

Monometallic Telescope

Three Mirror Anastigmat

Product Description:

The all-aluminum monometallic approach for achieving high performance and athermal telescopes is proven and well understood. In addition to the intrinsic athermal character of a monometallic design, the use of a single material eliminates much of the problem with mounting and supporting mirrors in a stress free manner over a wide temperature range.

The LightWorks team has produced several monometallic Three Mirror Anastigmats (TMA's) for space research, defense, aerospace, and custom test equipment applications. The LightWorks monometallic TMA product is a 3-mirror focal or afocal aluminum optical system. We have extensive experience with this system solution form and believe it offers distinct advantages for many applications.

The cost to machine and stabilize aluminum is low, and aluminum plated with a thin layer of nickel is ideal for Single Point Diamond Turning (SPDT) and finish polishing for near IR and visible-band applications. SPDT technology also ensures high accuracy alignment of the mirrors is simple and straightforward.

If a uniform operating temperature without gradients does not exist, there will be some performance degradation or defocus depending on the magnitude and distribution of the gradient. The fact that aluminum has high thermal conductivity, however, means that in many applications there is a good possibility that the all-aluminum, passively athermal design will work. This in turn means that the intrinsic cost, schedule, and risk benefits of this solution can be realized on many demanding projects.



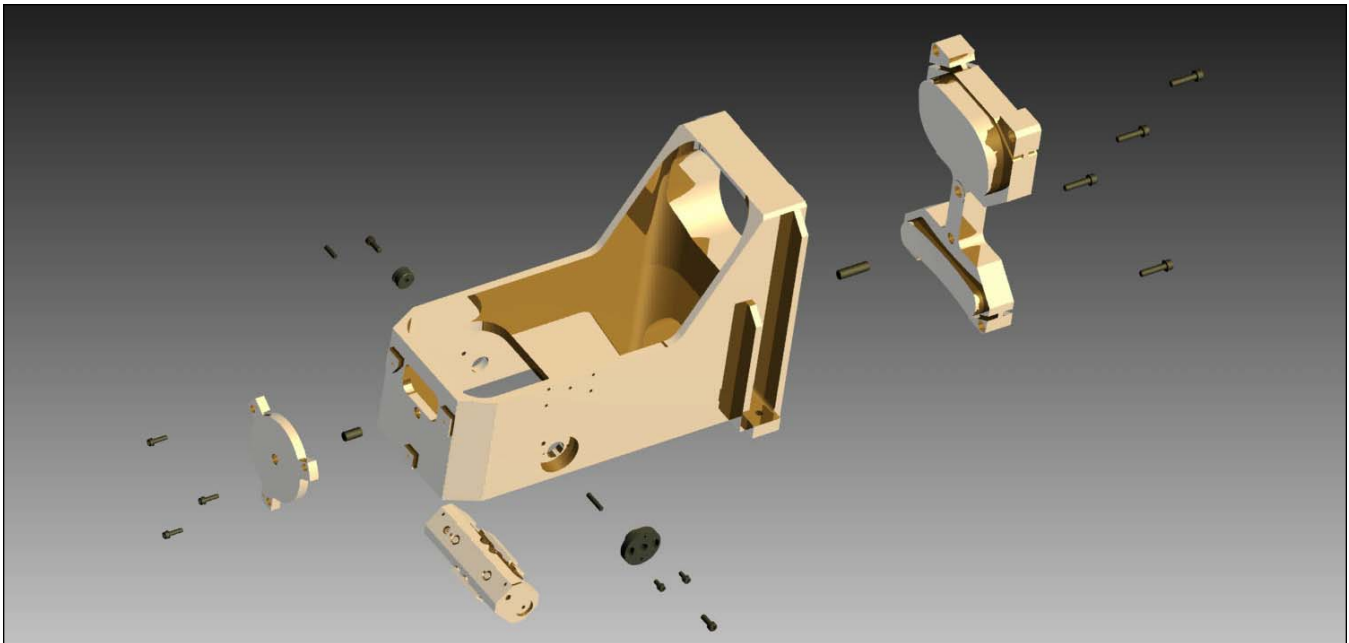
If your next telescope project requires a low technical complexity solution that also reduces program schedule risk in both the design and manufacturing process, call on LightWorks to collaborate with your team in developing your total best system solution.

Key Features:

- *Well suited to multi-wavelength applications*
- *Re-imaging designs achieve 100% cold shield efficiency in IR channels*
- *Thermal compensators used to eliminate thermo-structural effects at telescope mounting interface*

Applications:

- *Airborne infrared search and track*
- *Airborne surveillance*
- *Shipboard surveillance*
- *Space based sensors*
- *Special test equipment collimators*



Exploded View of Basic Telescope

Specifications:	TMA Type	
	Afocal Form	Objective Form
Effective Focal Length & F-number	Infinity	EFL to suit application F/10 to F/2
Operational Wavelength	Visible to LW IR	Visible to LW IR
Magnification	2 to 10x	
Field of View	Up to 4 X 4 degrees	Up to 4 X 4 degrees
Effective Aperture	1 to 10 inches	1 to 10 inches
Wavefront Error	< 2 waves P-V at 632.8 nm < 0.25 waves P-V post-polished	< 2 waves P-V at 632.8 nm < 0.25 waves P-V post-polished
Coatings	>98.4% 2.0 to 12u >99.0% 2.0 to 12u >98.0% 2.0 to 12u >98.0% 0.5 to 12u	Electro-deposited gold Protected gold Protected aluminum Protected silver
Operating Temperature		
Aluminum	Cryogenic to 90°C	Cryogenic to 90°C
Nickel Plated Aluminum	-60 to 90°C	-60 to 90°C
Mass	0.5 to 180 lbs.	0.5 to 180 lbs.
Natural Frequency	at 1st mode > 350 to 3000 Hz	at 1st mode > 350 to 3000 Hz



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