



MORPHOTONICS

Multi-Wafer Nanoimprint Lithography: A Panel-Based Approach to Scalable AR Waveguide Manufacturing

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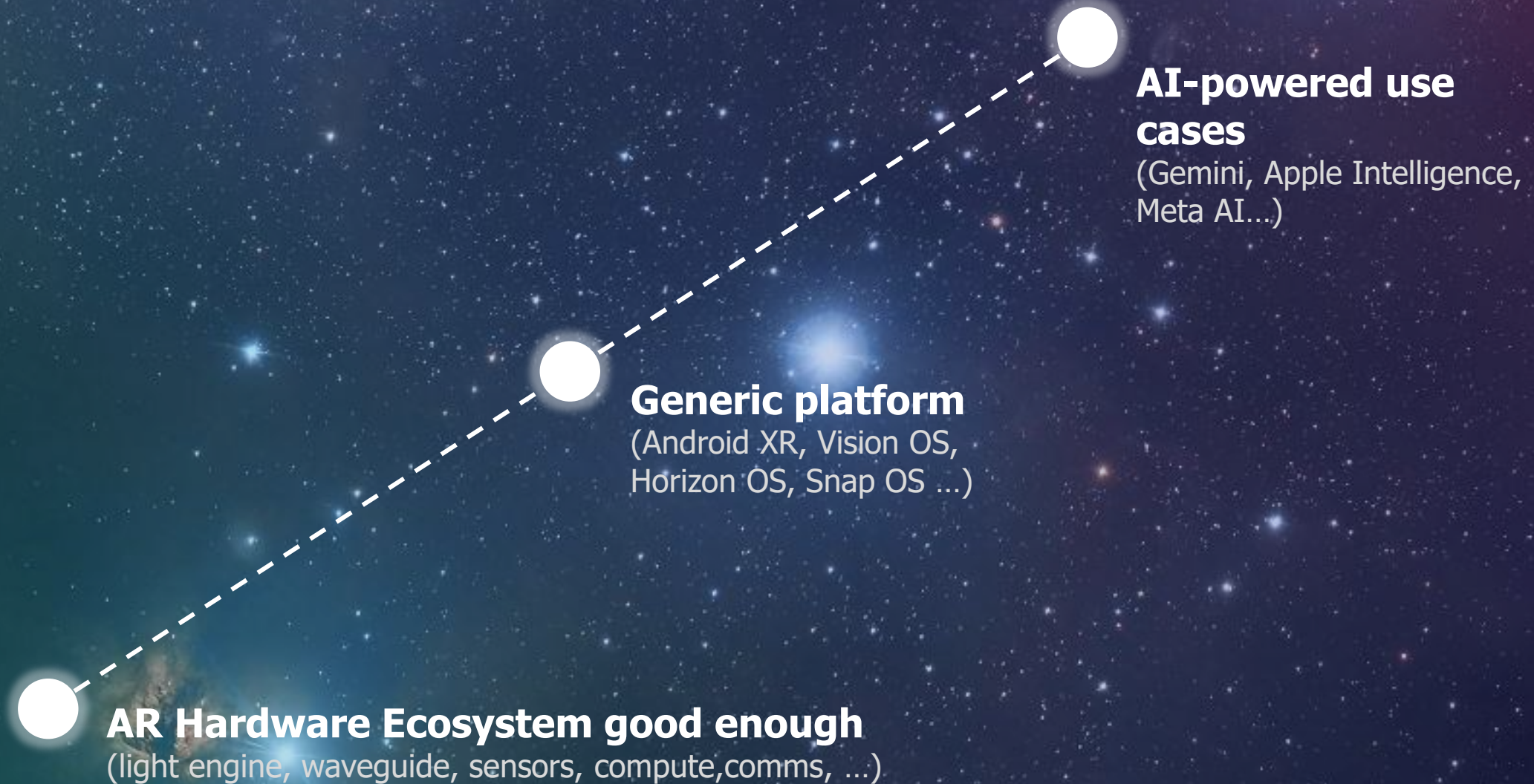
2016

When will AR glasses become mainstream?

2026



Time is now!



