HOPE PAPO D60 280mm f/4.66L Astronomical Telescope

Table of Contents

1 HOPE Series Astronomical Telescope

1.1 Introduction to HOPE Series Astronomical Telescope

The HOPE Series is a high-performance astronomical refractor lineup developed by ToupTek Astro, designed for astrophotography enthusiasts who pursuing exceptional imaging quality.

1.2 Features of HOPE PAPO D60 280mm f/4.66L

HOPE PAPO D60 280mm f/4.66L astronomical telescope offers the following key features:

- Optical System: A 5-element apochromatic (APO) lens design, incorporating imported Japanese SD (Special Dispersion) glass and high-refractive-index lanthanum glass, effectively eliminates chromatic aberration for sharp, color-accurate images. The Strehl ratio approaches the theoretical limit, enabling the capture of crisp and finely detailed star fields.
- Built-in Field Flattener: Delivers excellent image quality without requiring an external field flattener.
- Robust Construction: The CNC-machined aluminum alloy tube ensures precision and durability, making it suitable for diverse observing conditions while maintaining optical stability.
- Retractable Built-in Lens Hood: Effectively blocks stray light (e.g., ground lights or moonlight), enhancing contrast and clarity for pristine, high-definition astrophotography.
- High-Precision Focuser: Equipped with a 3-inch dual-speed rack-and-pinion focuser for smooth, precise adjustments to achieve optimal focus.
- Versatile Interfaces: Features M48/M54 threaded interfaces for broad compatibility with astronomical cameras and accessories, catering to different imaging needs.

1.3 Specifications of HOPE PAPO D60 280mm f/4.66L

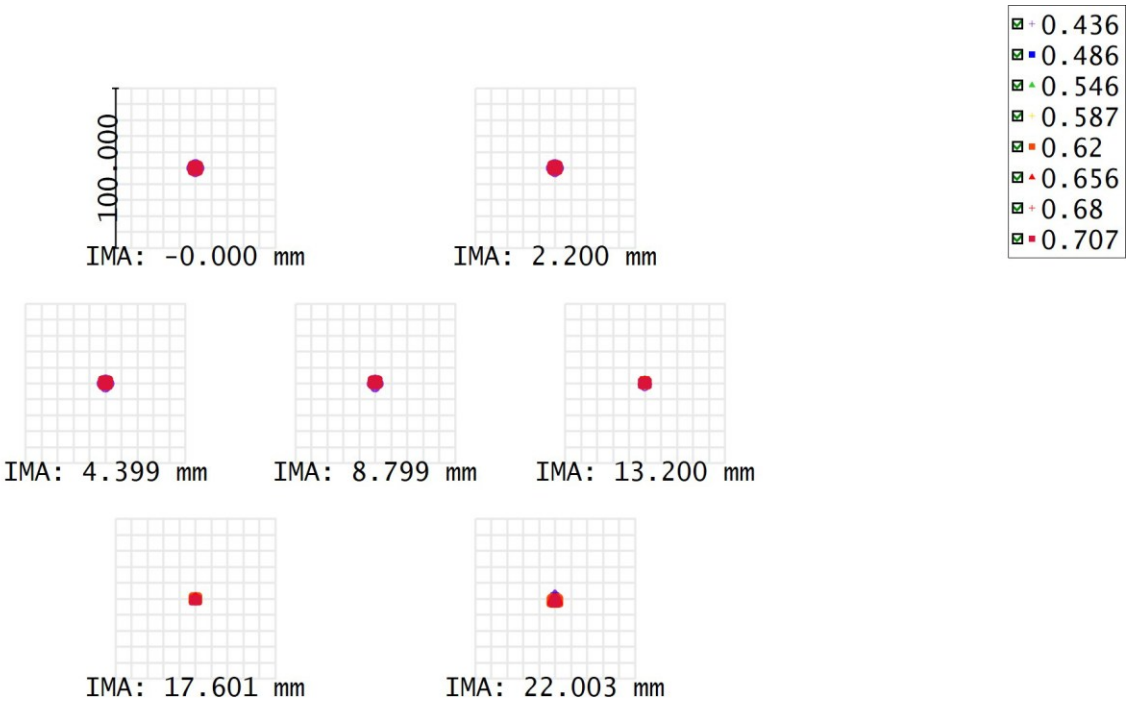
Aperture	60mm
Focal Length	280mm
Focal Ratio	f/4.66
Lens Type	5-element APO
Image Circle	44mm (full frame)
Minimum Focus Distance	3m
Focusing Method	Manual focus
Focus Travel	30mm
OTA Length	255mm (hood retracted), 315mm (hood extended)
OTA Weight	2.83kg
Total Weight (incl. ring clamp, handle and dovetail)	3.5kg
Rear-end Adapter	M54/M48
Rear-end Connection Distance	50mm-58mm (recommended: 55mm)

