



EXPERTS IN VISION TECHNOLOGY SOLUTIONS

- AUTONOMOUS VEHICLES
- ENTERPRISE DRONES
- SECURITY
- SURVEILLANCE

4K HDR Lenses

KEY FEATURES

- All glass construction
- Rectilinear distortion correction (Narrow)
- F- θ distortion (Wide)
- Telecentric
- Athermal operation
- Superior stray light rejection
- Optimized for HDR imaging applications
- Survival temperature range -40C to +70C
- Operating temperature range -20C to +50C



4K HDR Lenses – Ultra Series

Navitar has developed a family of high resolution lenses for demanding imaging applications such as unmanned aerial vehicles (UAV) and autonomous vehicle (AV) forward-facing camera systems. Multiple fields of view are offered for 1/2”, 2/3” and 1” sensor formats.

Navitar HDR lenses are designed to achieve excellent resolution across the field with minimal stray light and ghost image artifacts. All lenses are produced with state-of-the-art multi-layer anti-reflection coatings, a built-in infra-red rejection filter and ultra low reflectance internal mechanics for excellent veiling glare characteristics.

Lenses can easily be integrated with Pixelink cameras. For testing and evaluating performance, Navitar offers a custom bayonet mount with focus adjustment.

To appreciate the full performance of these lenses Navitar provides sensor integration to precisely align the camera sensor to the lens image plane. The resulting package provides a robust, fixed focus, fixed iris, athermalized imaging solution. IP67 sealing and the availability of hydrophobic coating for the external surface provides complete environmental compatibility.

NAVITAR LENSES	FOCAL LENGTH (mm)	f/#	LENGTH (mm)	DIAGONAL FOV	SENSOR SIZE	WAVEBAND	MTF
Dragon W	9.5	f/1.8	100	97°	1”	Visible	>60% at 145 lp/mm
Dragon N	18.0	f/1.8	100	51°			>60% at 145 lp/mm
Spider	6.9	f/2.8	62.5	133			>50% at 145 lp/mm
Falcon W	7.1	f/2.4	55	89°	2/3”	Visible	50% at 145 lp/mm
Falcon N	18.75	f/2.8	54	33°			
Apidae W *	4.3	f/2.8	40	142°			
Apidae N *	18.5	f/2.8	32.5	24.4°	1/2”	Visible	50% at 100 lp/mm
Sparrow W *	7.0	f/1.8	37	76°			Consult Navitar for Data
Sparrow N *	16.75	f/2.4	42.5	37°			
Iguana	3.2	f/2.7	21.8	140°			40% at 100 lp/mm

*Production-ready designs

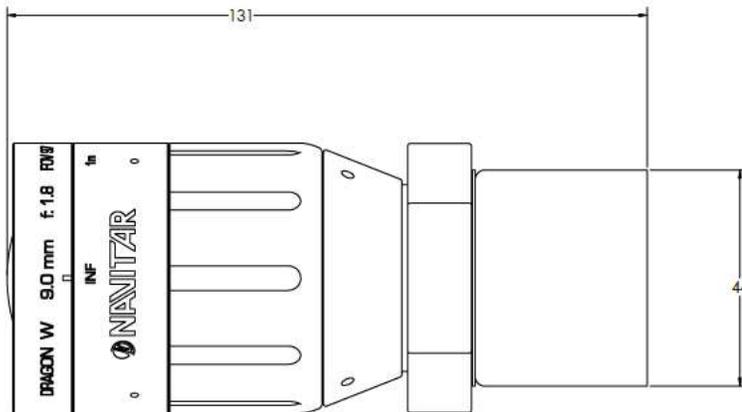


Dragon Wide and Narrow

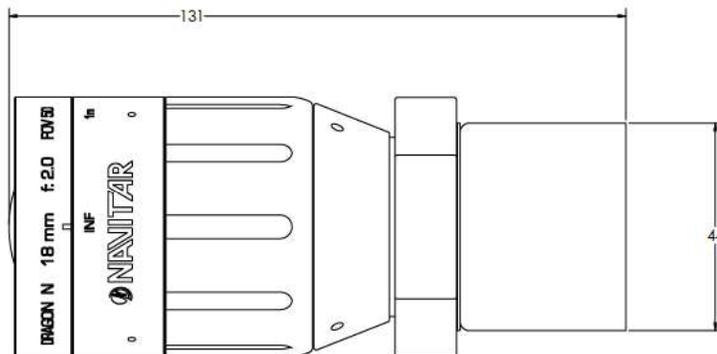
Dragon high performance lenses designed for 1" sensors such as Sony IMX 255 are available with either a fixed aperture stop or motorized switchable iris for day/night applications.

