

# Introduction of NMF600 S & NMF350 S

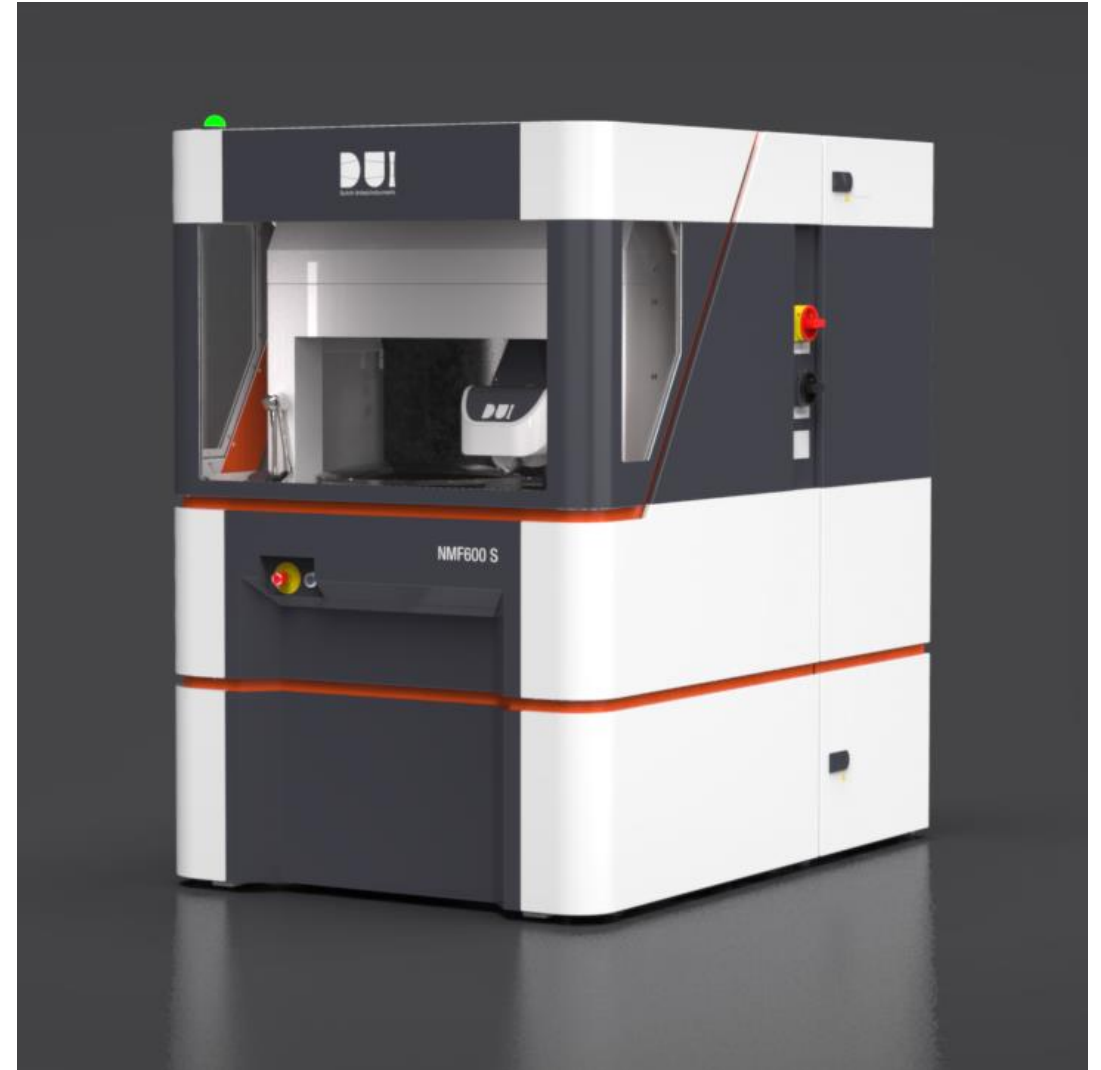
*Jing Zou*

*Dutch United Instruments*



# Dutch United Instruments in a nutshell

- Established in the Netherlands in 2017 with proven technology from TNO
- To provide the best form metrology products for aspheric and freeform optics
- Part of DEMCON group
  - Design & Engineering company established in 1992
  - DEMCON has >700 employees



# The Story of DUI

- *17 years* ago, a few Master and Phd students including the current **DUI CTO Rens Henselmans**, went on an epic journey to build a **dream form metrology** machine for optics manufacturing since no one can make what they can't measure.
- This dream machine needs to be **universal, large, interferometer accuracy, fast, non-contact**.
- The journey went for a few years ...