Why Glasses are the Natural Home for AI?



First-Person Context

AI sees what you see, hears what you hear
Grounded in the real world, not a screen

Ambient & Always On

No prompts, no friction
AI that works in the background

Eyes-Forward, Hands-Free

Built for living, not tapping
Audio without earbuds, no looking down

Mass Adoption, Zero Habit Change

4B people already wear glasses
Socially accepted, worn all day



Glasses are the only form factor that scales AI from an app to a companion



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Presentation Jason Hartlove (VP Meta) – SPIE AR|VR|MR 2026

- 'Cost is key'
- \$10B+ market possible if AR glasses cost below \$100



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Scaling Optical Combiners

Production & Yield

- ~24 Waveguides per 300mm wafer, yielding ~22
- 90% Through Process Yield
- 100M x 2 @ 90% Yield
Need 220M waveguides

Capacity Constraint

- At 22 WG/wafer
Need 10M 300mm wafers
- TSMC estimated installed capacity – 17M wafers/year

At 1B/year - need 6 TSMCs!

tsmc

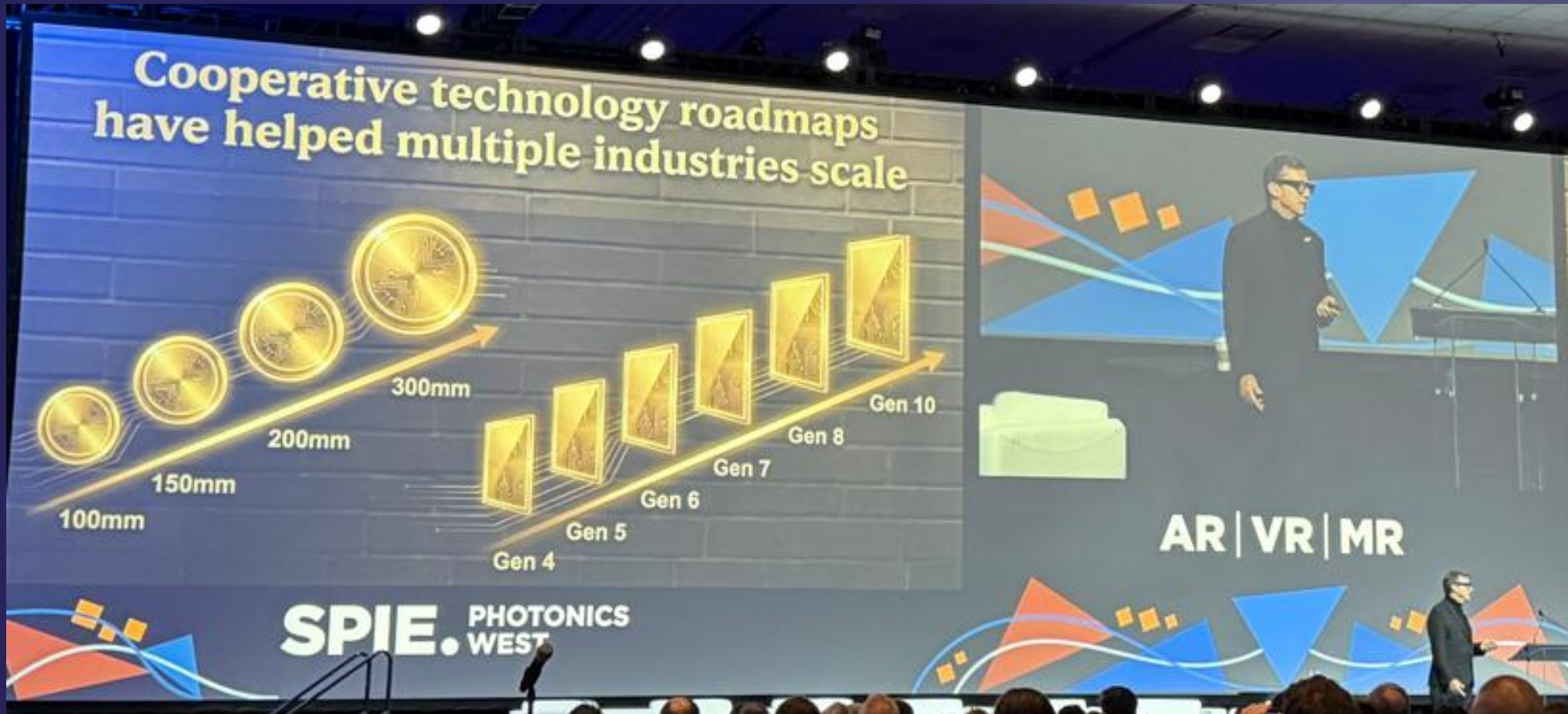
AR | VR | MR

SPIE. PHOTONICS WEST

Supplying the high volumes will be very challenging
Requiring high yield & many 300mm production lines.



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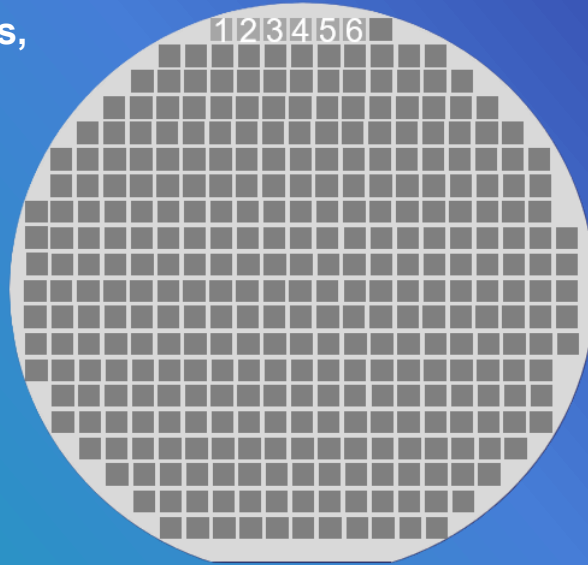


Meta proposed solution: 'follow the display-scaling route'



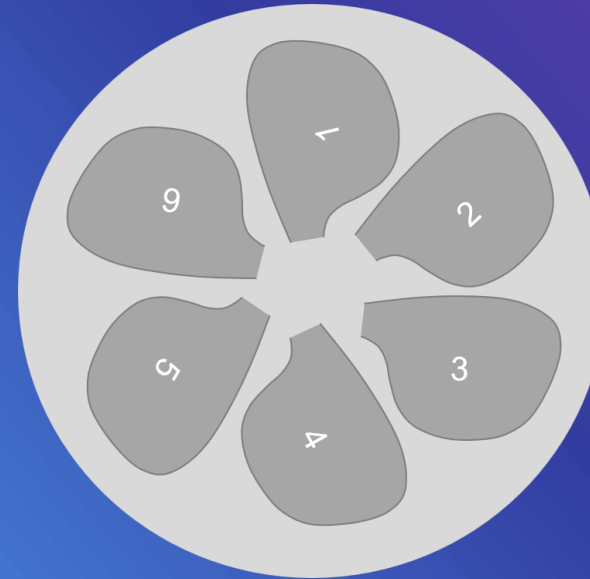
Manufacturing Mismatch Problem

- Small dies (CGHs, DOEs, MOEs...)
- 100s–1000s dies/wafer
- Standard SiO₂ wafer
- Standard wafer dicing
- \$/die



CHIPS

100s–1000s dies per wafer



AR WAVEGUIDES

a handful of dies per wafer

- Large dies for AR waveguides
- A handful of dies/wafer
- Custom high-index wafer
- Custom laser cutting
- \$\$\$/die

Waveguide ≠ Chip. The format gap is fundamental.

AI Glasses Market Opportunity



MARKET

\$60B+

Projected global
AI glasses
market by 2030*

DEMAND

200M+

Annual waveguides
needed
for 100M AI glasses

BARRIER

×5-10

Cost reduction needed
vs. today's waveguide
production methods

Demand is there — manufacturing cost is the barrier.



