

Designing for AR – Optical Challenges and Solutions

Waveguides and LBS for
Miniaturization and Performance

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dispelix

AR Market – the Need for Miniaturization

*The development of a compact form factor has been the biggest challenge for XR device companies. Hence, **miniaturization will continue to be a priority for product developers, which will accelerate the rate of adoption.***

[Frost & Sullivan, Dec 2021]



Market Wants:

- Higher resolution
- Lower power consumption
- Superior contrast
- Greater transparency
- Smaller form factor
- Lighter weight

Miniaturization Challenges

Impact on Reflective Panel Displays:

- Resolution vs. size
- Power consumption
- Brightness/volume
- Optical quality
- Heat management

Impact on Shelf-Emitting Displays:

- Brightness (OLEDs)
- Power consumption (uLED)
- Resolution
- Beam expansion (LBS)
- Optical quality
- Heat management

Impact on waveguide solutions

- Efficiency needs vs. total brightness
- Field-of-view vs. angular resolution
- Optical architecture vs. image source
- Artifact control

We Deliver the Impossible Everyday

TECHNOLOGY

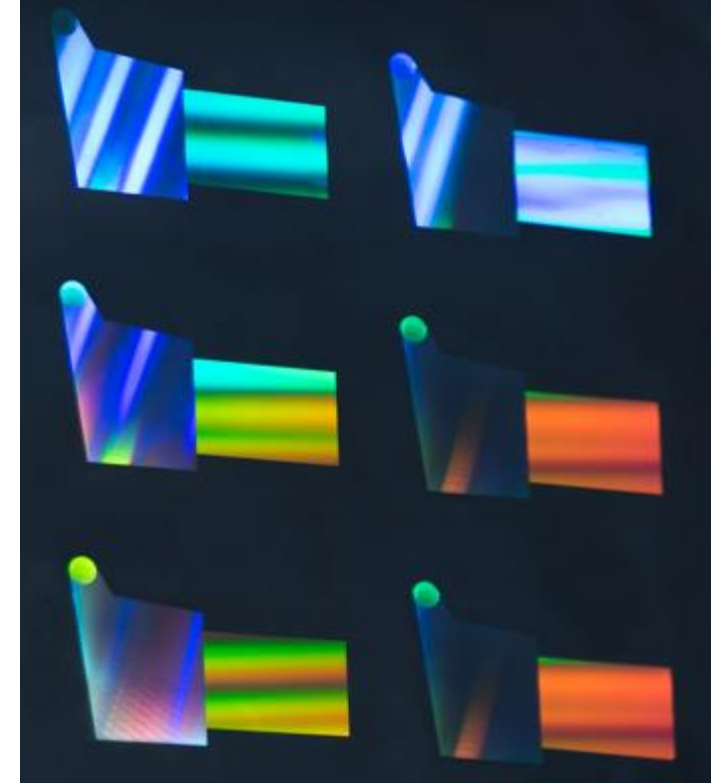
- AR waveguide displays based on patented, proprietary architectures and diffractive surface relief gratings

IN HOUSE waveguide design

- 20,000x faster than any raytracing-based simulation tool

MANUFACTURING

- IN HOUSE POC manufacturing for rapid prototyping
- IN HOUSE line for small quantities
- Mass Manufacturing team enable volume partners to execute



Manufactured by Applied Materials and AAC
Designed by Dispelix

Image: Applied Materials

The LBS Ecosystem is Growing!

Founding Board



Regular Members



Associate Members



The LaSAR Alliance was established to foster an ecosystem around Laser beam scanning solutions for AR

