DEMO

www.demo.tudelft.nl

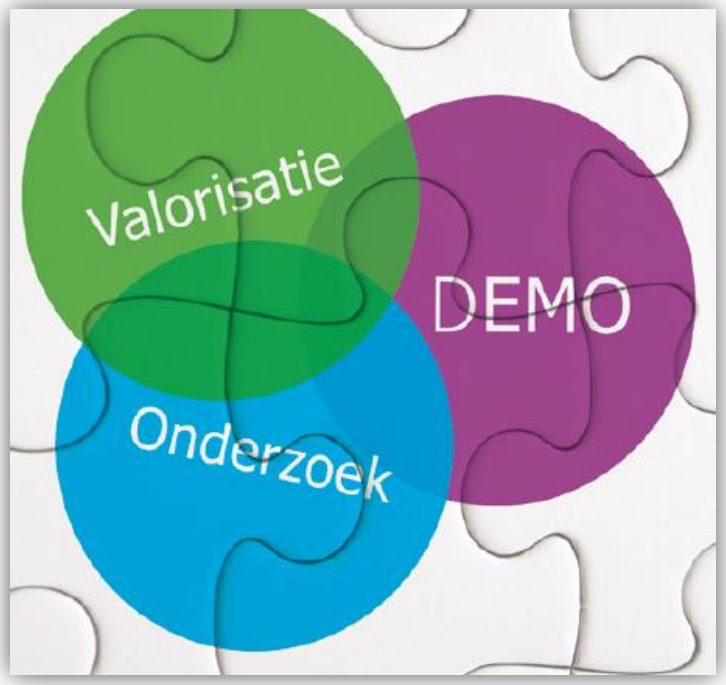
Dienst Elektronische en Mechanische Ontwikkeling

The Electronic and Mechanical Support Division

TU Delft

Introduction to DEMO 1/2

DEMO is part of the TU-Delft central support organisation, the University Corporate Office.



DEMO specializes in:

- The design and development of experimental setups and prototypes.

DEMO's aspiration:

- To play a significant role in scientific research and knowledge valorisation.

DEMO cooperates with:

- Scientists, PhD candidates, Education & Research assistants, students and "Technostarters".

Introduction to DEMO 2/2

You visit DEMO a.o. for:

- Systems design
- Advice on all kinds of mechanical and electronical issues
- The design and development of complete prototypes and test setups as well as individual components
- Project Management
- Advice on grant applications

Our technical expertises include:

- 3D CAD design using Inventor or SolidWorks
- Circuit and IC design and realization
- Programmable hardware
- Design and assembly of PCBs
- Custom software (embedded) and LabVIEW
- CNC turning, milling and Electrical Discharge Machining (EDM)
- Micro machining (EDM, milling and laser welding)
- High resolution 3D printing
- Welding and sheet manufacturing
- Process engineering

Support in grant applications

DEMO can support researchers in grant application by:

- Giving advice in producibility.
- Calculating design and production estimates.
- Making a concept design.
- Producing a simplified prototype. For example by 3D printing.

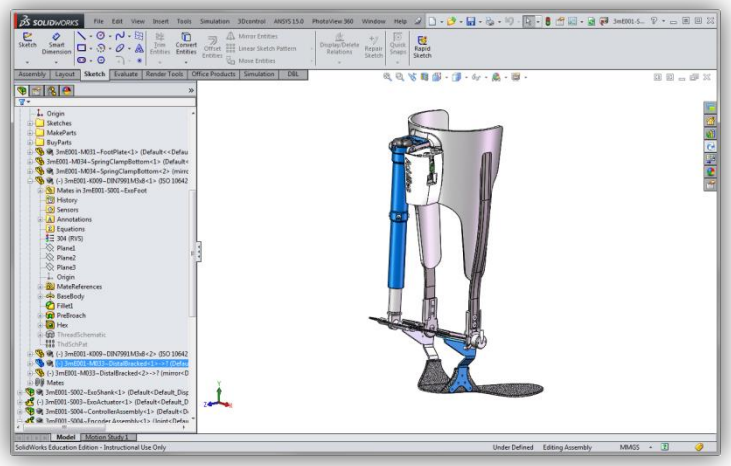
Budget is available for this support!!!

NWO Toegepaste en Technische Wetenschappen

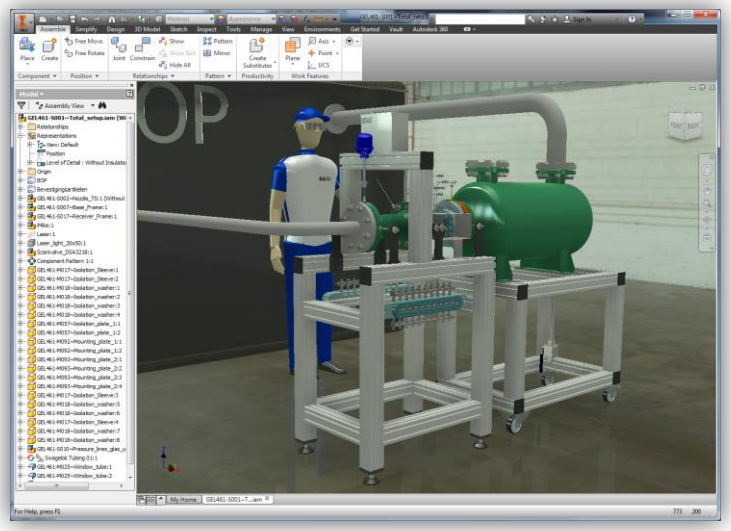
VENI
VIDI
VICI

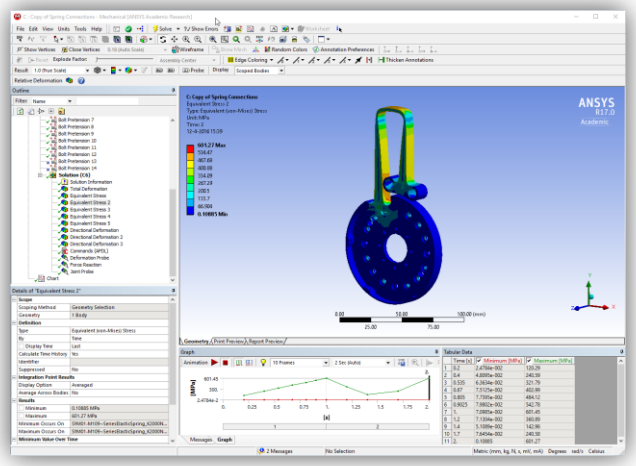
Technologies – Mechanical design

- 3D CAD design and 2D work drawings
  - Autodesk Inventor
  - Dassault Solidworks