1.4 Optical Performance Chart of HOPE PAPO D60 280mm f/4.66L

1.4.1 Spot Diagram

The spot diagram visually depicts the distribution of star-point light rays on the focal plane (or sensor). Different wavelengths are color-coded. Tightly clustered spots indicate sharp imaging, while dispersion reveals blur or chromatic aberration.

HOPE PAPO D60 280mm f/4.66L exhibits exceptional performance. The central RMS spot size is smaller than 1.1μm, and the full-frame edge RMS spot size is smaller than 2.3μm.



Surface: IMA

Spot Diagram

2025/7/28
Units are μm. Legend items refer to Wavelengths

Field	:	1	2	3	4	5	6	7
RMS radius	:	1.084	1.158	1.329	1.613	1.178	1.236	2.209
GEO radius	:	3.370	3.370	3.365	3.291	2.571	2.225	3.683

Scale bar : 100.000 Reference : Middle

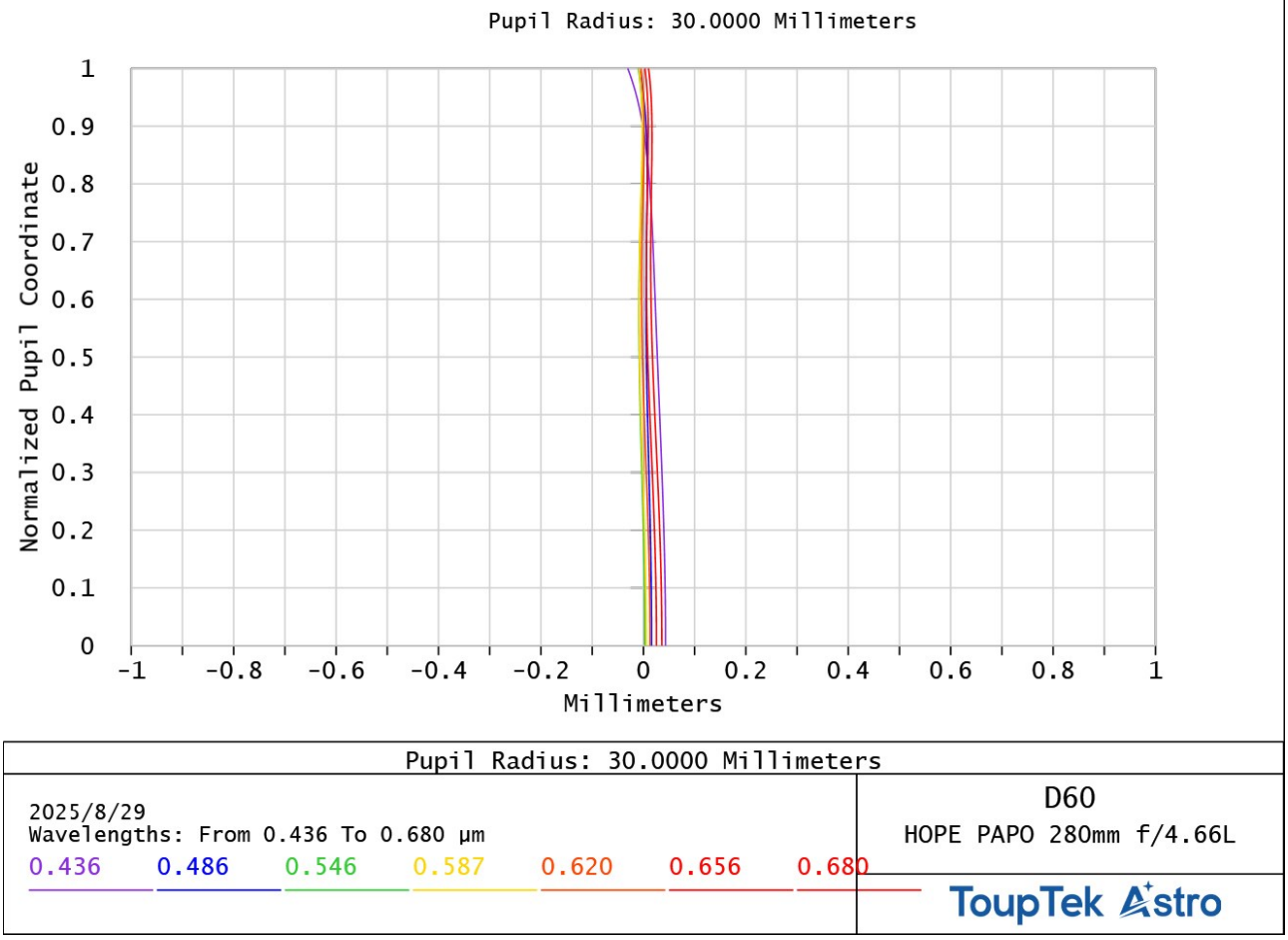
D60
HOPE PAPO 280mm f/4.66L

ToupTek Astro

1.4.2 Longitudinal Aberration

Longitudinal aberration measures focal shifts along the optical axis, primarily caused by spherical aberration and axial chromatic aberration.

