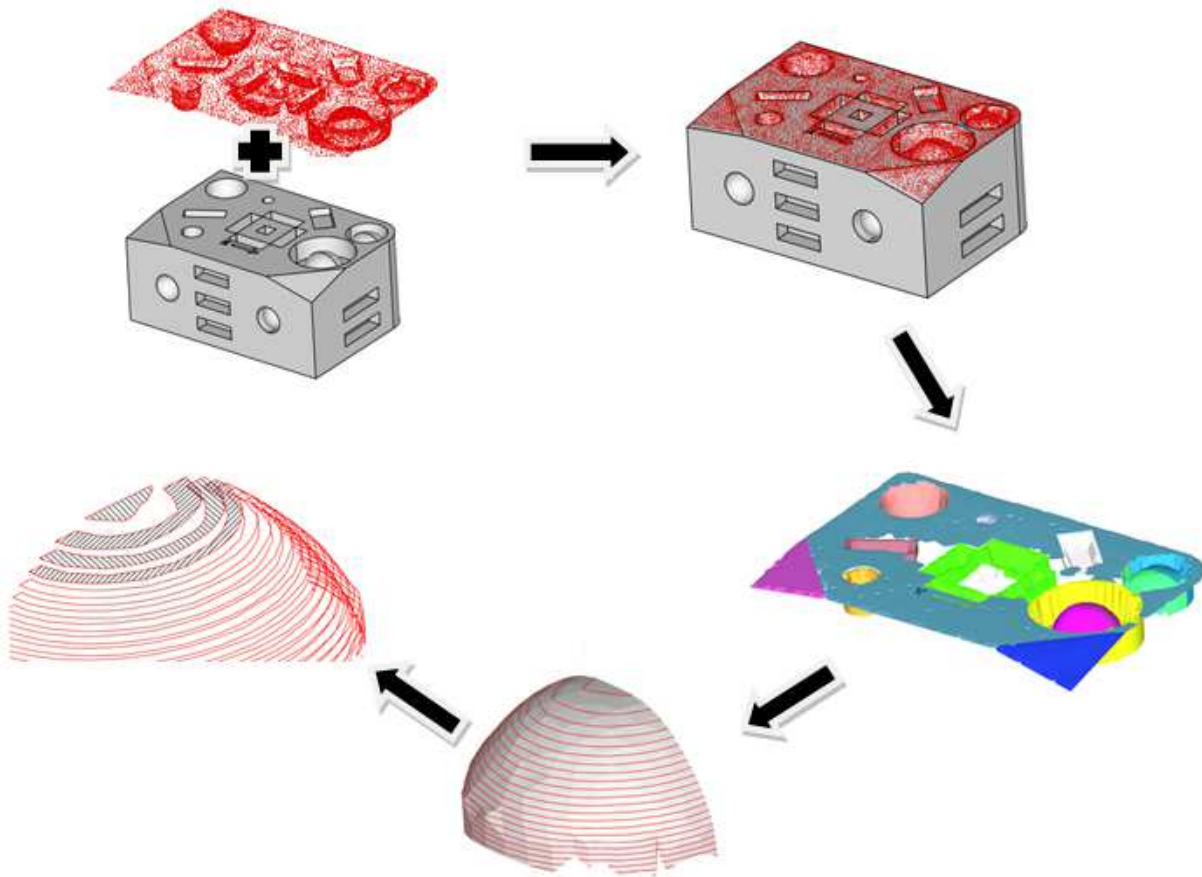
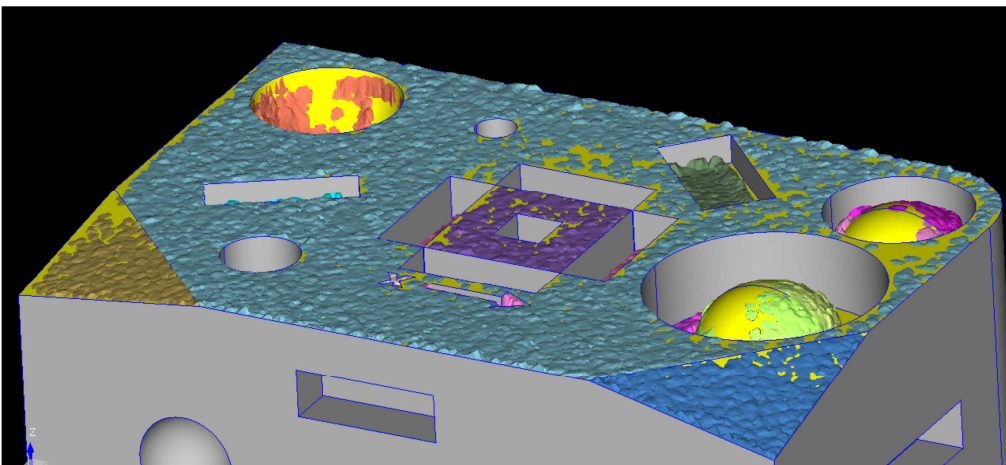


