EPIC Online Technology Meeting on Vision and Imaging Camera System

14th of September 2020

Vision & Business areas

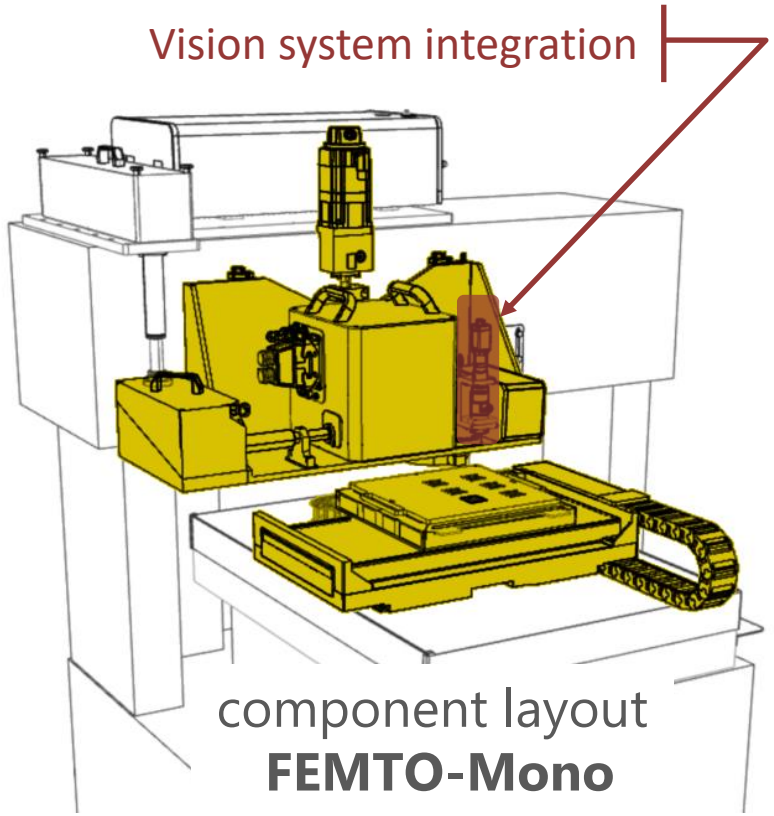
Vision :

- We are a **machine tool manufacturer offering micro machining solutions** to our customers.
- Our machines are well known for their **long-lasting quality and reliability within mass production** environment
- We strive for **market leadership in our areas** with machines based on standardized modules

Business areas :

- **Injection System market** in automotive (**EDM**, **FEMTO-Laser** and **Milling)**
- **Test Equipment market** in electronics (**FEMTO-Laser**)
- **PCB** market in electronics (**Drilling** and **Routing**)
- **Plus :** new applications in known markets or known applications for new markets

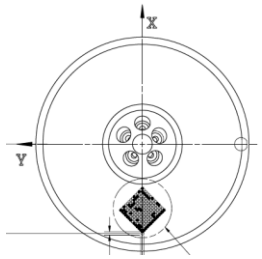
FEMTO Laser

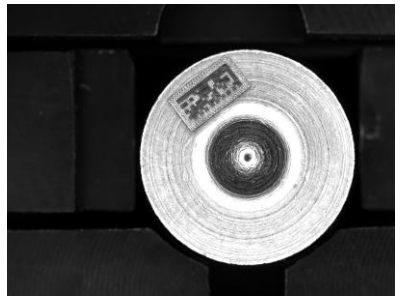


component layout
FEMTO-Mono

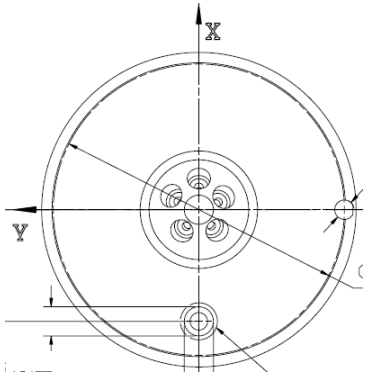
posalux
SWISS MADE

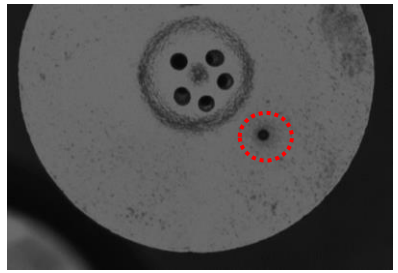
a) guarantee component traceability
   - read data matrix code



