dispelix

BRINGING IT ALL TOGETHER – XR DISPLAY SOLUTION

Comfort & Performance

JUSSI RAHOMÄKI, CPO | DISPELIX

dispelix

Founded 2015

Located in Finland, US and China

Enabled by 150+ talented employees

100+ patents and 200+ patent applications

Full XR display solution

High refractive index materials

Patented waveguide architectures

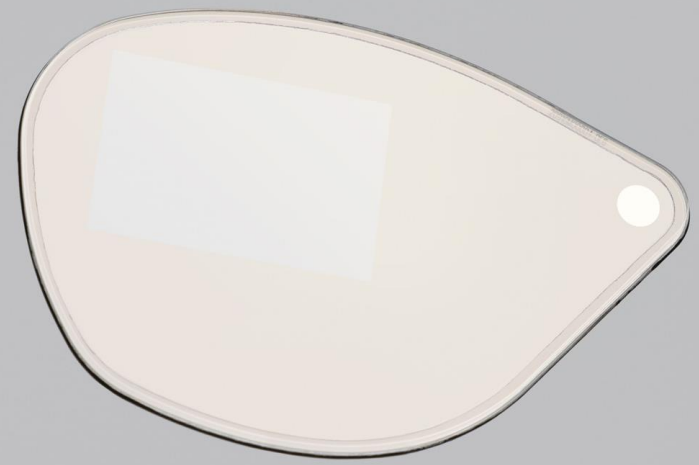
Proprietary waveguide design software

LED and laser waveguide platforms

Manufacturing technology

Long-term stability and reliability

Designed for visual & wearable comfort



Comfort

See-through

Lightweight

Compact

Social acceptance

Eye-contact

Privacy

Aesthetics

Consumer-ready image quality

Sharpness

Contrast 40% @ 16 lp/deg

White point

Minimized color radius & shift from white, i.e. D65 CIELUV space

Rich and deep colors

Uniform illumination over entire eye-box & FOV by full color spectrum

Brightness

Display brightness competes with ambient light

- Full moon 0.25 lux
- Living room 50 – 100 lux
- Office light 300 – 500 lux
- Overcast day 1,000 - 2,000 lux
- Bright sunlight 111,000 lux

Required brightness depends on user case

- Indoors ~500 nits
- Outdoors 1000 – 3000 nits
- Fighter jet pilot ~10,000 nits

XR display brightness is a combination of

- Waveguide combiner brightness efficiency
- Display engine's luminous flux

	Luminous efficacy (lm/W)	Luminous power (lm)	XR display luminance (nits)*
µ-LED	1 ~ 8	3 ~ 5	1000 ~ 1600
LCoS	7 ~ 10	2 ~ 5	600 ~ 1600
DLP	7 ~ 15	6 ~ 10	2000 ~ 3000

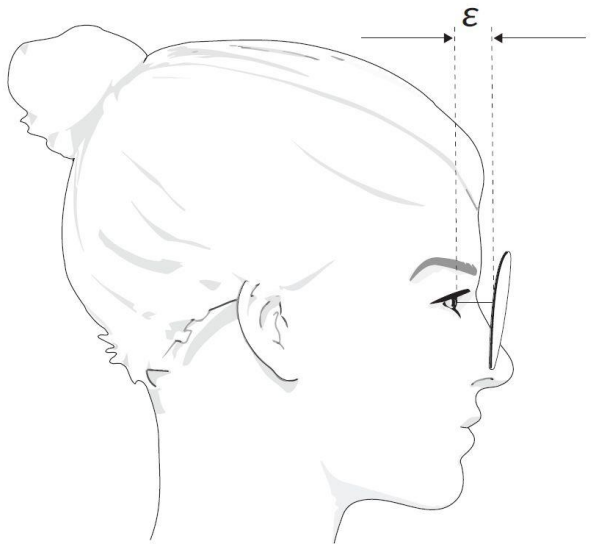
*) Dispelix Selvä 30° FOV AR 16:9, brightness efficiency 310 nits/lm

