

Zoom 6000

A Workhorse to Fit Nearly Any Application

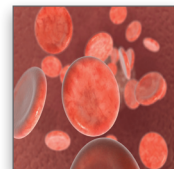
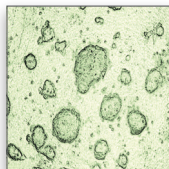
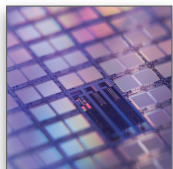
For high magnification applications, the Zoom 6000 series of lenses is the number one choice around the world. Recognized as the industry standard, our versatile 6.5X zoom lenses are designed to give you the magnification powers of traditional microscopes without the bulk or expense. They are easily integrated, assembled, and configured to your exact application. Compared with the competition, the Navitar Zoom 6000 series offers unmatched optical performance, repeatability and mechanical flexibility.

- Dynamic magnification range of 0.09-393X offers incredible versatility.
 - High contrast images and vivid colors help your equipment perform better.
 - 0.01-125.68 mm field coverage allows you to view a wide range of parts.
 - Working distance can be varied from 13 to 390 mm.
 - Add infinity corrected objective lenses to achieve unmatched edge flatness and clarity.
 - Available with internal coaxial illumination. Review matrix on page 34 for FOV specifications.
- See the Zoom 6000 system diagram on pages 20-21.



Applications

Navitar high magnification lenses are utilized in a wide variety of biotechnology and nanotechnology applications including gel documentation, particle characterization, DNA sequencing, flow cytometry, AFM, colony picking, cell sorting and live cell imaging. Navitar high magnification systems are also utilized in the semiconductor and electronics industry for automated visual inspection, FPD fabrication, wafer inspection and non-contact measurement.



Zoom 6000 UltraZoom

Combine Infinity-Corrected Objectives for Maximum Resolution and Magnification

Navitar's UltraZoom is a high-performance zoom lens system ideal for semiconductor inspection, flow cytometry, and other high magnification applications. Its advanced design offers high resolution and outstanding contrast. This system incorporates infinity corrected, plan apochromatic objectives providing long working distances and excellent edge flatness and clarity.

Resolution varies from 420 to 1,650 lines per mm, depending on the microscope objective used. The UltraZoom is also available with fine focus and/or coaxial illumination.

