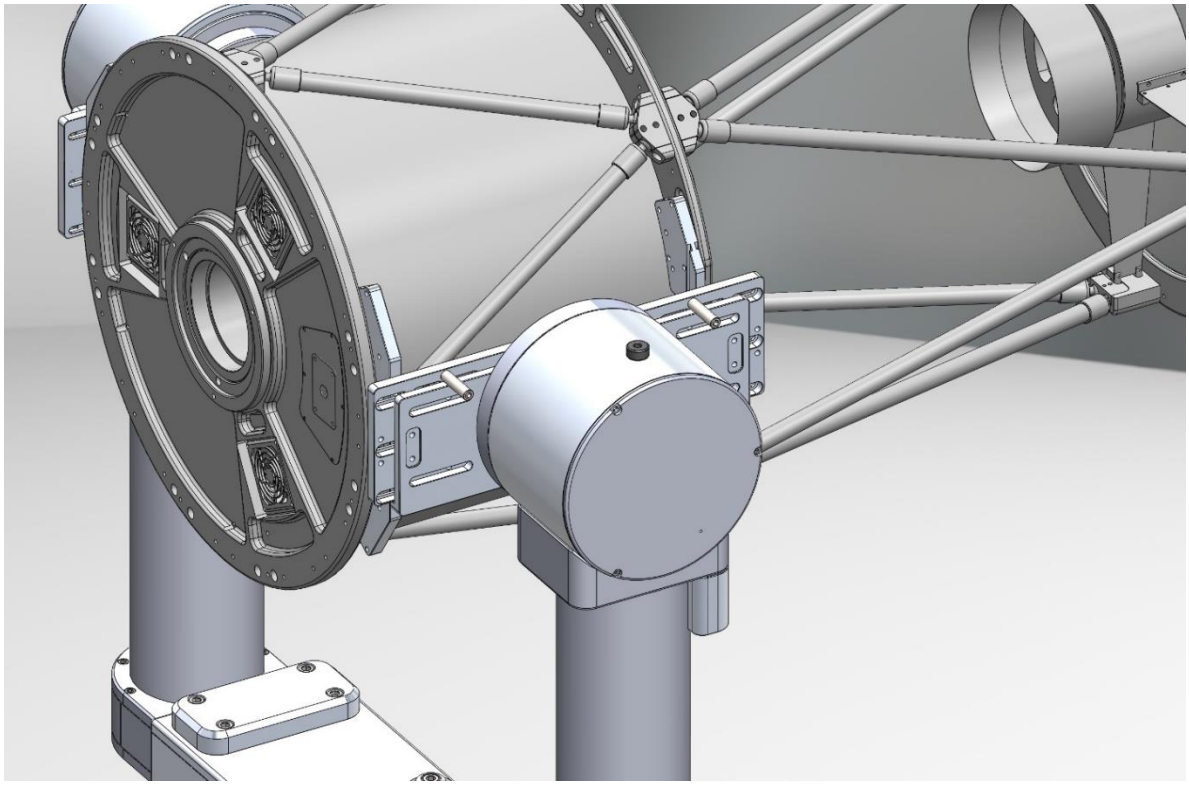


Scope Rail System
User Guide

Revision 3.0

May 2022

SOFTWARE BISQUE

Introduction

The Scope Rail System is designed to securely attach telescopes to the Software Bisque Apollo series of altazimuth mounts and Taurus equatorial fork mounts. The Scope Rail System aids loading heavy instrument payloads, effectively captivates the payload, and allows the payload to be balanced along the optical axis.

The graphics in this document show the Paramount Apollo mount, but the hardware and mounting process are the same for the Paramount Taurus mount.

Optional Scope Rail Adjuster/Retainer

The Scope Rail System offers optional threaded rods that are used to make controlled adjustments to heavier payloads. See “Adjuster/Retainer Use on Optical Payloads” on page 12 for details.

