NIL TECHNOLOGY

# PRESS RELEASE

# Record-setting performance of transmit metalenses

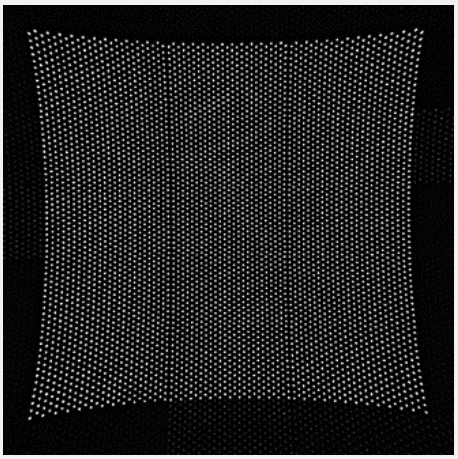
**Copenhagen, Denmark, October 05, 2023** – NIL Technology (NILT), a leader in advanced optical solutions, is announcing a portfolio of metalens-based transmit-optics with record-setting performance. The portfolio includes two-in-one dot projectors, diffusers, polarization-sensitive optics, and application-specific solutions. All the transmit optics announced consist of a single nano-structured surface and work with non-collimated light sources.

Applications that benefit from this innovation include automotive driver monitoring systems, short-distance Lidar, 3D sensing (iTOF and dTOF), biometrics, face recognition, and autonomous vehicle safety and navigation.

The metalens-based dot-projectors consist of a single surface that collimates the light and projects the dot patterns. Delivering the functionality with a single surface enables compact dot-projector modules. The dot-projectors have more than 70% efficiency and less than 10% dot-uniformity-error. The metalens-based diffusers offer a wide field of illumination while delivering high efficiency and pronounced batwings at higher illumination angles. The diffusers are notable in the absence of a 0th-order transmission peak.

The polarization-sensitive optics enable applications to leverage the emerging VCSELs with polarization control. Furthermore, the meta optics platform can be customized for application-specific illumination profiles.

NIL TECHNOLOGY



*The image shows the projected dot pattern from a single meta-surface that collimates the light and projects the dot patterns. The field of illumination is 70°x70° with 3x5 tiling.*

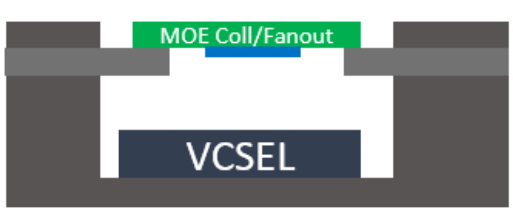



*Illustration of a schematic module geometry that shows the simplicity of using a single optical surface to produce the dot pattern.*

"*NILT's has consistently reported the highest transmission efficiencies for metalenses. Our sophisticated design tools and vertically-integrated manufacturing means our customers get the highest performance in the "as-build" parts*," said Dr. Ulrich Quaade – Head of Optics at NIL Technology.

NILT's transmit-optics metalenses are customizable, and parameters such as the field of illumination, batwing heights, the dot spacing, and tiling in the dot pattern can be designed specifically to customers' requirements.

## Metalenses offer a host of advantages over conventional refractive lenses

Metalenses, the revolutionary flat lens technology, offers significant advantages over conventional refractive lenses. In narrowband applications, such as VCSEL-illuminated applications, one metalens can replace 6 to 8 refractive surfaces, leading to ultra-compact modules that are also simpler to assemble. Metalenses can deliver multiple functionalities from a single meta-surface, such as collimation and dot generation, leading to simpler modules and higher assembly yield. In near-infrared, the metalenses are constructed using silicon-on-glass, which delivers thermal stability 100 times better than plastic lenses.

Metalens technology brings the precision and process control of lithographic techniques to optics, delivering superior tolerance control resulting in minimal part-to-part variation in mass production.

NIL TECHNOLOGY

## Vertical integration delivers higher performance and faster time to market

NILT's vertical integration delivers fast turnaround times for prototypes, customized solutions to meet customers' exact needs, and mass production capacity.

Our solutions are powered by our in-house proprietary design algorithms, unique mastering capabilities, and wafer-level replication processes. The vertical integration enables rapid prototyping, which helps our customers quickly find the technology-product fit while eliminating the need to work with the CMOS fab processing eco-system. NILT can deliver prototype parts in 8 weeks and rapidly iterate with our customers to meet the exacting demands of any application. We deliver the prototype parts from our facilities in Europe and our mass-production parts from our factory in Malaysia.

Vertical integration also means our designs are inherently designed for mass production, considering the mastering and nano-replication processes. Our electron beam lithography mastering and in-house wafer-based processing deliver consistent "as-built" part performance, leading to higher application-level performance.

*"NILT is your one-stop-shop for all your meta optics needs. Our versatile metalens technology can be customized to the application's specific needs. We control everything in-house, from design to product shipment, and can deliver products to our customers' specifications quickly. Additionally, NILT's fabrication services can take your design, prototype it, and mass produce It.*" says Theodor Nielsen, CEO, and founder of NILT.

For inquiries, please contact:
**Brian Orr, VP Sales** or **Dr. Ulrich Quaade, Head of Optics** at **contact@nilt.com**

**About NILT**
NIL Technology ApS (NILT), founded in 2006, is an optical solutions company designing, developing, and manufacturing optical elements and components using high-precision nanoscale features. The company is backed by several industry-independent investors: Jolt Capital, NGP Capital, Swisscanto, Vaekstfonden, and the European Innovation Council (EIC).

NILT creates competitive advantages with flat optics in optical applications for 3D sensing, consumer electronics, machine vision, autonomous vehicles, telecommunication, and AR/VR/MR displays. NILT is based in Denmark and has offices in Switzerland, Sweden, Malaysia, and the US. Visit us at www.nilt.com.