

Sunex

Excellence in Optical Design and Manufacturing

FOVEA™ Lenses

25+ year track record of success in taking customer concepts from design through mass production.



Sunex F_{OVEA}TM lenses

Fovea Distortion

The fovea centralis is located in the retina's center and is responsible for high-acuity human vision.

Sunex lenses with Fovea distortion map this type of behavior and "exaggerate" the central details while trading off the off-axis details. Practically speaking, this results in a higher number of pixels per degree in the center, allowing machine vision algorithms to benefit from a higher resolution in the center field compared to standard f-theta distortion lenses.

Applications

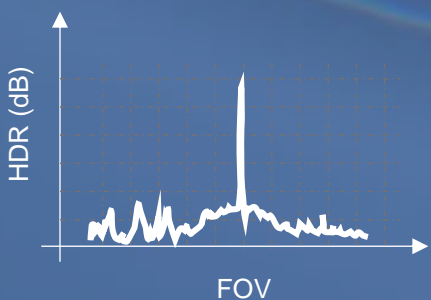
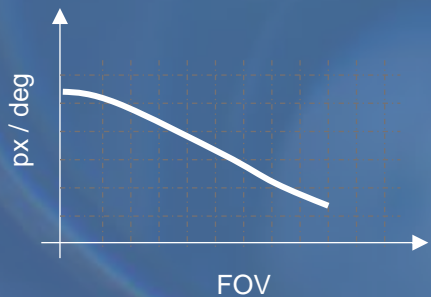
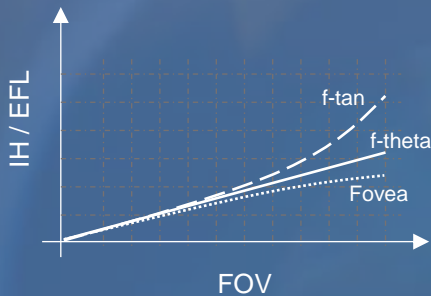
Sunex's expertise and experience in manipulating distortion profiles to align with application-specific requirements have been valued by customers for many years. Our Tailored DistortionTM expertise has often been applied to SuperFisheyeTM lenses to correct large FOV lenses' barrel distortion.

Applications that benefit from a Fovea distortion profile include forward-looking ADAS and autonomous driving cameras, where the vehicle must detect objects at a far distance in the central FOV range while still having a wider FOV capability to maintain peripheral vision.

High Dynamic Range (HDR)

HDR (high dynamic range) sensors can capture light intensity variations up to six or more orders of magnitude within the same image frame (~120db). This puts a very demanding requirement on lens performance.

Sunex has developed design expertise, process know-how, and nested cleanroom manufacturing facilities to eliminate or minimize optical noise (such as ghosts, flare, starbursts, spurious images) in lenses for high-performance applications.



All graphs are for illustration purpose only. The individual lens performance can be different.

| PN | Format | MP Class | HFOV | F/# | TTL | Features |
|--------|---------|----------|------|------|------|--|
| DSL144 | 1/1.8" | 1.7MP | 100° | 1.6 | 24 | Hybrid, Short TTL |
| DSL345 | 1/1.9" | 1.7MP | 100° | 1.6 | 24 | All Glass, Short TTL, |
| DSL364 | 1/1.8" | 2.1MP | 133° | 1.6 | 28.5 | All Glass, Wide FOV |
| DSL248 | 1/2.5" | 2.6MP | 100° | 2.0 | 25.4 | All Glass, Short TTL, |
| DSL450 | 1/1.8" | 8.3MP | 122° | 1.44 | 30 | All Glass, 4k, High RI, very low F/# |
| DSL457 | 1/1.8" | 8.3MP | 120° | 1.8 | 26.3 | All Glass, 4k, large image circle |
| DSL452 | 1/1.43" | 12MP | 120° | 1.6 | 38 | All Glass, 12MP High Resolution, low Ghost |

Table only shows a selection. Additional Fovea™ lens options are available.

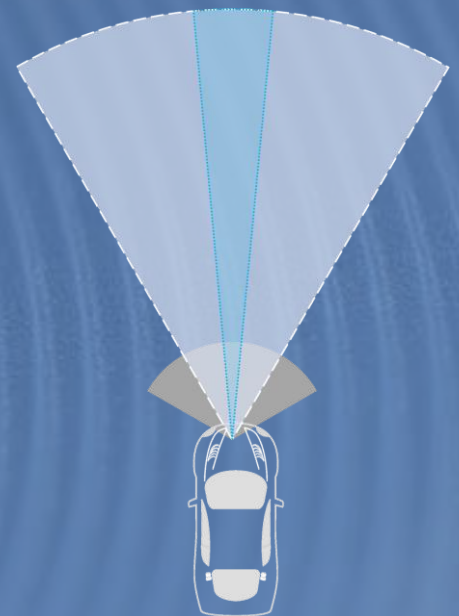
Athermalization

The shift of a lens's focal point over a wide temperature range is a physical phenomenon based on the material-specific expansion and contraction with temperature. A decrease in image quality could be the outcome if the focal point of the lens relative to the sensor's image plane shifts too much. A fully athermalized system requires selecting appropriate optical and mechanical materials, the right design strategy, and close collaboration with the customer to optimize thermal performance on a system level.

Fast Prototyping

We provide prototyping services for complete lens assemblies often as the first step after a new custom design.

Sunex can produce prototypes with short lead times to verify the design before transitioning further on the path to mass production using state-of-the-art fabrication processes for glass and plastic optical elements and all mechanical components.



-  Wide FOV Lens
-  Fovea Full FOV
-  Fovea Center FOV

Enable human-like vision with

FOVEA™ lenses

Consulting – Design – Manufacturing - Support

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