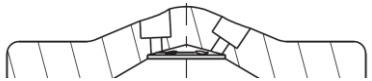


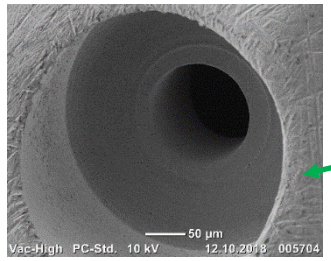
b) identify component angular position
   - detect laser/mechanical marking

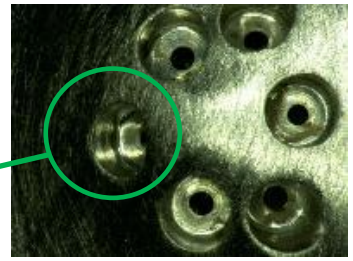




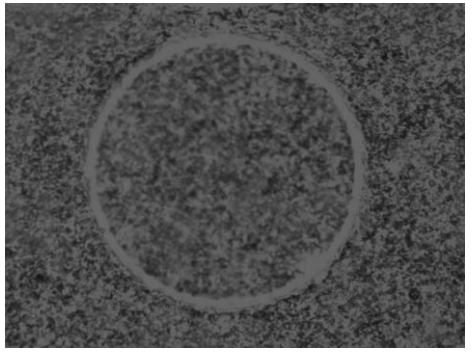
c) Align “spray-hole” with “step-hole”
   - locate milled step-hole”





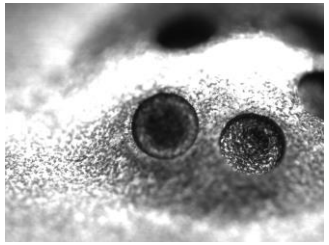


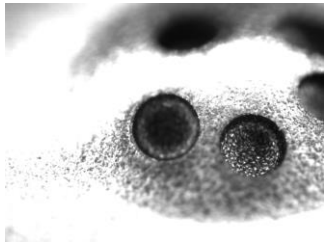
Challenges for the vision system :



a) Contrast for detection of a physical blind hole,
laser marked dot or circle or whatever is really bad.
Example of laser marked circle to define part orientation.

b) Sensitivity to lighting conditions and projection angle.
(Two pictures from the same part with slight
change in light setup)