How Morphotronics is enabling mass manufacturing in AR

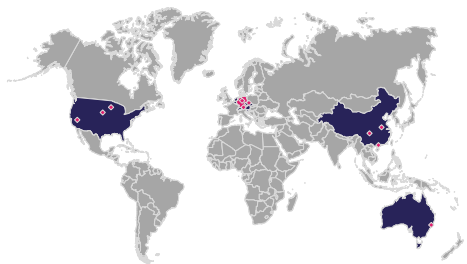
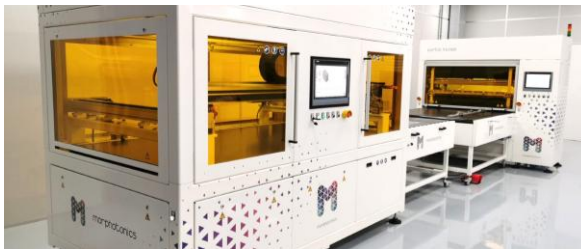


Company | Morphotonics



Solution

Nanoimprint Lithography (NIL) based on proprietary Roll-to-Plate (R2P) technology, started in 2014 building on >10 years of research



Team

Diverse team of 50 employees with various backgrounds, steered by experienced MT and backed by Top-Tier Deep Tech investors



Ecosystem

World-class ecosystem of local and global partners in place to deliver growth plans



INVESTNL



3M

European
Innovation
Council



€40M Series B | In the news



TECHCRUNCH · 22 SEPTEMBER 2026

“Morphotonics raises €40M to expand its display tech into data centers”

Backed by investors including **3M Ventures**, **European Investment Bank (EIB)**, and **Invest-NL**

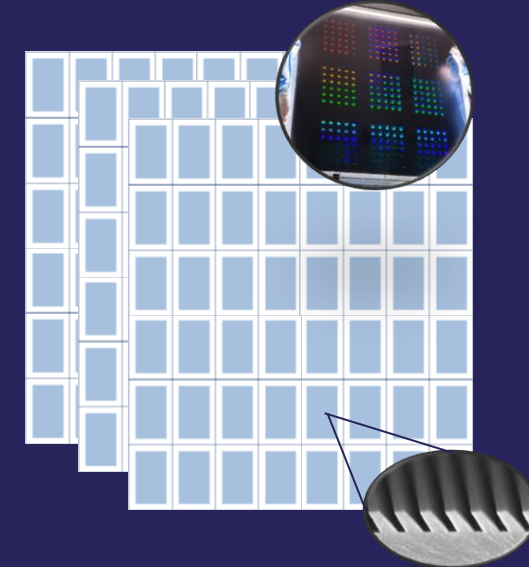
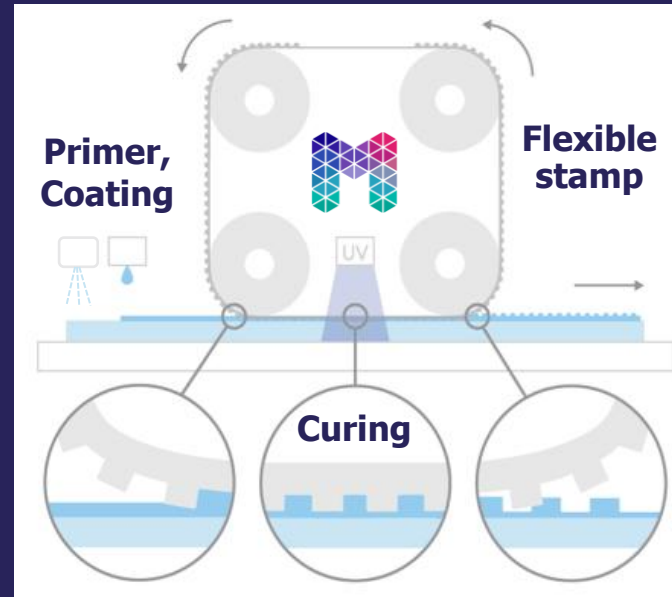
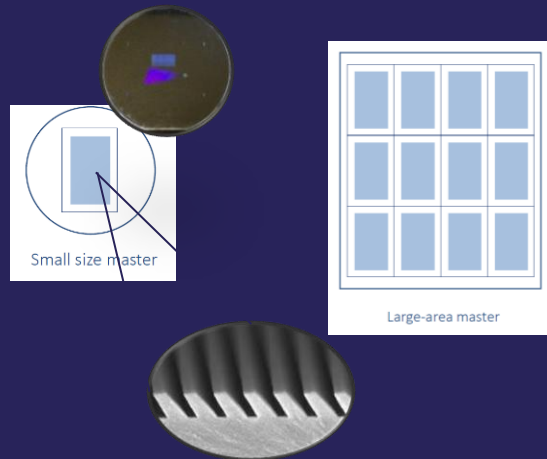
Picked up by **>20 Tier-1 outlets** across tech, deep-tech and investor media