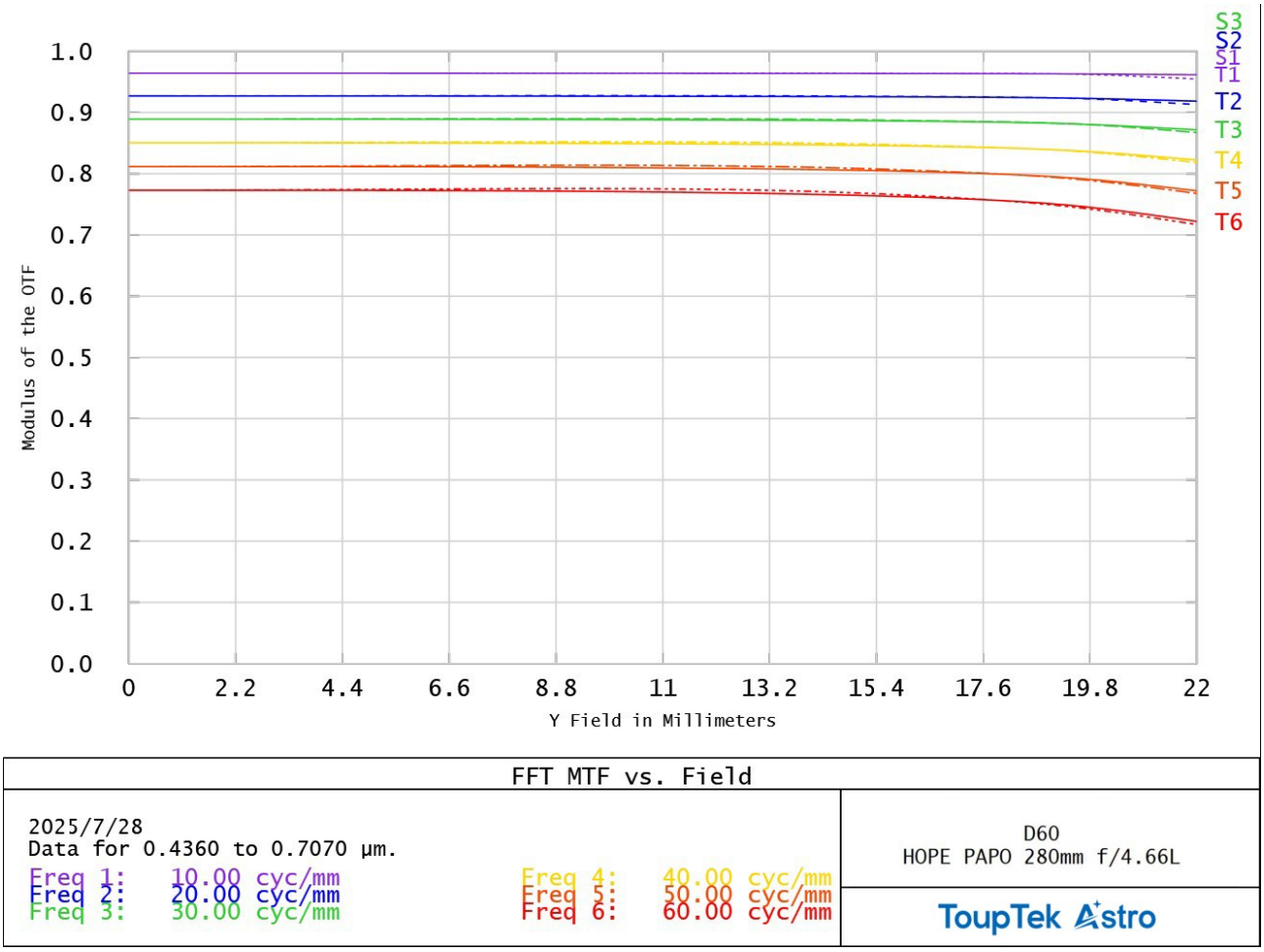
HOPE PAPO D60 280mm f/4.66L demonstrates low-slope and flat curves across wavelengths, and minimal curve separation, indicating superior chromatic correction.



1.4.3 FFT MTF vs. Field Curve

The FFT MTF vs. Field curve graphically represents the modulation transfer function (MTF) of an optical system as it varies across the field of view (image height). It is used to analyze the imaging resolution and contrast uniformity at different field positions and serves as a critical tool for evaluating the performance of an astronomical telescope. S and T denote the Sagittal and Tangential directions, respectively. A smooth decline in the MTF curve indicates well-balanced aberration correction, while