<https://lasaralliance.org/>

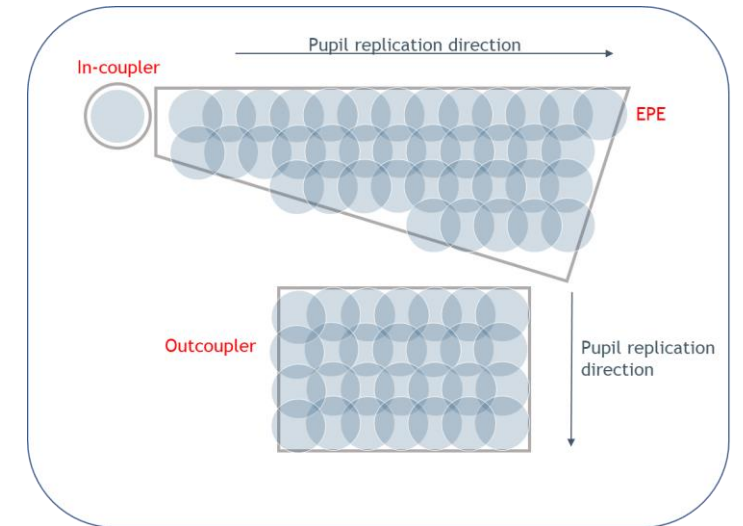
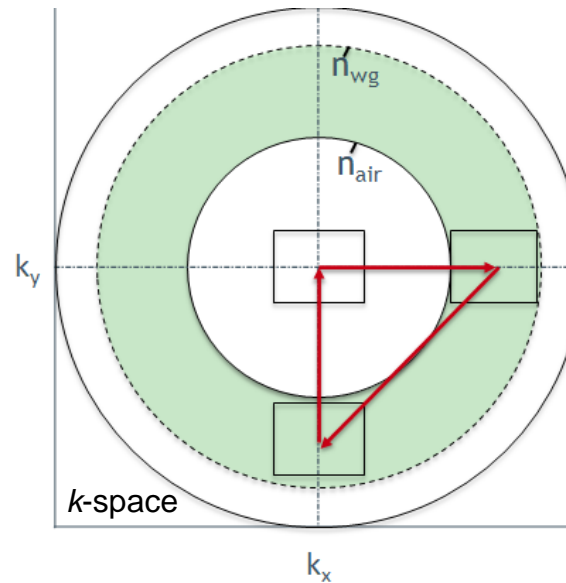
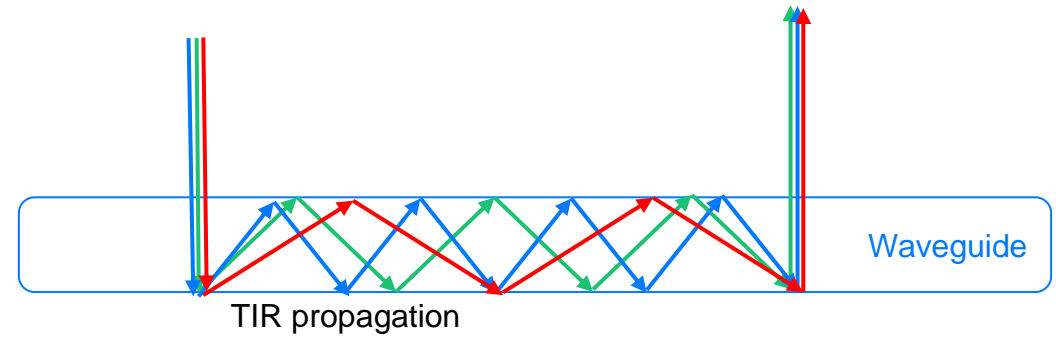
Waveguide Essentials

Propagation conditions defined by:

- Wavelength
- Incident angle
- Refractive indices
- Pupil size
- Waveguide dimensions

Waveguide performance impacts:

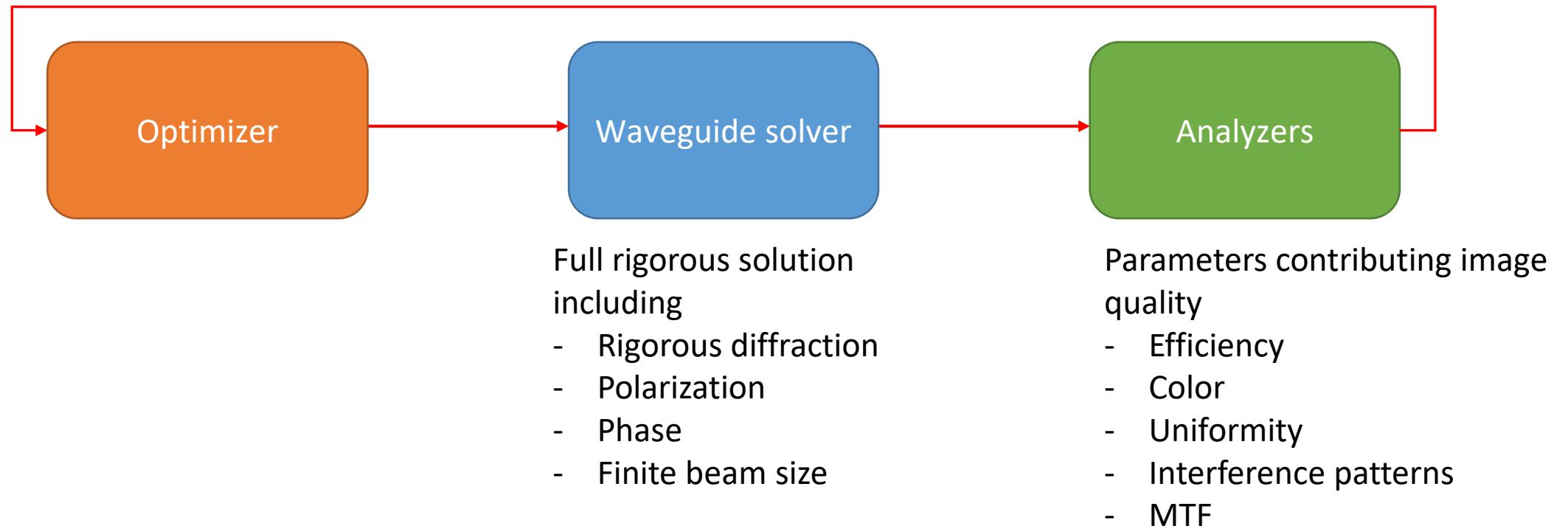
- Maximum allowed FOV
- Uniformity
- Efficiency