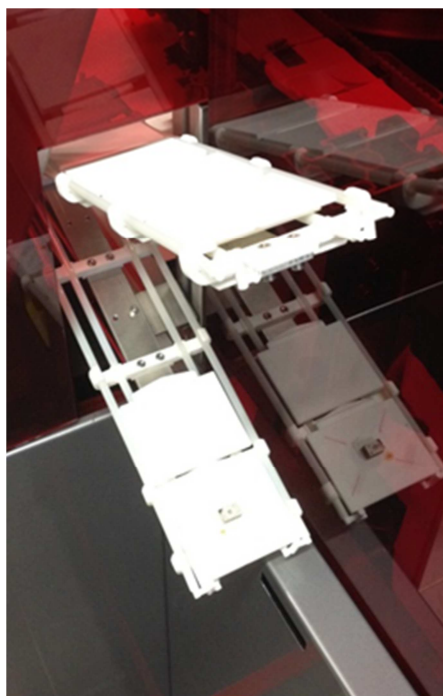
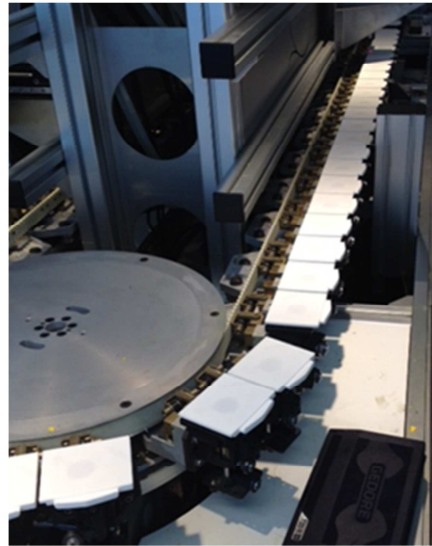
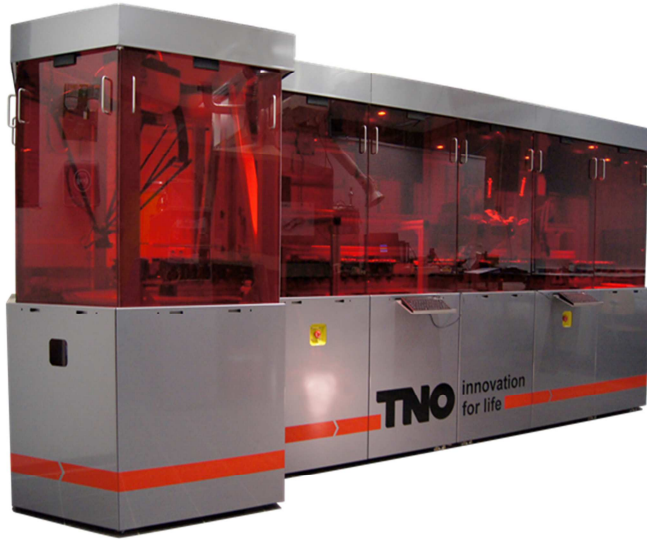
HYPROLINE