**Dream machine yet?  
Many suitors but no match ...**

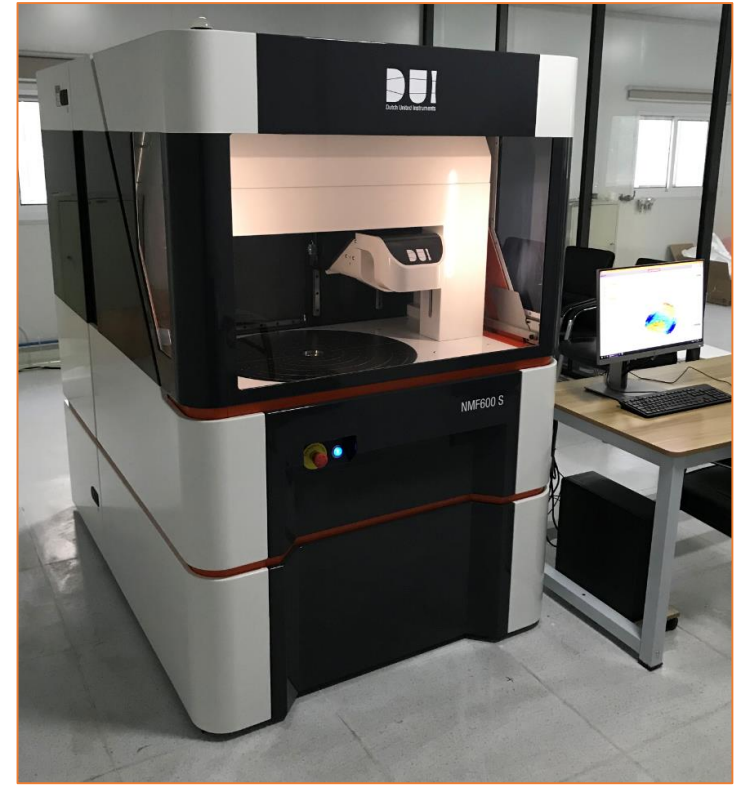




NANOMEFOS



17 years of development and user testing



NMF



Daughter company of DEMCON, licensed from TNO



worked on this transformation over another 2 years

Introduction of NMF600 S & NMF350 S

Dutch United Instruments

# Sneak preview

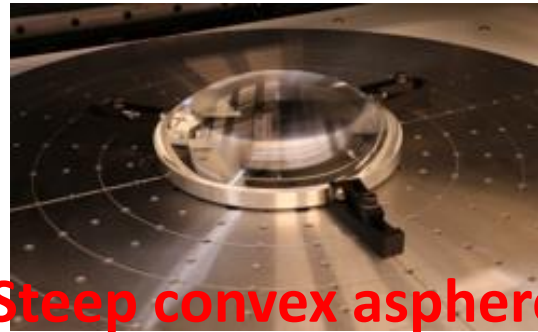


<https://www.youtube.com/watch?v=6bvscJ-mUGs>

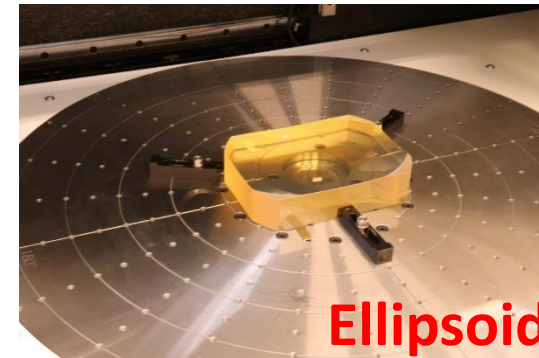
# Universal (from small to large, from ground to coated )