- Final Elements calculations
  - Inventor (Structural)
  - Solidworks (Structural)
  - Ansys (Structural, Thermal, Flow)



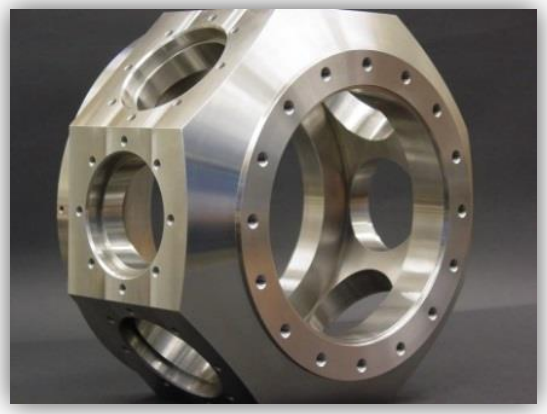


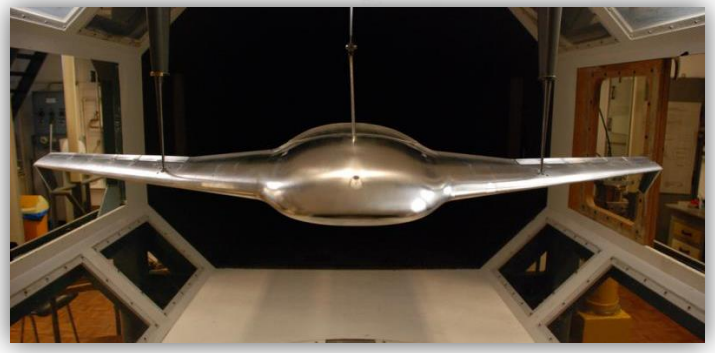
Technologies – CNC milling

- 3, 4 and 5 axis CNC milling machines
  - Fabrication size up to:

    1130 x 720 x 630 (3-axis)

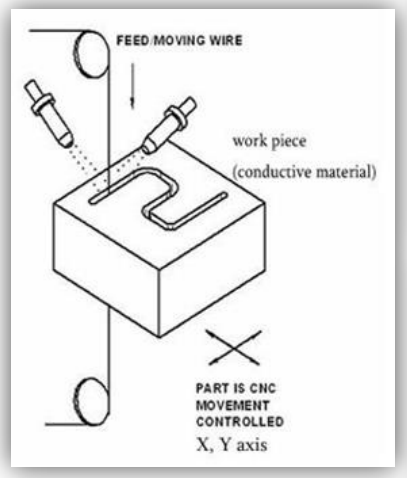
    820 x 700 x 450 (5-axis)
  - Very high accuracy
  - Mill size starting from Ø 0,2mm and experimenting with mill sizes of Ø 0,04mm

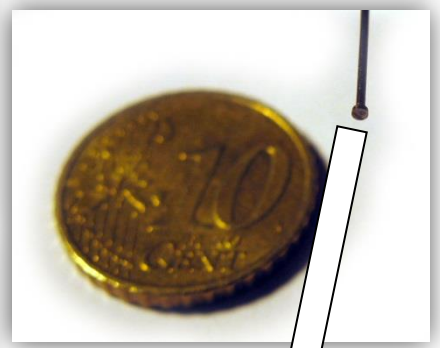




Technologies – EDM

- Electrical Discharge machining
  - Wire-EDM
  - Wire of 0,2, 0,1 or 0,05mm
  - Workpiece up to 370 x 270 x 255

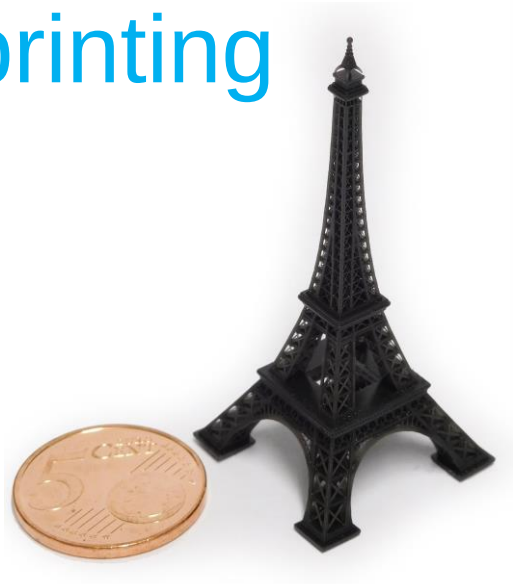




- Micro EDM milling (Sarix SX200)
  - Electrode rod can be shaped with laser as required

- Micro EDM drilling (Sarix SX100, Smalltec)
  - Holes of 8µm possible

Technologies – 3D printing



Plastic:

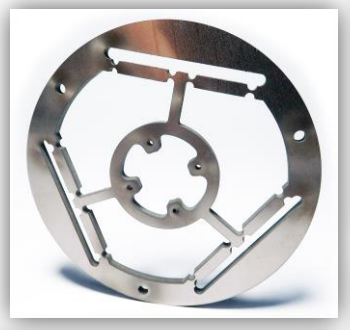
- Building volume: 115 x 72 x 160 mm (XYZ)
- Native Pixel Size (XY): 44 or 60 µm
- Layer thickness (Z): 25 µm up to 150 µm
- Building time of 12,5mm/hour (@ 50µm)
- Several plastic materials available with different properties