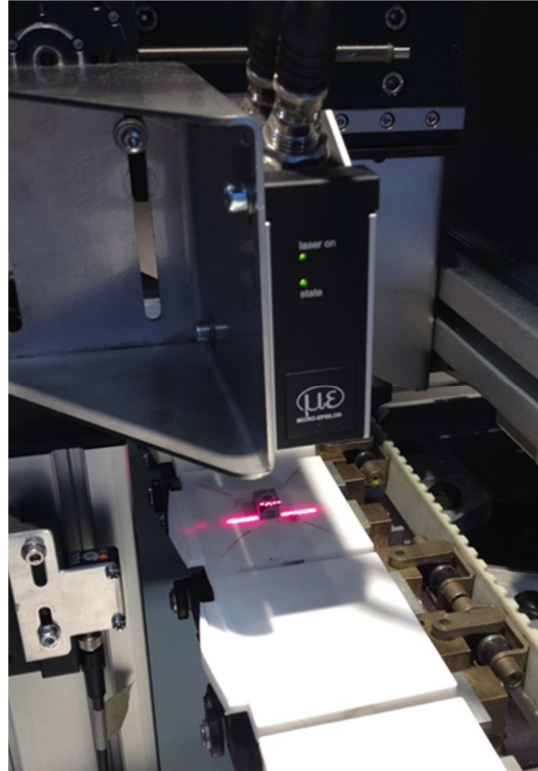
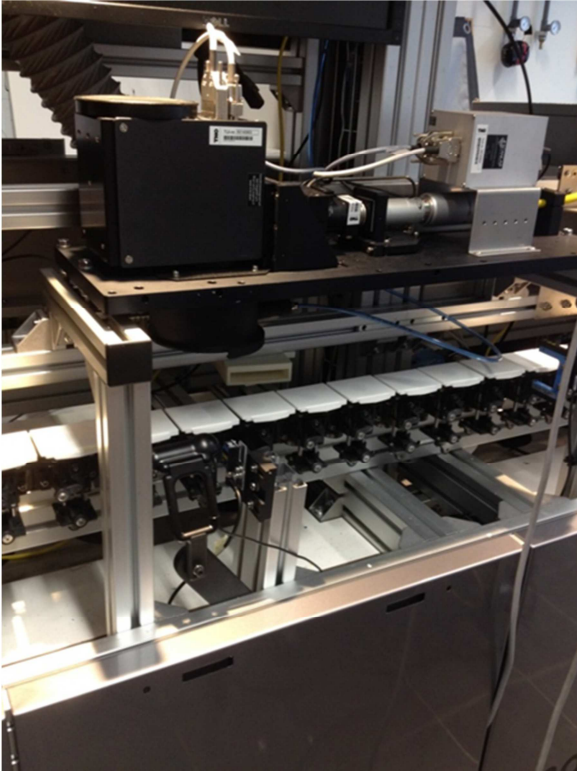


