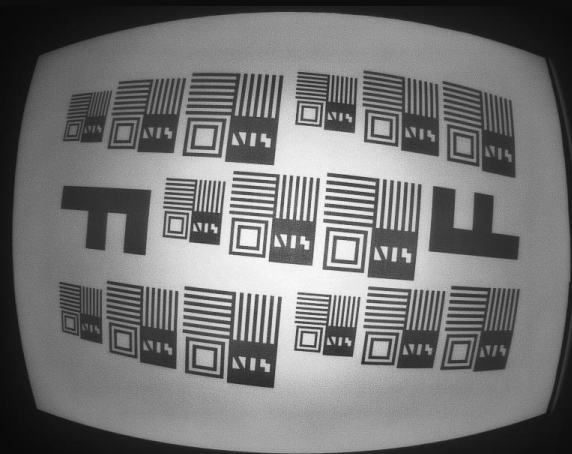


Flat NIR Metalens (1M) Specifications

Technical specifications to support press release dated 31 August 2021 from NIL Technology.



The press release can be found [here](#).

Read more about 1M, Meta Optical Elements at nilt.com/technology/metalenses/

NIL Technology (NILT) has built a complete NIR camera module, using a 940 nm near-infrared (NIR) wavelength imaging lens with a single metasurface and a NIR sensor.

The single metalens, which we introduce as 1M, [Meta Optical Element \(MOE\)](#), is groundbreaking in its form, performance, compactness, and efficiency. It validates the uniqueness of MOEs over traditional refractive lenses.

NILT 1M is defined using e-beam lithography and replicated by nanoimprint lithography. NILT's design rules are in place to ensure lenses can be mass-produced. The 1M lens is made in silicon on a glass substrate, making it strong and thermally stable. It is optimized for 940 nm, having a high relative illumination. This makes it an attractive

lens for TOF modules.

The 1M is designed for Chip on Board (COB) NIR sensors with low CRA. The single metalens is designed for high efficiency and low stray light.

NILT Meta Optical Elements are expected to be cost-competitive with refractive lenses in mass quantities. Engineering Samples are shipping now.

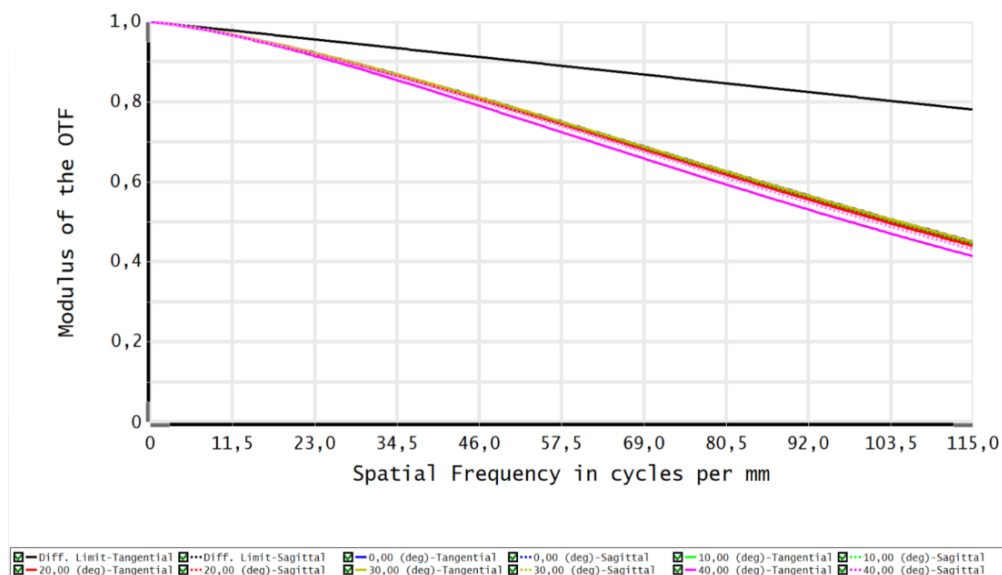
The following lens specifications are representative of our technology. Please contact NILT for custom requirements at contact@nilt.com

Specifications of the NILT defined 1M MOE demonstrator

Parameter	Specifications		
Wavelength	940 nm		
EFL	1.24 mm		
TTL	3.1		
FOV, diagonal	80°		
F/#	1.6		
CRA	<1.5°		
Distortion	23%		
Aperture Diameter	0.78 mm	Lens MTF	
Lens Diameter	∅ 2.50 mm	0.0 F (Ny/2: 114 cc/mm)	45%
BFL	1.213 mm	0.5 F (Ny/2: 114 cc/mm)	44%
		1.0F (Ny/2: 114 cc/mm)	42%

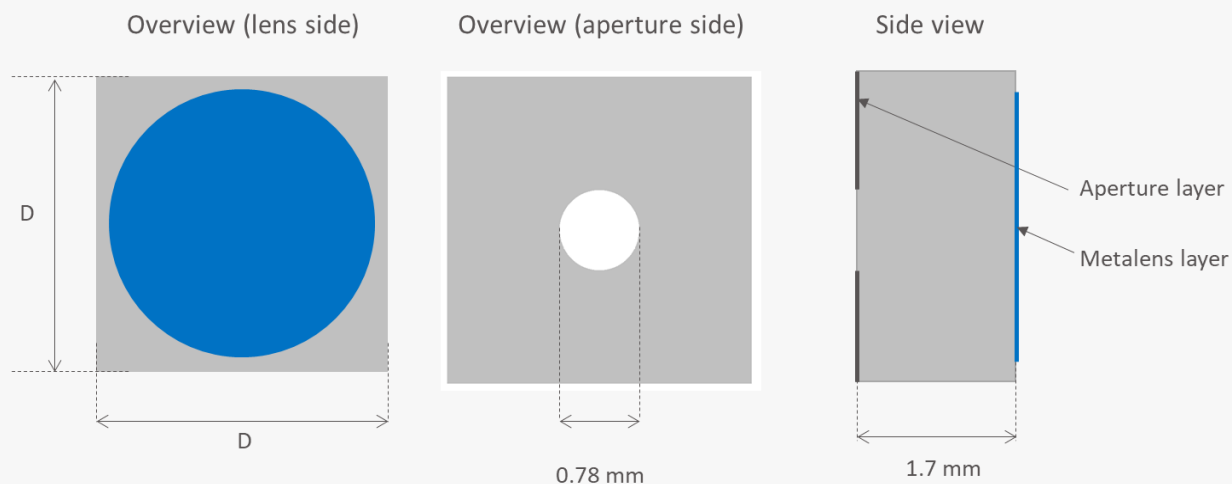
Lens design

The performance of the 1M shown below as Modulation Transfer Function [MTF]. The MTF shows good contrast for all field points (up to full field). The MTF as function of spatial frequency is plotted in the graph below.



Mechanical specifications

The figure below presents the 1M from top, bottom, and cross-sectional view.



- The distance D can be chosen freely, as long as it is larger than the clear aperture (2.7 mm).
- Lens material is silicon on glass with aperture layer in Cr.

Lens samples can be shipped in GelPak or using tape on frame.

Inquires

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

ABOUT NILT

NIL Technology (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, and VR/AR displays; all solutions made by diffractive optical elements (DOE) and metalenses/meta optical elements (MOE). NILT is based in Denmark and has offices in Switzerland, Sweden, and the US.

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