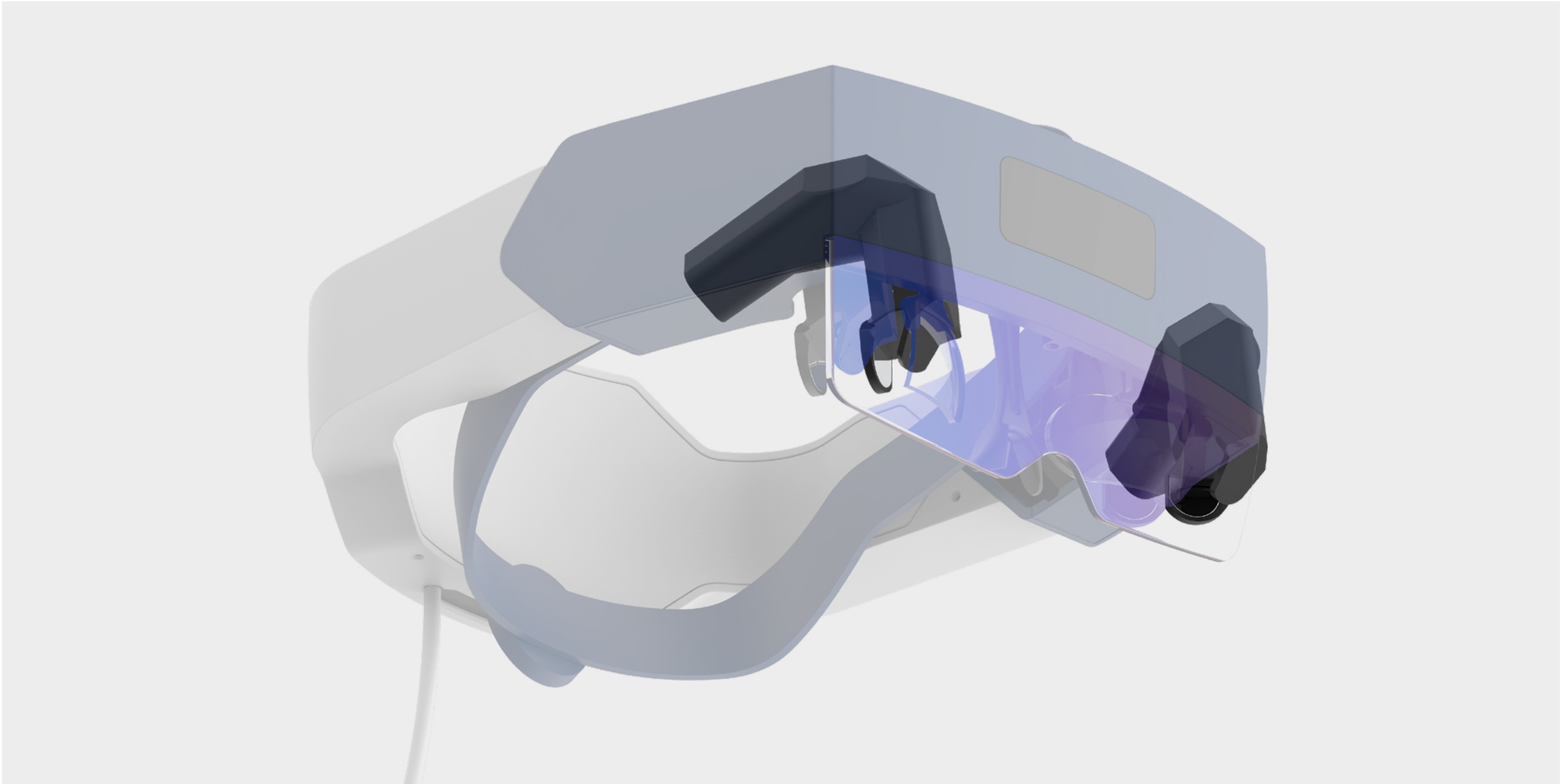




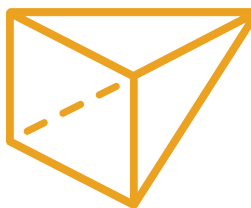
AR WITHIN ARM'S REACH





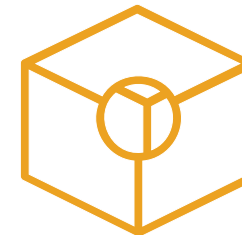
Genuine image depth

offers extended usage without eye-strain or nausea.



