SKY & TELESCOPE Test Report
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S&T Test Report

Dennis di Cicco

A Highly Portable Astrophotography Combination

What began as a straightforward review of a new telescope mount soon took an interesting turn.

When Software Bisque, makers of highly regarded telescope mounts found in countless amateur and professional observatories around the world, announced the Paramount MyT — its first-ever mount designed for portable use — there were immediate requests from readers for a review. So early this year we borrowed one from the company to test.

With a payload capacity of up to 50 pounds (23 kilograms), the MyT would be a good mount for a wide range of today's visual telescopes and astrophotography setups. Since imaging equipment places the greatest demands on a mount, we decided to test the MyT with an astrograph

The Paramount MyT with the NP127fli & ProLine 16803

U.S. prices: Paramount MyT: $6,000
NP127fli: $7,295
FLI imaging setup: approximately $16,000 as tested, but can cost more or less depending on options

As a package, the equipment discussed this month forms a powerful setup for wide-field, deep-sky astrophotography. This image of the famous Veil Nebula in Cygnus was captured in a single field of view and three hours of total exposure made through red, green, blue, and hydrogen-alpha filters.

ALL PHOTOS BY THE AUTHOR

created through a collaboration between Tele Vue Optics and Finger Lakes Instrumentation (FLI). Comprising a special model of Tele Vue's NP127 apo refractor coupled with FLI's Altas Focuser, Centerline Filter Wheel, and ProLine 16803 CCD camera (other models are also compatible), the setup tipped the scales at 38 pounds, including my ADM dovetail mounting bar and guidescope. A hefty load for a 5-inch imaging system, but one that on paper should be a good fit for the MyT.

Proof came after only a few nights of testing. This setup works superbly as a system, and people at Software Bisque, FLI, and Tele Vue have also recognized this. They are informally discussing the possibility of marketing the setup as a package deal. Someone even floated the idea of including a small, dedicated computer with all the necessary software preloaded and configured — a truly novel concept for a high-end, deep-sky astrophotography setup. Time will tell if this happens, but regardless, it put an interesting perspective on what began as a review of just the mount.

This gear is premium equipment, which is priced accordingly. As I've mentioned in the past, the bar is set very high when it comes to my expectations for this kind of equipment, and in this case I wasn't disappointed. After months of testing and hundreds of exposures made with the system used both as a portable setup and on a fixed pier in my backyard observatory, I am extremely impressed with how everything performed. I can comfortably endorse all of this equipment as a package as well as individual pieces. So, end of review? No. At least not if I want to walk away with a clear conscience. But I'll save my reservations for later in this story. For now, let's take a closer look at the equipment.

The Imaging System

The Tele Vue NP127fli is a dedicated imaging version of the company's 5-inch apo refractor reviewed in this magazine's July 2007 issue. It has no provision for visual use with eyepieces. The original telescope's focuser has been replaced with a rigid adapter that provides a strong, flexure-free connection to the FLI imaging train and permanently maintains the system's optical alignment. The scope also includes Tele Vue's Large Field Corrector lens properly positioned at the rear of the adapter to deliver optimal star images across the field of FLI's large-format CCD cameras. This lens slightly increases the scope's nominal 660-mm focal length to 680 mm, yielding an f/5.35 focal ratio and a field of view a bit more than 3° across with the ProLine 16803 camera I tested.

The Truesense KAF-16803 CCD in this camera has a square imaging area measuring 36.8 mm on a side. The scope provides 100% illumination across a field slightly more than 20 mm in diameter, beyond which the light falls off smoothly to 88% at the edges of the chip. The illumination 25 mm from the optical axis, which

WHAT WE LIKE:

Excellent combination for deep-sky imaging

All first-class equipment that worked flawlessly

Equally well suited for portable use or for unattended remote-observatory operation

WHAT WE DON'T LIKE:

While especially attractive as a "plug & play" imaging system, it can have an extremely steep learning curve for people new to CCD imaging or those lacking firsthand experience with similar equipment.