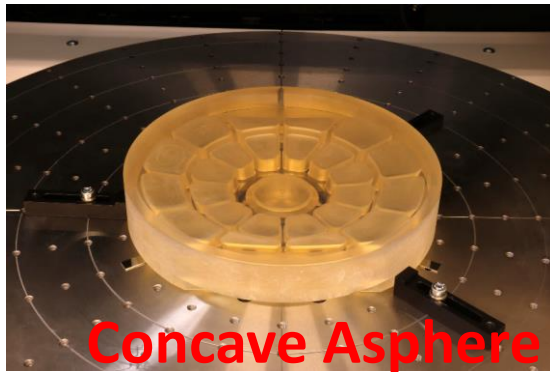
**HUD freeform**



**Steep convex asphere**



**Ellipsoid**



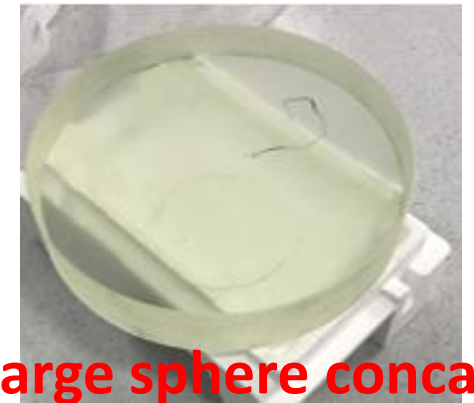
**Concave Asphere**



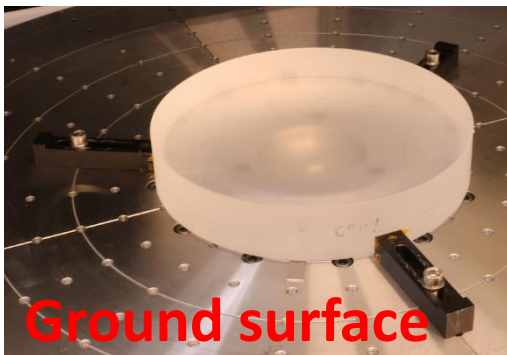
**IR coated asphere**



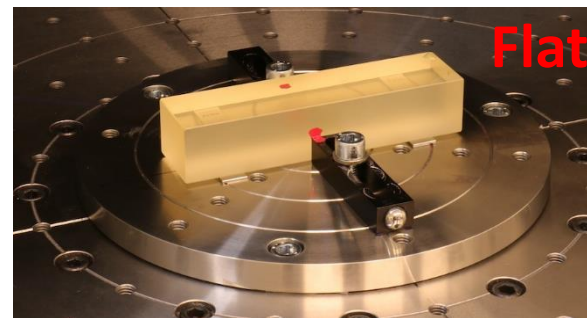
**long convex cylinder**



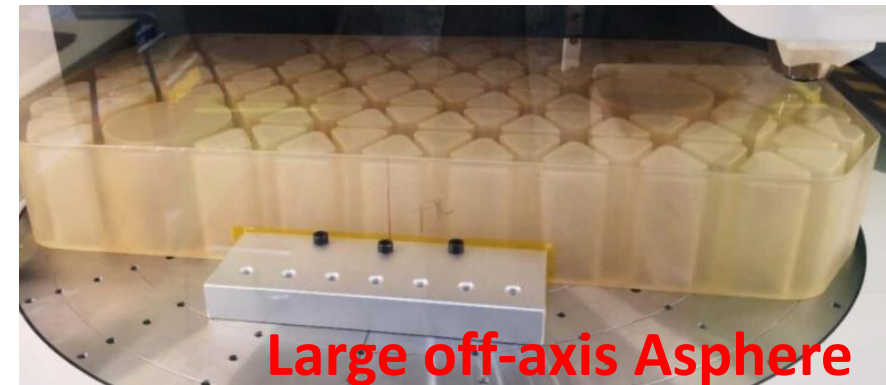
