



The first fabless semiconductor optics company

Transforming optical sensing

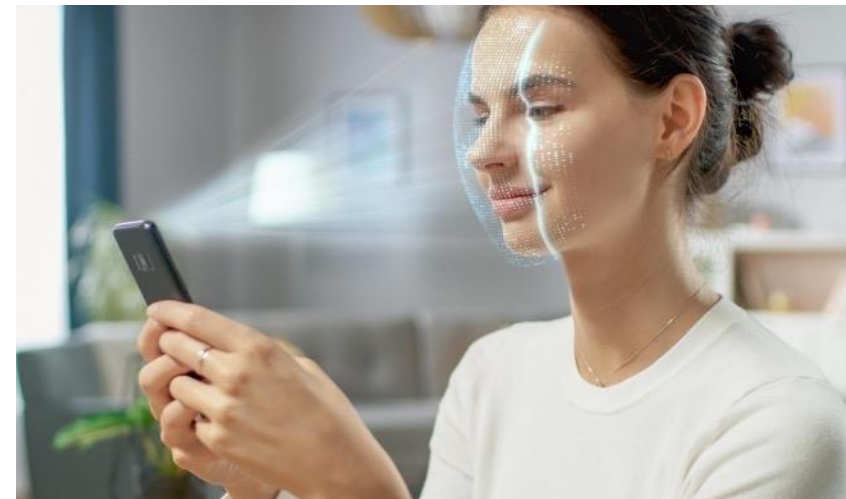
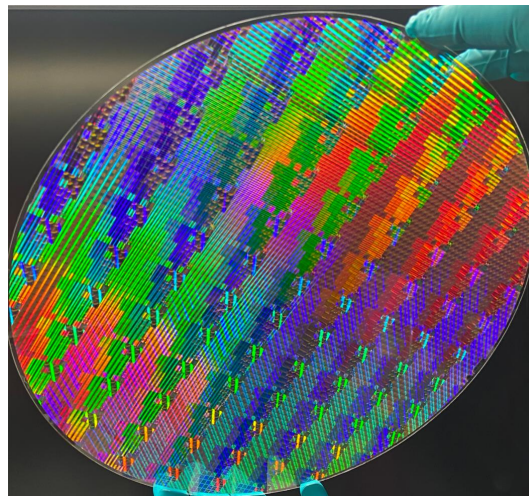
EPIC

Rob Devlin, Co-founder CEO

2023-01-09



Pioneer in Commercialization of Meta-optics



HARVARD
UNIVERSITY

Harvard University spin out,
commercializing foundational
metasurface IP



Fabless optical semiconductor company
with multiple foundry partners



Design and sell meta-optics
targeting 3D sensing in consumer
electronics & automotive markets



Based in Boston with 30+ employees
>40% of the team focused on design

 **NEOTRIBE**

3M

 **M.
VENTURES**

 **foothill
ventures**

 **TDK**
TDK VENTURES

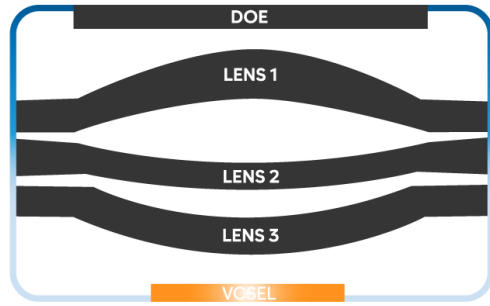
**intel
capital**

**global
brain**

 **BRAEMAR**
ENERGY VENTURES

 **SGINNOVATE**

Metasurface Optics



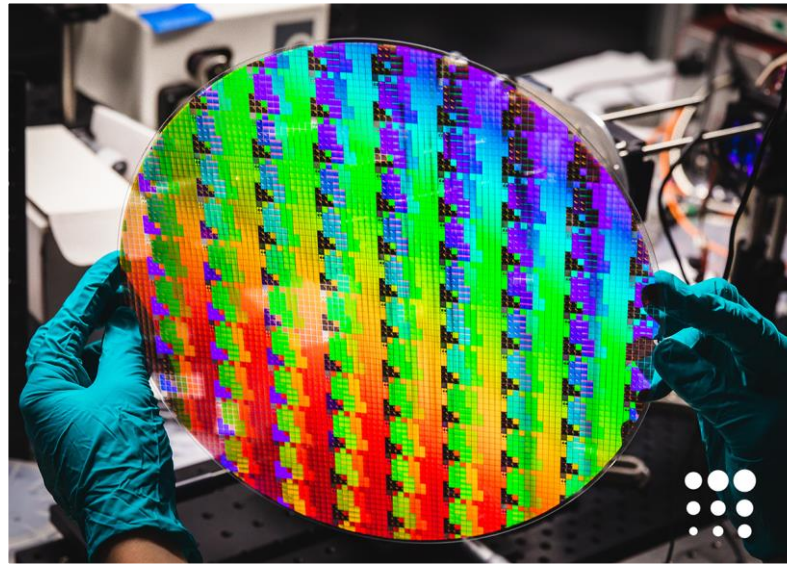
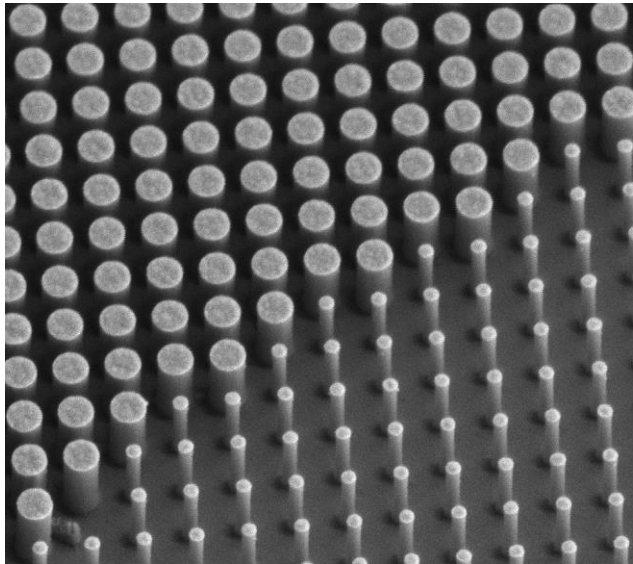
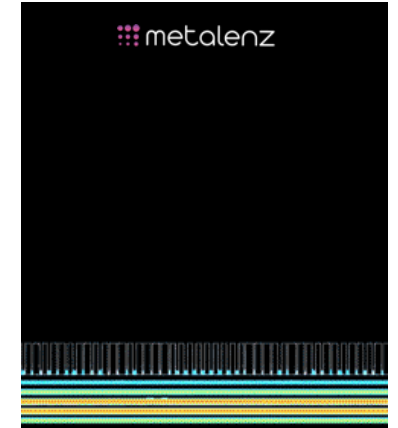
conventional

