



FFPLUS SUCCESS STORY: BUSINESS EXPERIMENTS

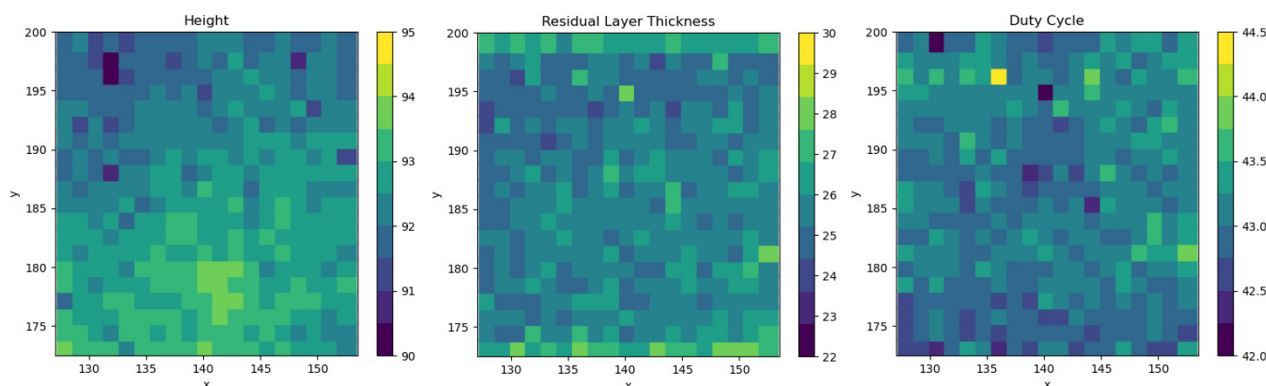
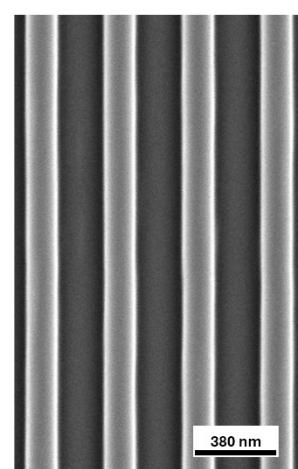
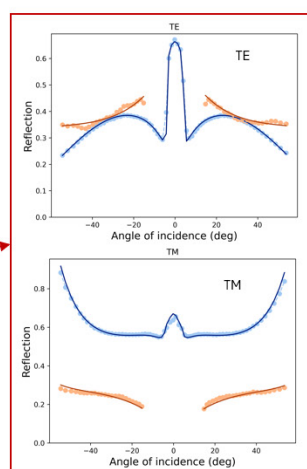
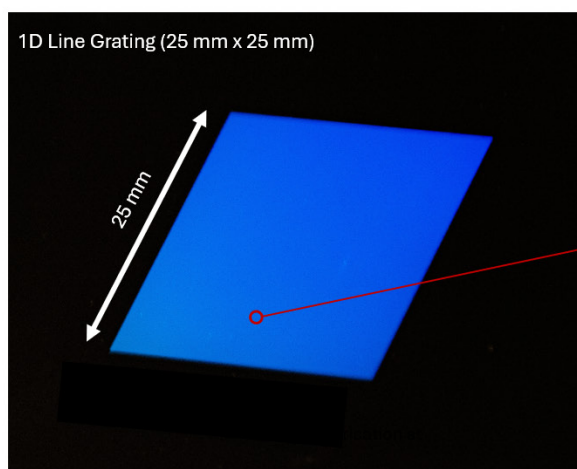
SEMICONDUCTOR METROLOGY WITH NANOMETRE PRECISION POWERED BY HIGH- PERFORMANCE COMPUTING

ORGANISATIONS

TeraNova is a Dutch SME developing metrology and non-destructive inspection systems for functional nanostructures. Its instruments support quality control in photonics and electronics manufacturing. **81Watts**, an Estonian DeepTech SME specialising in HPC, AI and mathematical modelling, is the Technology Expert, developing computational workflows and integrating it with EuroHPC resources.

THE CHALLENGE

Manufacturers of large-area wafers for photonics, metasurfaces and augmented reality must verify nanostructures to within a few nanometres and recover detailed geometry quickly. Each optical measurement requires repeated simulations across large parameter spaces. Conventional workstations lack the speed, convergence and throughput required for scalable, production-grade inspection, constraining industrial deployment now.



Technology used: HPC, AI
Industry Sector: Manufacturing

THE SOLUTION

TeraNova and 81Watts combined optical measurements with physics-based simulations, automated fitting and machine-learning-assisted initialisation. The Deucalion EuroHPC supercomputer ran data preparation, synthetic-data augmentation, model training, inference and parallel fitting, using about 6,400 GPU-hours and 10,000 kCore-hours. HPC enabled larger parameter searches, improved convergence and cut processing time by around 40% versus a standard desktop PC.

THE IMPACT

The experiment strengthens TeraNova's commercial position by adding proven HPC-enabled capabilities to its LabScatter and AutoScatter metrology systems. Processing approximately 40% faster than on a retail PC makes the workflow better suited to production environments, where inspection speed, repeatability and scalability influence adoption. By parallelising computationally intensive simulations and fitting, HPC removes a key bottleneck and supports higher-throughput, nanometre-precision quality control. Manufacturers can shorten inspection cycles, identify process deviations earlier and obtain richer information on nanostructure geometry without destructive testing. This supports customer acquisition and revenue growth in photonics, augmented reality, metasurfaces and advanced optical manufacturing. The project also expands 81Watts' expertise in HPC-enabled metrology, creating opportunities to apply similar methods in other industrial quality-assurance markets.

BENEFITS

- Cut computation time by around 40% compared with a standard PC.
- Used 6,400 GPU-hours and 10,000 kCore-hours on Deucalion.
- Improved fitting convergence by exploring larger parameter spaces.
- Scaled LabScatter and AutoScatter for higher-throughput quality control.
- Opened new opportunities in photonics, AR and advanced optical manufacturing.



Funded by
the European Union



EuroHPC
Joint Undertaking