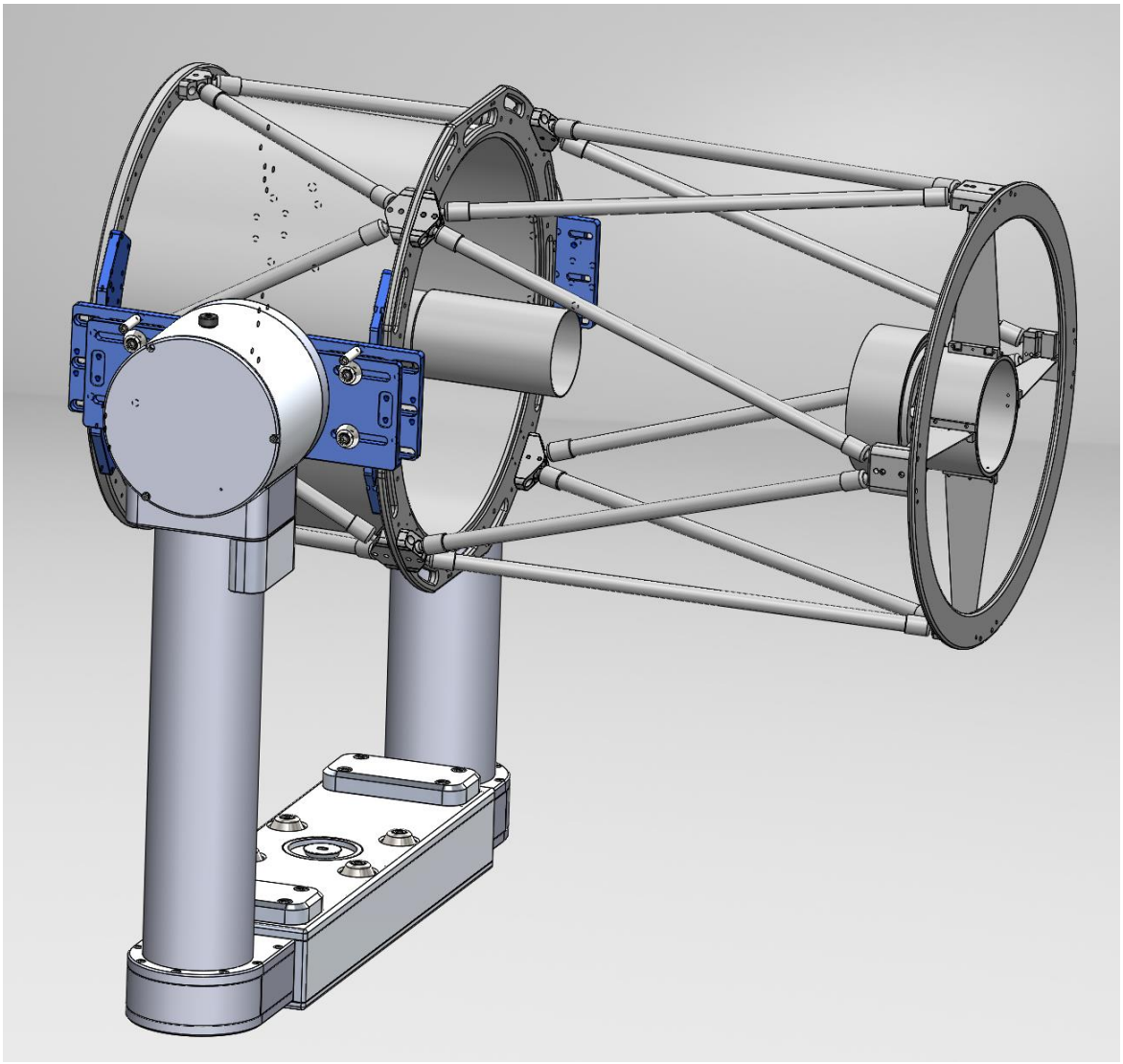
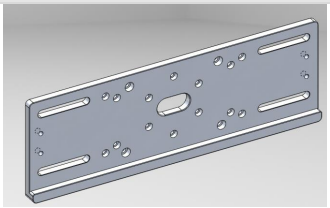
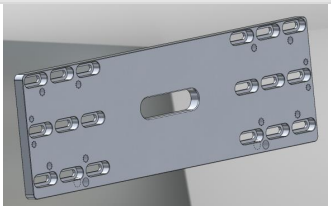
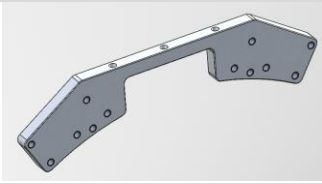
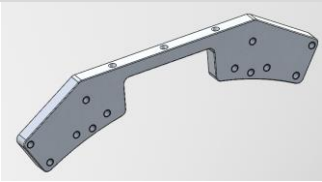


Figure 1: The blue portions show the Scope Rail System carrying an optical tube assembly.

Packing List

The table below shows the standard and optional Scope Rail System components.

Component	Photo	Quantity	Options
Scope Attachment Plate		2	

Component	Photo	Quantity	Options
Scope Rail		2	This component is available in three lengths: • 15.7 in. (40 cm) • 19.6 in. (50 cm) • 23.8 in. (60 cm) See page 10 for details.
Scope Rail Rear Bracket		2	Optional, based on the OTA
Scope Rail Front Bracket		2	Optional, based on the OTA
Clamp Screw		8	With 3/8-16 x 1.125-in. SHCS
Scope Rail *Loading Pin*		4	
5/16-18 x 0.75-in		12	For attaching the scope rail to the scope rail brackets
5/16-18 x 0.75-in. SHCS		8	Scope Attach to drive plate (4x) and Scope attach to support plate (4x)
Washers for 5/16-18 x 0.75-in. SHCS		12	
Scope rail bracket attachment screws		Varies, usually 16 total, 4 per bracket	Based on the OTA

Scope Rail System Components

The Scope Rail System assembly consists of four main parts (with an optional adjuster/retainer system) not including the required fasteners. Two *Scope Attachment Plates* are mounted to both fork tines and have slots that permit fore and aft motion, relative to the tines, to balance the telescope, and a protruding step for the Scope Rails (and payload) to rest on. Two *Scope Rails* are mounted to the optical payload and fastened to the Scope Attachment Plates.

On both fork tines, four stainless-steel clamp screws are inserted through each slot in the Scope Attach Plate and threaded into the Scope Rail. Two *Loading Pins* are mounted to each Scope Rail for use while lowering the optical payload between the fork tines. The weight of the payload rests on the Loading Pins which hold the payload in the correct position so that the slots on the Scope Attachment Plates line up with the threaded holes on the Scope Rails.

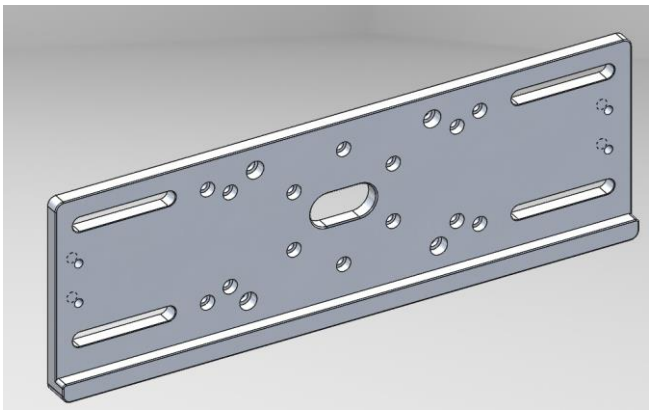


Figure 2: The Scope Attachment Plate.

