



NIL TECHNOLOGY

PRESS RELEASE

NILT demonstrates revolutionary and record setting metalens-systems at SPIE Photonics West 2024

Copenhagen, Denmark, January 29, 2024 – NIL Technology (NILT), a leader in advanced optical solutions, will be demonstrating five demo-systems at SPIE Photonics West's Trade show in Moscone Center. The demo systems are:

1. revolutionary, all metalens, ultra-compact camera optimized for eye-tracking
2. indirect time-of-flight (iTOF) system with a dual meta-surface Rx lens,
3. single-surface 2-in-1 dot-projector for driver-monitoring and depth-sensing
4. metalens operated in narrowband visible wavelength, and
5. optical waveguide for Augment Reality (AR) glasses.

"NILT's demo-systems showcase the use of metalens and nano-optics across diverse set of applications including AR|VR|MR eye-tracking, industrial depth sensing to automotive driver monitoring systems. It also illustrates NILT's vertically integrated model with tightly coupled capabilities in design, rapid prototyping, and nanoimprint-based mass-production to deliver metalenses for the mass markets" says Theodor Nielsen, Founder and CEO of NILT.



Ultra-Compact Eye-Tracking Camera: metaEye™ is a cutting-edge metalens camera featuring an innovative, patent-pending lens design exclusive to metalenses, achieving an ultra-compact size, superior performance, and exceptional environmental resilience. The camera module's dimensions are remarkably small at 1.64 mm in width and length, and 2.17 mm in height, including the flex PCB and sensor cover glass. It meets all eye-tracking system specifications including 90° field of view (FOV) and maintains high-quality Modulation Transfer Function (MTF) across the entire FOV when paired with an 850 nm LED. This new category of compact cameras finds versatile applications in areas like eye-tracking, smart locks, intelligent speakers, Simultaneous Localization and Mapping (SLAM), and pervasive sensing. Its uses also span across various sectors, including gaming, presence detection, and smart home devices.

Metalens-based Time of Flight System: NILT's innovative indirect time of flight (iTOF) system showcases depth mapping capabilities using a two-surface (2M) Rx metalens, effectively substituting three to four traditional refractive lenses. This iTOF metalens integrates several NILT patents-pending technologies designed to minimize stray light and multi-path interference, resulting in highly accurate depth maps. The system's versatility extends to applications such as room-scanning, spatial mapping, logistics support, and the operation of autonomous robots.

Single-surface metalens Dot-Projectors: Our demonstration systems highlight the remarkable capabilities of our record-breaking single-surface metalens dot-projectors, unveiled in October 2023. These innovative projectors consist of a single surface adept at collimating light and projecting precise dot patterns. The use of a single surface not only streamlines the module design but also facilitates the creation of exceptionally compact dot-projector modules. These projectors boast over 70% efficiency, less than 10% dot uniformity error, and high contrast ratios exceeding 40. We are showcasing three distinct configurations with fields of illumination (FOI) of 70° x 40°, 70° x 70°, and a record-setting 144° x 70°, all demonstrated live.



Visible Metaoptics: The use of metalens for visible wavelengths is garnering considerable attention across various applications. Our system exemplifies NILT's expertise in designing and producing metalens for visible wavelengths which use materials that are different from those used in near infra-red wavelengths. The showcased demonstration system features a metalens collimator effectively paired with a 520 nm laser source. NILT recognizes the immense potential in merging computational imaging with narrow-band visible sensing, as a way to extend the unique benefits of metalenses to the visible spectrum.

Augmented Reality Waveguides: This system showcases NILT's leadership in providing master with blazed, slanted, and binary grating – that are crucial for the AR/VR/MR sector. The demo-system features an exemplary waveguide module, combining NILT's 17 years of experience in mastering, with LightTrans' state-of-the-art optical design software and Morphotonics' mass-manufacturing expertise in wafer-level replication. It features a monochrome microLED projector from JBD Display seamlessly integrated with a waveguide composed of three 1D gratings (an in-coupler, pupil expander, and out-coupler). NILT excels in offering unparalleled design flexibility, allowing for a mix of all grating types with precise positioning and orientation. Many leading brand-name demonstrator products today are powered by NILT's innovative waveguide technology.

For inquiries, please contact Brian Orr, VP Sales, at contact@nilt.com

About NILT

NIL Technology (NILT) excels in creating optical solutions with advanced metalenses, offering custom lens and module design, rapid prototyping, and mass production. NILT's vertical integration ensures swift, collaborative processes for customers' specific needs. NILT also engages with our customers in a foundry model where we prototype and mass-produce the customer's metalens designs. Furthermore, NILT makes custom masters using electron beam lithography, with AR displays being a key focus area. NILT applications areas include 3D sensing, XR, autonomous vehicles and life sciences. With design teams in Europe and production in Malaysia, NILT combines global expertise with efficient manufacturing. Discover more at www.nilt.com.