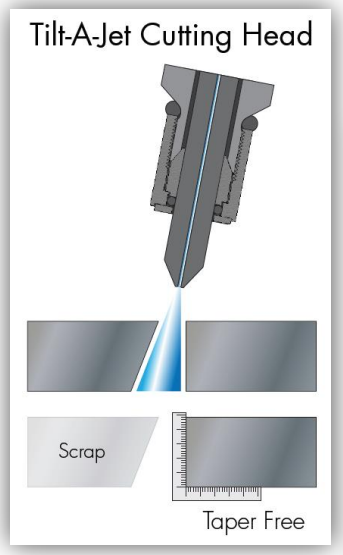
Metal

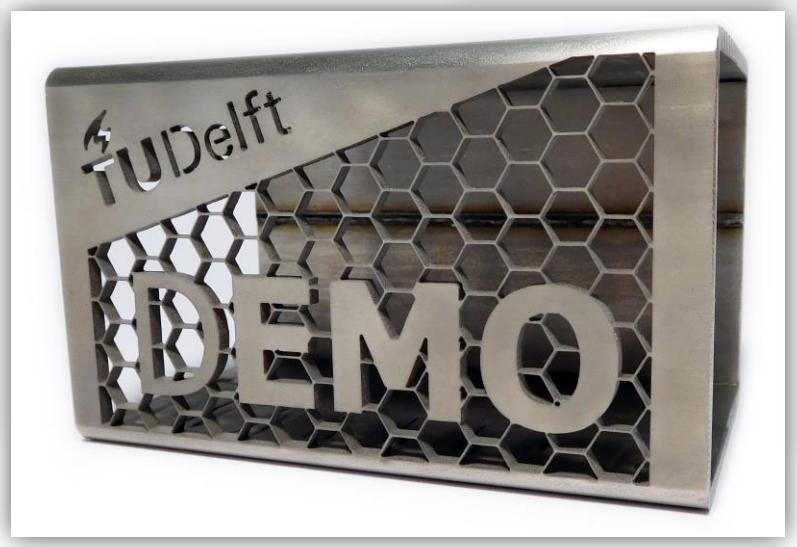
- Building volume: Ø98 x 100
- Laser spot diameter: 35 µm
- Layer thickness : 25-40 µm
- Material: Stainless steel

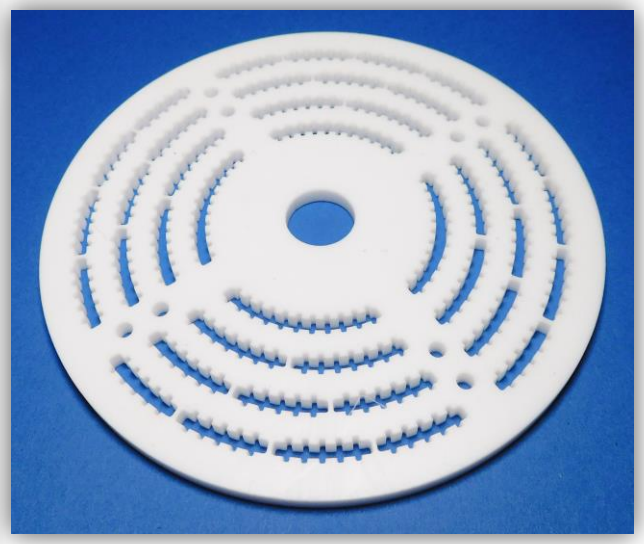
Technologies – Waterjet cutting

- Waterjut cutting and engraving in most materials
- High quality setting available for precise parts
- Taper free cutting due to Tilt-A-Jet cutting head
- Cutting jet width down to 0,4 mm
- Cutting space of 635 x 635 mm







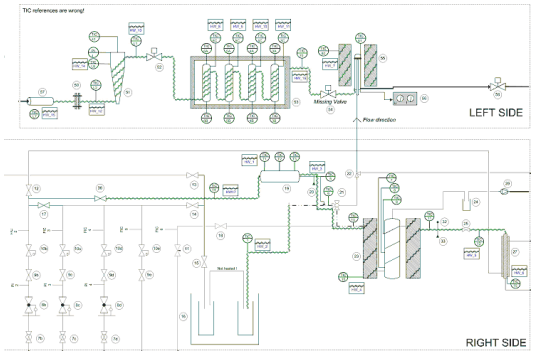


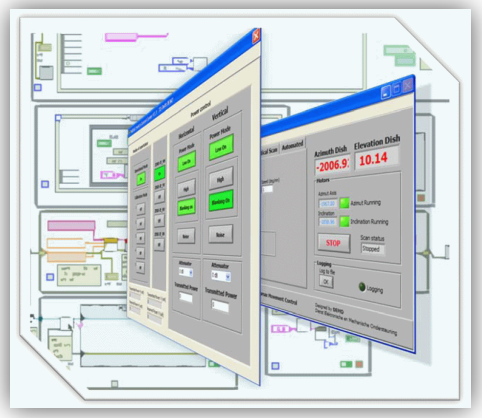
Technologies – Electronic hardware

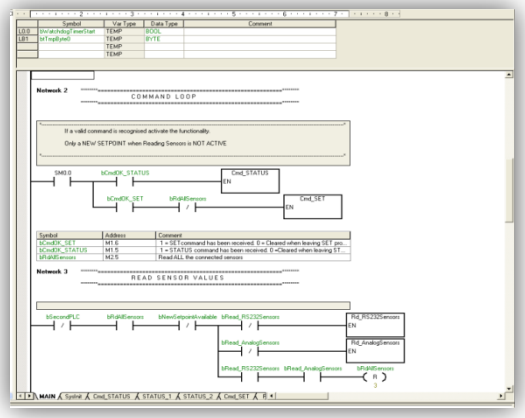
- Analog, digital & electronic circuits for PCB
- Integrated circuit design
- Electric Cabinet design with DIN rail technology
- Power- & High voltage electronics
- Debugging, problem shooting
- PCB layout
- Component selection
- Cables & Connectors
- Transformer & Coil design & prototyping

