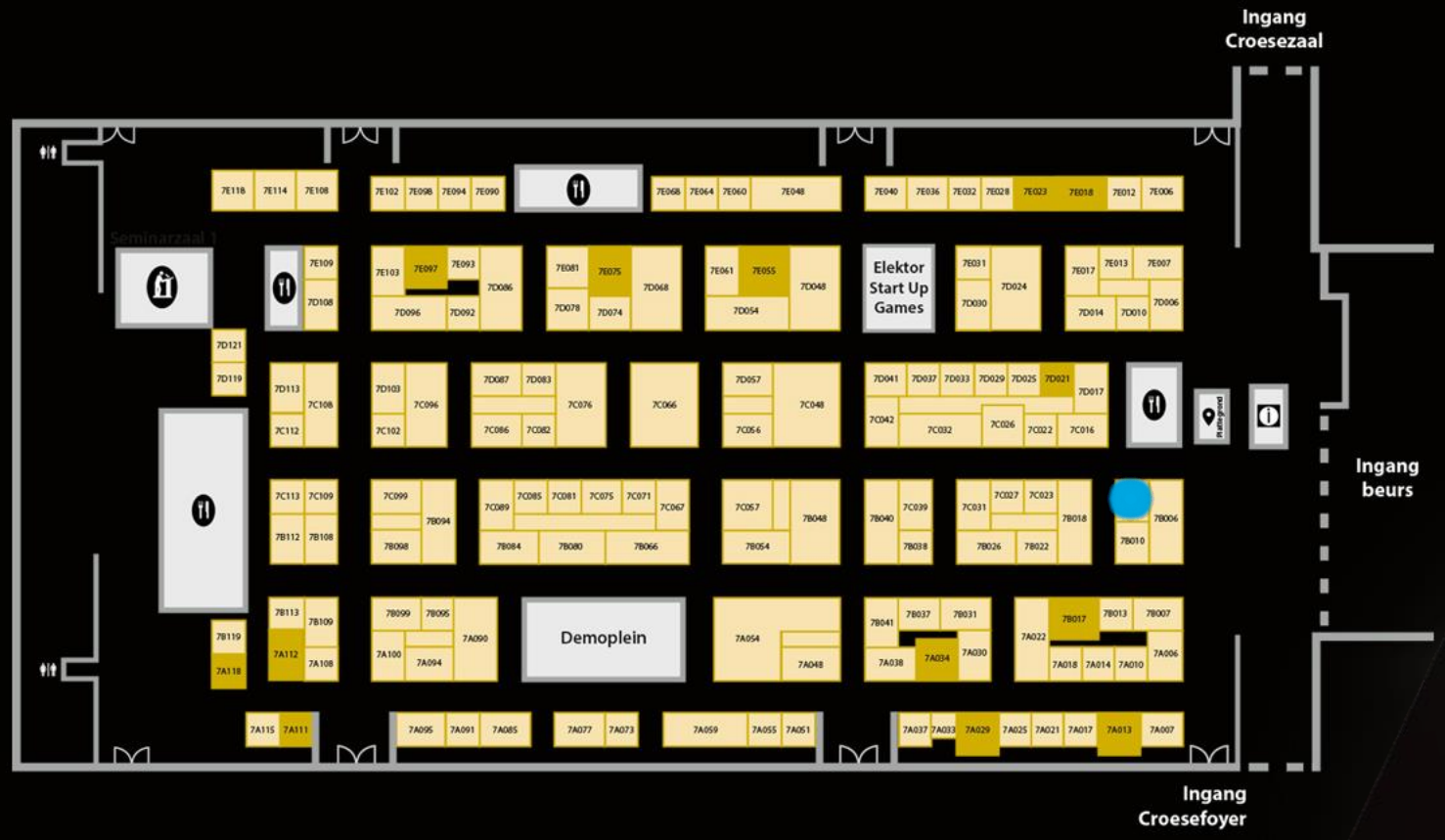

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