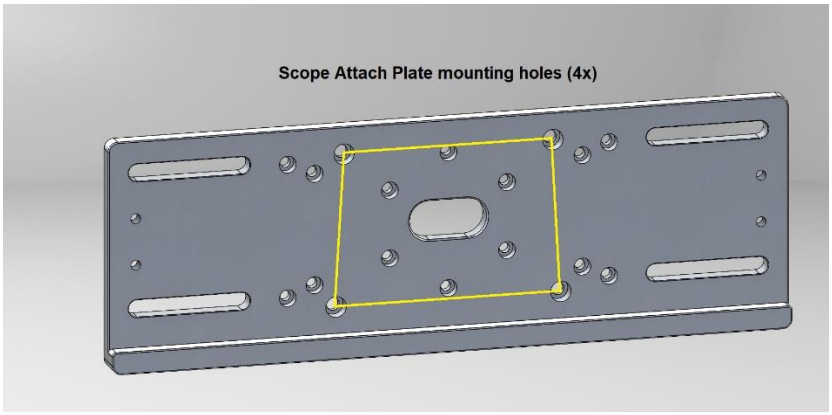


Figure 3: Use these four holes to mount the attachment plate to the tines.

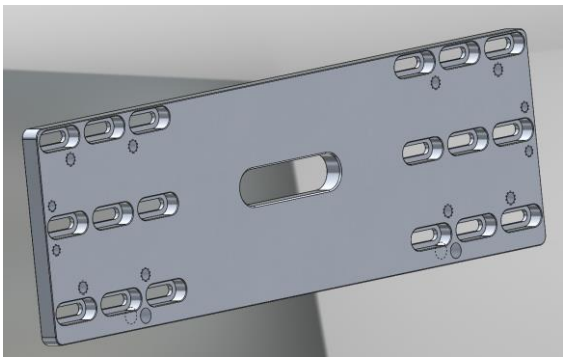


Figure 4: The Scope Rail component is available in three lengths to accommodate different telescopes.

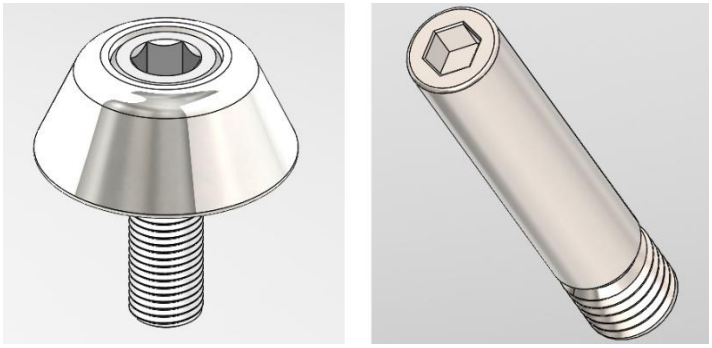


Figure 5: The Clamp Screw (left) and Loading Pin (right).

Example Procedure for Mounting a Truss OTA

The bullet points below provide an overview of the payload mounting procedure, with each step described in detail below.

- Measure the Scope Rail outer dimension. This is the outside distance between the Scope Rails that are mounted to the optical payload.
- Adjust the fork spacing so that the inner distance between the Scope Attachment Plates is 1 to 2 centimeters wider than the Scope Rail spacing that was measured on the payload
- Place the Axis Lock Pin in the drive tine.
- Lower the optical payload between the fork tines until the Loading Pins rest on top of the Scope Attachment Plates. The payload is now manageable but *is not yet secure*.
- While holding the payload in place, insert the clamp screws through the slots in the Scope Attach plate into the threaded holes Scope Rail. Choose the threaded holes that are nearest the center of the slot in the Scope Attach plate.

When mounting the optical payload to the fork tines, both tines should be spaced 1 to 2 cm wider than the outer distance between the Scope Rail plates mounted on the optical payload. As the payload is lowered between the tines, the Loading Pins contact the top of the two Scope Attachment Plates so that they bear the weight of the payload. Since the balance point of the payload is between the front and back Loading Pins, the payload remains in a manageable position until the Clamp Screws can be inserted through the Scope Attach Plate and threaded tight into the Scope Rail. At this point, the payload is safely attached to the tines.

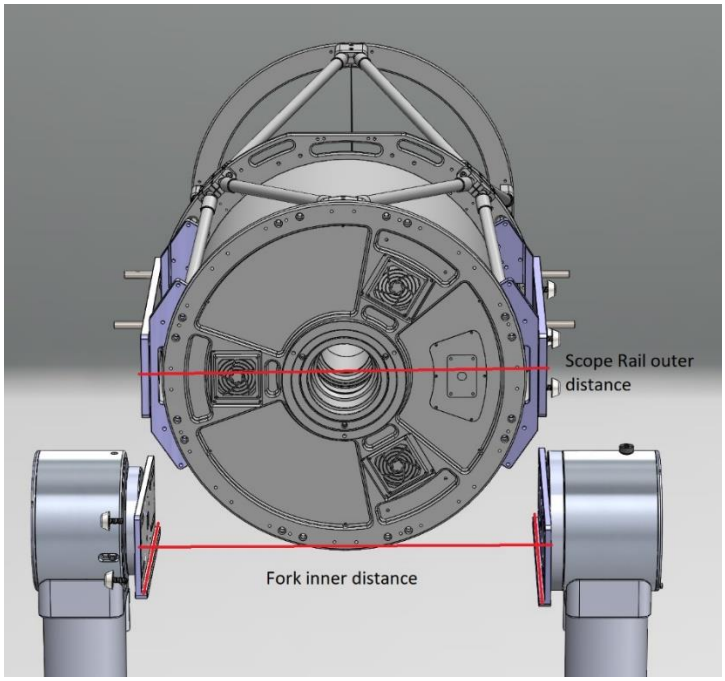


Figure 6: The red lines show where to measure the distance the between the Scope Rails on the OTA and the distance between the fork tines.