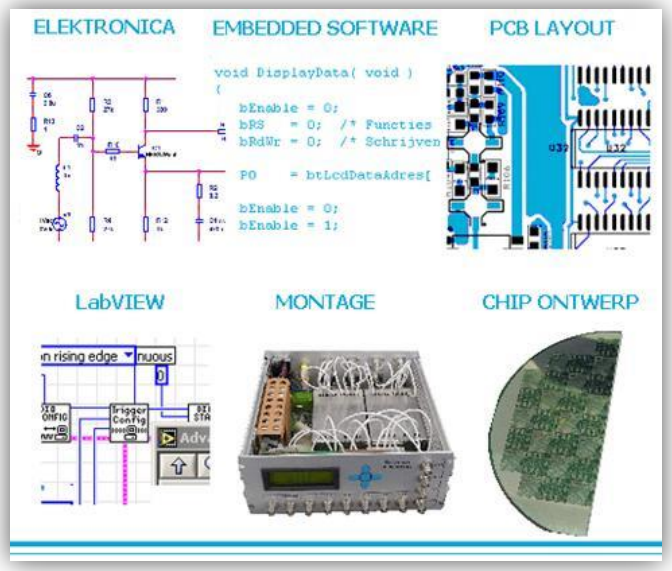
Technologies – Software

- LabVIEW
- PC-based software
- Embedded firmware
- PC, PLC's, Compact Rio, microcontrollers, FPGA
- Digital Signal Processing





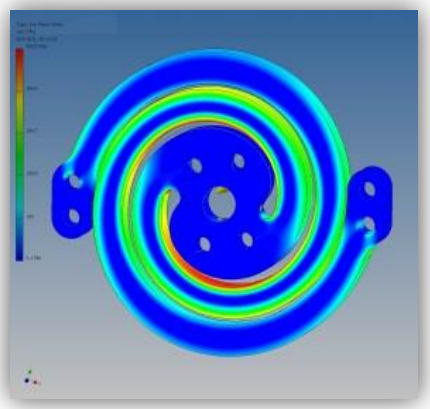




Projects

3D design in SolidWorks

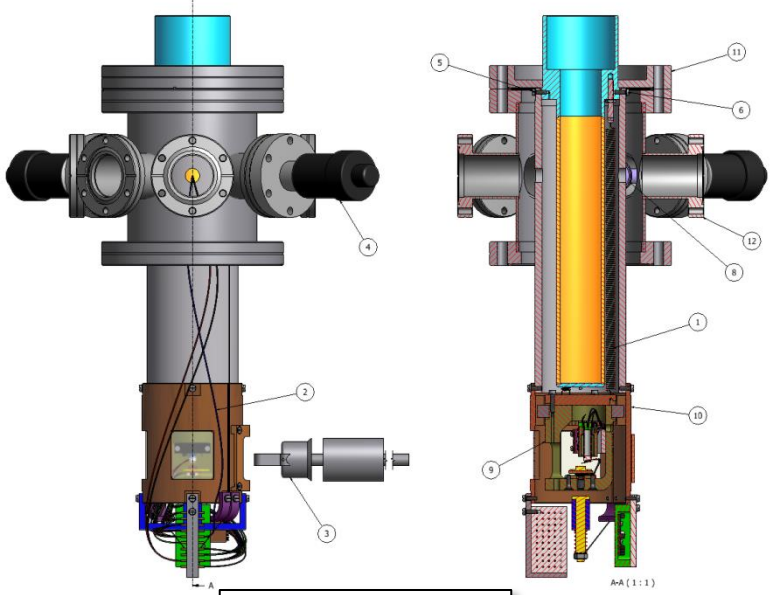
Mindwalker Exoskeleton



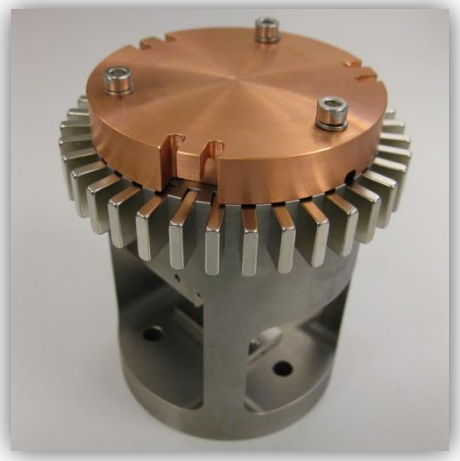
The research is part of MINDWALKER project, funded under Seventh Framework Programme (FP7) of European Commission, with grant agreement no. 247959

Atomic Force Microscope

That works in vacuüm, at -196˚ C and is isolated from vibrations. Motion is done with Piezo elements.