curves that remain as flat as possible across the full field and stay close to the diffraction limit ensure uniform imaging performance and detail reproduction.

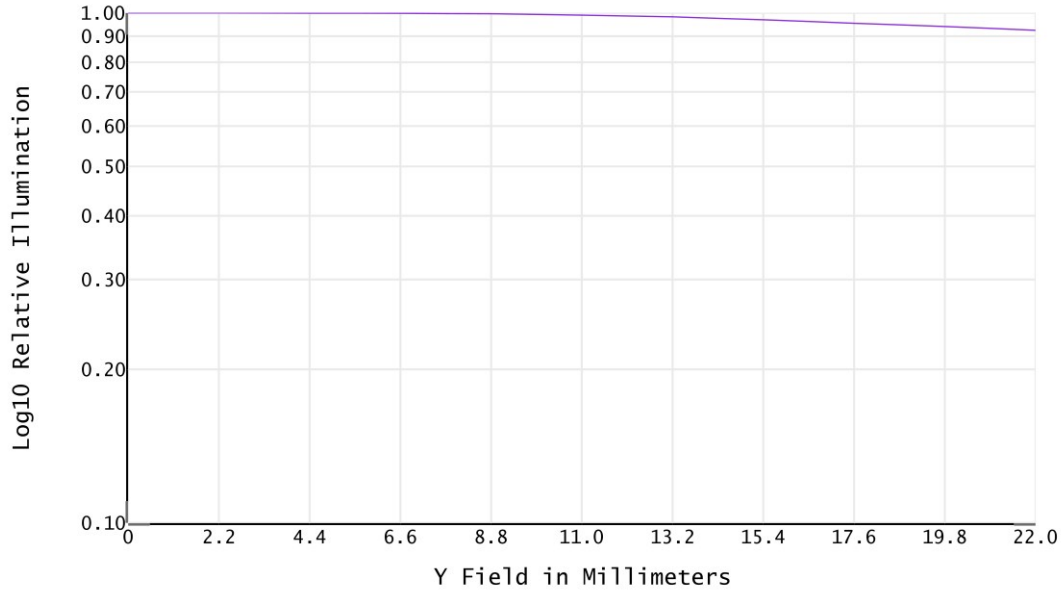
For HOPE PAPO D60 280mm f/4.66L, the FFT MTF vs. Field curve achieves values greater than 0.95 at a low frequency of 10LP/mm in both Sagittal (S) and Tangential (T) directions. At a high frequency of 30LP/mm, the MTF remains above 0.85 in both directions. The curve exhibits a gradual decline, with minimal differences between Sagittal and Tangential performance from the center to the edge of the full frame. This demonstrates the exceptional resolution and outstanding imaging uniformity of HOPE PAPO D60 280mm f/4.66L.