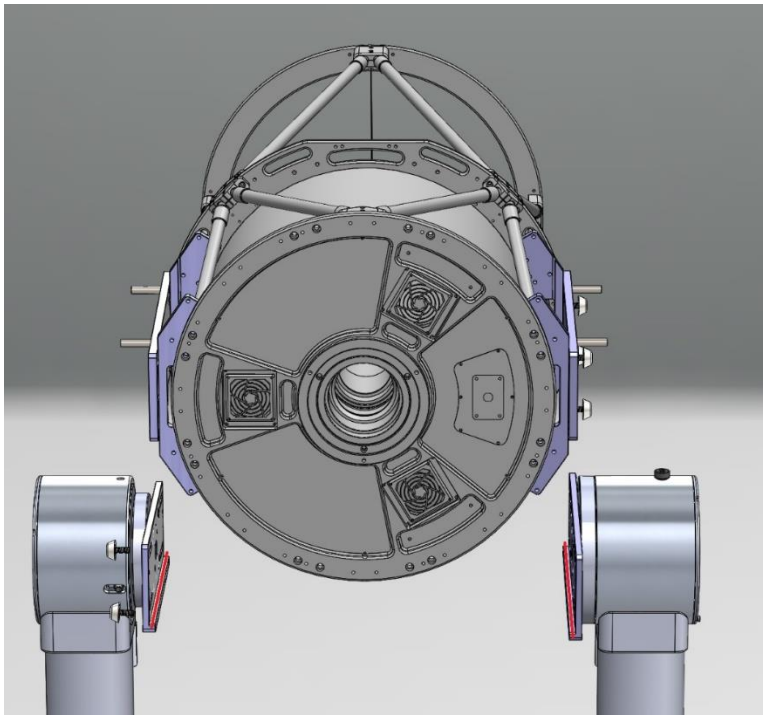


Figure 7: The red lines indicate the resting position of the Scope Rails.

Lowering the OTA into the Fork

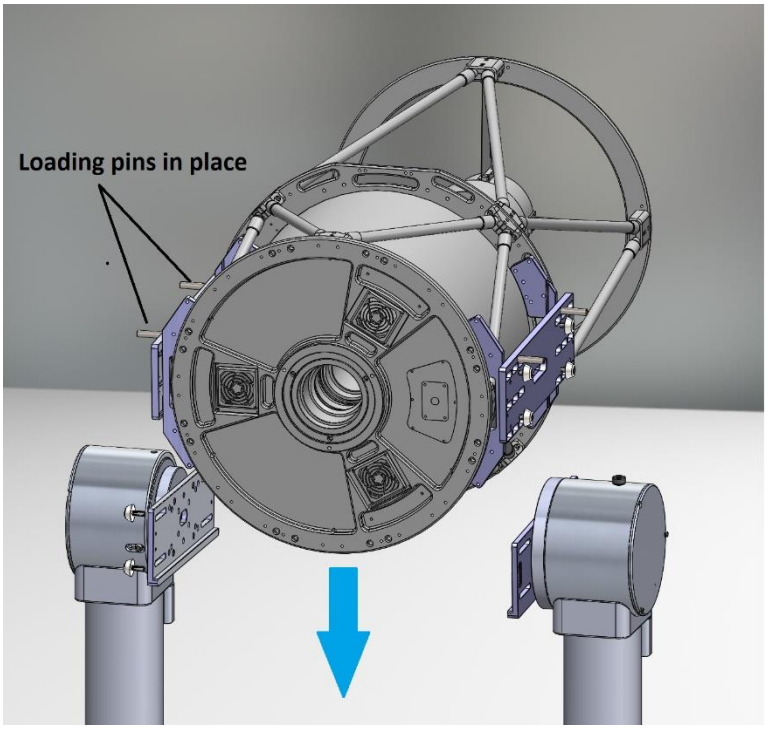


Figure 8: The Loading Pins rest on the top of the Scope Rails.

The Axis Lock Pin should be inserted into the drive tine so that the altitude (Apollo) or Dec (Taurus) axis does rotate when mounting the OTA.

On the Apollo mount the Locking Pin does not lock the axis tightly in place but ensures the axis can only rotate back and forth a small amount.

At this point, the adjustable tines should be pushed inward until the Scope Attachment Plates come in contact with the Scope Rails. Take great care as the assembly step as overcoming the weight of the payload and adjusting the fork spacing can be challenging.

Once the tine spacing is close enough that the Clamp Screws can be threaded into the Scope Attach Plate, the extra security provided by the Clamp Screws eases the with final fork adjustment. The support tine also has ±0.50 in. (12 mm) of adjustment along the alt/declination axis to relieve any stresses due to fork spacing.

On Apollo 700/800 mount, an Adjuster/Retainer option is available so that the forks can be moved by tightening or loosening a threaded rod.

Once the optical payload with the protruding Loading Pins is resting on the two Scope Attachment Plates, the Clamp Screws can be inserted through the Scope Attach plate and threaded into the Scope Rail. For a given slot, there will be more than one threaded hole that is accessible on the Scope Attach plate.