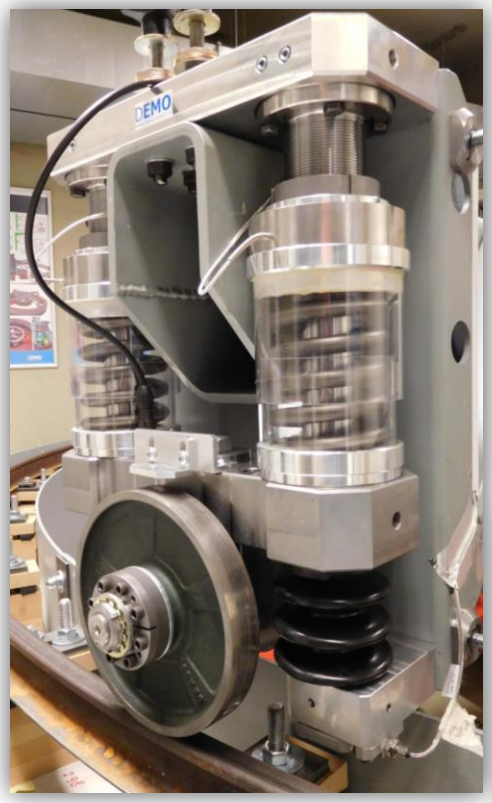
3D design in Inventor

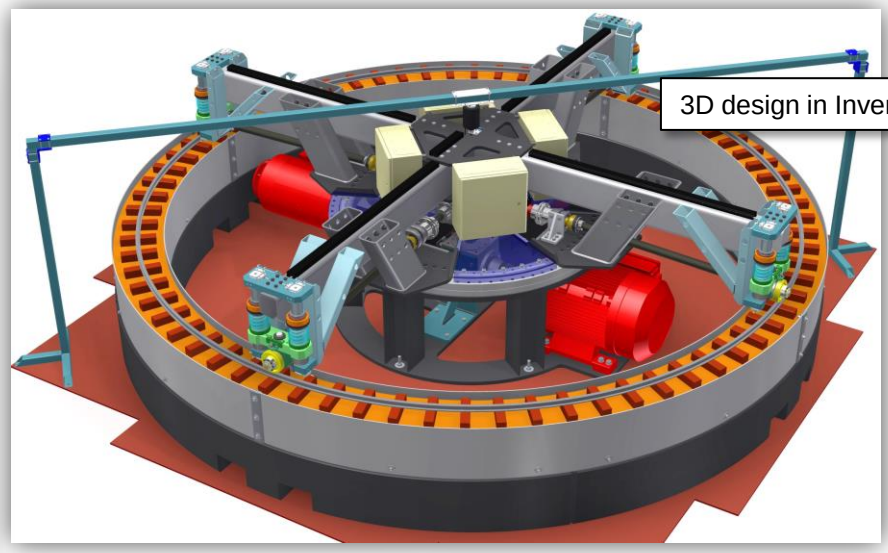


Projects

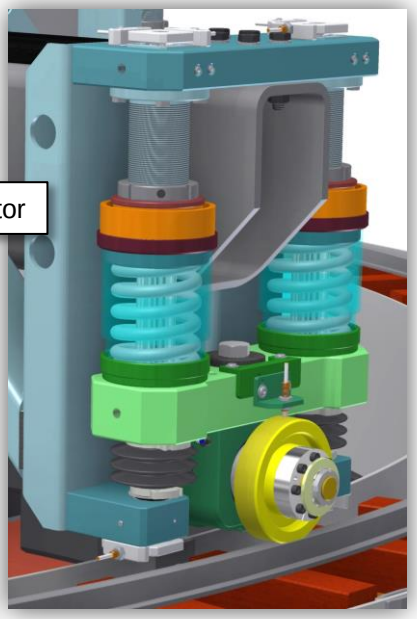
Wheel-Rail test rig

A circular test rig to investigate rolling contact fatigue between train wheel and rails.

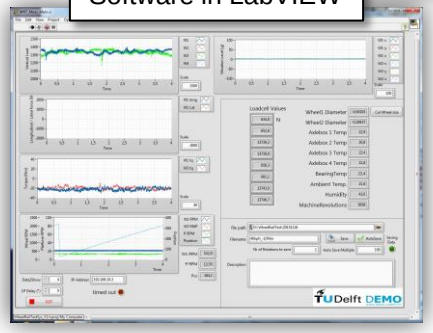




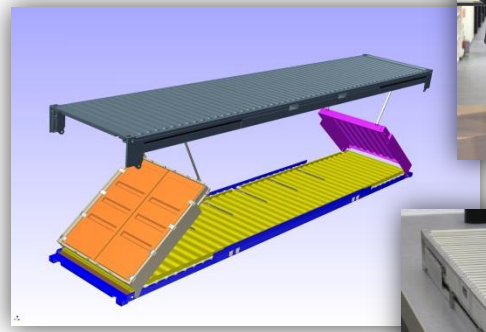
3D design in Inventor



Software in LabVIEW



Projects

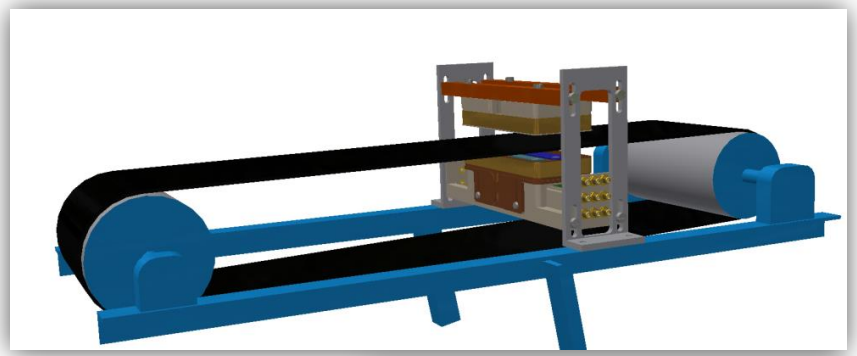


Foldable container

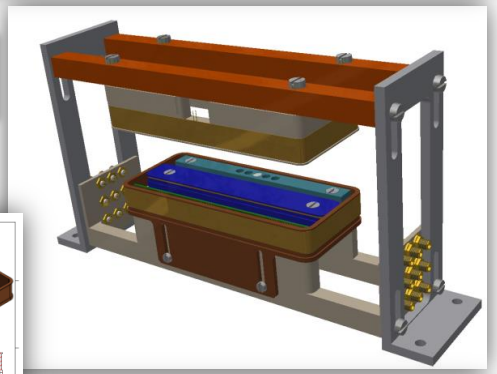
Design and production of scaled and first 1:1 model

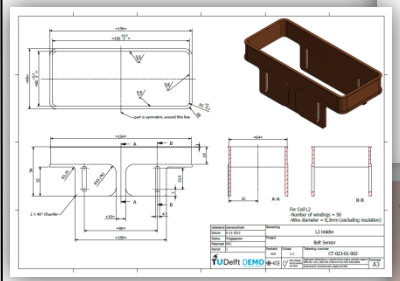
Belt Sensor

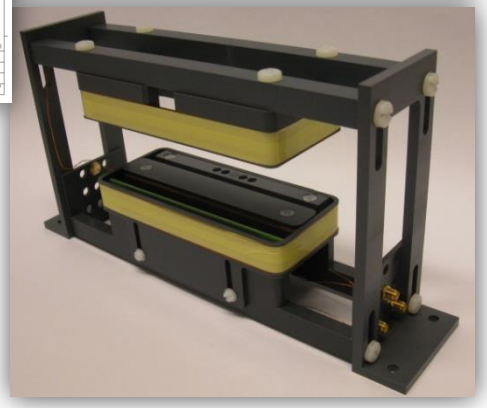
Setup to detect different metals in a waste stream with different electronic coils.