Designed for mass manufacturing

Scaling to large-area as path to mass production



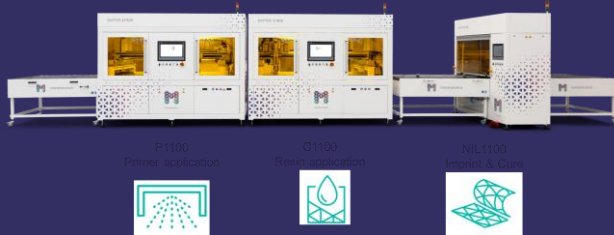
- Scaled imprint area from 700 x 700 mm² up to 1.1 x 1.3 m²
- From single small or larger master to volume production using stamp upscaling
- Over 1000x re-use of flex stamps, using proprietary materials
- Reproducible technology with products being manufactured & delivered to customers

Our portfolio: Addressing customer needs



Portis platform

Semi automated: manually operated systems for R&D & low-volume production



Aurora platform

Fully automated system for high-volume production large substrates

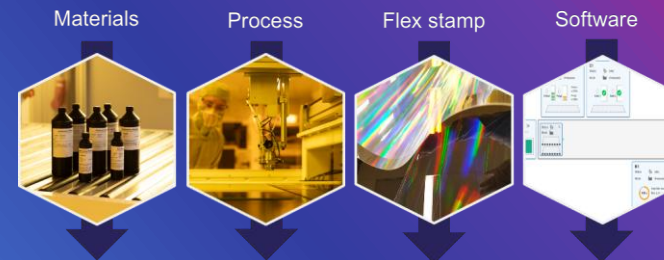


Cypris platform

Fully automated system for high-volume production small and medium substrates



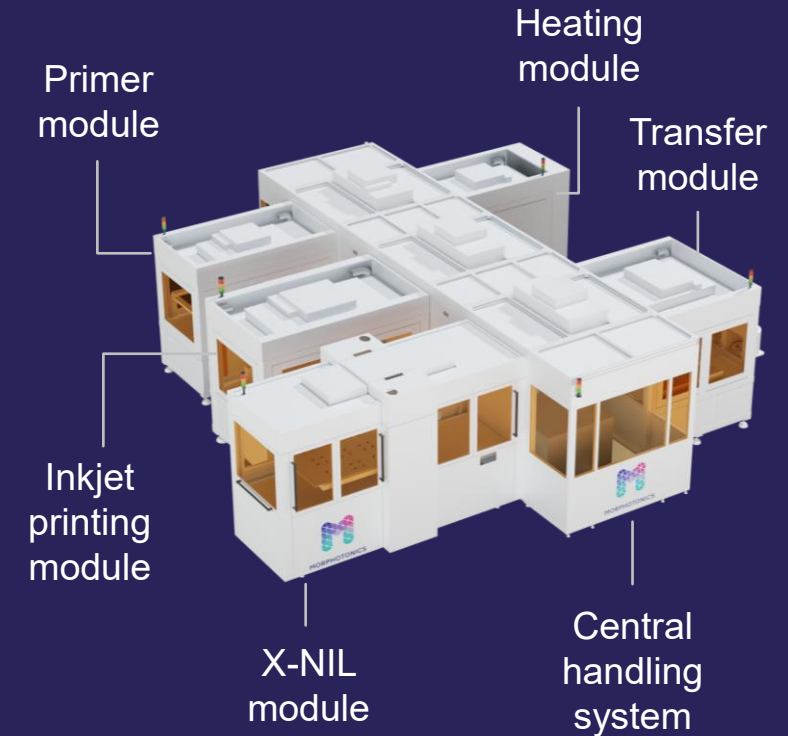
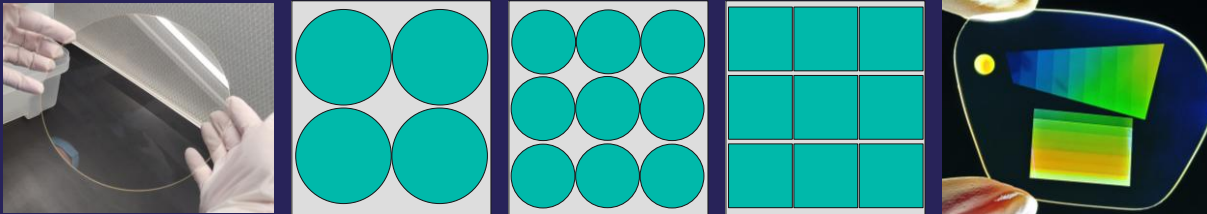
Providing a Complete Mass Production Solution, across all platforms



