SKY & TELESCOPE
Test Report
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Dennis di Cicco

iOptron's SkyTracker

The newest tracking platform for camera-only astrophotography is among the best ever.

iOptron SkyTracker

U.S. price: $399.00
ioptron.com

iOptron's SkyTracker is available in white or black and comes with a polar-alignment scope and carrying case. The author highly recommends the $49 optional ball head since it outperformed ones he's spent twice as much for.

ALL PHOTOGRAPHS BY THE AUTHOR

IF YOU BELIEVE the American humorist Arnold H. Glasow's contention that "Success is simple. Do what's right, the right way, at the right time," then iOptron's new SkyTracker is a sure-fire success. Well-engineered and equally well-manufactured, this highly portable camera tracker has hit the astrophotography market at an ideal time.

Another thing that's right is its price. At $399, the SkyTracker offers the hands-down best value I know of for a camera-tracking platform.

Small mounts intended for camera-only astrophotography have been commercially available on and off for decades. Over the years I've purchased several of them, used a few others, built a couple from scratch, and designed a bunch more in my head. These trackers have served mostly a niche market, since only a relative handful of astrophotographers, at least in North America, were willing to spend money on tracking mounts that were generally too small for telescopes. Most sky-shooters were content to do skyscapes with their cameras on fixed tripods or take occasional wide-field tracked photos with cameras riding piggyback on equatorially mounted telescopes.

Times have changed, however, and we all know that digital photography is profoundly altering astrophotography. One of the biggest changes is that regular daytime photographers are learning that they don't need to put their cameras away when the Sun sets. Beautiful pictures with a starry sky backdrop have entered mainstream photography. And you need look no further than several recent astrophotography-themed TV commercials for computers and cars for proof of that. It seems that those of us who love shooting pictures of the night sky no longer have to feel that we have a really unusual hobby!

With so many new people photographing starscapes, the time has never been better for small tracking camera mounts, and several have recently entered the market. The newest is iOptron's SkyTracker. I borrowed one from the manufacturer to test last February, and from my first night out I was highly impressed with its performance.

The SkyTracker is about the size of a paperback book and has two features that immediately set it apart from the competition. Foremost is the included polar-alignment scope. The other is a precision, worm-driven latitude adjuster. As with other tracking mounts, iOptron's is designed for use on a camera tripod, but there's no need to use a camera head (often the least rigid part of a photographic tripod) to achieve polar alignment. I attached the SkyTracker directly to the center column of a heavy-duty Manfrotto tripod. Since both azimuth and altitude adjustments are needed to achieve polar alignment, it would be nice to have a tripod with a center column that rotates (mine didn't), but it was surprisingly easy for me to nudge the tripod into the correct azimuth position. It was even easier to set the proper altitude thanks to the fine motion of the built-in latitude adjuster, and this was particularly true when I had a heavy camera on the mount.

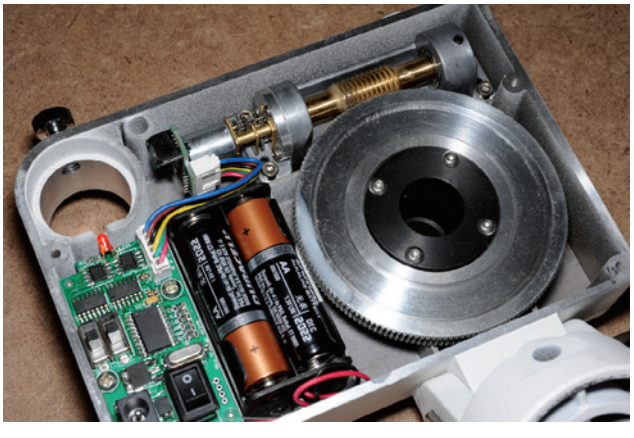
The Polar Scope

The included polar-alignment scope is the same one built into iOptron's high-end equatorial mounts that I have reviewed in the past. It's exceptionally accurate and extremely easy to use. It has an illuminated reticle with calibrated circles for Polaris (Northern Hemisphere) and Sigma Octantis (Southern). The circles are divided into 12 hours like the face of a clock. With iOptron's telescope mounts, the Go To hand controller graphically displays where to position Polaris or Sigma Octantis on the reticle to achieve accurate alignment. Since the SkyTracker has no hand controller, iOptron created a $2 app for Apple mobile devices. What I particularly like about this system is that you don't need to do any calculations — you just move the SkyTracker until the alignment star appears on the reticle in the location shown on the app's display and you're aligned. It takes only moments to do.

In principle, the polar scope needs the SkyTracker to be level in its east-west direction so that the reticle's clock face is oriented correctly. But in practice, eyeball-leveling is sufficient. If you don't have an Apple device for the app, there are other ways to determine Polaris's position relative to the celestial pole, but you'll need to "flip" the star's real position in the sky to match the inverted view in the polar scope.

And here's a word of caution: don't assume other polar-align apps will work. Astro-Physics has developed a similar app for its polar-alignment scope (January 2013 issue, page 37). But its app is incompatible with the SkyTracker because the Astro-Physics polar scope has a right-angle viewer that produces a different field orientation.

The author tested the SkyTracker with it attached directly to the center column of a heavy-duty Manfrotto tripod. If the polar-alignment scope interferes with equipment mounted on the tracker, it can be removed after the tracker is aligned.



The iOptron unit is exceptionally well made and includes a miniature servomotor with an optical encoder for speed regulation and a gear train that would impress a watchmaker. The worm gear and worm wheel are each mounted in a pair of ball bearings.