	Dragon Wide	Dragon Narrow
Focal Length	9.50mm	18.0mm
F/number	f/1.8	f/1.9
Field of View	97° diagonal, 86° horizontal, 45° vertical	51° diagonal, 45° horizontal, 24° vertical
Image Circle	16.0mm	16.0mm
Waveband	450nm-650nm	450nm-650nm
MTF	>50% across field at 145 lp/mm	>60% across field at 145 lp/mm
Total Track Length	100mm	100mm
Diameter	48mm	41mm
Weight	220g	220g
Stray Light Rejection	<1E10-4 (In-field) <1E10-5 (Out-of-field)	<1E10-4 (In-field) <1E10-5 (Out-of-field)
Focus Stability	Athermal	Athermal

Dragon Wide



Dragon Narrow

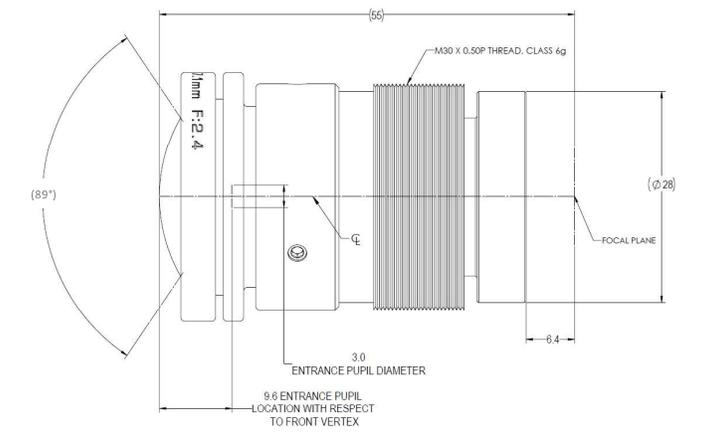


Falcon Wide and Narrow HDR Lenses

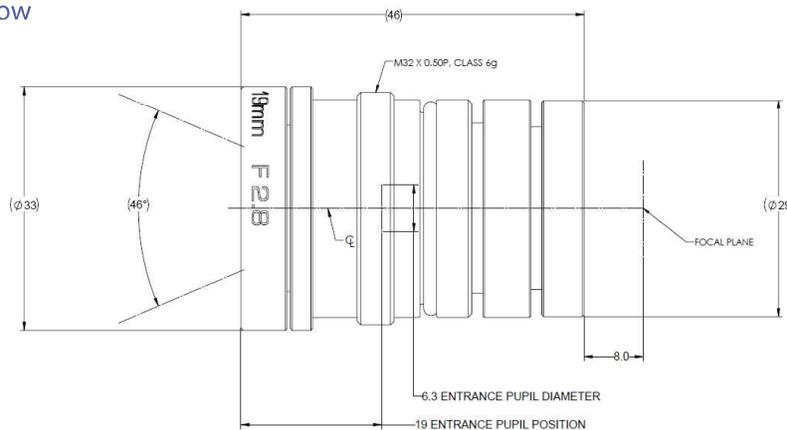
Falcon offers compact wide and narrow angle lenses aimed at 2/3" sensors such as Sony IMX250 and 264. The patented design had been widely deployed in autonomous vehicles.

	Falcon Wide	Falcon Narrow
Focal Length	7.1mm	18.75mm
F/number	f/2.4	f/2.8
Field of View	89° diagonal, 68° horizontal, 57° vertical	33° diagonal, 26° horizontal, 21° vertical
Image Circle	11.0mm	11.0mm
Waveband	450nm-650nm	450nm-650nm
MTF	>50% across field at 145 lp/mm	>50% across central 40° field at 145 lp/mm
Total Track Length	55mm	54mm
Diameter	33mm	33mm
Weight	80g	80g
Stray Light Rejection	<IE10-4 (In-field) <IE10-5 (Out-of-field)	<IE10-4 (In-field) <IE10-5 (Out-of-field)
Focus Stability	Athermal	Athermal

Falcon Wide



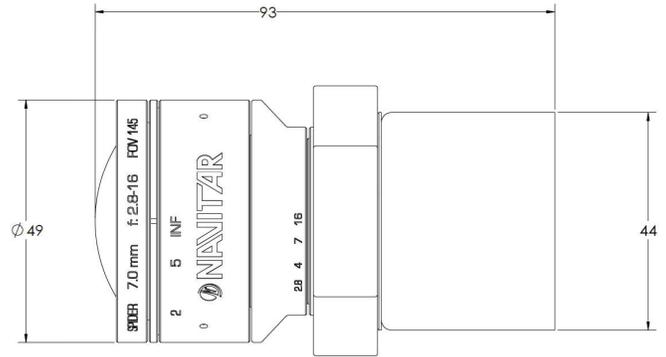
Falcon Narrow



Spider

Spider is a compact, wide angle lens aimed at large sensors up to 1.1" format (17.6mm diagonal) such as Sony IMX253 or IMX304. Available with a motorized focus adjustment from 2m to infinity.