Above: **The 34-pound MyT equatorial head (sans counterweight shaft) and its custom 19-pound tripod (a $1,350 option) can easily be carried short distances in a single trip.**

Right: **Because of power requirements mentioned in the text, as well as those for his laptop computer and autoguider, the author did his "portable" testing at the end of an extension cord in his suburban-Boston driveway.**

Thanks to internal wiring and a variety of connectors built into the MyT's base (*top*) and saddle plate (*above*), it's relatively easy to run power and computer cables to telescopes and cameras on the mount. Two of the autoguiders used by the author were powered by their USB connections, but the cooled autoguiding camera seen in the accompanying photographs requires 12 volts DC. Because it draws more current than is available from the MyT's 12-volt outlet on the saddle, the author used a separate power cable that he threaded through the MyT's internal passageways.

corresponds to the corners of the CCD, is still greater than 70%, making the overall system vignetting easily corrected with standard flat-field calibration performed during image processing.

As the astrophotography with this review attests, the NP127fli delivered excellent star images across the full frame of the KAF-16803 chip. Furthermore, all the images here were taken on nights when the telescope was focused only once at the beginning of the imaging session and left unchanged regardless of the filter or filters used during the night. For general astrophotography, I can't ask for better performance from a 5-inch f/5.35 system than I got with the NP127fli.

While all the images here were made with the FLI ProLine 16803 camera we borrowed for this review, my strongest endorsement for the camera comes from having used the same model in my backyard observatory since late 2010. It has been hands-down the most trouble-free, high-end camera I've tested. I can't recall a single image that was lost because of a problem with the camera. Even on those occasional nights when extreme dewing conditions caused condensation to form on the CCD-chamber windows of some of my other cameras, the ProLine soldiered on without missing a beat. As such, you can consider my thumbs-up recommendation of the ProLine 16803 camera to be based on years of use rather than months.

This was, however, my first experience with FLI's Centerline Filter Wheel and Atlas Focuser. While both worked flawlessly, depending on the software you use to control this setup, you may have to upgrade to the latest version to access all 10 filter positions. I only used the wheel's first six slots, and had no problems accessing them with Diffraction Limited's *MaxIm DL* version 5.23 or Software Bisque's *TheSkyX Professional* supplied with the MyT.

Initially I controlled the Atlas Focuser manually from my laptop computer, finding it very accurate and consistently able to return the camera to pre-determined positions. But after a bit of trial-and-error tinkering with

Left: **Elevation of the MyT's polar axis can be set to its approximate position with this quick-release mechanism, but to prevent it from becoming wedged in place, both ends of the stainless-steel bar seen here should be fully seated in their respective slots before any weight is placed on the mount. Fine elevation adjustments are made with the large hand knob.** ***Right:*** **Little details such as arrows next to the tripod levels indicating which leg to adjust when leveling the mount are indications of the care that went into designing the MyT and its accessories.**

As with the picture of the Veil Nebula on the cover, this shot of the large emission-nebula complex IC 1396 in Cepheus was captured in a single field of view. It was assembled from four hours of total exposure. Both color images were processed by Sean Walker.

software settings in *MaxIm*'s focusing algorithm, I was able to focus automatically. It was very impressive to make a few mouse clicks and after about a minute have the telescope's focus automatically set to an accuracy easily as good as anything I could achieve manually. I wish I had this capability on all of my imaging setups.