3D design and
2D drawings in Inventor







TU Delft

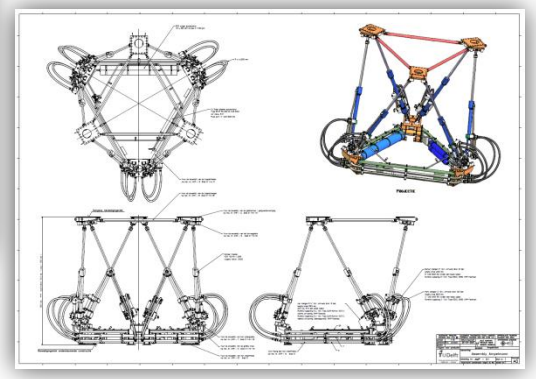
DEMO
www.demo.tudelft.nl

Projects

Ampelmann

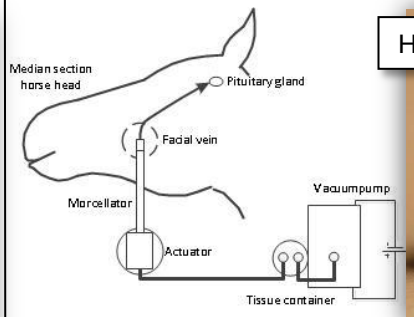
Self-stabilizing hexapod for accessing offshore structures as easy as crossing the road.

Design and production of first prototype

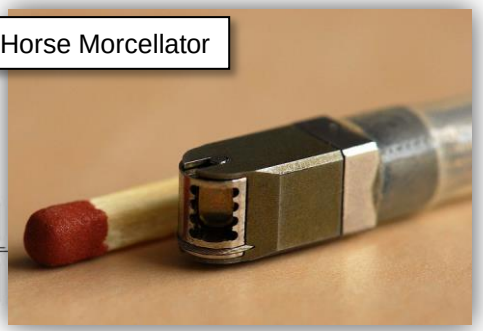


BITE – Bio-Inspired Technology

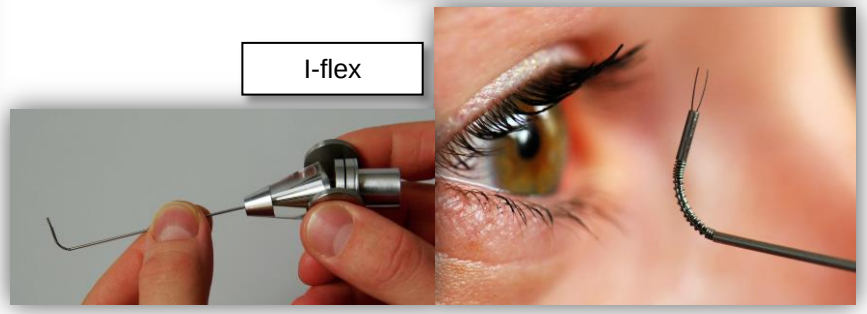
Production and co-design of several parts and complete assemblies for BITE



Horse Morcellator



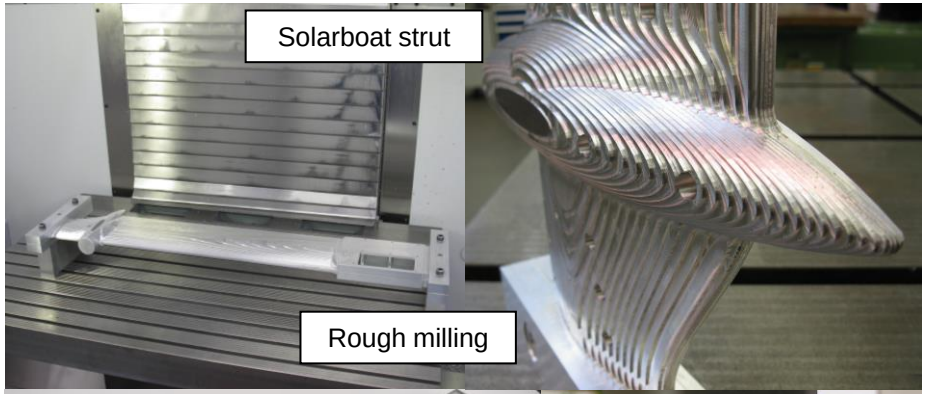
I-flex



Muco-Adhesive device

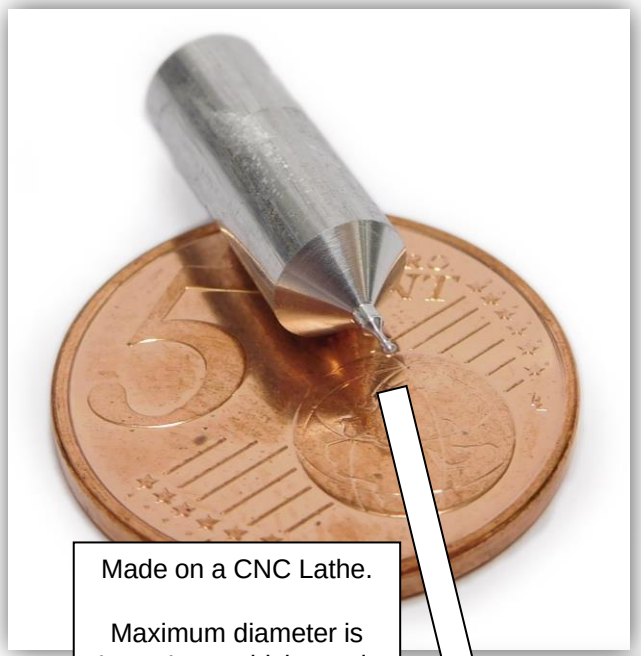
Projects

Production of several parts for TU-Delft dreamteams like NUNA, Forze zero, DUT racing and the Solarboat team