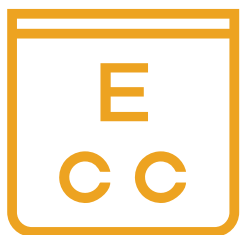
Continuous focus

allows users to focus correctly on virtual objects at any distance, enhancing user interaction.



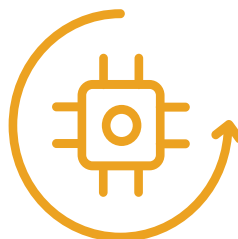
High spatial resolution

offers a truly immersive experience with retinal resolution imagery.



Adaptive prescription

offers users a tailor-made experience matching their visual needs.



Computational efficiency

allows real-time light-field rendering on mobile platform.



No eye-tracking required

enables a simple and robust system architecture.

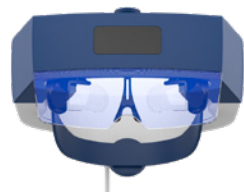
	Digital light-field (sequential) 	Holography	Classical light-field (spatial)	Multiple depth planes	Varifocal element
Genuine image depth	Yes	Yes	Yes	No	No
Continuous focus (planes)	Unlimited ¹	Unlimited ¹	> 10	2 - 4	> 100
Spatial resolution	High	Medium	Low ²	High	High
Adaptive prescription	Yes	Yes	Yes ³	Only SHY	Only SHY
Computational efficiency	High	Very low	Medium ⁴	High	High
Eye-tracking required	No	No	No	No	Yes
Hardware complexity	Low	High	Medium	Low	Low

¹ Resolution is finite, however much higher than an eye can resolve

² To achieve high spatial resolution would require HD microdisplay (8K and above)

³ Only in small range

⁴ Computational efficiency is usually limited by the image data transfer bandwidth



Per eye	Today	Target 2023
Angular resolution at infinity	20 px/°	45 px/° (MTF 60 px/°)
Modulator resolution	1 Mpix	1 Mpix
Depth resolution	Continuous	Continuous
FoV (diagonal)	55°	Light-field: 30° (Flat periphery: 60°) ¹
Effective eyebox (exit pupil)	11 mm (4 mm)	13 mm (6 mm)
Eye relief	27 ± 3 mm	18 ± 3 mm
Colors	1 million	2 millions
Rendering load (equivalent to flat image)	HD	HD
Frame rate	120 Hz	150 Hz
Sub-frame rate	2.9 kHz	6.5 kHz
Brightness	500 nits	Up to 7000 nits



Per eye	Today	Target 2023
Contrast	1 000/1	1 000/1
Combiner type	Curved semi-reflective	Holographic, prescription compatible
Transparency	30%	80%
Power consumption	2900 mW	900 mW
- light source and driver	300 + 400 mW	50 + 50 mW (@500 nits)
- modulator and driver	600 + 1600 mW	400 + 400 mW
Module volume (l.-f. engine)	60 cm ³	10 cm ³
Module weight (l.-f. engine)	81 g	32 g
Spatial tracking	Intel Real Sense T265	Custom
Hand-tracking	Ultraleap	Custom

¹ Image consisting of high-resolution light-field in 30° FoV and possible low-resolution peripheral image up to 60° FoV.