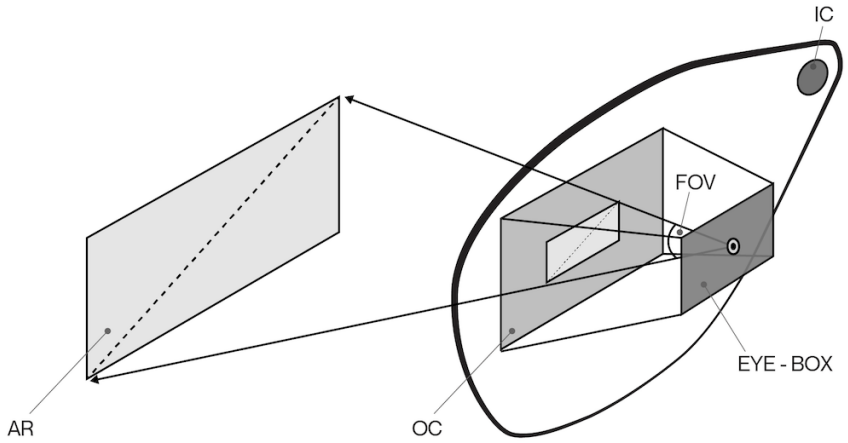
Dispelix AR displays are suited for indoor and outdoor user cases

Convoluted inter-dependencies

- Brightness ↗ Battery lifetime ↘
- Brightness ↗ Thermal Management Issues↗
- Brightness ↗ Field-of-View ↘
- Field-of-View ↗ Eye-relief ↘
- Field-of-View ↗ Eyebox ↘
- Eye-relief ↘ Wearable comfort ↘
- Eyebox ↘ Visual comfort ↘