VS



metalenz

- Abrupt phase changes in x, y and z
- Multiple functions in one surface
- Fully customizable platform
- Simplest optical system
- Control over all information in light



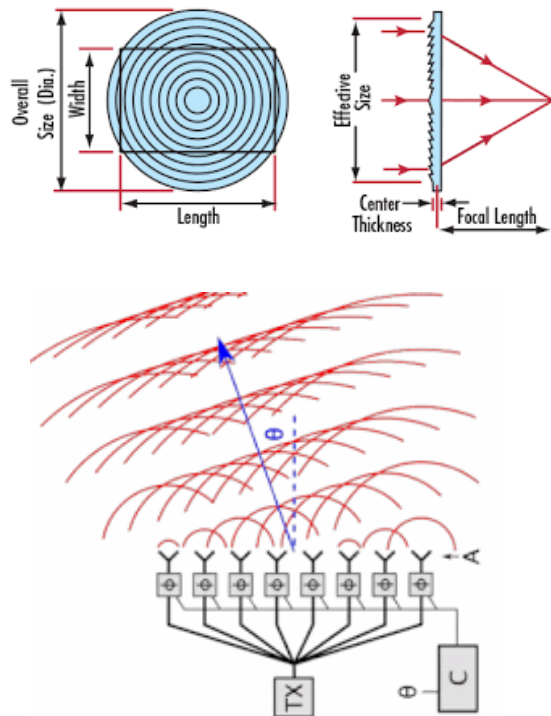
Mfg Process

- Enables optics manufacturing in semi foundries
- Single semiconductor layer
- All standard semiconductor materials

The metasurface concept

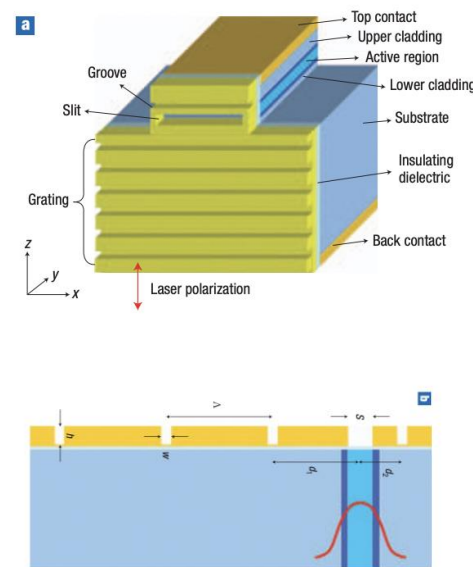
1822-2007

Fresnel lens, DOEs, phased arrays, high contrast gratings



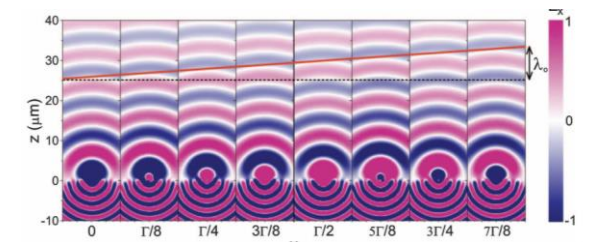
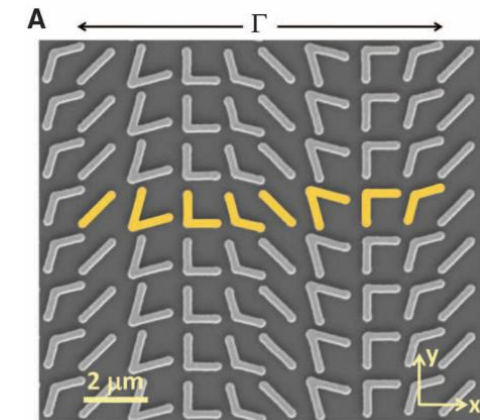
2007

Single layer collimating lens for QCL



2011

“Metasurface”



Sensing Disruptions

Enabling the proliferation of optical sensing

\$5B



1990s→2000s

\$30B

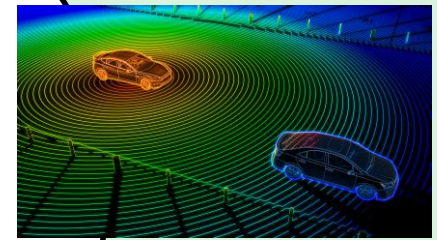


smaller, cheaper

2000s→2020

Many sensing applications only require a single wavelength but need to pack into a small size or have extra optical capability!