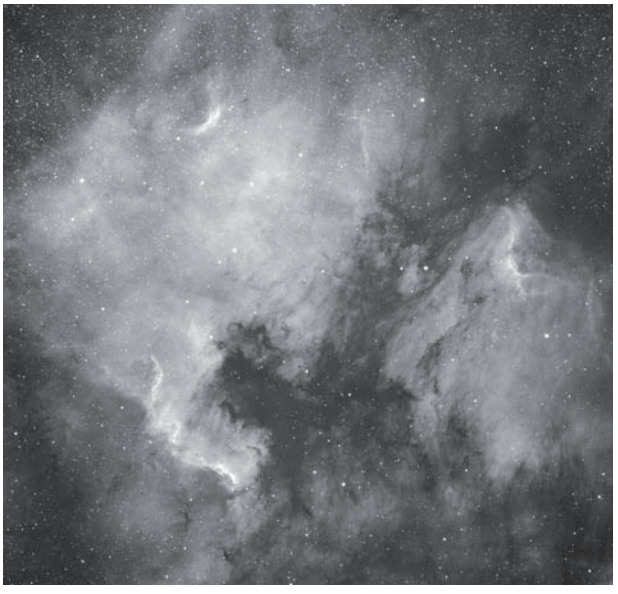
The electrical cabling for the camera, filter wheel, and focuser are noteworthy for their simplicity. USB 2.0 computer connections and power for all three flow over just two wires that run from the camera. One goes to the camera's power supply and the other to your computer. Small jumper wires connect the camera with the filter wheel and focuser.

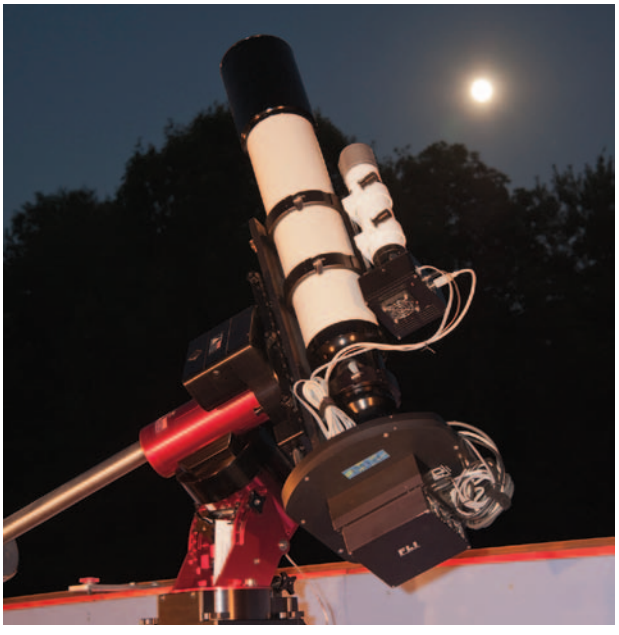
The Paramount MyT

While the MyT is promoted as a portable Paramount, at its heart is the same control system and feature set found in its larger siblings. Indeed, when controlling the MyT from a computer there's nothing that distinguishes it from the other Paramounts. This, in my opinion, is the MyT's greatest strength. I've covered these features in detail in reviews of the Paramount MX and ME II (July 2012 and September 2014 issues, respectively). Rather than repeat that material here, you can read both reviews on the *Sky & Telescope* website at **skypub.com/Paramount**. Each review covers different aspects, features, and ways of operating the mounts, and virtually everything said in those reviews is also applicable to the MyT, including my comments on the outstanding accuracy and precision of

the mounts' pointing and tracking systems. It's one of the big reasons I was impressed with the MyT.

Weighing only 34 pounds without the counterweight shaft attached, the MyT certainly qualifies as a portable mount, but there's more to the story than just weight. Power requirements and polar-alignment methods need to be considered, since they set the MyT apart from many other portable mounts.