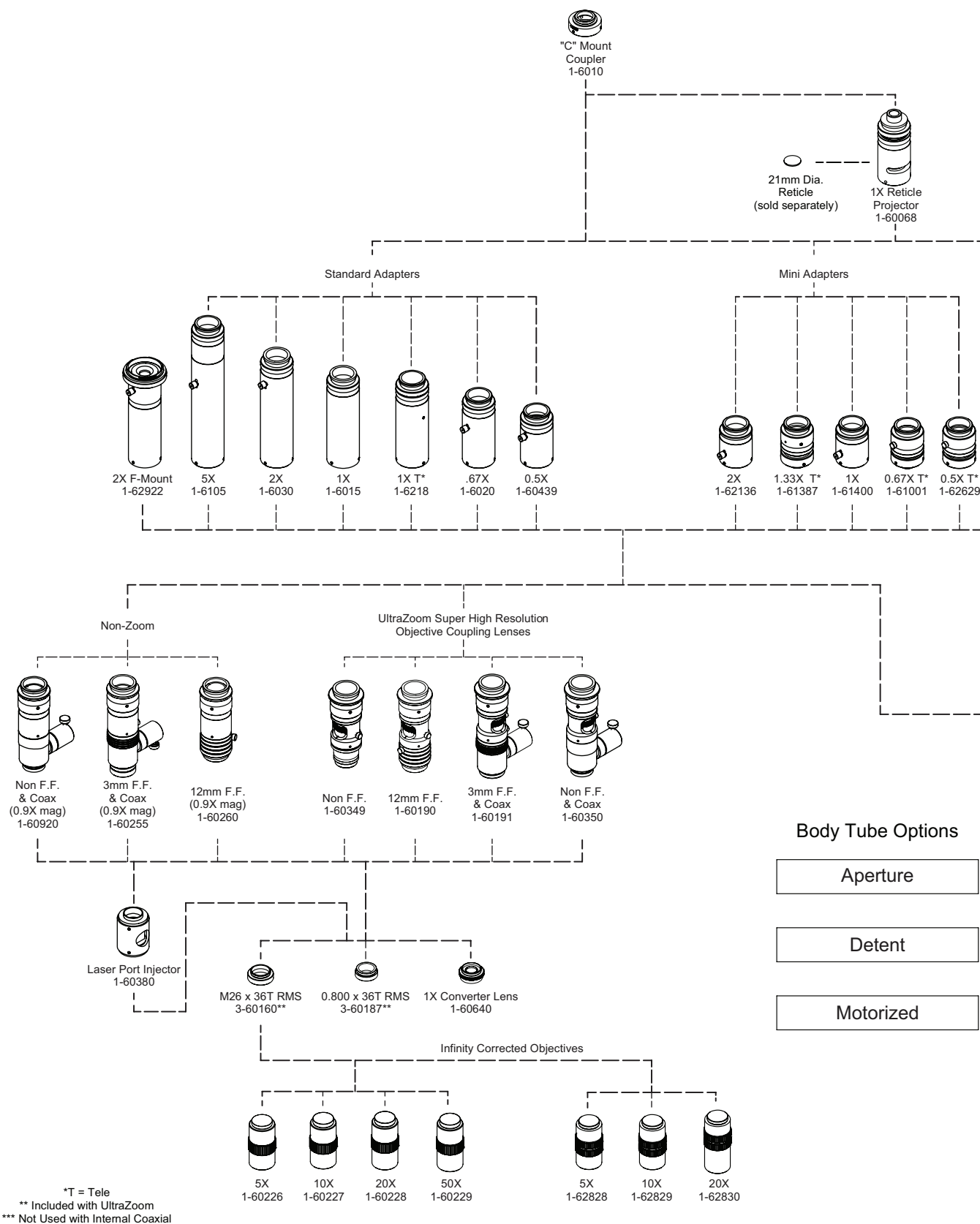
Zoom 6000 Accessories

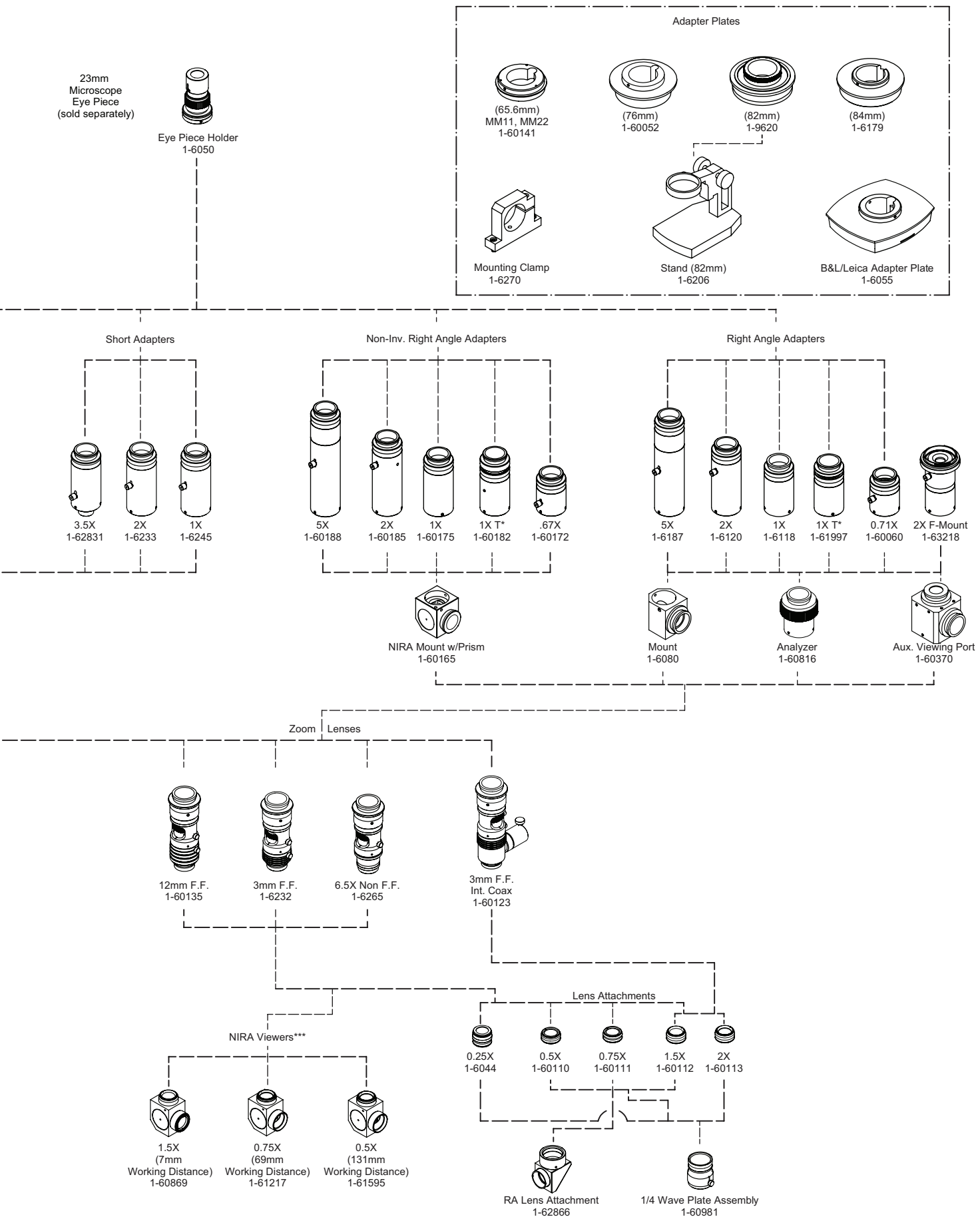
A full line of accessories is available for our Navitar high magnification imaging systems. To learn more visit www.navitar.com or contact your account manager.