1.4.4 Relative Illumination

Relative illumination measures the uniformity of illumination across the image plane in an optical system, describing the brightness attenuation from the center to the edge of the image. The horizontal axis represents the image plane position (0mm = sensor center, 22mm = full-frame edge), while the vertical axis indicates relative illumination as a percentage (with 100% being the maximum).

HOPE PAPO D60 280mm f/4.66L maintains a relative illumination above 95% at the 44mm full-frame edge, with a smooth attenuation curve. This ensures uniform brightness distribution and consistent image quality across the entire frame.



Relative Illumination	
2025/7/28 Wavelength: 0.546000 µm	D60 HOPE PAPO 280mm f/4.66L
	ToupTek Astro

1.5 HOPE PAPO D60 280mm f/4.6L Native Flat-field Design

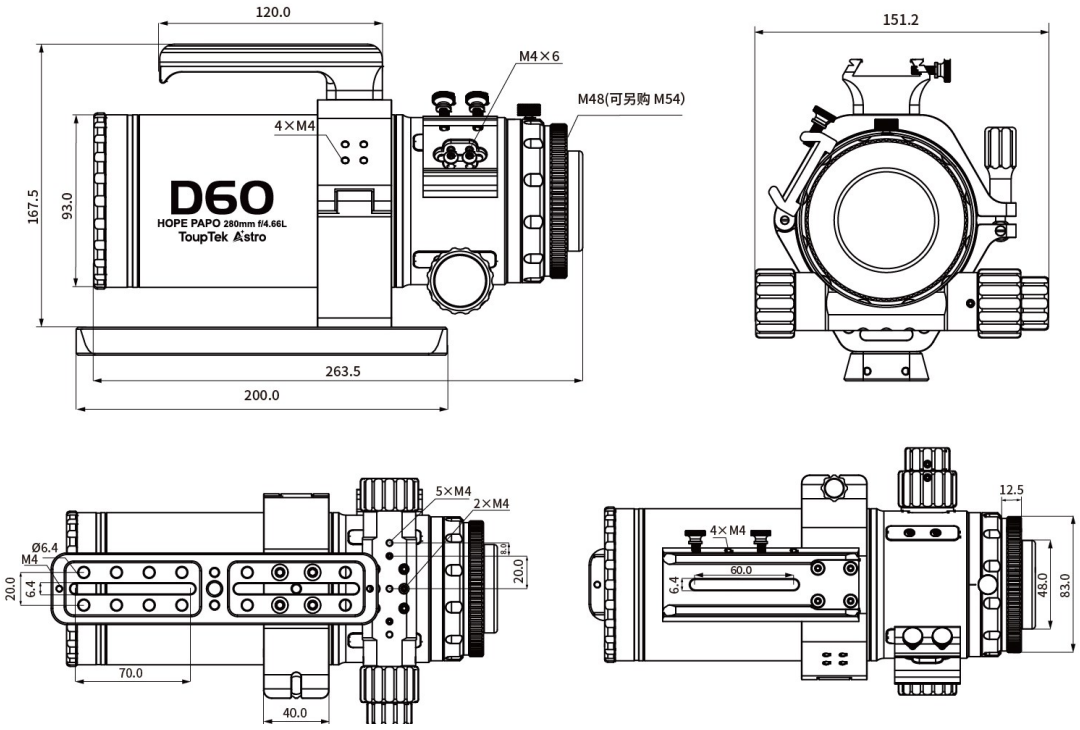
Full-frame coverage. Entire star field sharp and clear.