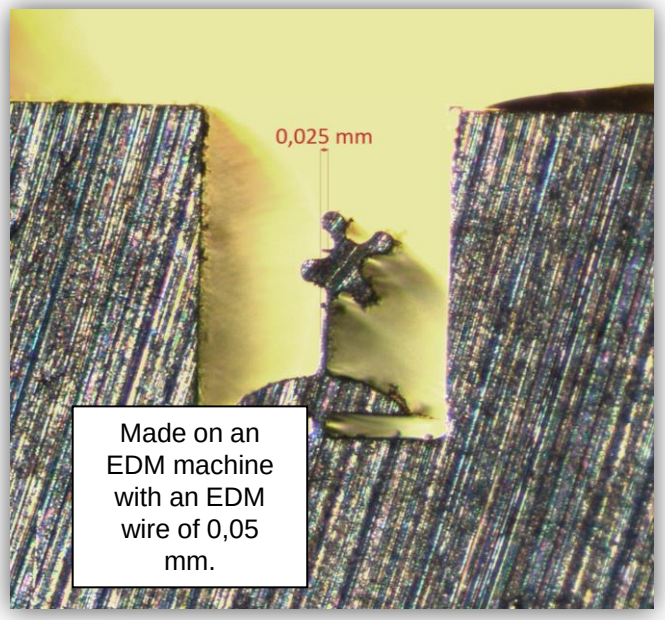
Projects

Several small components



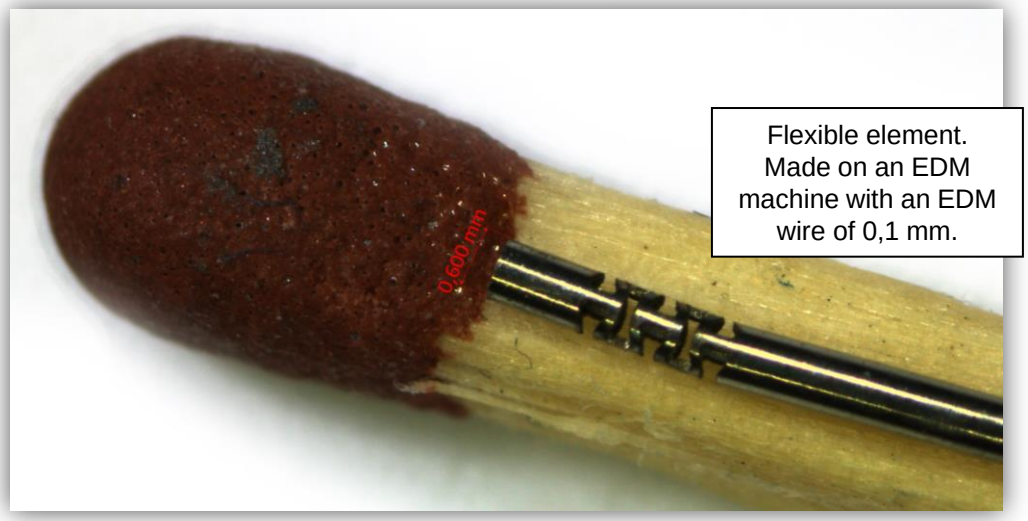
Made on a CNC Lathe.

Maximum diameter is 1mm. Letter thickness is 0,05mm.



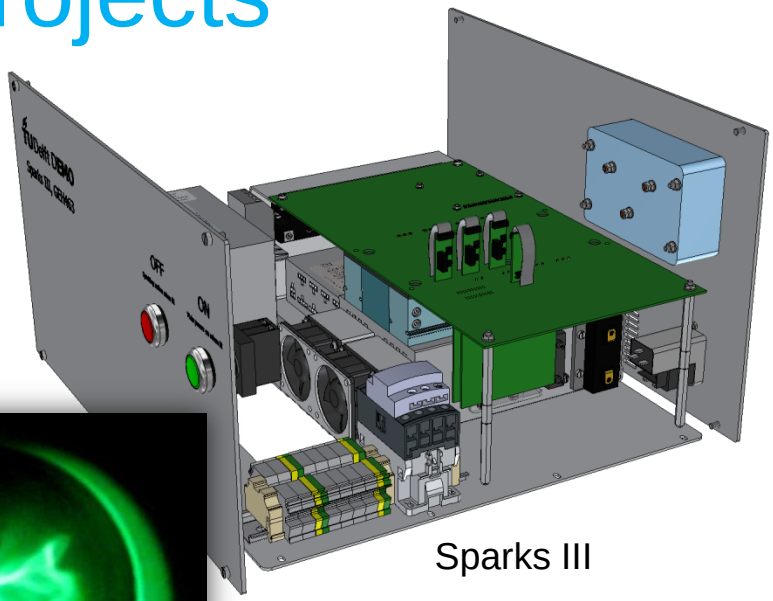
Made on an EDM machine with an EDM wire of 0,05 mm.

3D printed Nozzle. Outside diameter is 8mm.



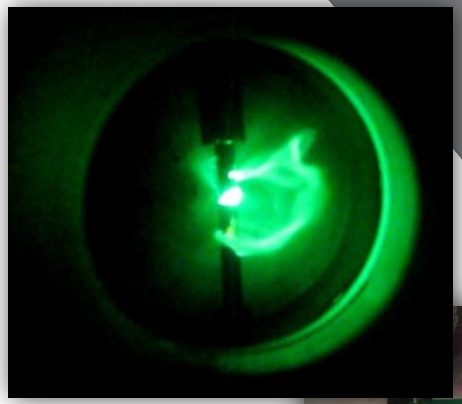
Flexible element. Made on an EDM machine with an EDM wire of 0,1 mm.

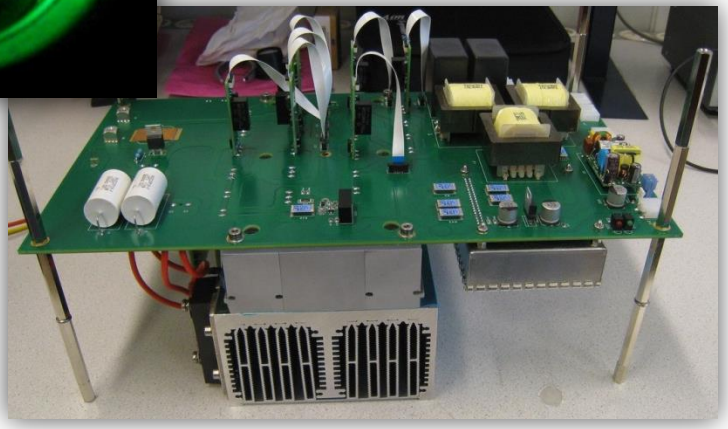
Projects



Sparks III

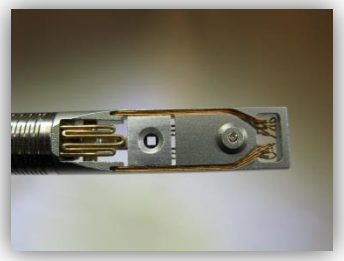
Sparks generator for the production of nanoparticles.