- Right-Angle Mounts & Adapters
- Adapter Plates
- Laser Injection Port
- Auxiliary Viewing Port
- 2X F-Mount Adapter
- Polarizers
- Analyzer
- Infinity Corrected Objectives
- Aperture Control
- Detents
- Lens Attachments



Zoom 6000 System Diagram





Matrices and Specifications

Zoom 6000 Field of View Matrix

In mm at Nominal Working Distance

Lens Attachment	W.D. (mm)	Camera Format/Parameters	.5X Adapter Low - High	.67X Adapter Low - High	1X Adapter Low - High	1.33X Adapter Low - High	2X Adapter Low - High	3.5X Adapter Low - High	5X Adapter Low - High	Resolve Limit (microns) Low-High	Depth of Field (mm) Low-High
0.25X 0.006 - 0.018 1-6044	308 (nominal)	Mag.	0.09X - 0.56X	0.12X - 0.75X	0.18X - 1.13X	.24X - 1.5X	0.35X - 2.25X	.63X - 3.95X	0.88X - 5.62X	27.78 - 9.26	13.89 - 1.54
		Sensor 1/4"	45.70 - 7.12	34.03 - 5.33	22.85 - 3.56	17.18 - 2.68	11.42 - 1.78	6.53 - 1.02	4.54 - 0.72	27.78 - 9.26	13.89 - 1.54
	282-351 (1) W.D. range	Sensor 1/3"	68.64 - 10.64	51.12 - 8.04	34.32 - 5.32	25.80 - 4.0	17.16 - 2.66	9.8 - 1.52	6.88 - 1.08	27.78 - 9.26	13.89 - 1.54
		Sensor 1/2"	91.36 - 14.16	68.06 - 10.66	45.68 - 7.08	34.34 - 5.32	22.84 - 3.54	13.05 - 2.02	9.12 - 1.44	27.78 - 9.26	13.89 - 1.54
		Sensor 2/3"	91.40 - 19.52	93.62 - 14.66	62.84 - 9.76	47.25 - 7.34	31.42 - 4.88	17.95 - 2.79	12.56 - 1.96	27.78 - 9.26	13.89 - 1.54
0.5X 0.011 - 0.035 1-60110	175 (nominal)	Mag.	0.18X - 1.13X	0.24X - 1.50X	0.35X - 2.25X	.46X - 2.99X	0.70X - 4.50X	1.22X - 7.87X	1.75X - 11.25X	15.15 - 4.76	4.13 - 0.41
		Sensor 1/4"	22.85 - 3.56	17.02 - 2.66	11.42 - 1.78	8.59 - 1.34	5.71 - 0.89	3.26 - .51	2.28 - 0.36	15.15 - 4.76	4.13 - 0.41
	143-187 (1) W.D. range	Sensor 1/3"	34.32 - 5.32	25.56 - 4.0	17.16 - 2.67	12.90 - 2.01	8.58 - 1.33	4.90 - 0.76	3.43 - 0.53	15.15 - 4.76	4.13 - 0.41
		Sensor 1/2"	45.68 - 7.08	34.03 - 5.33	22.85 - 3.56	17.18 - 2.68	11.42 - 1.77	6.58 - 1.02	4.57 - 0.71	15.15 - 4.76	4.13 - 0.41
		Sensor 2/3"	45.70 - 9.76	46.81 - 7.33	31.43 - 4.89	23.63 - 3.68	15.71 - 2.44	8.98 - 1.40	6.29 - 0.98	15.15 - 4.76	4.13 - 0.41
0.75X 0.017 - 0.053 1-60111	113 (nominal)	Mag.	0.27X - 1.69X	0.35X - 2.25X	0.53X - 3.38X	.70X - 4.49X	1.05X - 6.75X	1.85X - 11.83X	2.63X - 16.88X	9.80 - 3.14	1.73 - 0.18
		Sensor 1/4"	15.22 - 2.38	11.34 - 1.78	7.61 - 1.19	5.72 - .89	3.81 - 0.59	2.17 - .34	1.52 - 0.24	9.80 - 3.14	1.73 - 0.18