Eye focus

0.3 M

Eye focus

0.5 M

Eye focus

3 M

Q1 2020



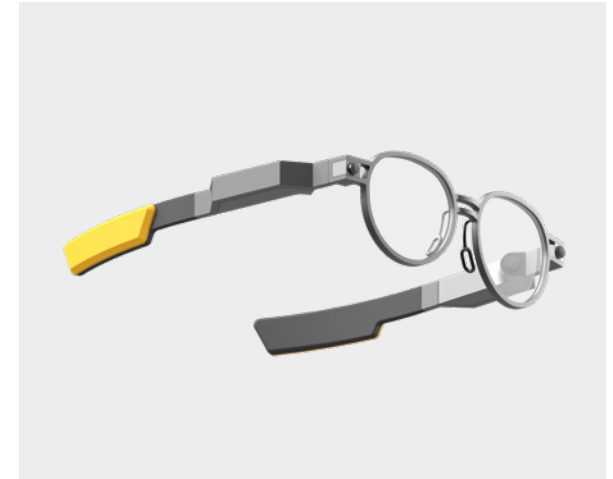
Q1 2021



2023



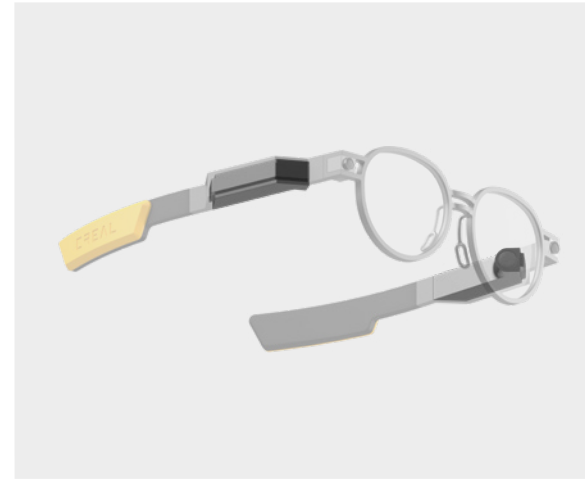
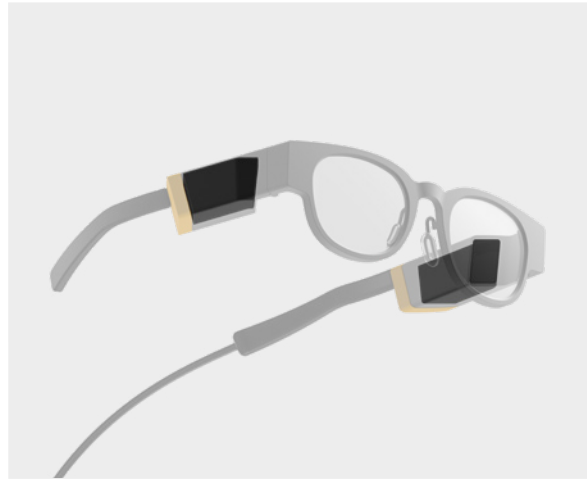
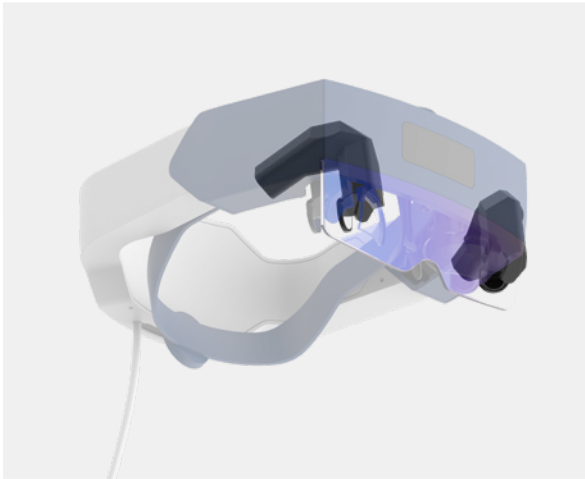
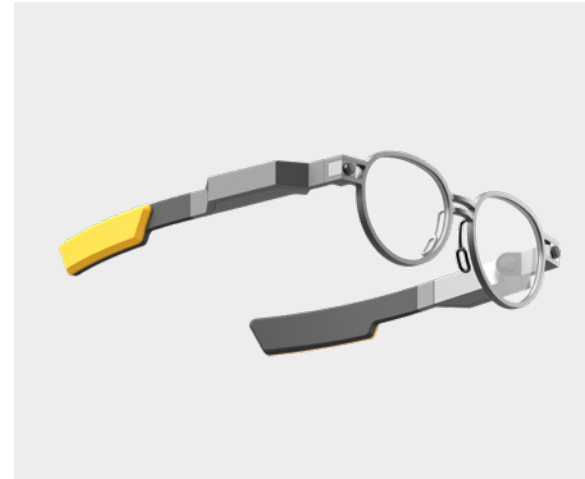
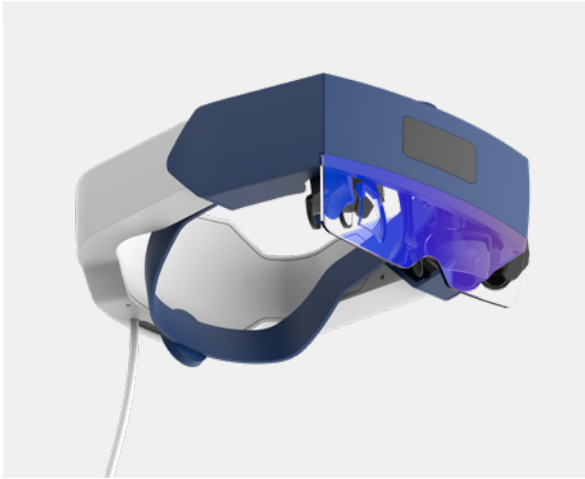
2025+