Top: **Mainly because of his experience with other Paramounts, the author obtained "keeper" images on his first clear night. This one is a 30-minute exposure of the North America Nebula made through a hydrogen-alpha filter.** ***Above:*** **It may be billed as a portable mount, but the MyT is every bit at home in an observatory, where it can be run remotely over the internet from any place in the world. Many of the author's tests were done with the setup in his backyard observatory and controlled from his house a few hundred feet away.**

The MyT, like the other Paramounts, requires 48 volts DC and it comes with an AC adapter for those who have conventional AC power available at their observing sites. But there are also a variety of ways to power the mount when AC isn't available. Software Bisque offers an optional adapter ($99) that delivers 48 volts DC using EGO 56-volt lithium-ion batteries sold by Home Depot (**homedepot.com**). These rechargeable batteries are available with 2 and 4 amp-hour capacities and charging options that can take as little as 30 minutes. Software Bisque says that the larger battery will power the MyT for more than 10 hours of typical use. There are also a variety of commercial 12- to 48-volt DC converters that will power the MyT from a 12-volt DC source such as a car battery.

Unlike many portable equatorial mounts, the MyT has no provision for a polar-alignment scope. You must use other methods to align the mount's polar axis on the celestial pole. Because the MyT has nicely engineered azimuth and altitude adjustments on its polar axis housing, it's easy to use traditional methods such as drift alignment to set up the mount.

But I particularly like a method that is unique to the current Paramount line. With the base of the mount carefully leveled, and the polar axis roughly positioned using a compass and the elevation scale engraved on the mount, you fire up the electronics and slew the mount to its "home" position. This position is carefully set during the mount's construction and corresponds to a precisely known position on the sky if the mount were accurately polar aligned. Since the mount probably isn't aligned at this point, you simply command the mount to slew to any celestial object currently visible in the sky, and using only the altitude and azimuth adjustments on the polar axis housing, you move the mount until the object is centered in the field of view of whatever instrument is on the mount. Done carefully, the method can result in polar alignment that is sufficiently accurate for most astrophotography.

This alignment method does involve caveats. One is that the process is easiest to do when there's a telescope with an eyepiece on the mount — something I didn't have with my imaging setup. Because my guidescope was carefully aligned with the main telescope, my solution was to temporarily replace the small CCD guiding camera with an eyepiece. The guidescope's 50-mm aperture was more than enough to show bright stars even before the Sun set.

TheSkyX software supplied with the MyT includes sophisticated methods for achieving precision polar alignment. I've used them, and they work extremely well, but they can be time consuming, especially if you don't take into account a small amount of inertia that's inherent in the mechanism on the mount's calibrated

azimuth adjustment. Nevertheless, polar alignment requirements for various types of astrophotography are outside the scope of this review, but suffice it to say that the simple method outlined above will work for many applications, and more precise methods are available if you need them.