	100-119 (1) W.D. range	Sensor 1/3"	22.86 - 3.56	17.04 - 2.67	11.43 - 1.78	8.59 - 1.34	5.72 - 0.89	3.26 - .51	2.29 - 0.35	9.80 - 3.14	1.73 - 0.18
		Sensor 1/2"	30.46 - 4.74	22.69 - 3.56	15.23 - 2.37	11.45 - 1.78	7.62 - 1.19	4.35 - .68	3.05 - 0.47	9.80 - 3.14	1.73 - 0.18
		Sensor 2/3"	30.50 - 6.52	31.21 - 4.89	20.95 - 3.26	15.75 - 2.45	10.48 - 1.63	5.98 - .93	4.19 - 0.65	9.80 - 3.14	1.73 - 0.18
None 0.023 - 0.071	92 (nominal)	Mag.	0.35X - 2.25X	0.47X - 3.00X	0.70X - 4.50X	.93X - 5.89X	1.40X - 9.00X	2.45X - 15.75X	3.50X - 22.50X	7.25 - 2.35	0.95 - 0.10
		Sensor 1/4"	11.42 - 1.78	8.51 - 1.33	5.71 - 0.89	4.29 - .67	2.86 - 0.45	1.63 - .25	1.14 - 0.18	7.25 - 2.35	0.95 - 0.10
	81-93 (1) W.D. range	Sensor 1/3"	17.16 - 2.67	12.77 - 2.01	8.58 - 1.33	6.45 - 1.0	4.29 - 0.67	2.45 - .38	1.72 - 0.27	7.25 - 2.35	0.95 - 0.10
		Sensor 1/2"	22.85 - 3.56	17.01 - 2.67	11.42 - 1.77	8.59 - 1.33	5.71 - 0.89	3.26 - .50	2.28 - 0.36	7.25 - 2.35	0.95 - 0.10
		Sensor 2/3"	22.90 - 4.89	23.40 - 3.65	15.71 - 2.44	11.81 - 1.83	7.86 - 1.22	4.49 - .70	3.14 - 0.49	7.25 - 2.35	0.95 - 0.10
1.5X 0.034 - 0.106 1-60112	51 (nominal)	Mag.	0.53X - 3.38X	0.71X - 4.50X	1.05X - 6.75X	1.40 - 8.98	2.10X - 13.50X	3.67X - 23.62X	5.25X - 33.75X	4.90 - 1.57	0.43 - 0.04
		Sensor 1/4"	7.61 - 1.19	5.67 - 0.89	3.81 - 0.59	2.86 - .44	1.91 - 0.30	1.09 - .17	0.76 - 0.12	4.90 - 1.57	0.43 - 0.04
	48-52 (1) W.D. range	Sensor 1/3"	11.43 - 1.78	8.52 - 1.33	5.72 - 0.89	4.3 - .67	2.86 - 0.44	1.63 - .25	1.14 - 0.18	4.90 - 1.57	0.43 - 0.04
		Sensor 1/2"	15.23 - 2.37	11.34 - 1.77	7.62 - 1.19	5.73 - .89	3.81 - 0.59	2.18 - .34	1.52 - 0.24	4.90 - 1.57	0.43 - 0.04
		Sensor 2/3"	15.00 - 3.26	15.60 - 2.44	10.48 - 1.63	7.88 - 1.22	5.24 - 0.81	2.99 - .46	2.10 - 0.33	4.90 - 1.57	0.43 - 0.04
2.0X 0.040 - 0.142 1-60113	36 (nominal)	Mag.	0.70X - 4.50X	0.94X - 6.00X	1.40X - 9.00X	1.86X - 11.97X	2.80X - 18.00X	4.9X - 31.5X	7.00X - 45.00X	3.62 - 1.17	0.24 - 0.02
		Sensor 1/4"	5.71 - 0.89	4.26 - 0.67	2.86 - 0.45	2.15 - .34	1.43 - 0.23	.82 - .13	0.57 - 0.09	3.62 - 1.17	0.24 - 0.02
	34-37 (1) W.D. range	Sensor 1/3"	8.58 - 1.33	6.39 - 1.00	4.29 - 0.67	3.22 - .50	2.15 - 0.33	1.22 - .19	0.86 - 0.13	3.62 - 1.17	0.24 - 0.02
		Sensor 1/2"	11.42 - 1.77	8.51 - 1.33	5.71 - 0.89	4.29 - .67	2.86 - 0.44	1.63 - .25	1.14 - 0.18	3.62 - 1.17	0.24 - 0.02
		Sensor 2/3"	11.40 - 2.44	11.70 - 1.83	7.86 - 1.22	5.91 - .92	3.93 - 0.61	2.24 - .35	1.57 - 0.24	3.62 - 1.17	0.24 - 0.02