With the payload close to balance, choose the threaded hole that is nearest the center of the slot in the Scope Attach Plate. This provides the greatest motion in either direction to achieve payload balance. If the payload must be moved more than the selected Clamp Screw position allows, you may have to reposition the Clamp Screw in a different hole during the balance process.

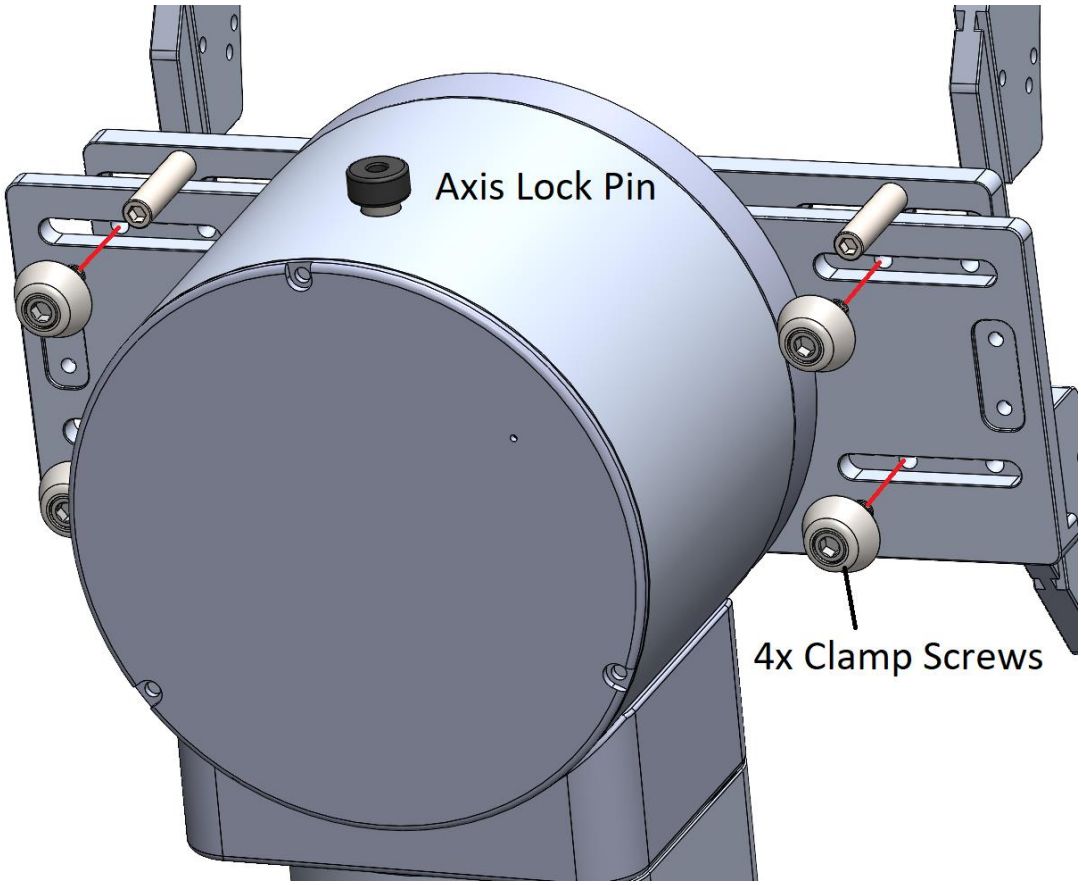


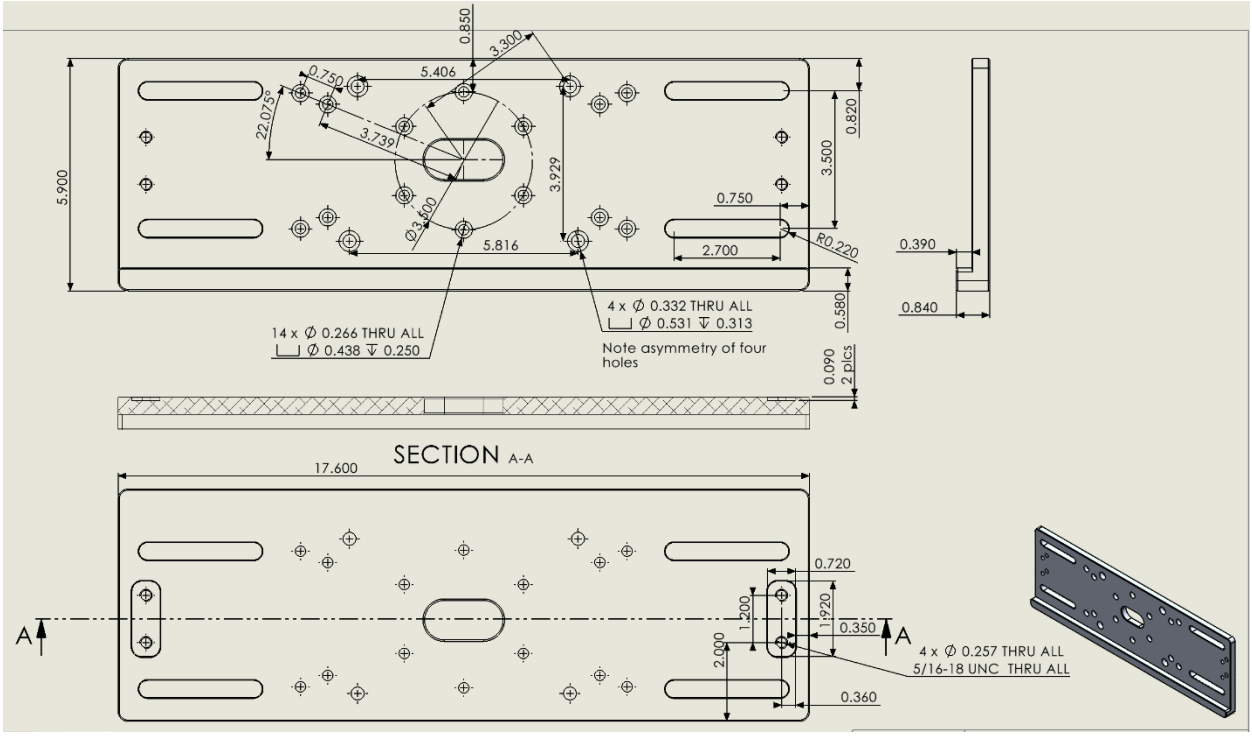
Figure 9: Inserting the Clamp Screws. Note at least two threaded holes in the Scope Rail are always visible.