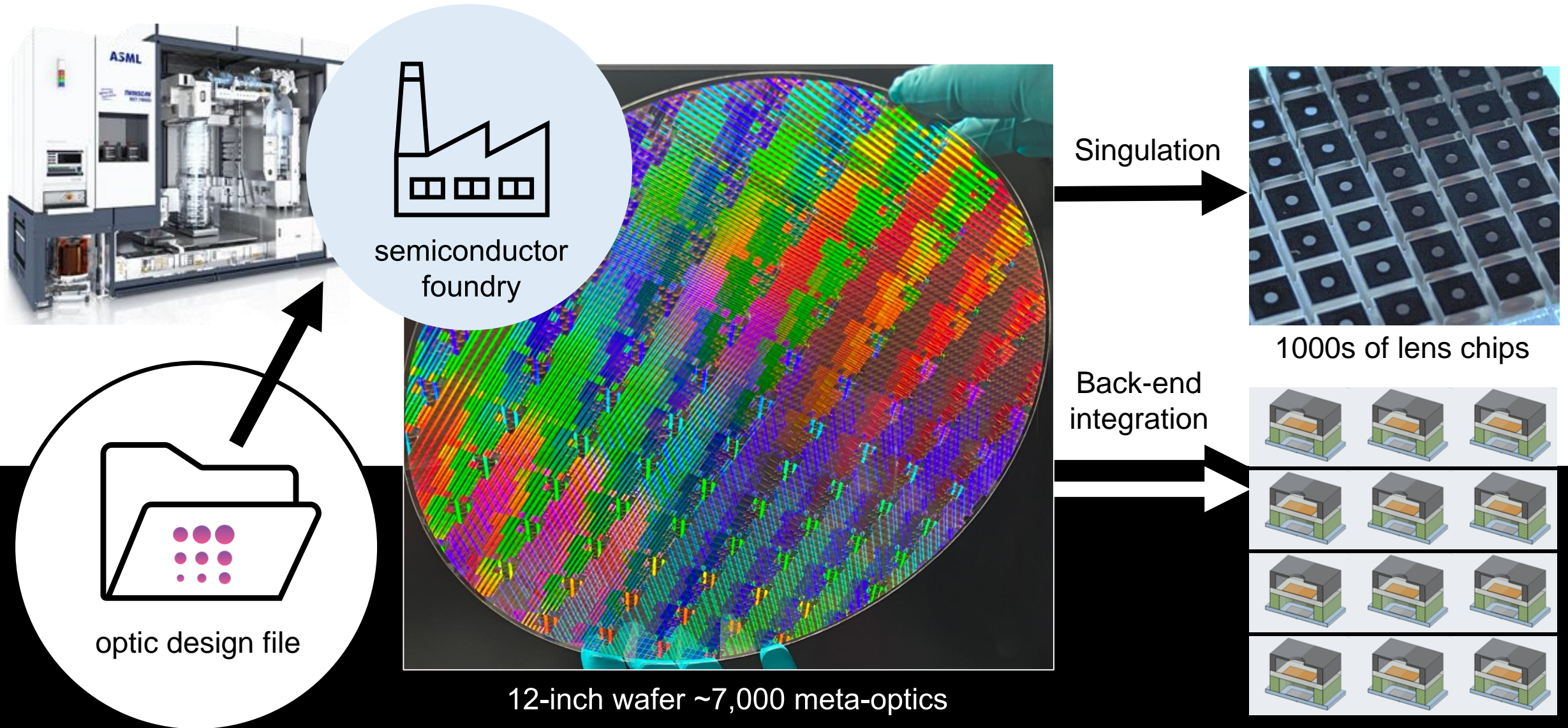
\$50B



2020s→2030s

Supply Chain Consolidation

Enabling the optical foundry



What can we do for optical systems?