**Large sphere concave**



**Ground surface**



**Flat**



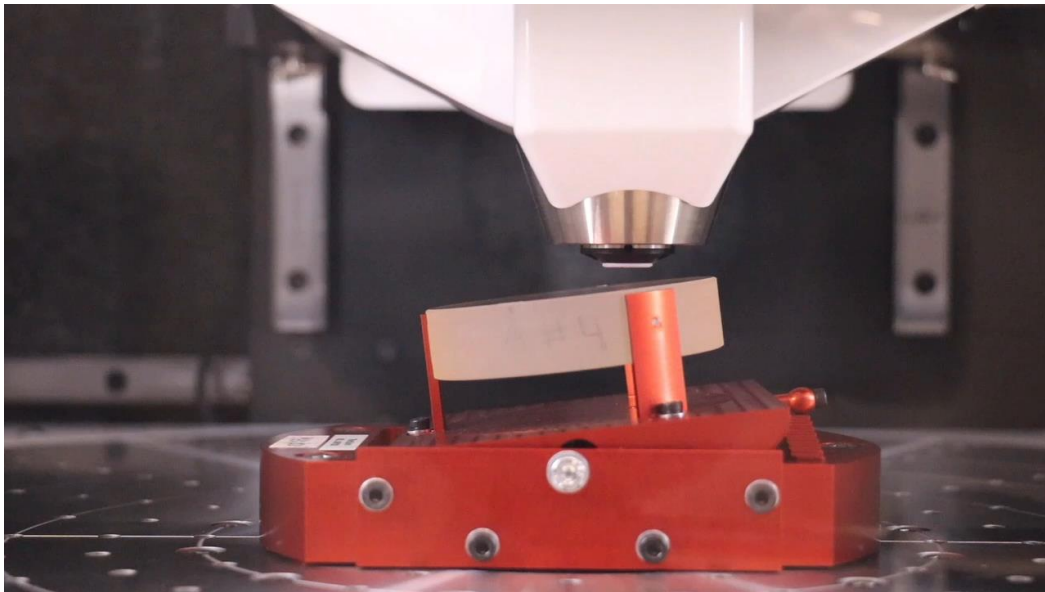
**Large off-axis Asphere**



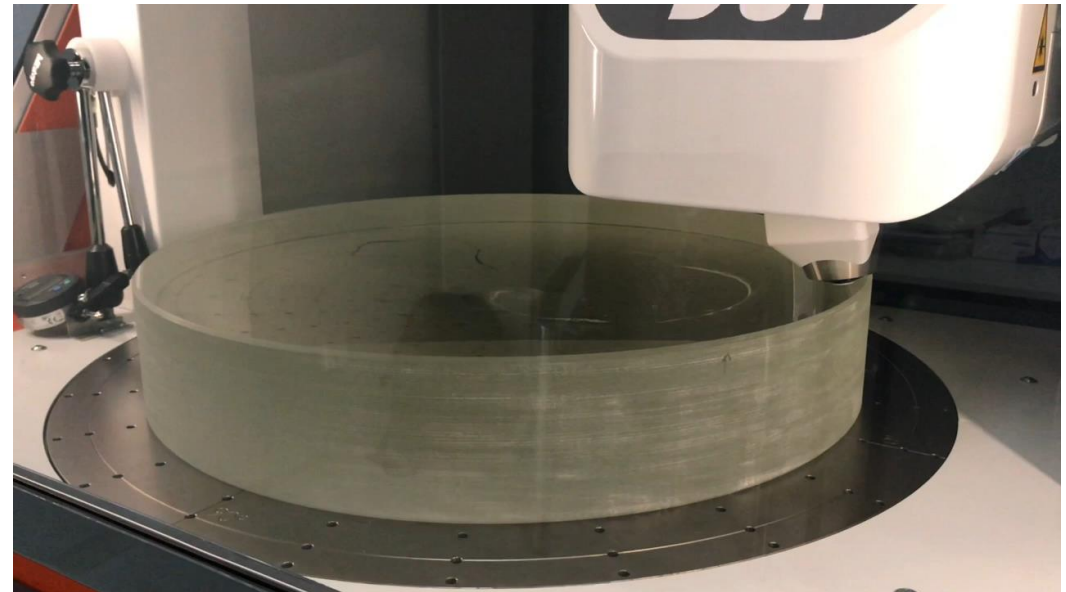
# Non-contact & fast measurement

- Dual stage servo probe with confocal principle
- Spindle rotates @ 1rev/s
- Measurement done in minutes;