→Multi-objective optimization problem for the entire system





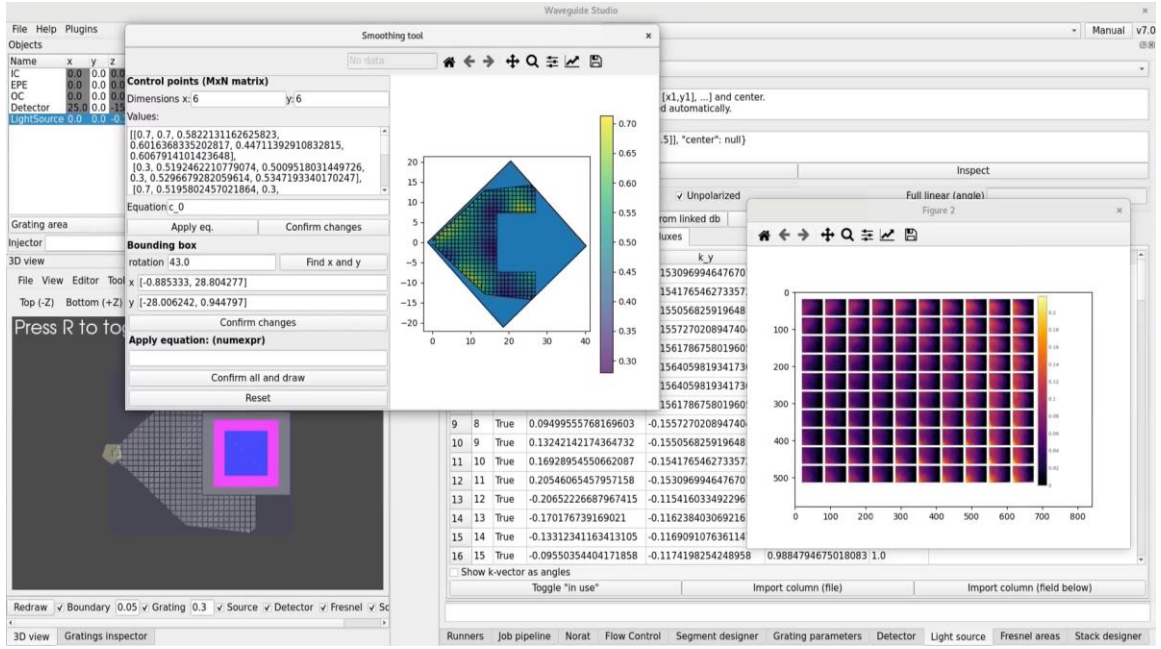
Proprietary Design tool

Human Visual Model

Voice of Customer

Dispelix Waveguide Studio

Optimised display design



Interface fit

Coupling efficiency

Exit pupil diameter and coupling angles are matched with in-coupling grating

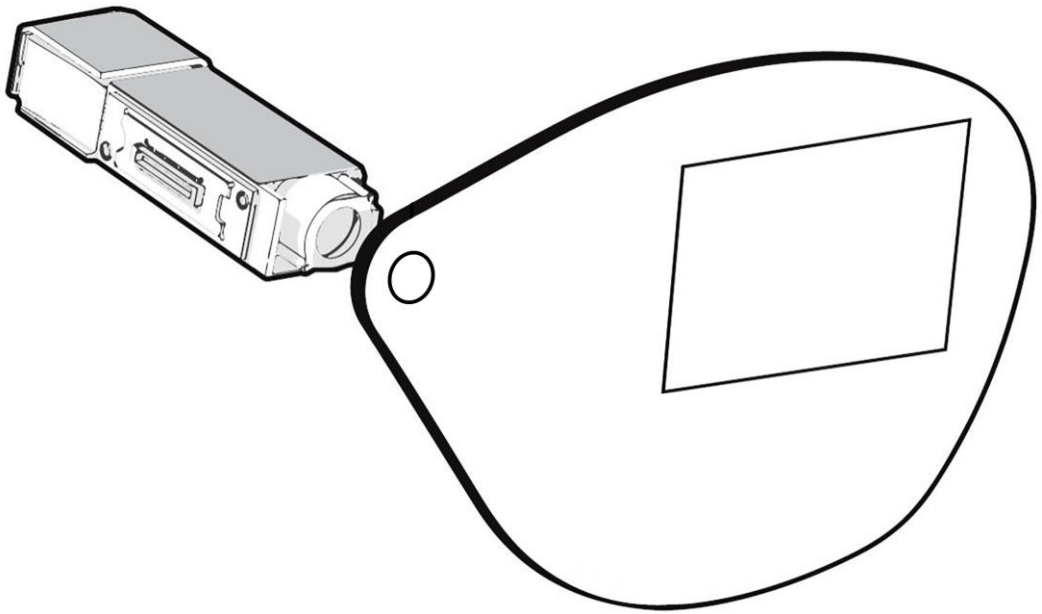
Brightness efficiency

Source luminous power optimization in waveguide combiner

Gratings are fine tuned to match source spectrum

Image artefact elimination

Control straylight and surface reflections at in-coupling

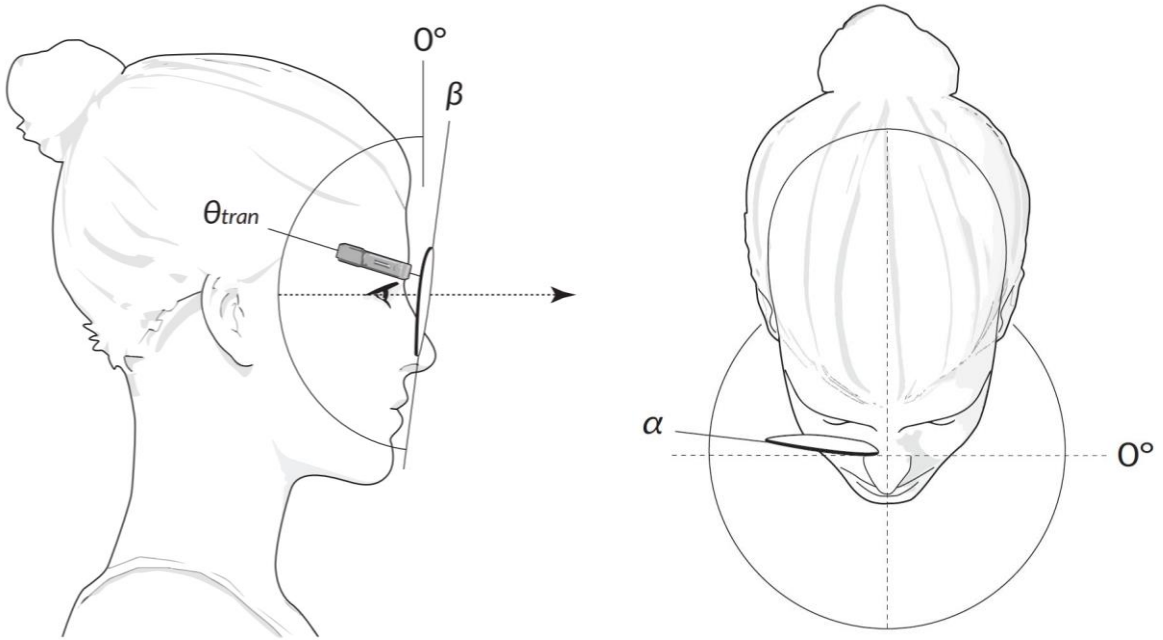


Form factor

Tilts

Dimensions

Weight budget



Prescription integration

Monolithic integration in development

Searching partners

Ecosystem

Waveguide combiner design & development

dispelix

Interface partners

Pico-projector

OEM

Use case

Sensors

Foundry

Waveguide combiner production

Prescription

ODM

System design & Assembly & Testing

Dispelix Service Model

From Design to Delivery


dispelix