When the forks are spaced near their final position and the Clamp Screws are in place, the entire weight of the payload rests on the fork plates so that the Loading Pins are no longer necessary. The Loading Pins can be safely removed after the Clamp Screws are fully tightened.

Once the Clamp Screws are in place, but not yet fully tight, the payload can slide fore and aft along the optical axis for balance; the amount of motion is limited by the length of the slots in the Scope Attach plate.

The Loading Pins should be removed after assembly as they will collide with the drive if left in place.

Scope Rail System Drawings



The Scope Attachment Plates are mounted to each fork tine. The protruding "step" at the base of the plate is where the Scope Rail rests. The Scope Rails slide along this surface when balancing the OTA.

Scope Rail Length Options

The Scope Rails are available in three different lengths to accommodate different size and length OTAs. The drawings below reference the mounting hole spacing used by several commercial OTAs.

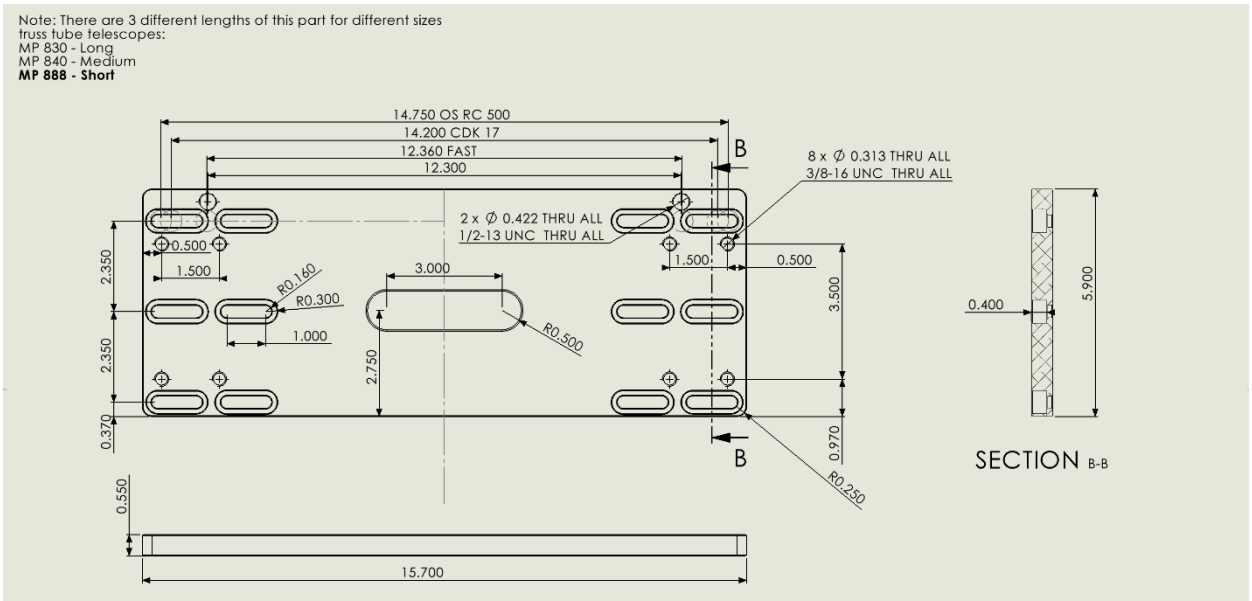


Figure 10: The shortest length Scope Rail is 15.7 in. (40 cm).