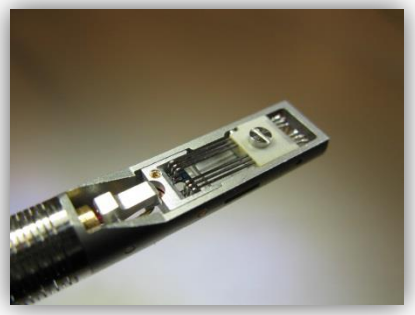




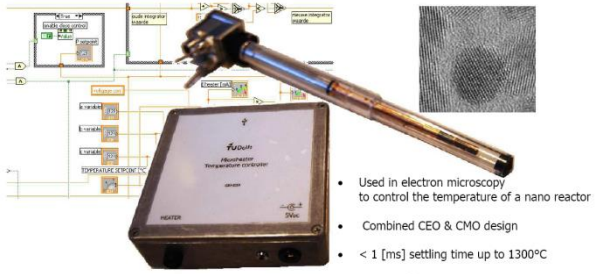
Nanoreactor holders

For use in TEM microscopes. Several variants made with options like single or dual tilt, electrical contacts and temperature control.

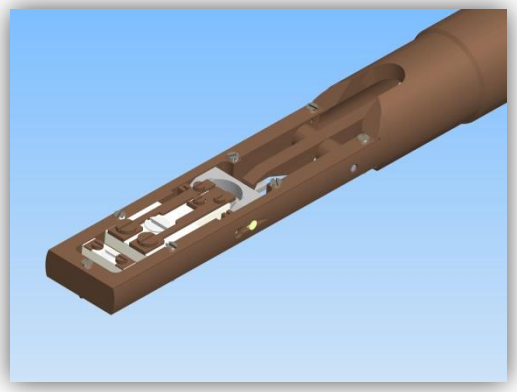




Nano reactor temperature controller



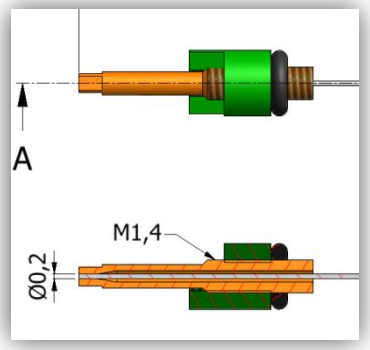
- Used in electron microscopy to control the temperature of a nano reactor
- Combined CEO & CMO design
- < 1 [ms] settling time up to 1300°C
- Operated by a pc via USB

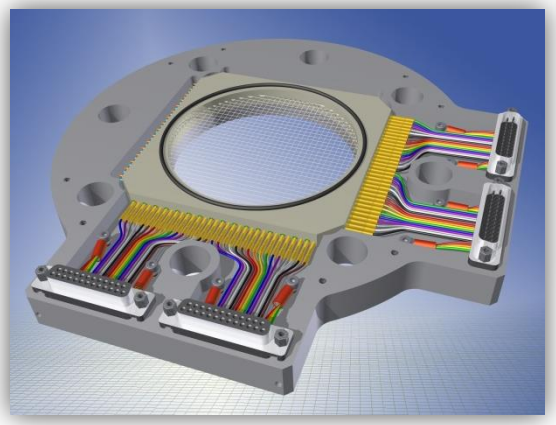


Projects

Wire Mesh Sensor

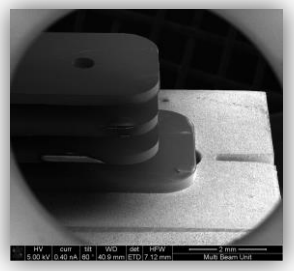
For measuring oil flow in water tubes

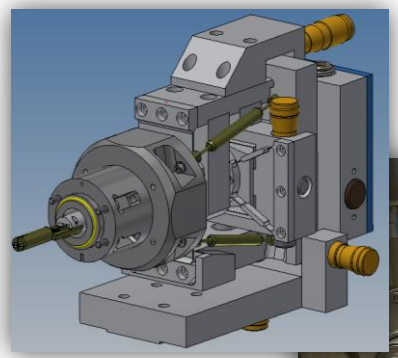




Multi Beam Blanker Array

Positioning of a stacked MEMS device in a scanning electron microscope

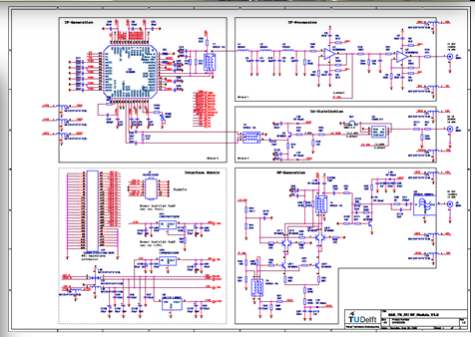


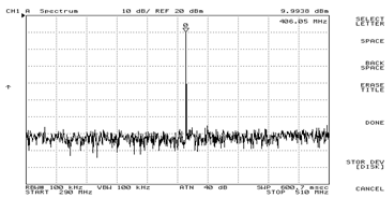


I-Optics

Retinal eye camera
1024 x 1024 pixel, 66 dB S/N, 24 electrons readout noise, 12 bit ADC ,10 f/s, USB 2.0

Ursa Minor





TU Delft

DEMO
www.demo.tudelft.nl

Cost, Locations and Contact

Cost:

- Internal rate: ~€40 per hour
- External rate: On request

Locations:

- There are various DEMO locations all over the campus (AS (TNW-zuid), AS (TNW Lorentzweg), CEG (CiTG), EEMCS (EWI), 3mE-P&E, AE (L&R)). You are free to choose your preferred location.

Contact:

- www.demo.tudelft.nl
- infodemo@tudelft.nl
- +31 (0)152783244