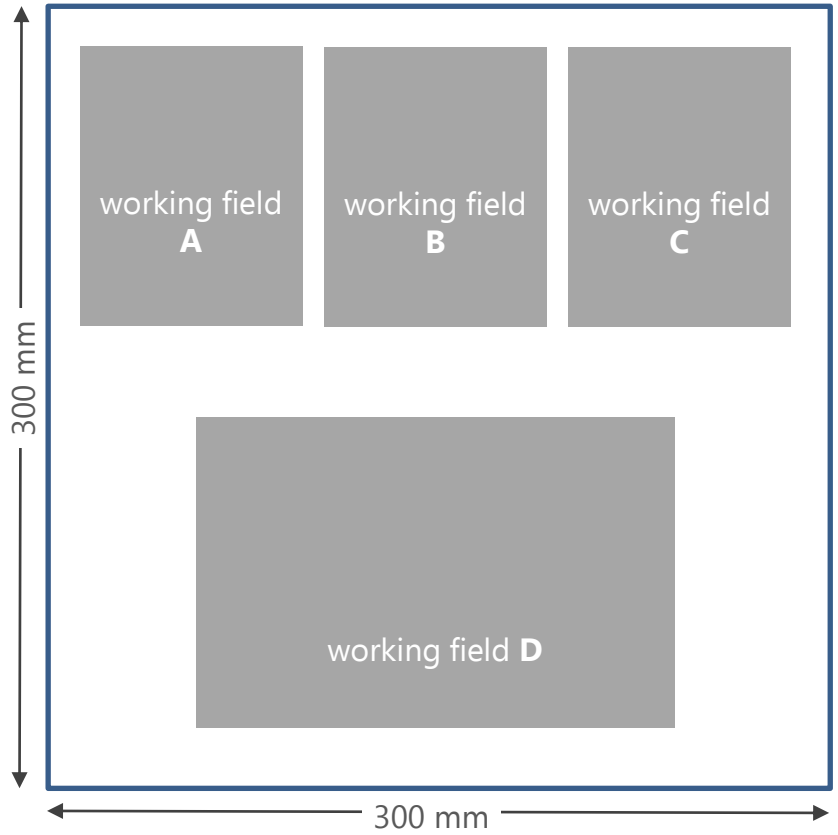




c) Vision application has to have 100% success rate
↳ no recognition => loose production part

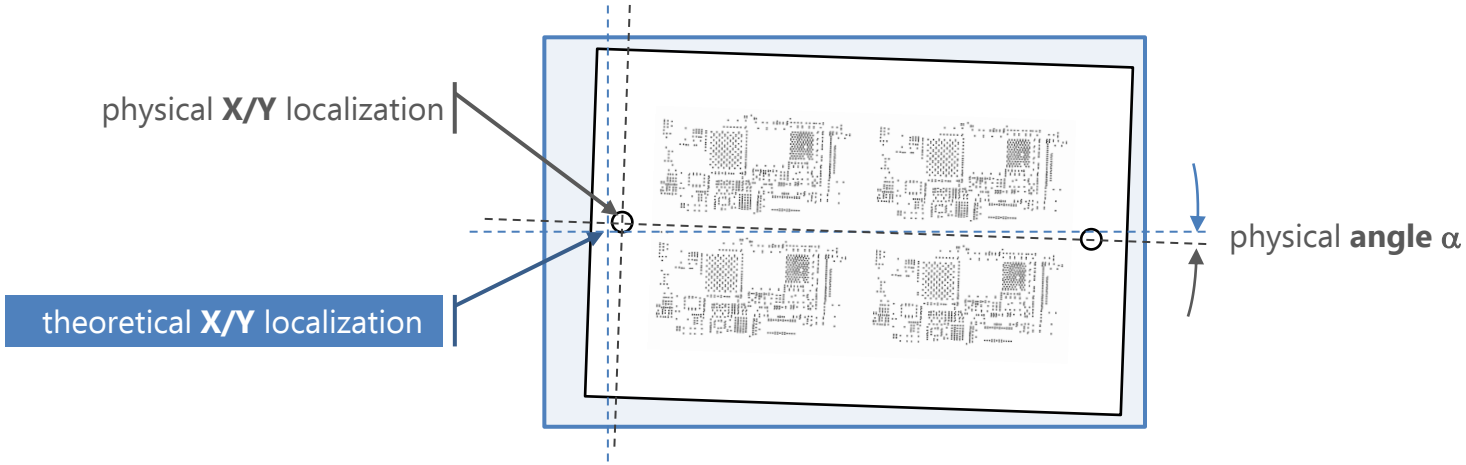
d) The rapidity of treatment, take picture, recognize and send result within 0.2 sec max.

The user can create inside the working field of the stage (300 x 300 mm) individual working areas to position the **theoretical** part drawing (xxx.dxf).



The **physical** position of each part on the stage has to be detected by vision :

- Reference hole n°1 for **X/Y localization**
- Reference hole n°2 for **angle α**



Challenges for the vision system :

a) Accuracy for hole center calculation within ± 0.002 µm

a) Range of reference hole diameter 20 µm < $\varnothing_{\text{reference hole}}$ < 3 mm
   ↳ use different lenses (X1, X2 or X3)

b) Be insensitive regarding substrate color (influence on contrast)
   ↳ use backlight