Dispelix Waveguide Design Principles

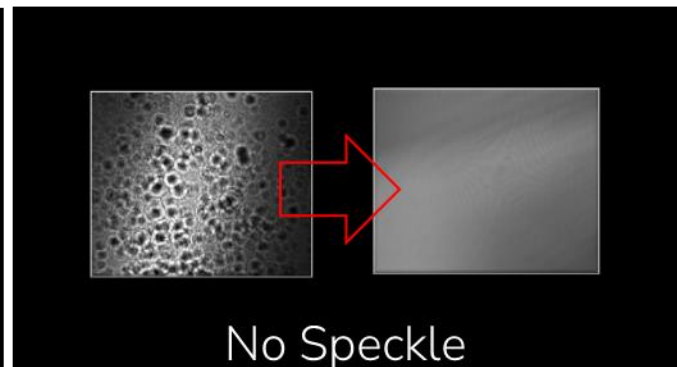
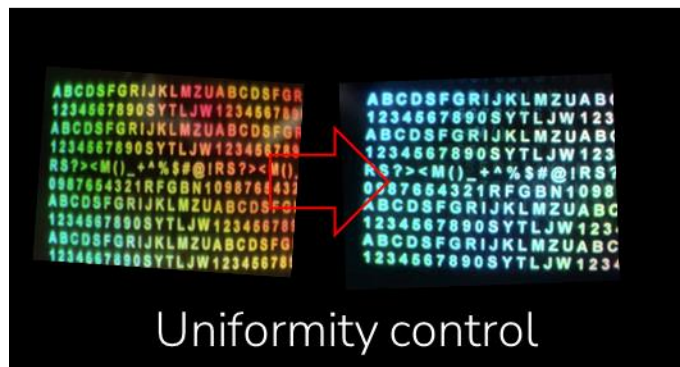
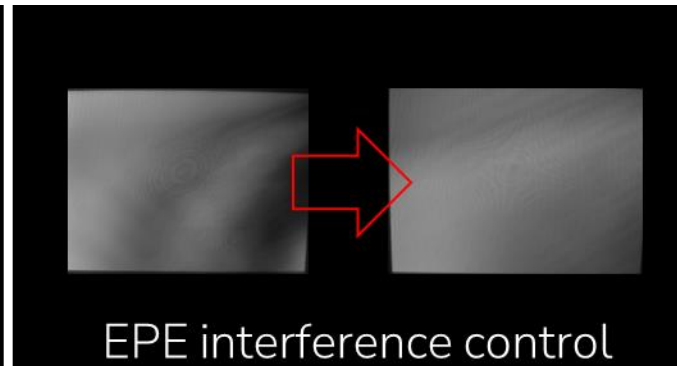
- *How does Dispelix design a waveguide?*

Direct feedback loop for manufacturing and optical interface tolerances



Dispelix Solutions for Miniaturization Challenges

Laser beam scanning example



- ✓ Light-weight waveguide 3 grams
- ✓ High transparency for user comfort and safety
- ✓ Thin (0.3 mm) to avoid bulginess with prescription integration

Dispelix Product Offerings for Miniaturization:

DPX Selva for Reflective Panel and μ LED Sources



DPX Sade for LBS Sources



EPIC Community

What Dispelix can do for you?

What you can do for us?