



**CALEDONIAN OPTICAL**

## IOT Digital Ray-Path 2

Pushing the limits of geometry  
in lens personalisation

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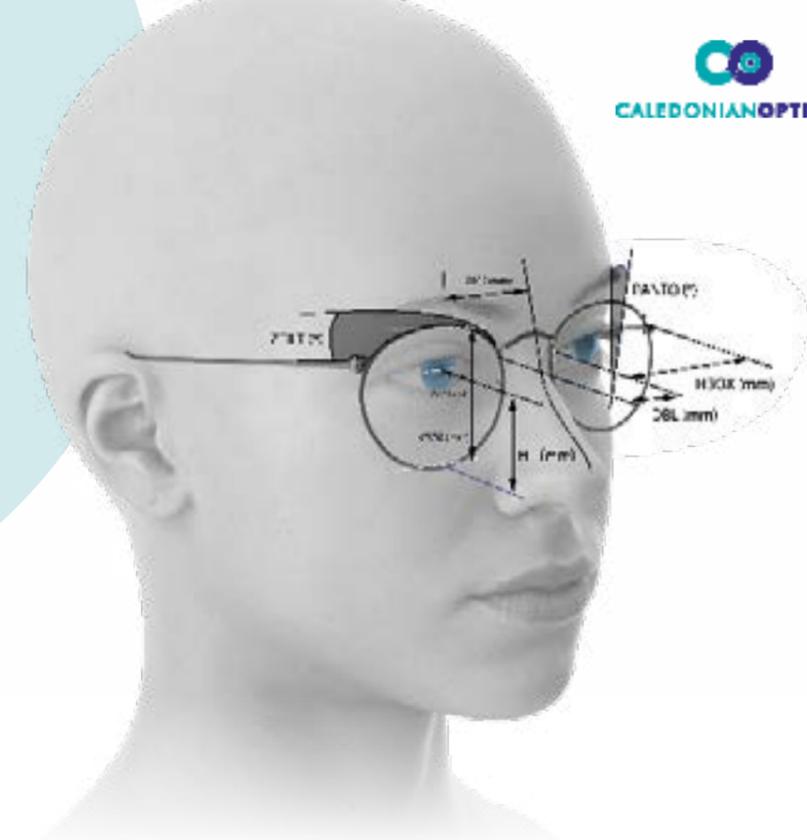
IOT Digital Ray-Path 2 is IOT's foundational technology for minimizing oblique aberrations in personalised and compensated free-form lenses. In addition to mathematically compensating for oblique aberrations.

IOT Digital Ray-Path 2 pushes the limits of geometry in lens personalisation by incorporating the wearer's accommodative capacity in the final lens calculation to further minimise oblique aberrations.

Oblique aberrations, found in any lens, include astigmatic and spherical power errors. These errors create an out-of-focus image vision as the wearer's gaze moves away from the optical center of the lens. Eliminating them completely is not mathematically possible. Some residual power error remains, causing a slight blur.

## Lens personalisation parameters

- Prescription & Addition
- Monocular Pupillary Distance (MPD)
- Pupil Height (SEGHT)
- Frame Dimensions (VBOX/HBOX/DBL)
- Pantoscopic Angle (PANTO)
- Wrap Angle (ZTILT)
- Back Vertex Distance (BVD)
- Near Working Distance



## The potential of accommodation

The relationship between eye accommodation, the accommodative object space, and compensated power has long been understood. Until now, lens calculation technology has not been sophisticated enough to create free-form digital lenses that take full advantage of this knowledge.

Accommodation is the wearer's natural ability to focus on different distances, without moving their eyes or head, by stimulating or relaxing the lens within the eye. IOT Digital Ray-Path 2 incorporates this factor into each individual lens calculation. IOT Digital Ray-Path 2

also considers the accommodative object space, the volume defined by the points within the clear visual range, for each direction of gaze.

IOT Digital Ray-Path 2 mathematical methods take advantage of the natural ability of the visual system to compensate for a portion of the spherical component of oblique aberration. IOT Digital Ray-Path 2 considers small power adjustments wearers can naturally make at each fixation point. Oblique aberrations are minimised, in a more effective way, offering wearers impeccable visual quality.