Reduce complexity



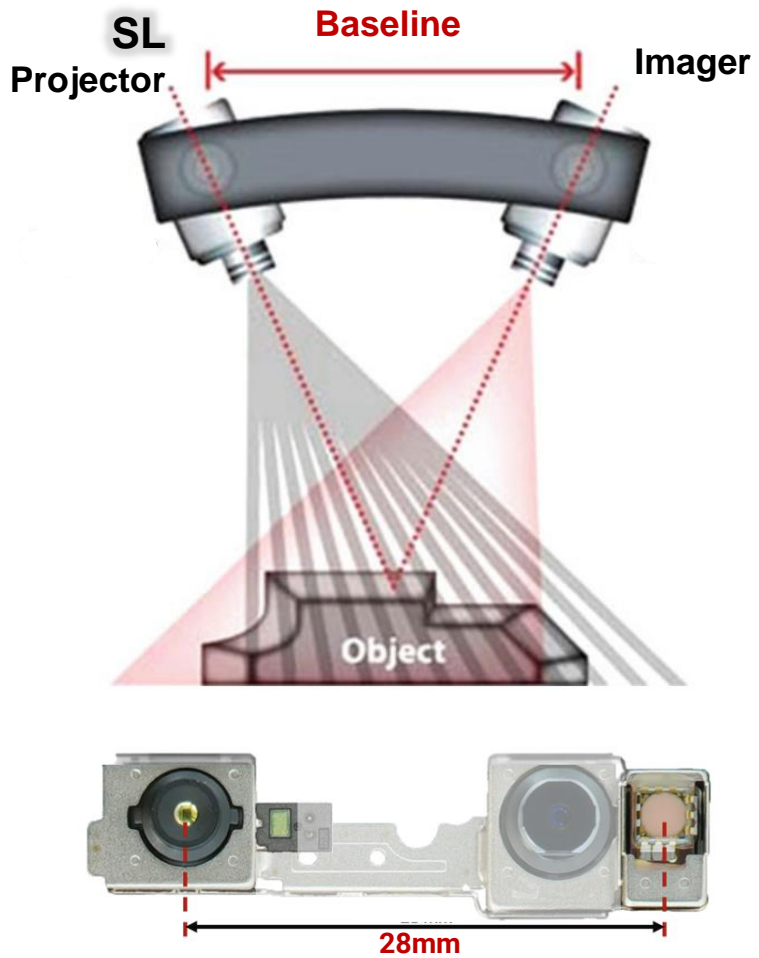
shrink form factor



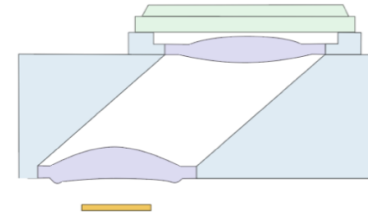
improve performance

Metalenz Dot Projectors

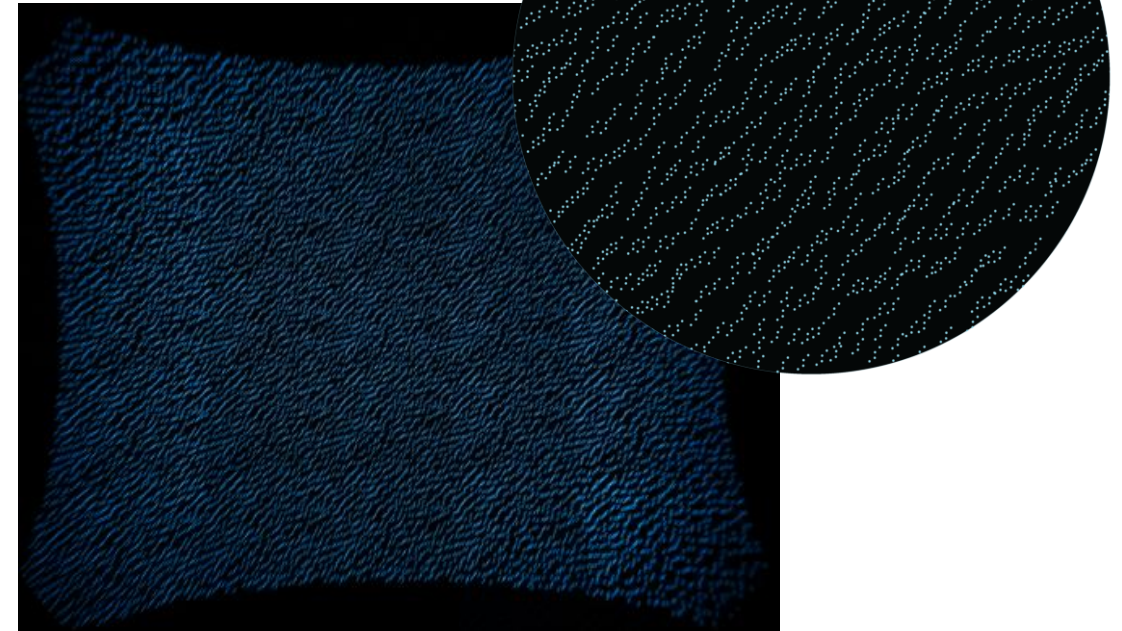
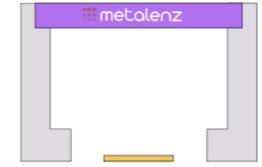
Structured Light