*tilted flat @ 7 deg, Ø30 mm, 3:45 minutes*

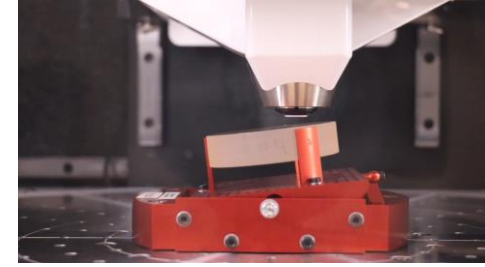


*Ø500 mm concave, 7 mins*

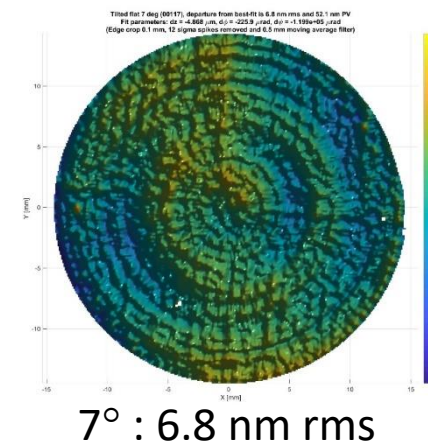
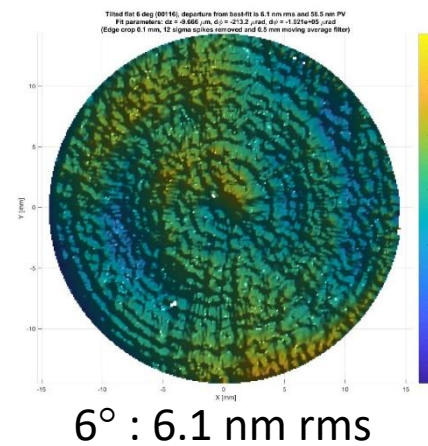
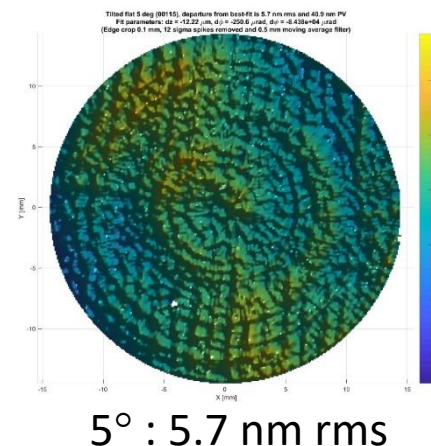
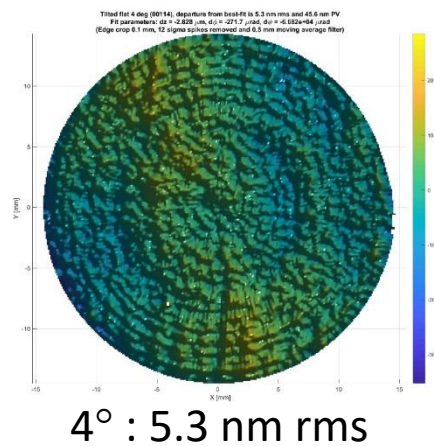
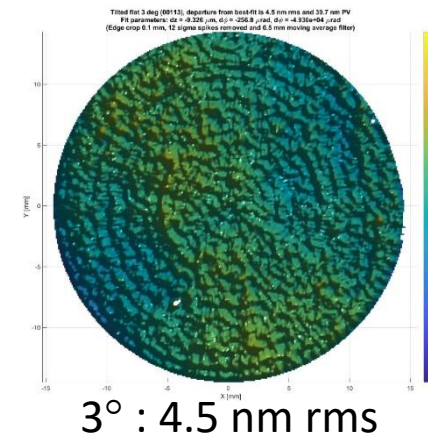
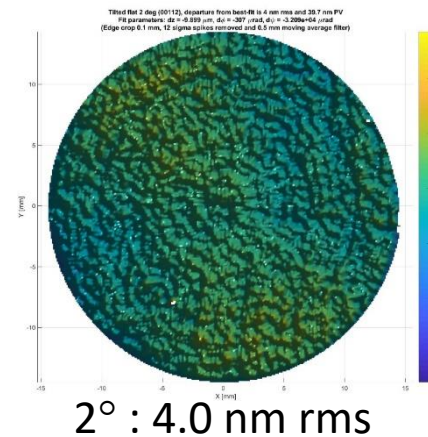
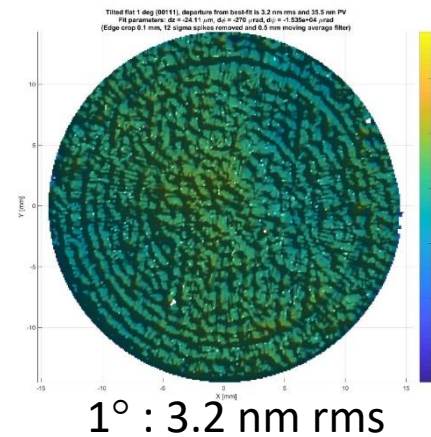
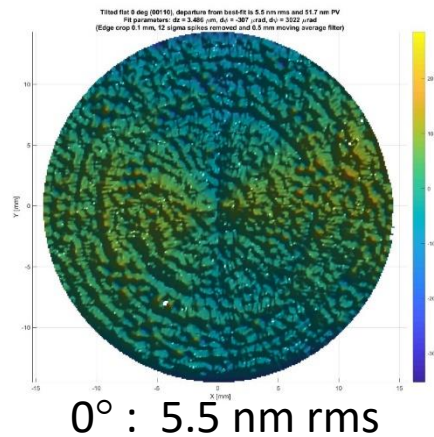