The native flat-field design corrects for field curvature, ensuring pinpoint focus for stars both in the center and at the edges, resulting in clearer image quality and more rounded stars.

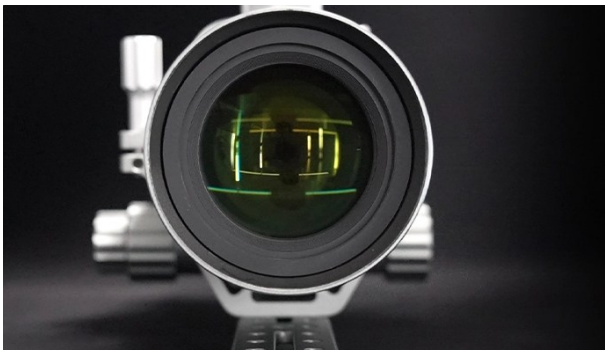
This built-in field flattener design significantly simplifies the imaging workflow. There is no need to calculate complex back-focus distances or purchase an additional field flattener. Easy focus is achieved within a 50-58mm connection distance (55mm recommended).

Note: Because the telescope's focal plane position and working distance have been precisely engineered, the use of a star diagonal for visual observation is not recommended.

1.6 HOPE PAPO D60 280mm f/4.66L Dimension



1.7 HOPE PAPO D60 280mm f/4.6L Precise Mechanical Structure

	Made from high-strength aluminum alloy, precision CNC-machined for resistance to vibration, temperature changes, and deformation. Prevents subtle shifts and maintains imaging focus for stable results.
	The interior lens tube features a blackened treatment to effectively suppress stray light, ensuring clean and clear images. A retractable lens hood blocks stray light interference and improves image contrast and uniformity. The magnetic positioning allows for a one-second and secure attachment. When retracted, the overall size is reduced for improved portability.
	The 3-inch focuser with a 30mm travel allows for both coarse and fine adjustments. Manual focusing or using an electric focuser is precise with no backlash. A focus position window with a clear scale ruler allows quick determination of focus position and improves efficiency.
	The camera angle adjuster enables 360° rotation without disassembling equipment, enabling easy and flexible framing.

	The multi-function handle supports the connection of diverse accessories for expanded capabilities. Built with an integrated dovetail bar and pre-drilled side slots, the OTA offers stable support and effortless accessory integration, unlocking the full expansion potential.
	The base is embedded with a riser block and features multiple positioning slots. A VIXEN-style dovetail plate adapts to various equatorial and alt-azimuth mount systems. The central 3/8" threaded hole can be converted to a 1/4" threaded hole using the included accessories, enabling application in more scenarios like landscape and lunar photography.
	The entire telescope is compact and portable for taking on the go. With the lens hood retracted, it is only 255mm long, allowing it to fit neatly into a bag for easy storage and transport.

1.8 HOPE PAPO D60 280mm f/4.6L Highly Compatible Interfaces

Comes standard with an M48 adapter ring, compatible with different sensor format cameras and various photography accessories. An optional M54 adapter ring is available to meet the needs of larger format photography.

From long-exposure deep-sky astrophotography to capturing distant landscapes with a DSLR, HOPE D60 excels in all scenarios.