conventional

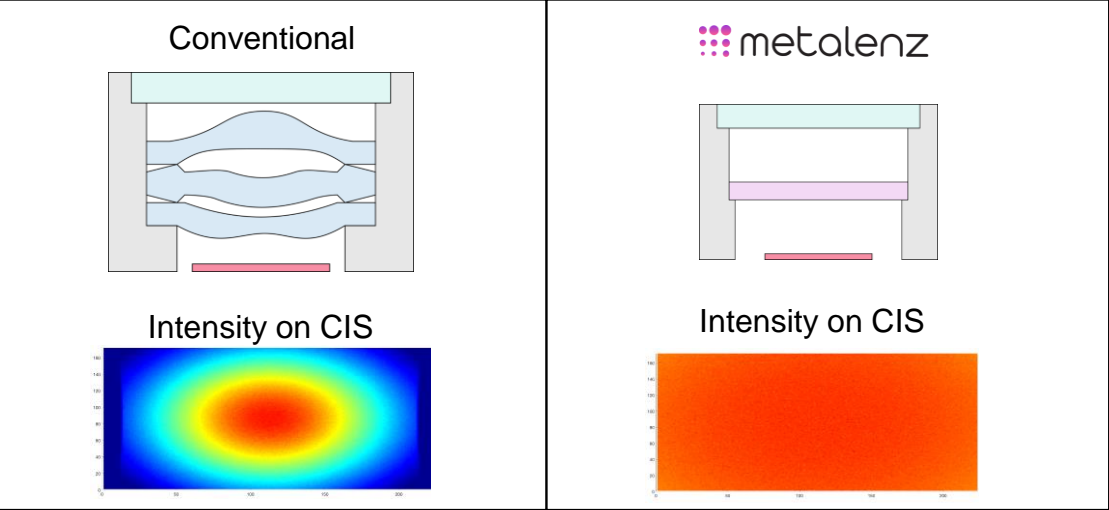


orion™



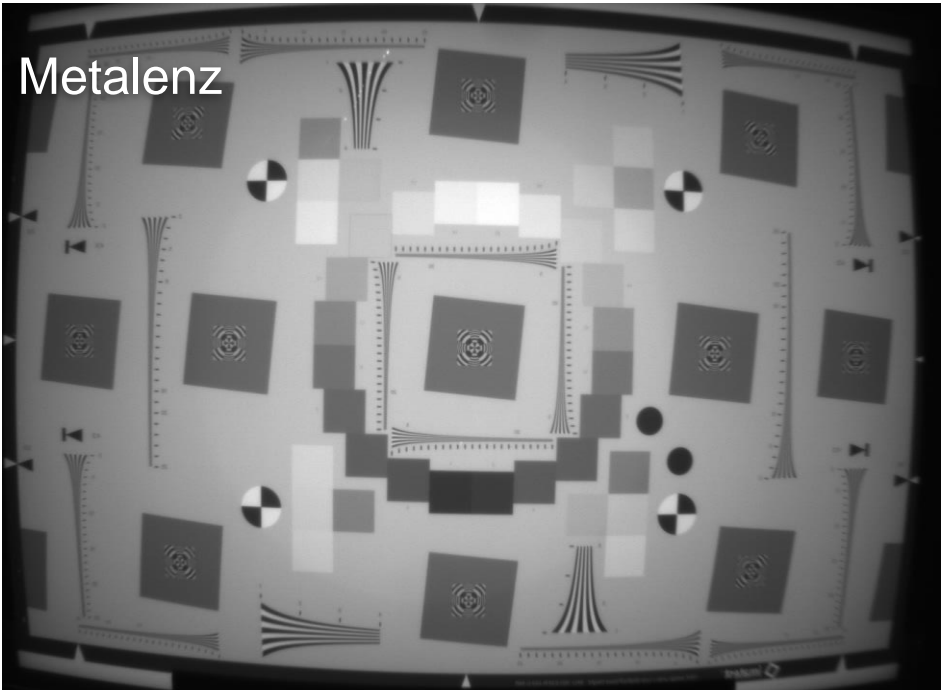
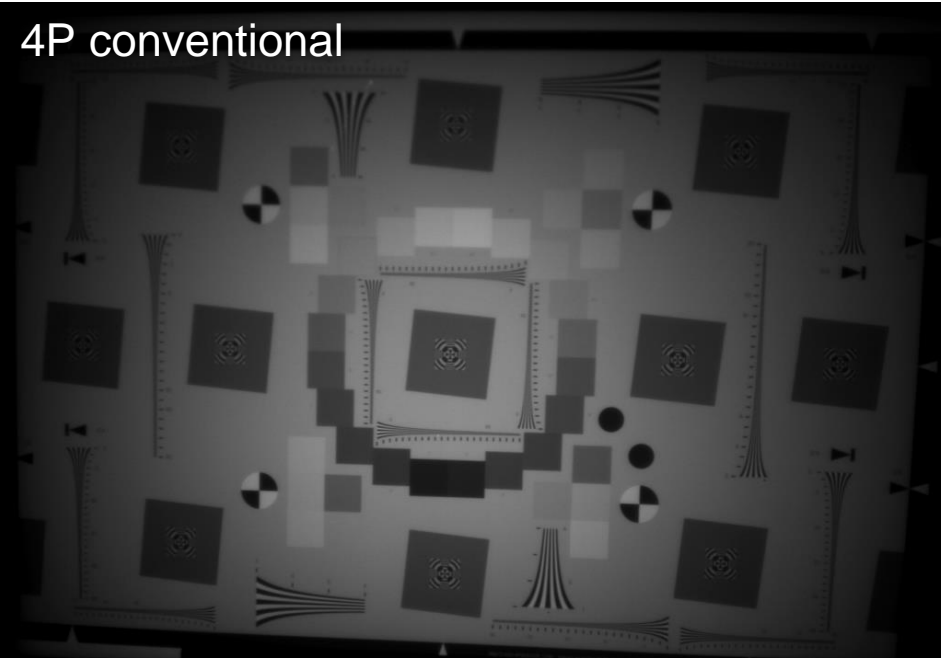
Metalenz NIR Imaging

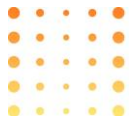
Time-of-Flight, Structured light, 2D Imaging



Metrics	4P	WLO	Metalenz
Design	4P	2P	1M
Track Length (mm)	3.5	3.1	2.7
Module MTF 0F/0.7F (%) @nyq/2	36/26	15/10	38/32
RI (%)	40	20	70
Total intensity (a.u.)	1	0.75	2
Distortion (%)	2	17	20
Chief ray angle (deg)	30	30	0