Q1 2021

2023

2025+



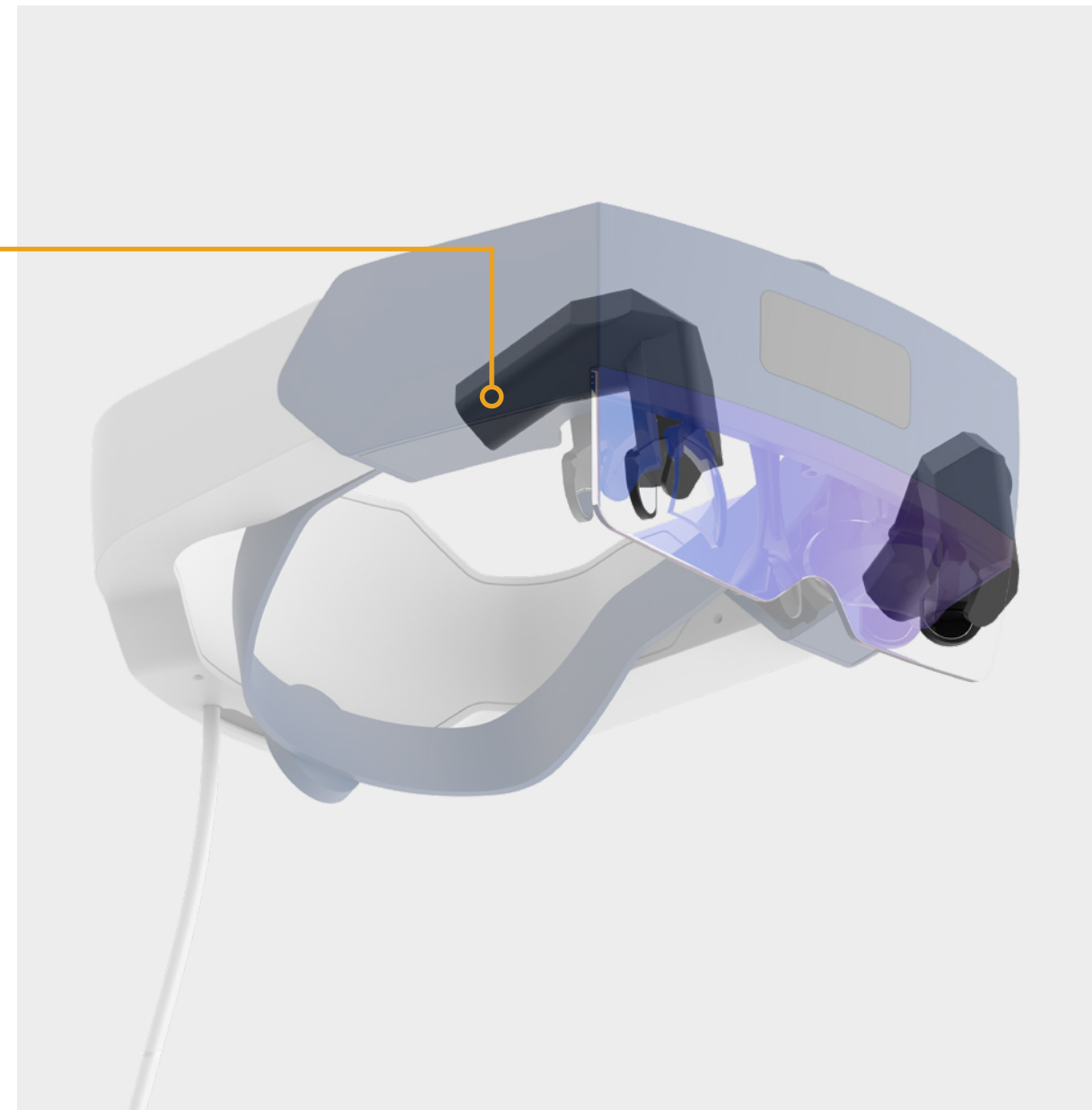
Full evaluation kit and optical engine available today