# Nanometer accuracy even for freeform optics

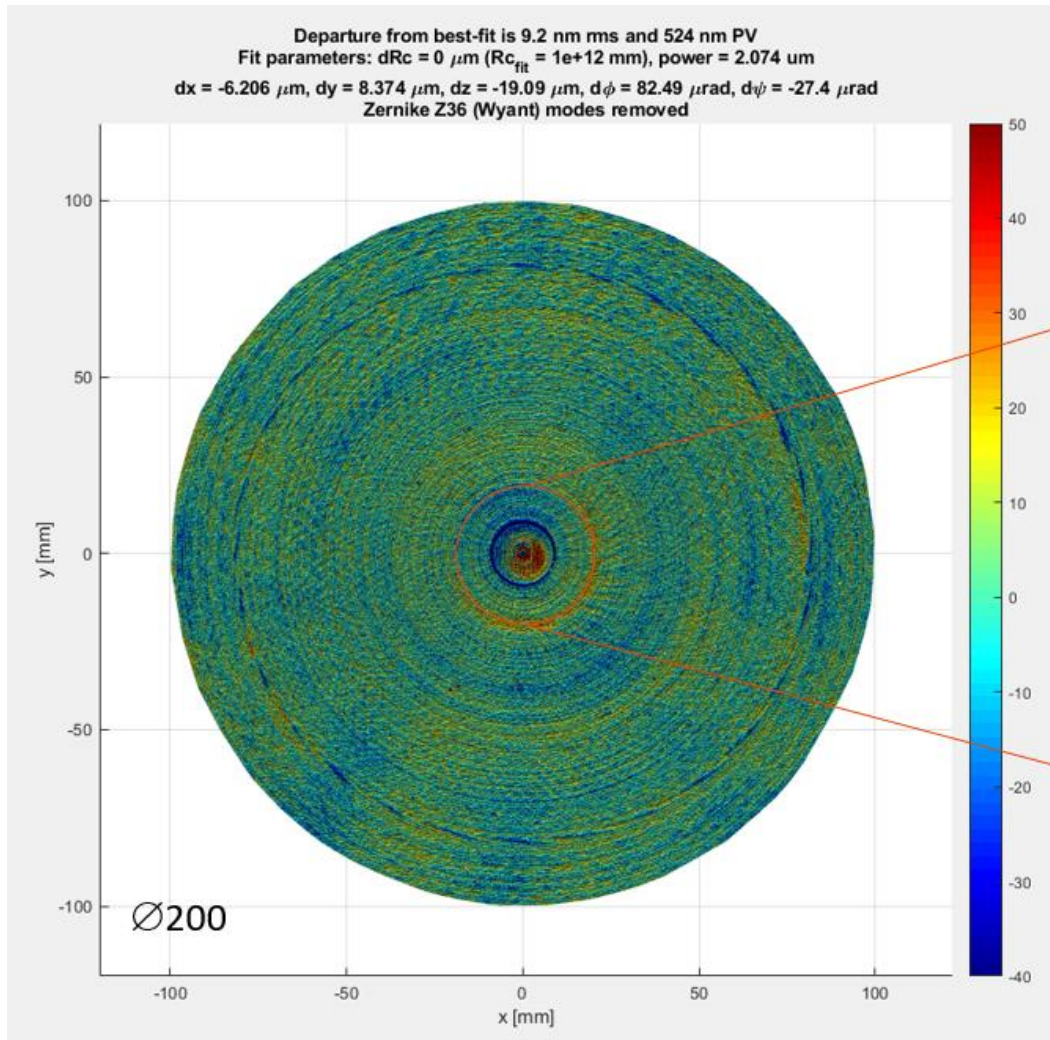


- $\text{Ø}30$  mm aperture, max 2.5 mm PV, Tilted flat measured from  $0^\circ$  to  $7^\circ$
- Fit tilt only (no power removed)