Metalenz provides telecentric camera at mobile form factor

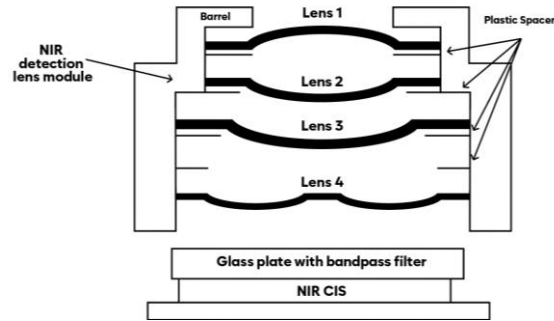




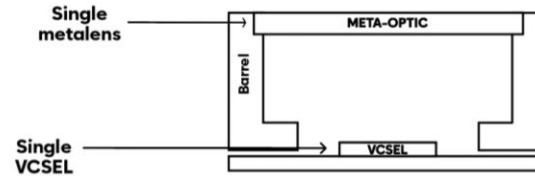
OrionTM

Metalenz Differentiation

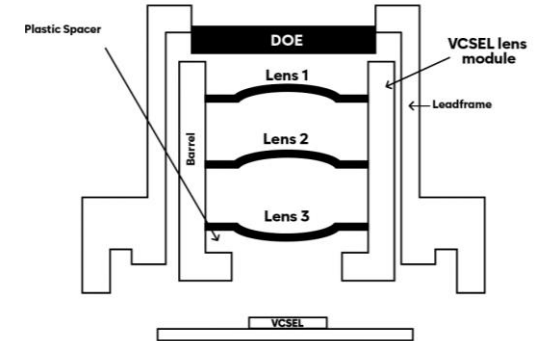
Conventional Imaging Optic



metalenz Metasurface Optic



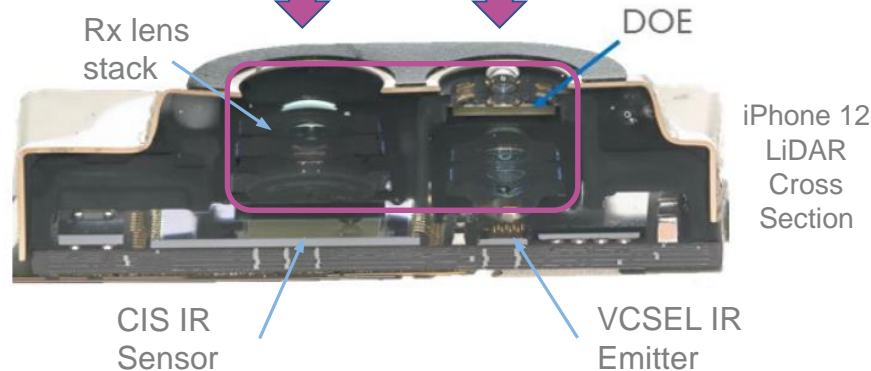
Conventional Illumination Optic



Metalenz Imaging Advantages

- Multifunction design
- 4 to 1 lens reduction
- 2x more light
- 40% noise reduction
- Extreme temp stability
- Reflow compatible