Notes:

The above fields of view are measured diagonally in millimeters (Horizontal = Diagonal x 0.8 and Vertical = Diagonal x 0.6).

(1) Working distance range when using 12 mm fine focus. Field of view will change with shorter or longer working distances.

NA varies depending in system magnification.

Zoom 6000 UltraZoom Field of View Matrix

1-60190, 1-60191, 1-60349 and 1-60350 (In mm)

Objective Lens (Mitutoyo) Long WD	W.D.	Camera Format/ Parameters	1X Adapter Low - High	1.33X Adapter Low - High	2X Adapter Low - High	3.5X Adapter Low - High
5X 0.14 NA* 1-60226	34	Mag.	1.74X - 11.43X	2.3X - 15.0X	3.48X - 22.86X	6.1X - 39.4X
		Sensor 1/4"	2.30 - 0.35	1.74 - 0.26	1.15 - 0.17	0.65 - 0.1
		Sensor 1/3"	3.45 - 0.52	2.61 - 0.40	1.72 - 0.26	0.98 - 0.15
		Sensor 1/2"	(1) 4.05 - 0.70	3.48 - 0.54	2.30 - 0.35	1.31 - 0.20
		Sensor 2/3"	(1) 4.02 - 0.96	4.0 - 0.74	3.16 - 0.48	1.80 - 0.28
10X 0.28 NA* 1-60227	33	Mag.	3.48X - 22.86X	4.63X - 29.9X	6.96X - 45.72X	12.3X - 78.8X
		Sensor 1/4"	1.15 - 0.17	0.86 - 0.13	0.57 - 0.09	0.33 - 0.05
		Sensor 1/3"	1.72 - 0.26	1.30 - 0.20	0.86 - 0.13	0.49 - 0.08
		Sensor 1/2"	(1) 2.10 - 0.35	1.73 - 0.27	1.15 - 0.17	0.66 - 0.10
		Sensor 2/3"	(1) 2.10 - 0.48	2.10 - 0.37	1.58 - 0.24	0.9 - 0.14
20X 0.42 NA* 1-60228	20	Mag.	6.96X - 45.72X	9.3X - 59.9X	13.92X - 91.40X	24.5X - 157.6X
		Sensor 1/4"	0.57 - 0.09	0.43 - 0.07	0.29 - 0.04	0.16 - 0.03
		Sensor 1/3"	0.86 - 0.13	0.65 - 0.10	0.43 - 0.07	0.25 - 0.04
		Sensor 1/2"	(1) 1.0 - 0.17	0.86 - 0.14	0.57 - 0.09	0.33 - 0.05
		Sensor 2/3"	(1) 1.03 - 0.24	1.0 - 0.19	0.79 - 0.12	0.45 - 0.07
50X 0.55 NA* 1-60229	13	Mag.	17.40X - 114.30X	23X-150X	34.80X - 228.60X	61X - 393.8X
		Sensor 1/4"	0.23 - 0.03	0.17 - 0.03	0.11 - 0.02	0.07 - 0.01
		Sensor 1/3"	0.30 - 0.05	0.26 - 0.04	0.17 - 0.03	0.10 - 0.015
		Sensor 1/2"	(1) 0.31 - 0.07	0.30 - 0.05	0.23 - 0.04	0.13 - 0.02
		Sensor 2/3"	(1) 0.30 - 0.10	0.30 - 0.07	(1) 0.30 - 0.05	0.18 - 0.03

(1) Entire zoom range is not used.