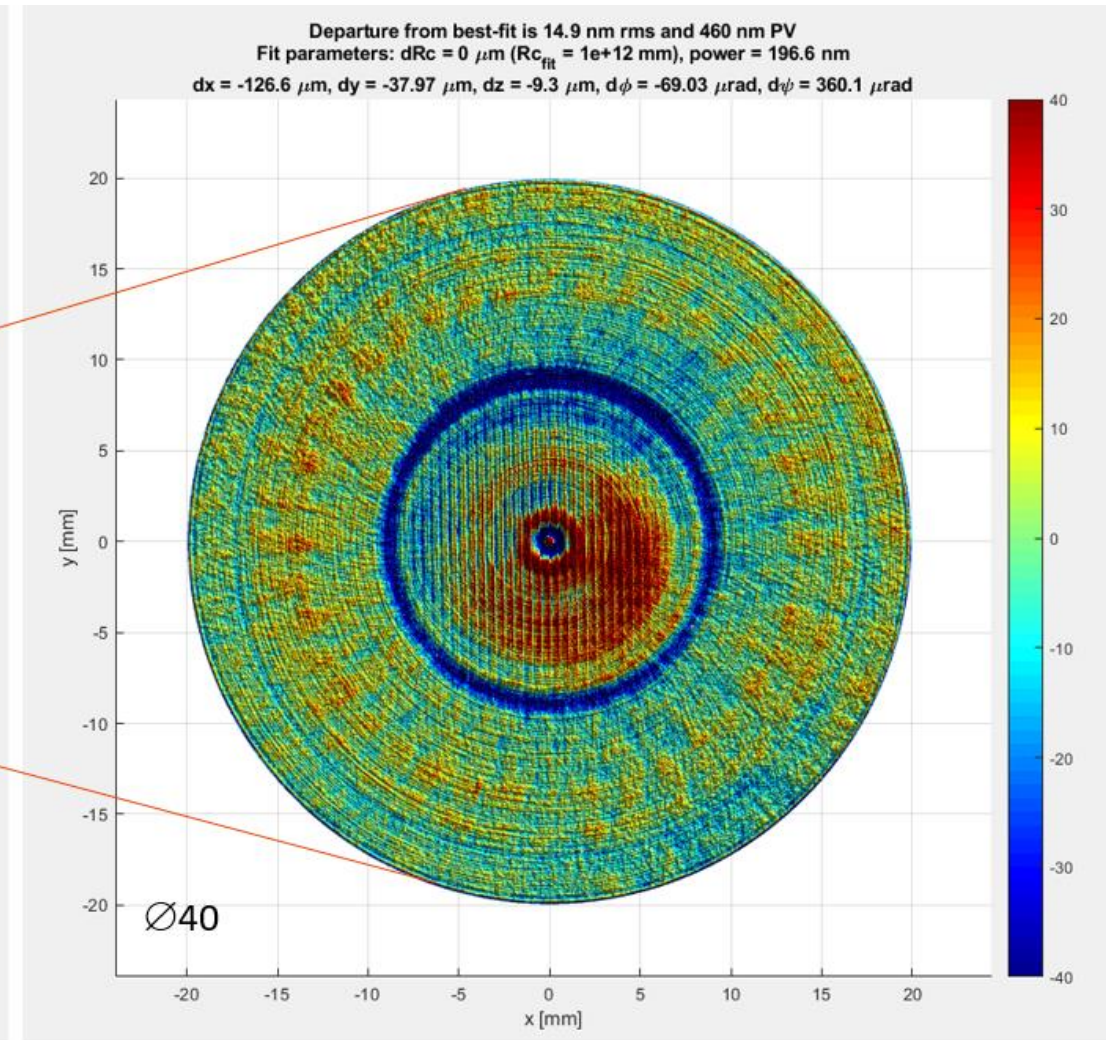




# High resolution, zooming in on manufacturing defects

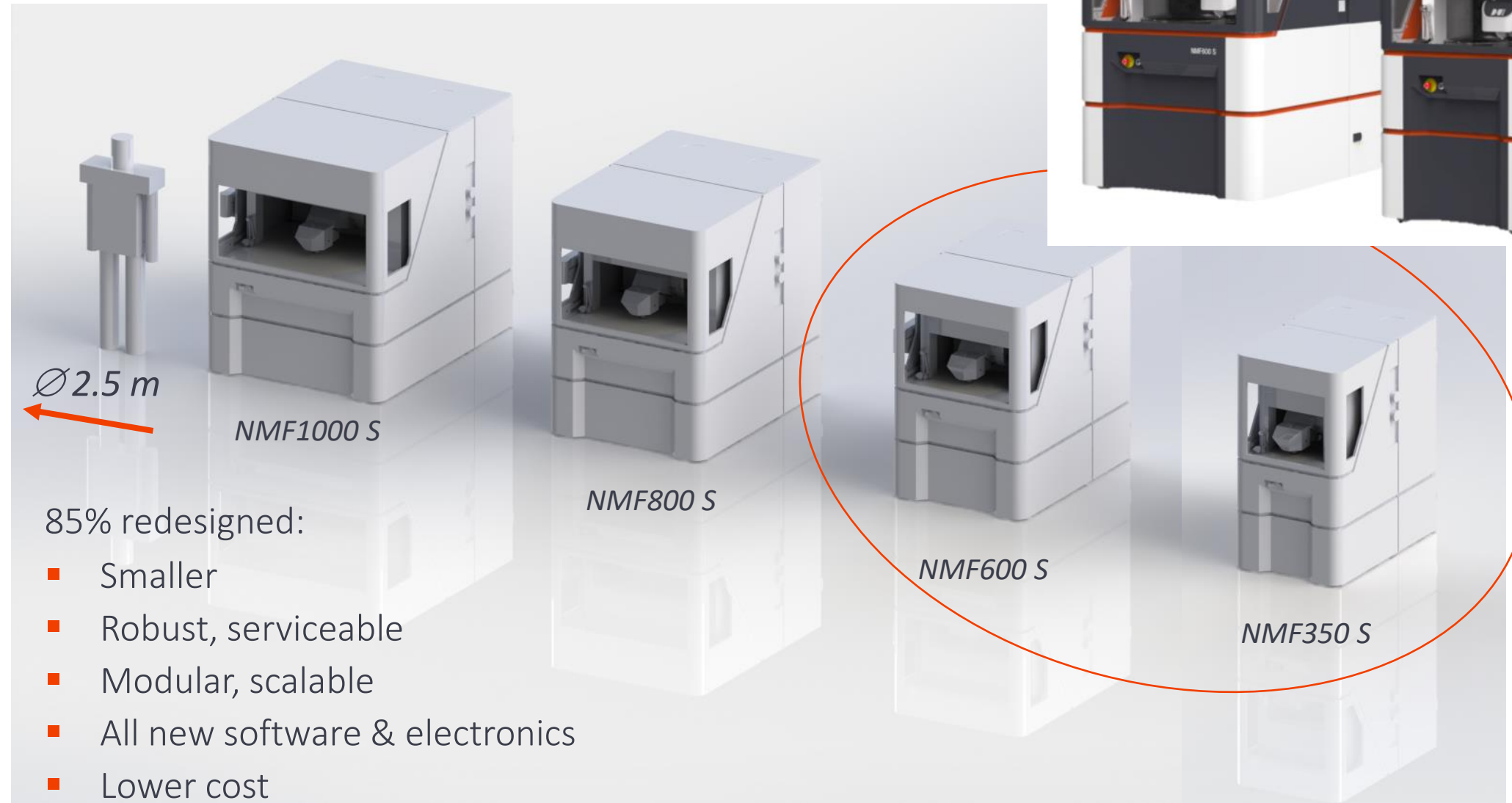


Full surface, 0.1 mm pointspacing, Z36 (Wyant) removed



Centre Ø40 mm, 0.025 mm pointspacing, power removed

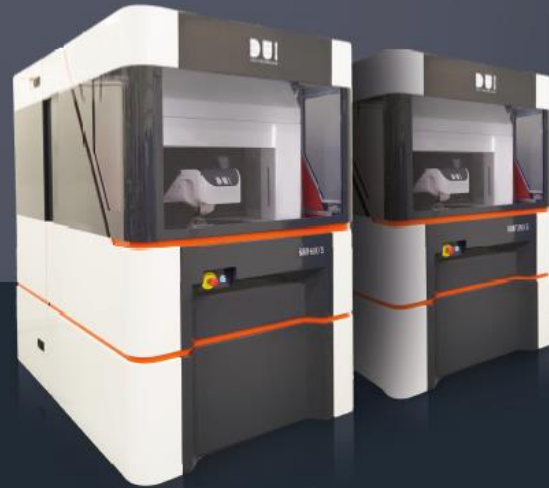