metalenz



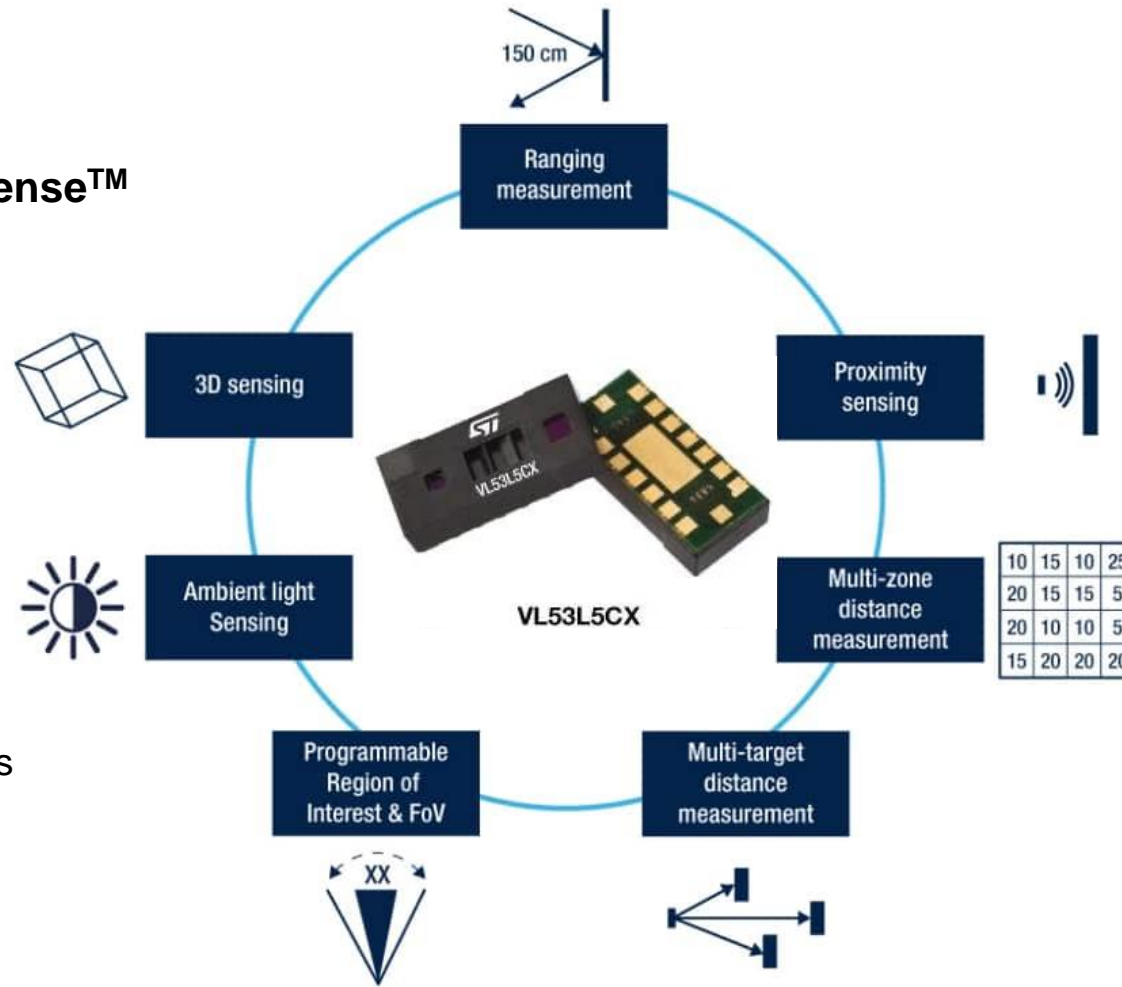
Metalenz Illumination Advantages

- Multifunction design
- Higher contrast ratio
- Wider field of illumination
- Part-to-part repeatability
- Extreme temp stability
- Reflow compatible

Meta-optics from Metalenz: smaller, simpler, better & brighter

First Metalenz Devices In Market Now

- On the market today
- Replaces existing optics in STMicroelectronics FlightSense™ ToF module



Use cases

Obstacle detection- robotics & drones
Gesture control
User presence detection
Liquid level measurement
Inventory management
Camera autofocus assist

Forbes



[World's First Printable Optical Metasurface For Vision, 3D Sensing, LIDAR Now Shipping In Consumer Products](#)



Gemini™

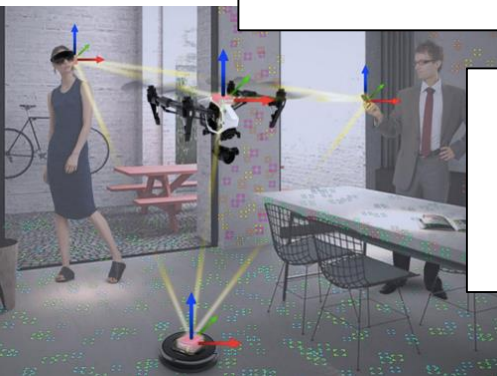
The World's First Dual Pattern 3D Projector

dynamic illumination supports multiple applications from one 3D Sensor (near/far)



AR

Far field for 3D mapping
Near field for gestures

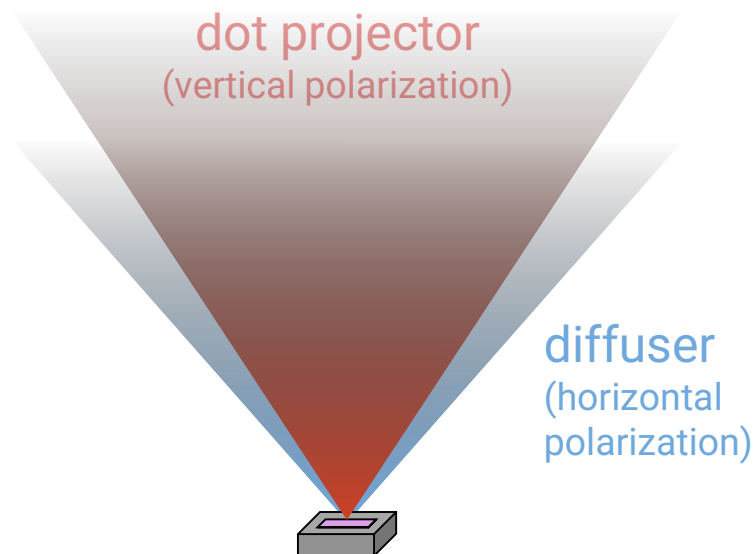


3D SLAM

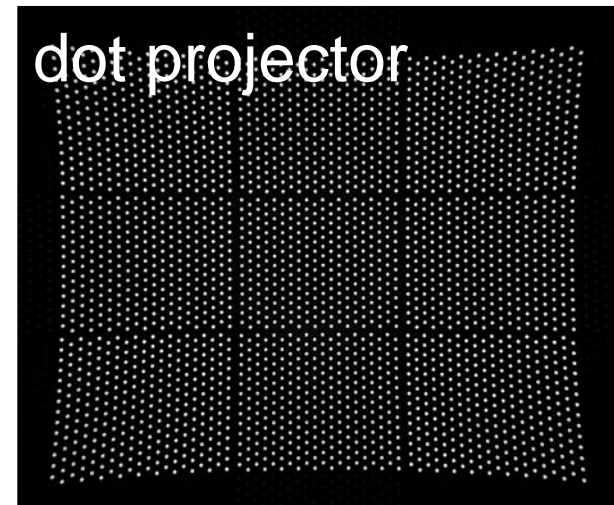
Far field for navigation
Near field for approaching

Photography Assist

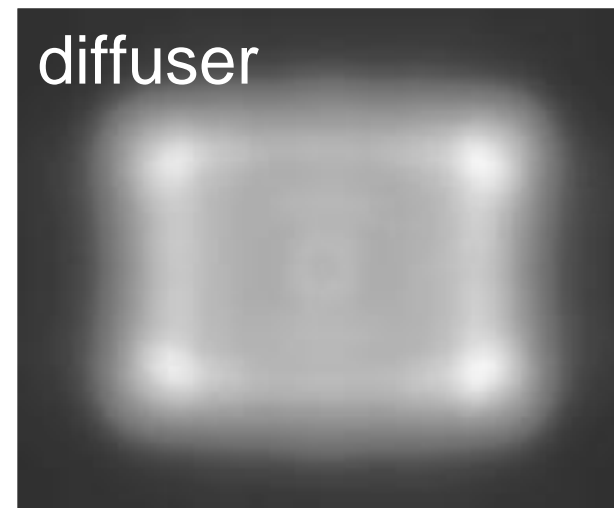
Far field for focus, night scene
Near field for bokeh



dot projector



diffuser





PolarEyes™

Fit for any form factor

Impact

Meta-optics enable complete control of polarized light.
Current optics cannot capture this information.
This enables better information to enter machine vision systems.