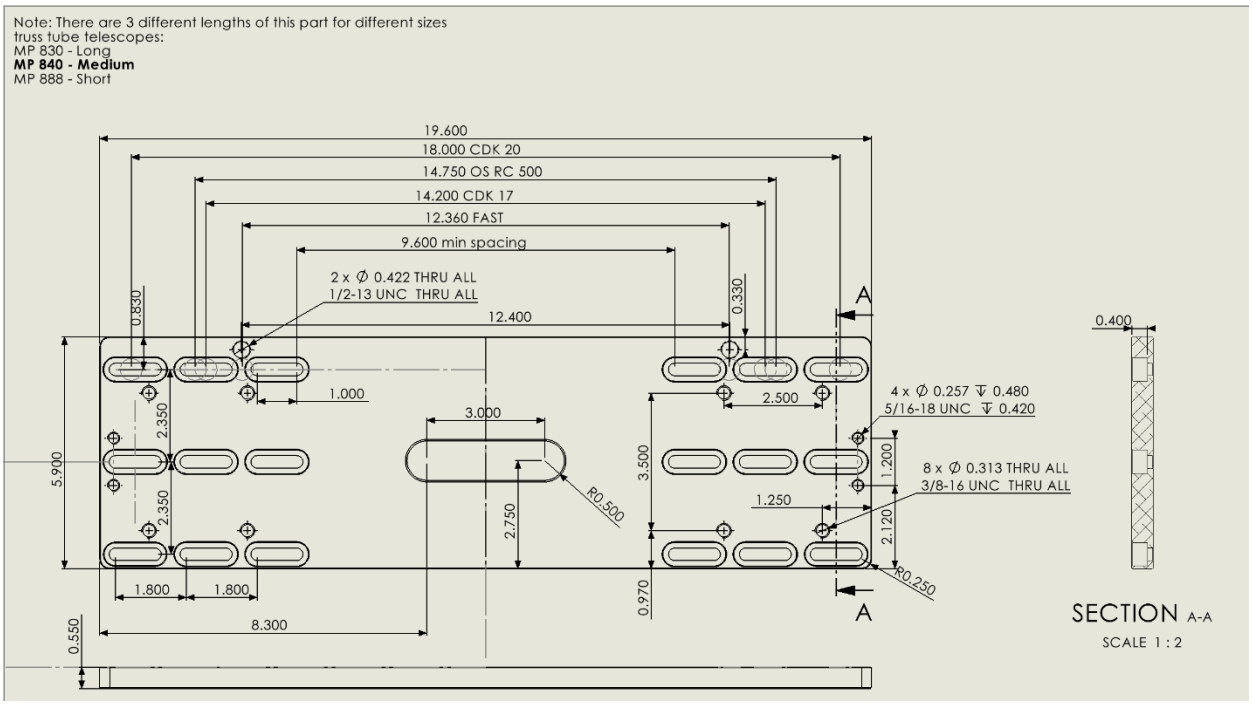


Figure 11: The medium length Scope Rail is 19.6 in. (50 cm).

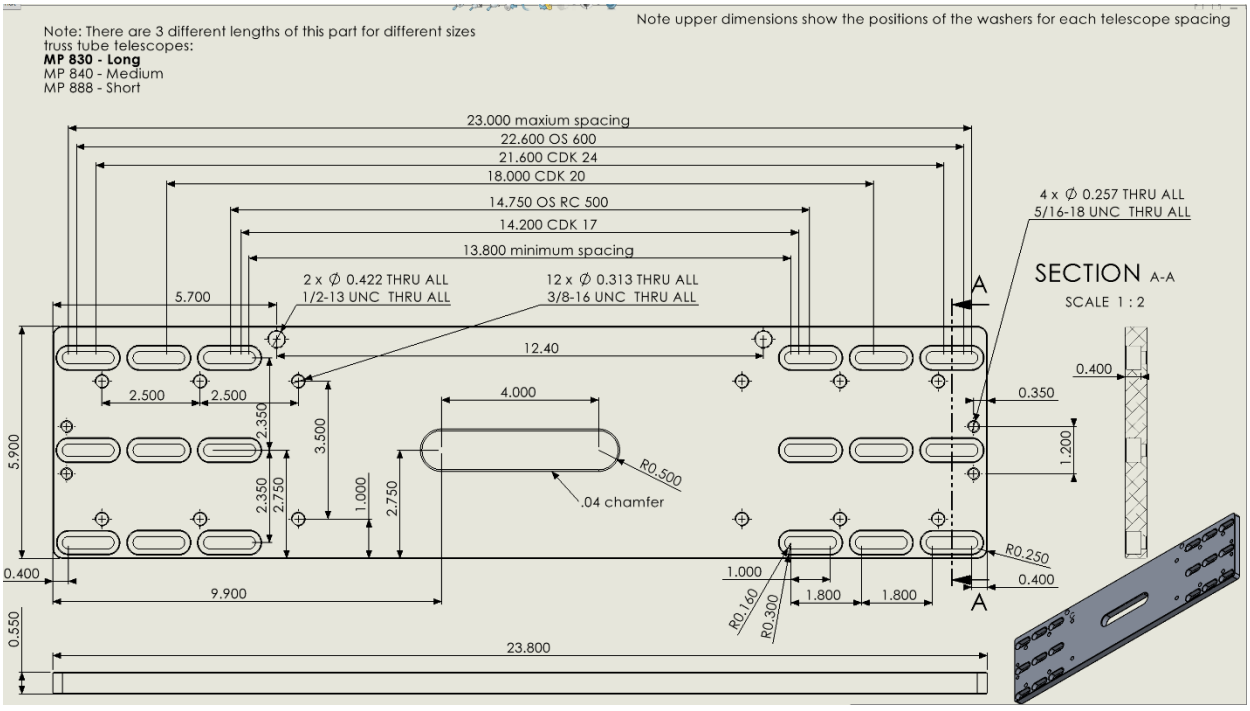


Figure 12: The longest length Scope Rail is 23.8 in. (60 cm).

Adjuster/Retainer Use on Optical Payloads

This optional mechanism is mounted between the Scope Attach Plate and the Scope Rail. When in place, the motion along the optical axis can be controlled by rotating the threaded rods. With heavier payloads, fine adjustments to the telescope balance position are made by rotating the threaded rod on each side by a small amount. For example, tighten both sides by one-quarter of one turn to extend the distance between the retainers to move the payload in that direction.

When used to adjust the separation between the fork tines, only one assembly is required, and is typically removed once the width between the tines is properly adjusted. When used on the telescope, the assembly is most useful when one is mounted to both sides of the OTA.