1.9 HOPE PAPO D60 280mm f/4.6L Compatible with Electric Focusers of Multiple Brands

ToupTek Astro AAF

Oasis Electric Focuser (Installed with 32mm clamp and A6 gear)

GEMINI Electric Focuser

ZWO EAF

1.10 HOPE PAPO D60 280mm f/4.6L Versatile Usage

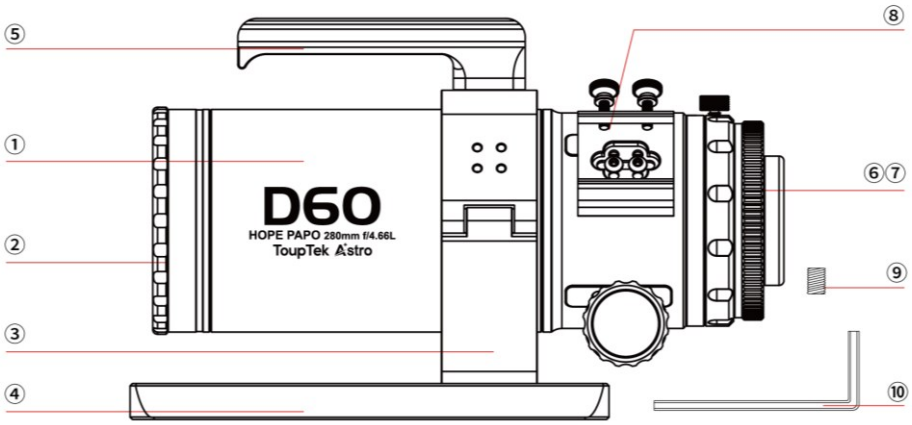
1.10.1 Compatible with DSLR/mirrorless cameras, instantlytransforming into a professional telephoto lens.

1.10.2 Connect to an astronomical camera to become apowerful tool for deep-sky astrophotography.

IC1396 Elephant’s Trunk Nebula Wide Area Photographer：HQBB

M45 Wide Area　　Photographer：Wu Jiang

1.11 HOPE PAPO D60 280mm f/4.6L Packing List



① OTA Tube × 1
② Front Lens Cap × 1
③ Telescope Tube Ring × 1
④ Dovetail Plate × 1
⑤ Handle × 1
⑥ M48×0.75 Male Adapter × 1 (Standard) / M54×0.75 Adapter × 1 (Optional)
⑦ M48-M Metal Dust Cover × 1 (Standard) / M54-M Dust Cover × 1 (Optional)
⑧ Dovetail Rail × 1
⑨ 3/8″ to 1/4″ Threaded Insert × 1
⑩ Hex Wrench × 3
⑪ Paper Information Package × 1 (user manual, leaflets, stickers, etc.)

2 ToupTek®-- Contact Information

	杭州图谱光电科技有限公司	
	杭州市西湖区西园五路 6 号奥强大厦 1 号楼 15 层	
	杭州, 310030, 浙江,	
	中国	
	Hangzhou ToupTek Photonics Co., Ltd	
	15F, Aoqiang Building 1, No. 6, Xiyuan 5th Rd.,	
	Hangzhou, 310030, Zhejiang,	
	P.R.China	
	+86-571-8111-0735 +86-571-8111-0730 +86-571-8810-2638, +86-18058780750 (手机/Mobile Phone)	
	FAX: +86-571-8668-3738	
	tphz@touptek.com	
	Skype:	18058780750/ToupTek Photonics
	Q Q	2426878316
	Wechat	18058780750

3 ToupTek Web

3.1 Microscopic Web

Chinese: https://www.touptekphotonics.com.cn

English: https://www.touptek.com

English: https://www.touptekphotonics.com

3.2 Astronomy Web

Chinese: https://www.touptek-astro.com.cn

Chinese: https://www.touptek-astro.cn

English: https://www.touptek-astro.com

3.3 Astronomy independent station/shop

English: https://www.touptekastro.com