Cypris X700 Platform



- ❑ Multiple-wafer handling with carrier:
 - Round wafer - 4 x 300/310 mm or 9 x 200 mm
 - Squared glass capable (+ 25-50% area advantage)
- ❑ Handling sizes up to 700 x 700 mm
- ❑ Modular equipment design:
 - Primer, Inkjet Printer, Imprinter, Baking & Robot handling
- ❑ X-NIL imprint module with single-digit micron alignment
- ❑ Target annual capacity of up to 6M eyepieces
 - 15 carriers/hr = 60 WPH-300 mm & 135 WPH-200 mm
- ❑ Available late 2026



Flexibility | Design freedom for AI Glasses



Examples of design freedom

Substrate material

HRI glass, polymer, SiC

Substrate shape

Round, rectangular, panel

Resin

HRI, etch resist

Residual Layer Thickness

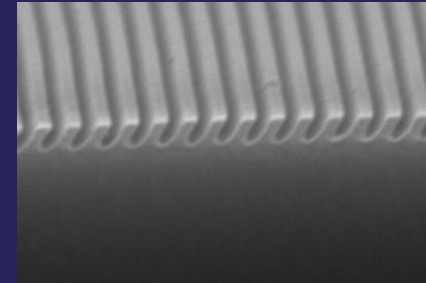
Thin layers by Inkjet Printing

Grating Types

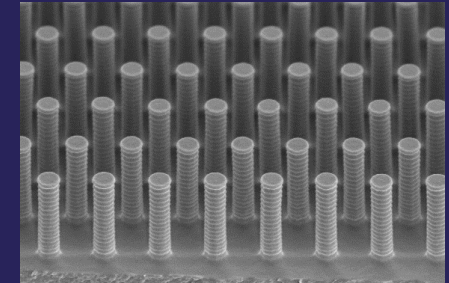
Binary, Staircase, Blazed, Slanted



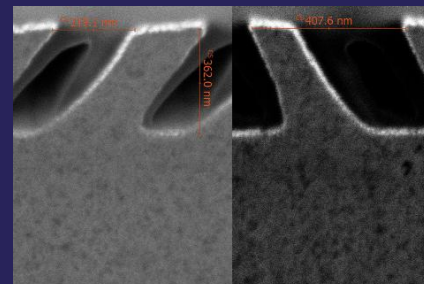
Low and consistent
RLT



Undercut & slanted



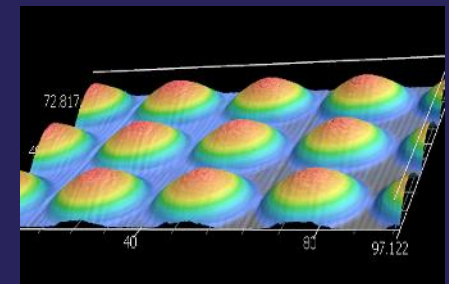
High aspect ratios



Opposing grating
orientations



Nano & micro textures



Micro lenses





Thank you
for your attention!

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