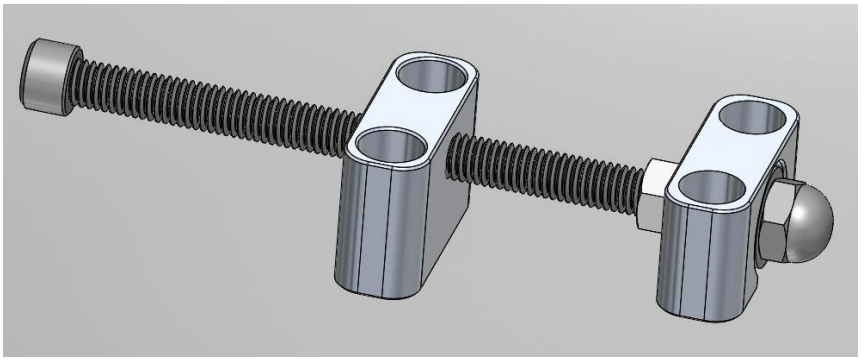


Figure 13: The Adjuster/Retainer Assembly

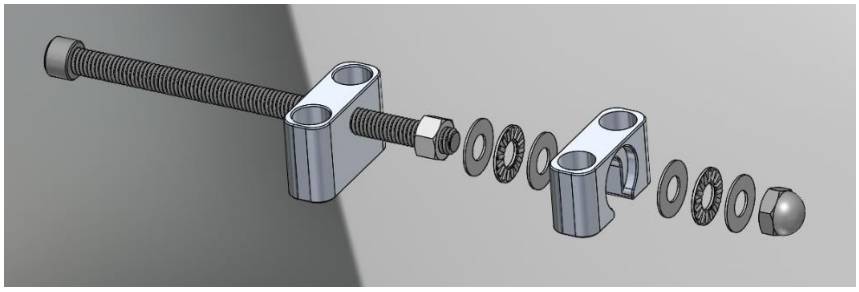


Figure 14: An exploded view of the Adjuster/Retainer Assembly.

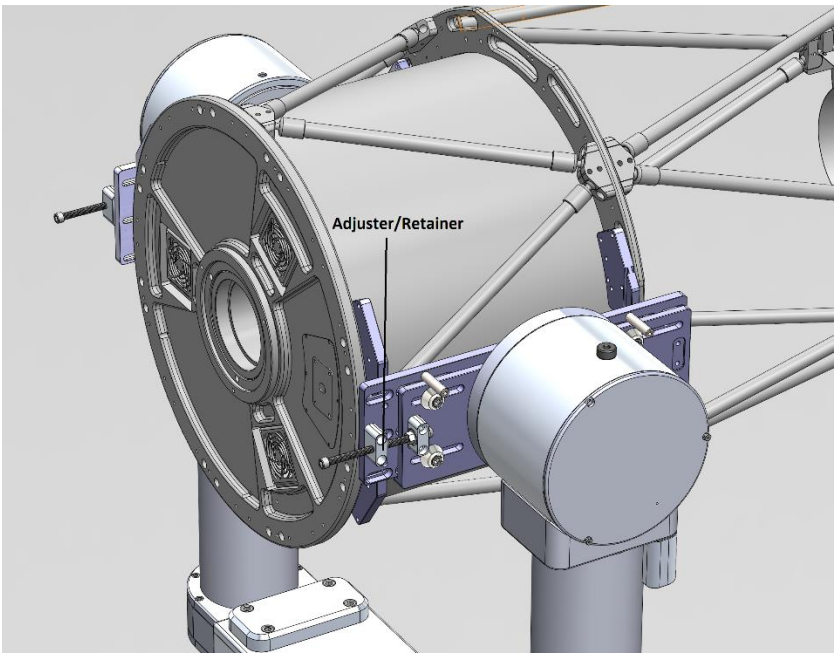


Figure 15: The Adjuster/Retainer installed on a Paramount Apollo mount.

Adjuster/Retainer Use on Apollo 800 Tine

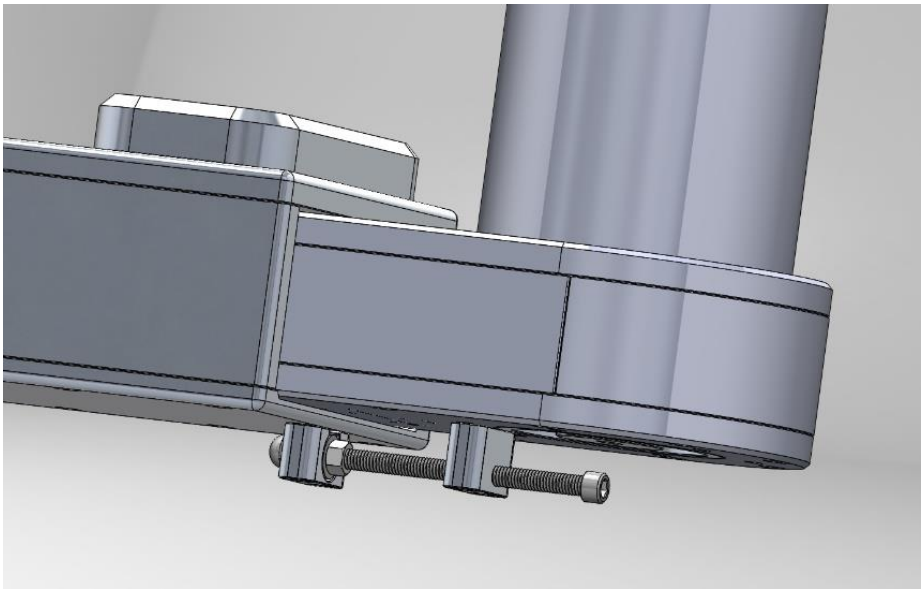


Figure 16: The Adjuster/Retainer on the Support Tine of an Apollo 800.