*NA at full zoom. NA varies with zoom settings.

Zoom 6000 Field of View Matrix for Internal Coaxial Zoom

1-60123 (In mm at Nominal Working Distance)

Lens Attachment	W.D.	Camera Format/ Parameters	.5X Adapter Low - High	.67X Adapter Low - High	1X Adapter Low - High	1.33X Adapter Low - High	2X Adapter Low - High	3.5X Adapter Low - High	5X Adapter Low - High
None 0.023- 0.071	92 (nominal) 90-93 (1) W.D. range	Mag.	0.35X - 2.25X	0.47X - 3.00X	0.70X - 4.50X	.93X - 6.0X	1.40X - 9.00X	2.45X - 15.75X	3.50X - 22.50X
		Sensor 1/4"	11.43 - 1.78	8.51 - 1.33	5.71 - 0.89	4.3X - 0.67	2.86 - 0.45	1.63 - 0.25	1.14 - 0.18
		Sensor 1/3"	(2) 11.10 - 2.67	(2) 11.40 - 2.01	8.58 - 1.33	6.45 - 1.0	4.29 - 0.67	2.45 - 0.38	1.72 - 0.27
		Sensor 1/2"	(2) 11.20 - 3.56	(2) 11.46 - 2.62	11.42 - 1.77	8.6 - 1.33	5.71 - 0.89	3.27 - 0.51	2.28 - 0.36
		Sensor 2/3"	(2) 11.06 - 4.89	(2) 11.54 - 3.60	11.40 - 2.44	11.0 - 1.83	7.86 - 1.22	4.49 - 0.7	3.14 - 0.49
1.5X 0.034- 0.104 1-60112	51 (nominal) 51-53 (1) W.D. range	Mag.	0.53X - 3.38X	0.71X - 4.50X	1.05X - 6.75X	1.4X - 9.0X	2.10X - 13.50X	3.7X - 23.6X	5.25X - 33.75X
		Sensor 1/4"	7.62 - 1.18	5.67 - 0.89	3.81 - 0.59	2.85 - 0.44	1.91 - 0.30	1.08 - 0.17	0.76 - 0.12
		Sensor 1/3"	11.32 - 1.78	8.52 - 1.33	5.72 - 0.89	4.29 - 0.67	2.86 - 0.44	1.62 - 0.25	1.14 - 0.18
		Sensor 1/2"	(2) 11.20 - 2.37	11.34 - 1.77	7.62 - 1.19	5.71 - 0.89	3.81 - 0.59	2.16 - 0.34	1.52 - 0.24
		Sensor 2/3"	(2) 11.2 - 3.25	(2) 11.20 - 2.44	10.48 - 1.63	7.86 - 1.22	5.24 - 0.81	2.97 - 0.47	2.10 - 0.33
2.0X 0.046- 0.141 1-60113	36 (nominal) 36-37 (1) W.D. range	Mag.	0.70X - 4.50X	0.94X - 6.00X	1.40X - 9.00X	1.86X-12.0X	2.80X - 18.00X	4.9X-31.5X	7.00X - 45.00X
		Sensor 1/4"	5.71 - 0.89	4.26 - 0.67	2.86 - 0.45	2.15 - 0.33	1.43 - 0.23	0.82 - 0.13	0.57 - 0.09
		Sensor 1/3"	8.57 - 1.33	6.39 - 1.00	4.29 - 0.67	3.22 - 0.5	2.15 - 0.33	1.22 - 0.19	0.86 - 0.13
		Sensor 1/2"	(2) 11.2 - 1.77	8.51 - 1.33	5.71 - 0.89	4.30 - 0.67	2.86 - 0.44	1.63 - 0.25	1.14 - 0.18
		Sensor 2/3"	(2) 11.2 - 2.44	(2) 11.7 - 1.83	7.86 - 1.22	5.91 - 0.92	3.93 - 0.61	2.24 - 0.35	1.57 - 0.24

Notes:

The internal coax will illuminate a circular area of about 11 mm in diameter. Any field of view larger than 11 mm will have darkened corners.

Low power lens attachments can be used but produce increasing vinetting. (1) Working distance range when using 3 mm fine focus. (2) Entire zoom range is not used.