# DUI NMF Product Family



# DUI NMF600 S & 350 S

## NMF600 S and NMF350 S

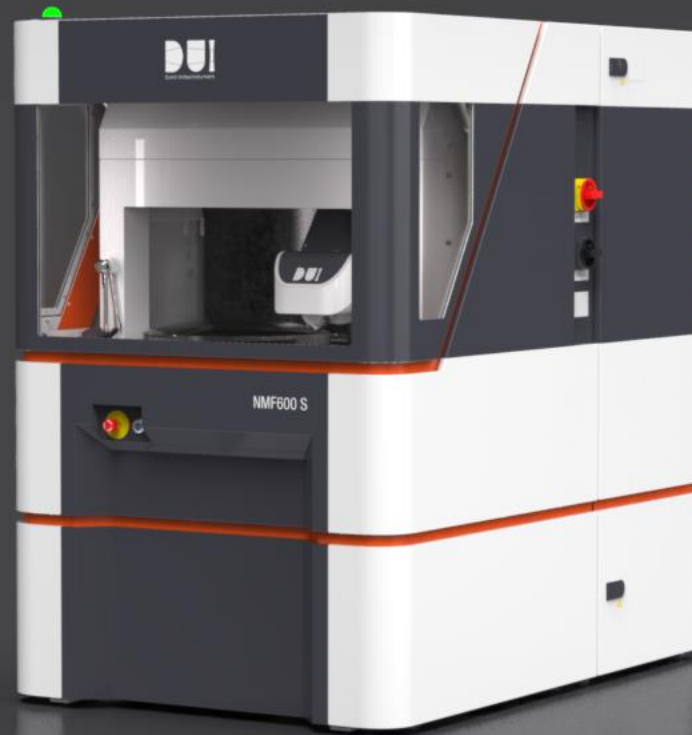
The fast and accurate measurement solution for aspheric and freeform optics



- › Versatile
- › Large measurement volume
- › Nanometer accuracy
- › Fast
- › Non-contact

**Interested? Contact us or visit us in Delft.**





Thank you!  
<https://dutchunitedinstruments.com/>