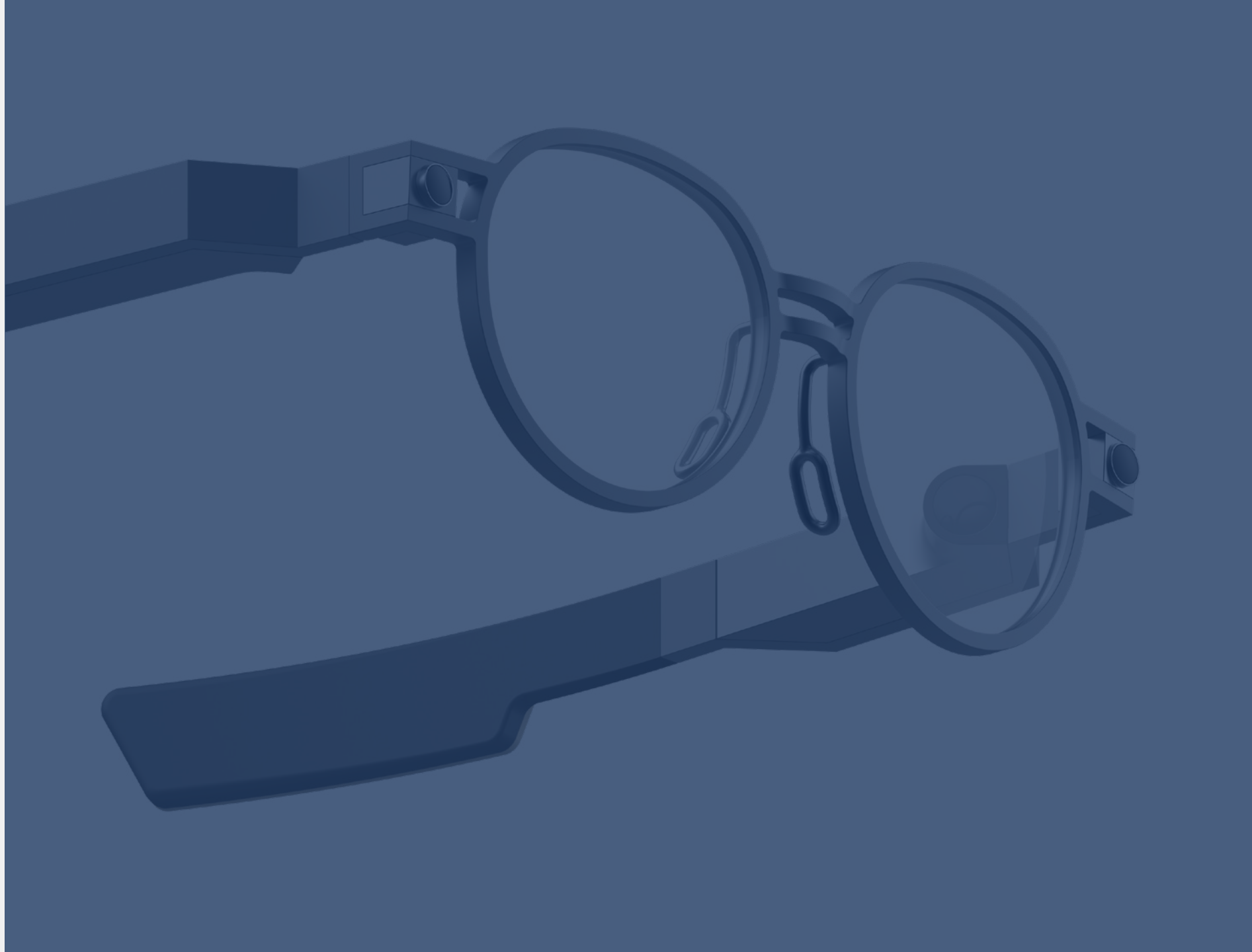
+ Complete light-field optical engine solution

Light-field can make **your next generation headset a market success**. It will be the first to allow comfortable extended interaction with virtual objects in the personal space.

Please ask us at sales@creal.com for:

- 1 AR technology evaluation kits
- 2 Engineering and integration support
- 3 Specifications for the smart glass light-field optical engine planned for 2023





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EPFL Innovation Park, Switzerland