## Benefits

- **Wider fields of view.**  
Reduced areas of blur result in wider fields of view for wearers.
- **Precise and comfortable vision.**  
For all working distances and directions any direction of gaze making lenses with IOT Digital Ray-Path 2 technology ideal for everyday wear and for viewing electronic devices.
- **A more consistent wearer experience.**  
Perceived power distributions remain stable, regardless of Rx or base curve. This is especially beneficial for patients with high prescriptions or large or wrapped frames.
- **Near elimination of peripheral blur.**



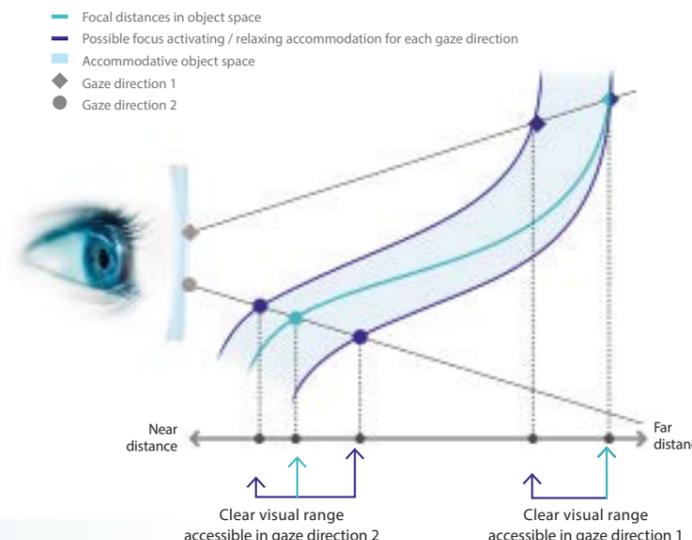
IOT Digital Ray-Path 2 works in synergy with nature.

It utilizes the innate power of the human eye to refine the optimization process for personalised lenses.

## Here's how it works

IOT Digital Ray-Path 2 calculates a unique back surface design for each lens with three-step optimization process.

- 1 The eye-lens system**  
First, it creates a simulation of the complete system that includes eye and considers all available information on the wearer, frame, and lens blank.
- 2 Accommodative object space**  
Next, it incorporates the wearer's natural ability to accommodate including the accommodative object space, the visual range associated with each direction of gaze.
- 3 Minimisation of oblique aberrations**  
Finally, it analyzes and minimises oblique aberrations at various distances and for each direction of gaze over the entire accommodative object space.

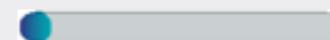


**The result:** extremely clear vision and precise focus.

## Proven results

OBLIQUE ABERRATIONS IN TRADITIONAL LENSES

11% of gaze directions are now optimised\*



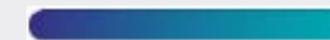
OBLIQUE ABERRATIONS IN PERSONALISED LENSES

43% of gaze directions are now optimised\*



OBLIQUE ABERRATIONS IN LENSES OPTIMISED WITH IOT DIGITAL RAY-PATH 2

99,5% of gaze directions are now optimised\*



\* Taking into account the wearer's accommodation capacity. Blur <0.18 D. Theoretical study carried out on a single vision lens. [+3.00 +1.00 x 45°], Base 6 D, index 1.5.

## IOT DIGITAL RAY-PATH 2 FEATURES



### PERSONALISATION

The design is further enhanced, when desired, by a complete set of individualisation parameters that take into consideration the unique attributes of the frame and the preferences of the wearer. If no parameters are provided, Digital Ray-Path 2 will utilise default values.



### COMPENSATED POWER

Lens power differs from prescribed power. The design is calculated, point by point, to ensure wearers perceive the proper power when looking through their lenses at every distance and direction of gaze, including near distances for viewing electronic devices.



### OPTIMISED FOR ACCOMMODATIVE OBJECT SPACE

Digital Ray-Path 2 incorporates the intelligent use of the wearer's accommodation into the traditional calculations for reducing oblique aberrations, resulting in a superior personalised lens. Oblique aberrations are minimized more effectively than ever before.



### CONSISTENCY

The perceived power distribution remains stable, regardless of the prescription or base curve. This is especially beneficial for high prescriptions and large or wrapped frames.

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