5000x smaller
from laboratories to pockets



conventional polarization camera

100x80x80
(mm)



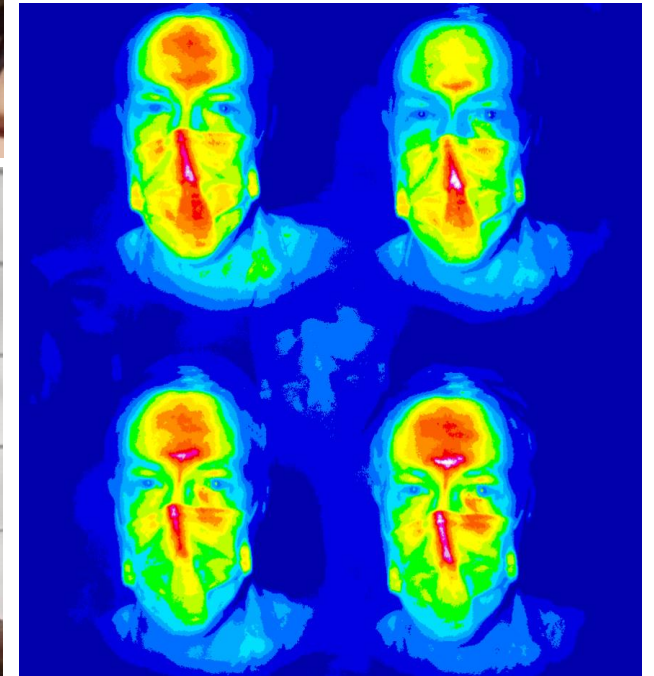
end product

10x6x2
(mm)



Applications

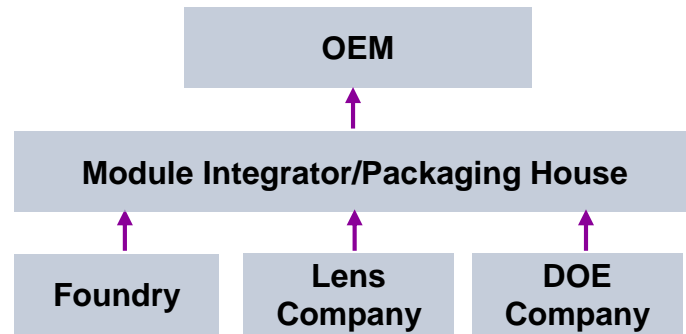
- Biometric Authentication
- Medical imaging
- Edge detection
- High resolution 3D shape reconstruction



Metalenz – The First Fabless Semiconductor Optics Company

Enabling supply chain consolidation and proliferation of advanced sensing

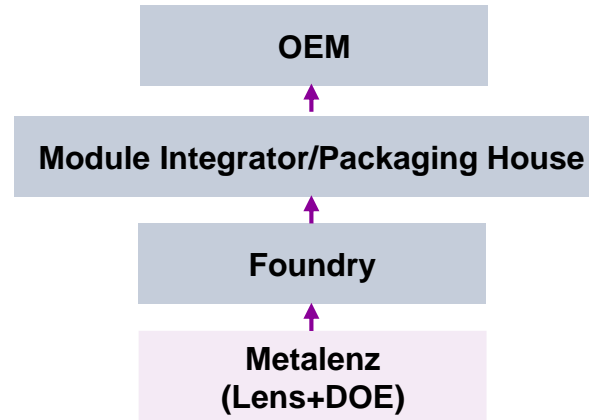
Past



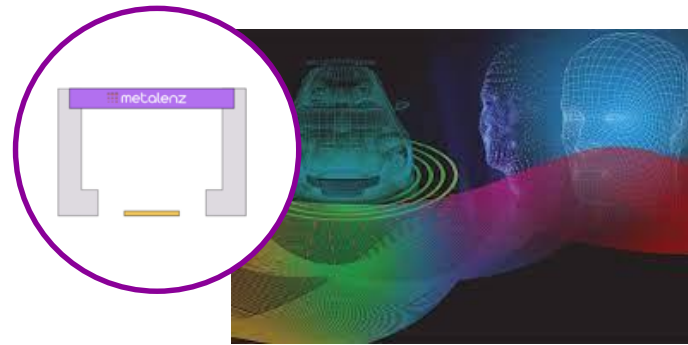
Traditional optics



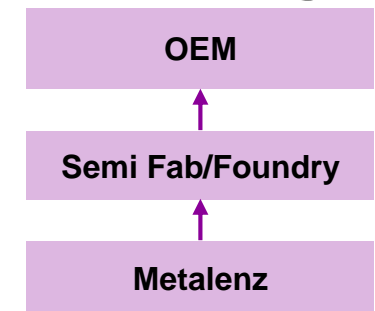
Present



Machine vision



Building



Smart sensing



Thank you

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We're hiring

<https://www.metalenz.com/about-us/careers/>