Final Thoughts

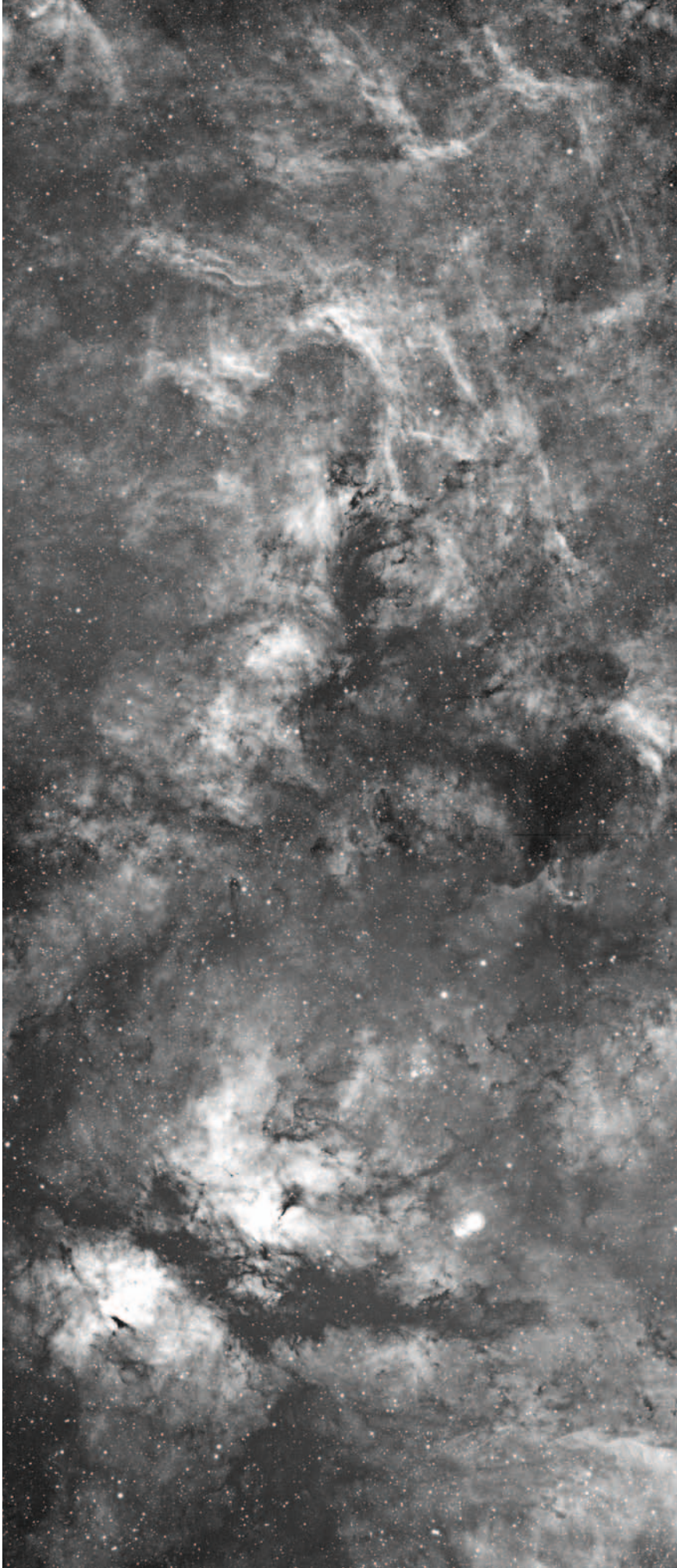
Because I've had mostly positive comments about the equipment covered here, as well as in the previous reviews of the Paramount MX and ME II, some may wonder why I hesitated making an unconditional recommendation at the beginning of this review. The reason is the *very* steep learning curve that goes with running this system. Let me explain.

The Tele Vue NP127fli is a straightforward instrument with little that will mystify even those new to imaging telescopes. And anyone who has experience working with astronomical CCD cameras will quickly master the FLI equipment. It is the Paramount MyT that presents the biggest learning curve, even for those familiar with German equatorial mounts in general. At its most basic level, the MyT can be set up and operated as simply as any motorized German equatorial mount, but learning the features that make it an incredibly powerful astrophotography platform take time, especially if you are not already familiar with *TheSkyX* planetarium software.

On the other hand, people experienced with previous Paramounts should find the MyT a breeze to use. Like me, they can probably spend a few hours unpacking, assembling, and balancing the equipment described here, followed by another hour or two connecting cables and setting up the software. That's all it took before I was ready to begin shooting "keeper" images on the first night. My shot of the North America nebula on the facing page is proof of that.

But a combination of products so nicely matched as the ones described here will likely appeal to people looking for a turnkey entry into the world of advanced deep-sky imaging. While this equipment does indeed make it easy to turn the key, it will still take time to learn how to drive the car. ✦

Dennis di Cicco *has been writing about equipment in the pages of* Sky & Telescope *for more than 40 years.*



Wide-field imaging systems, especially when combined with image-stitching software, are ideal for exploring vast fields of nebulosity that are typically overlooked by astrophotographers shooting with narrow-field equipment. This two-panel mosaic created with *ICE* (Microsoft's stitching freeware) covers a 5°-tall area around Gamma Cygni, the central star in the Northern Cross asterism. It is only the tip of the iceberg when it comes to the overall nebulosity permeating this stretch of the Milky Way.