Spider	
Focal Length	6.9mm
F/number	f/2.8
Field of View	133° diagonal, 118° horizontal, 62° vertical
Image Circle	16.0mm
Waveband	450nm-650nm
MTF	>50% across field at 145 lp/mm
Total Track Length	62.5mm
Diameter	45mm
Weight	62.5mm
Stray Light Rejection	<1E10-4 (In-field) <1E10-5 (Out-of-field)
Focus Stability	Athermal



Iguana

The Iguana patented 7 element, aspheric design offers a track length of less than 22mm, 20mm diameter and is aimed at 1/2" sensors.

Iguana	
Focal Length	3.2mm
F/number	f/2.7
Field of View	140° diagonal, 112° horizontal, 85° vertical
Image Circle	8.0 mm
Waveband	450nm-650nm
MTF	>>0.4 to 90% field at 100 lp/mm
Total Track Length	21.8mm
Diameter	20mm
Weight	30 grams
Stray Light Rejection	<1E10-4 (In-field) <1E10-5 (Out-of-field)
Focus Stability	Athermal



High Performance Lens and Camera Modules

Navitar 4K HDR lenses offer simple operation, little-to-no focus loss over large temperature ranges, outstanding color correction, and low lens-to-lens variation.

Combining HDR lenses with Pixelink camera sensors allows simple image acquisition (via USB 3.0, GigE, Firewire, etc.) and flexible image processing options to suit your individual application.

Choose from off-the-shelf Navitar 4K HDR lenses and Pixelink camera boards from 2/3" up to 1.1" sensor formats or tailor one of our existing designs to fit your specifications with no time lost during the design process.

Navitar camera modules are used in the automotive, virtual reality, augmented reality, drone, surveillance and agricultural industries.

Active Sensor Alignment

Active alignment of a lens and sensor enables accurate, cost-effective production of high resolution, precision camera modules. The alignment process ensures the full capability of the lens and sensor are carried over to the complete module.

For maximum performance, Navitar provides active lens/sensor alignment services for OEM's.

Active Alignment Position Accuracy Achiever

Specifications	
Alignment Degrees of Freedom (DOF) of Sensor	6
Alignment DOF Resolution	<0.1 μm
Pitch and Roll Accuracy	<2 arcmin
Yaw Accuracy	<360 arcsec
Mechanical Lens to Sensor Centration	< 2 μm
Number of Modules Per Hour (MPH)	120 MPH



Sparrow Wide and Narrow

Sparrow Wide and Narrow are new additions to the 4K HDR family of lenses. Designed for 1/2" sensors and with an aperture of f/1.8, Sparrow Wide is ideal for low light applications. Sparrow Narrow offers excellent resolution, over 37° diagonal field with a focal length of 16.75mm.

	Sparrow Wide	Sparrow Narrow
Focal Length	7.0mm	16.75mm
F/number	f/1.8	f/2.4
Field of View	76° diagonal,	37° diagonal,
Image Circle	8.0mm	8.0mm
Waveband	450nm-650nm	450nm-650nm
MTF	Consult Navitar for Data	Consult Navitar for Data
Total Track Length	37mm	42.5mm
Diameter	TBC	TBC
Weight	TBC	TBC
Stray Light Rejection	<IE10-4 (In-field) <IE10-5 (Out-of-field)	<IE10-4 (In-field) <IE10-5 (Out-of-field)
Focus Stability	Athermal	Athermal

Apidae

Apidae is a new addition to the 4K lens family offering 142° diagonal field. It is a compact, wide angle lens aimed at 2/3" sensors such as Sony IMX250 or IMX264 which have a diagonal length of 11mm. These sensors have a pixel size of 3.45µm and a Nyquist spatial frequency of 145 lp/mm.

	Apidae
Focal Length	4.3mm
F/number	f/2.8
Field of View	142° diagonal, 110° horizontal, 93° vertical
Image Circle	11.0mm
Waveband	450nm-650nm
MTF	>50% to 90% field at 145 lp/mm
Total Track Length	40mm
Diameter	TBC
Weight	TBC
Stray Light Rejection	<IE10-4 (In-field) <IE10-5 (Out-of-field)
Focus Stability	Athermal



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