Sequence of steps of scanning and laser polishing in Hyproline



Rough alignment of model and measurement data

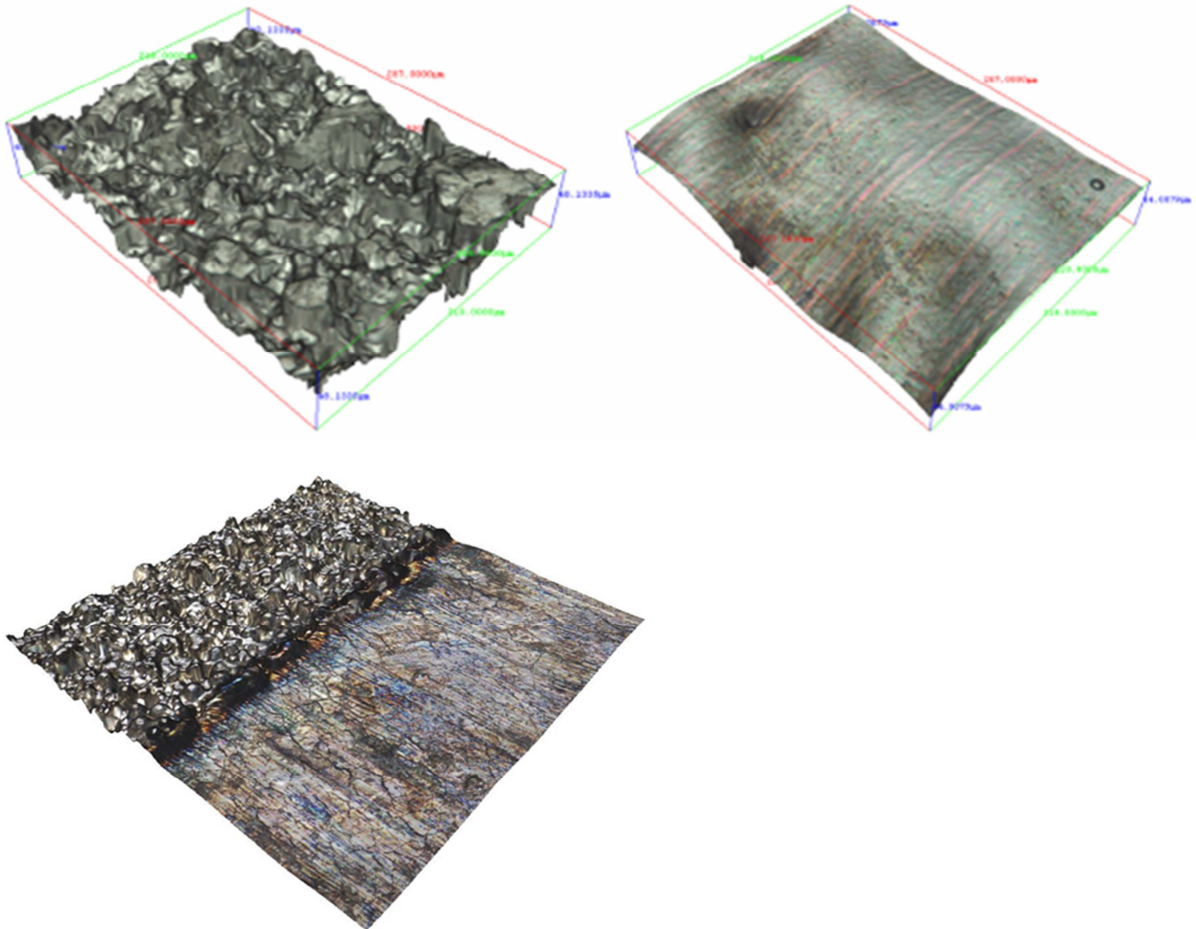




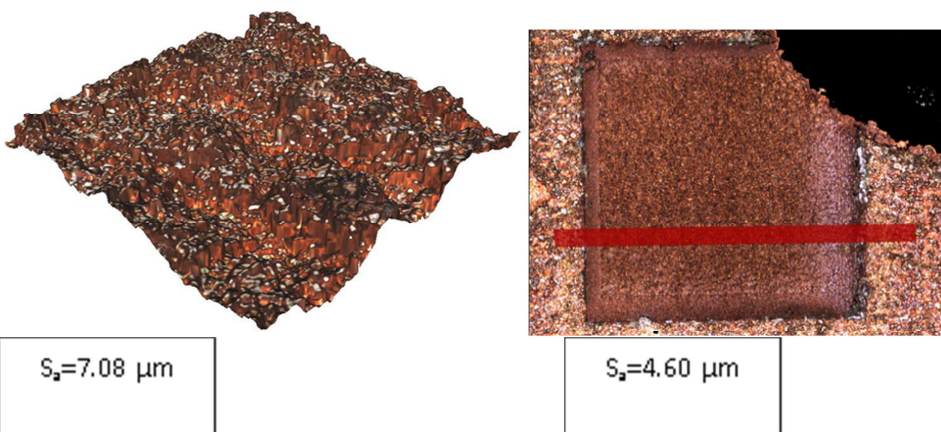
The Phase 3 demonstrator as built (overview of machine, transport belt with product carriers, robot P&P loading and unloading, laser processing, laser scanning (pointclouds))



Test geometry demo component fixed in its placeholder in the Hyproline



Untreated and laser polished detail of Ti test cube, S_a improvement from 6,8 μm to 3.2 μm



$S_a=7.08 \mu\text{m}$

$S_a=4.60 \mu\text{m}$

Hybrid platform

- 100 building / machining platforms
- 100 separate parts in operation
- High speed: 1m/s nominal (capable of 2m/s)
- Robotic high speed removal / placement of building platforms
- Modules for polymer 3D printing, curing, measurement and laser machining



Software

- Software for inspection and analysis of products
- Curved facet slicing for higher accuracy printing
- Comparisons between point clouds and nominal geometry.
- Creation of difference volumes and hatching patterns



AM Components

- Products manufactured at 20µm resolution.
- Low initial surface roughness
- Consistent surface quality
- Printing in steel, copper, titanium



Laser Machining

- On the fly laser machining
- Perform both ablation and polishing
- Improvement in surface roughness from 3µm to below 0.5µm.
- Use of inert gasses to improve surface finish
- Non-contact process
- Preserve sharp features



Fig. 3 Surface roughness (a) before and (b) after laser polishing

Measurement

- On the fly 3D measurement at reduced speed
- Uses Micro-Epsilon Scancontrol laser line scanner
- measurement volume of 4cm x 8cm x 4cm
- Resolution of 20 micrometers in X and Y

