



SOFTWARE BISQUE

## Paramount Apollo™ Specifications



- ✓ Extremely stable altitude-azimuth (alt/az) mount design.
- ✓ Includes the Paramount Software Suite; TPoint™ and the TCSpk™ provide *Total Pointing Integrity*™.
- ✓ High-torque direct-drive motors incorporated into all three axes.
- ✓ Integrated industrial three-axis direct drive motor controller.
- ✓ 180 kg (400 lb.) total instrument capacity.
- ✓ Virtually silent, ultra-fast slews (up to 60 degrees/second).
- ✓ High-resolution on-axis absolute encoders incorporated into all three axes.
- ✓ Direct drive rotator included.

### Introduction

The Paramount Apollo™ robotic telescope system exploits state-of-the-art technology to achieve superior performance by combining advanced observatory-control software with precision CNC machining, high-resolution, on-axis absolute encoders, and high-torque direct-drive motors on all three axes. Apollo™ employs the same multi-axis telescope pointing kernel that controls many of the world's largest telescopes.

Apollo™ employs the same multi-axis TPoint™ telescope pointing kernel that controls many of the world's largest telescopes and thousands of amateur telescope mounts.

The included Paramount Software Suite delivers sky charting, planning, a broad range of hardware control, custom scripting and much more. All on the operating system of your choice (Windows™, macOS™, and Linux™).

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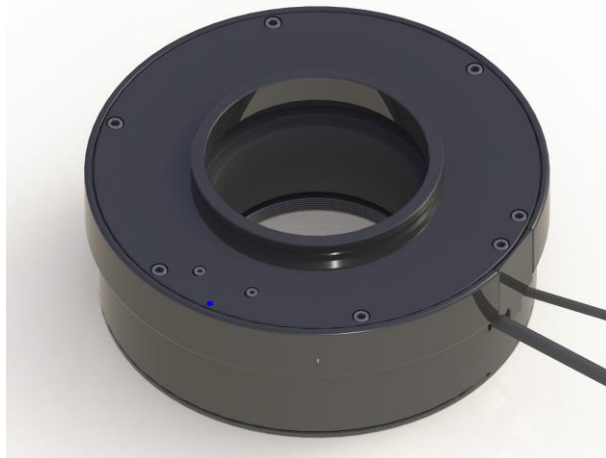
Apollo's alt-az fork-design operates within a relatively compact space to reduce the overall building size and total system cost.

## ■ **Software and Hardware Specifications** ■

Specification	Description	Apollo 500	Apollo 600
<b>Controller</b>	Three-axis industrial direct drive motor controller, 10-20A, 20 KHz control algorithm rate.	✓	✓
<b>Absolute Encoders</b>	150 mm, 26-bit absolute encoders on azimuth, altitude and rotator axis.	✓	✓
<b>Components</b>	145 kg (320 lb.) breaks into four individual components: <ul style="list-style-type: none"> <li>• Base: 52 kg (115 lb.)</li> <li>• Fork center: 14 kg (50 lb.)</li> <li>• Drive fork: 40 kg (88 lb.)</li> <li>• Support fork 28 kg (62 lb.)</li> </ul>	✓	✓
<b>Drive Fork</b>	<ul style="list-style-type: none"> <li>• 200 mm (8-inch) primary bearing.</li> <li>• 125 mm (5-inch) secondary bearing.</li> </ul>	✓	✓
<b>Motor Torque Constant</b>	8.7 Nm/Arms	✓	✓
<b>Support Fork</b>	100 mm self-aligning bearing, multi-axis OTA stress relief mechanism.	✓	✓
<b>Azimuth Axis</b>	<ul style="list-style-type: none"> <li>• 200 mm (8-inch) primary bearing</li> <li>• 125 mm (5-inch) secondary bearing</li> </ul>	✓	✓
<b>Telescope/OTA Attachment</b>	Intelligent Apollo™ “drop-in” telescope plate system.	✓	✓
<b>Azimuth Axis Travel</b>	540 degrees (“soft” stops at end of travel).	✓	✓
<b>Altitude Axis Travel</b>	0 to 90 degrees (“soft” stops at end of travel).	✓	✓
<b>Typical Slew Speeds</b>	25 degrees per second is a reasonable limit with typical telescope loads, 60 degrees maximum.	✓	✓
<b>Speed Range</b>	Floating point (double) speed specification, driven by TPoint’s TCSpk™ pointing kernel.	✓	✓
<b>Cabling</b>	All cables for operation, and controller, are enclosed within the Apollo™ housing. A large access conduit is present through each fork to accommodate custom instrument cables.	✓	✓
<b>Cable Covers</b>	Easy access to internal cabling by removing cable covers.	✓	✓
<b>Rotator Control</b>	Third axis on controller; the motor and encoder plug in to the motor drive side of the fork.	✓	✓
<b>Fork Adjustment</b>	High-compression clamping mechanism on each fork arm provides a	✓	✓

	configurable distance between the fork arms.		
<b>Axis Lock Pin</b>	Both axes can be locked in place to prevent rotation when mounting the telescope and other instrumentation.	✓	✓
<b>Computer Control Software</b>	TheSky™ Astronomy Software (Linux™/macOS™/Windows™)	✓	✓
<b>Connection</b>	Ethernet (TCP/IP control)	✓	✓
<b>Assembly</b>	Mount shipped in four separate, straightforward-to-assemble components	✓	✓
<b>Internal Brake</b>	Available for the altitude axis and is integrated into the fork arm. (optional)	✓	✓
<b>Motor Torque</b>		<ul style="list-style-type: none"> <li>• 30 Nm continuous torque altitude and azimuth axes.</li> </ul>	<ul style="list-style-type: none"> <li>• 37 Nm continuous torque azimuth axis</li> </ul>
<b>Fork Width</b>		600 mm (24 in.)*	600-750 mm (24-28 in.)*
<b>Fork Height</b>		700 mm (28 in.)*	750-860 mm (28-34 in.)*

\*Custom height and width fork arms for non-standard OTAs are available for an additional fee.



Apollo direct-drive rotator.

Please contact Software Bisque ([systems@bisque.com](mailto:systems@bisque.com)) so that our engineers can design a system that meets your project's specifications.



**S O F T W A R E B I S Q U E**

*Superior imaging solutions for discriminating astronomers.*