WHAT WE LIKE:

Solid, die-cast aluminum construction

Superb, easy-to-use polar-alignment system

Accurate drive rate with half-speed setting (see text)

WHAT WE DON'T LIKE:

Why something this good wasn't available years ago

The SkyTracker is ideal for wide-field starscapes such as this moonlit view made with a 14-to-24-mm zoom lens set to 16 mm. The unconventional half-speed tracking rate, which was used for this 1-minute exposure, evenly divides image blur between the stars and landscape, making both appear sharp to the eye.

iOptron's Ball Head

To have flexibility framing your pictures, you need to use some kind of photographic ball head between the SkyTracker's driven mounting block and your camera. iOptron offers one for $49. I've spent twice as much for ball heads that weren't nearly as good as the iOptron model, so I highly recommend you buy it if you don't already own one. It's solidly built, robust enough for heavy DSLR cameras, and it clamps securely with only light finger pressure on the locking knobs. I especially like the ball head's quick-release plate for attaching a camera, since this feature allows you to get everything set up and roughly adjusted before adding the weight of the camera. That said, I strongly suggest that you do your final adjustment of the tracker's polar alignment *after* the camera is in place.

The SkyTracker is extremely simple to use, and the illustrated manual is well done, even to the point of detailing how to install the four AA batteries, since the battery holder fits very tightly into its compartment. iOptron states that fresh batteries can run the tracker for up to 24 hours in mild weather. That may be, but my frigid February nights, with temperatures well below freezing, took their toll on battery life, and I barely got 12 hours from my first set of batteries. There is the option of powering the tracker with an external source of DC current between 9 and 12 volts.

The most challenging aspect of using the tracker is identifying Polaris for the polar alignment. This isn't a problem for anyone who has a basic knowledge of the night sky. There's a small hole drilled through the tracker's body that serves as a peep sight, and you'll be roughly aligned when you can see Polaris centered in the

iOptron's app for Apple mobile devices makes SkyTracker's polar-alignment system all but foolproof. Using the date, time, and location from the "smart" device, the app shows you where to position Polaris (for Northern Hemisphere observers) on the polar scope's reticle to achieve accurate alignment. The position is given relative to an imaginary clock face divided into 12 hours and corrected for the polar scope's inverted view.

hole. This alignment is sufficient for short exposures made with wide-angle lenses, but I always took the extra minute or two to refine the alignment with the polar scope. That way I could shoot longer exposures and use modest telephoto lenses and still have pinpoint stars. Indeed, with the SkyTracker carefully aligned, the tracking was the match of many small equatorial mounts I have used for telescopes.

For one test on my first night out with the SkyTracker, I made a long series of back-to-back 3-minute exposures with a 24-mm lens. The left picture in the illustration below was made by stacking the first and last frames (aligning the image on the frame and not the stars), and it shows how little the stars drifted during the nearly 5-hour sequence. And some of this apparent drift was due to the camera flexing on its mount as Orion neared the western horizon, since I had even better tracking on another night shooting a sky sequence that crossed the meridian.

I used the SkyTracker with lenses up to 180 mm in focal length. Shooting 3-minute exposures with that lens produced about 9 out of 10 images with pinpoint stars when the camera was randomly oriented on the tracker. The success rate was higher when the camera's weight was on the east side of the mount, causing the drive to "lift" the weight. Lenses with focal lengths of 50 mm or less had success rates close to 100% regardless of camera orientation.

The SkyTracker's camera-mounting block (left) has a brass inset that can be reversed for use with ball heads that have either ¼-20 or ⅜-16 threaded sockets. The optional ball head is noteworthy for its features, including a quick-release plate and solid locking mechanism.

In addition to the on/off switch, the Sky Tracker has only two controls — a switch for Northern or Southern Hemisphere operation and one that sets the tracking rate to either sidereal or half-sidereal rate. At first blush, the half rate might seem strange, but it evenly divides image blur between the sky and foreground. With wide-angle lenses, it can produce dramatic images of a starry sky suspended above a landscape with everything appearing sharp to the eye. Until relatively recently, a half-speed drive rate was rarely used except by a handful of the world's elite starscape photographers. Now their secret is out and manufacturers are taking note!

My final surprise with the SkyTracker came when I took the back off the unit for a peek at its inner workings. What I found was construction quality that I would have expected for a unit costing much more than $399. Particularly noteworthy are a servomotor with an optical encoder for speed regulation and a worm gear mounted with a pair of ball bearings. The worm wheel is also mounted with a pair of ball bearings, which is part of the reason why the 3-pound SkyTracker, which is made of die-cast aluminum, has a rated load capacity of 6.6 pounds (3 kg).

As I have mentioned in past reviews in this magazine, iOptron has become a major player in the world of telescope mounts. The company offers some of the best values for alt-azimuth and equatorial Go To mounts for light- and medium-weight scopes. And now with SkyTracker, it is offering the best value I know of for a camera tracker. If you're on the fence about purchasing a tracker, I suggest moving sooner rather than later, since Comet ISON's potential to put on a significant display later this year is sure to create a demand for them. ✦

***Left*: Described in the accompanying text, this view shows how well SkyTracker kept a camera fixed on a star field during a nearly 5-hour span. The cropped image is from a stacked pair of 3-minute exposures made at the beginning and end of the interval and aligned to the frame edges, not the stars. *Right*: Because of its precise polar-alignment system, accurate drive rate, and solid construction, the SkyTracker is suitable for use with modest telephoto lenses. This 3-minute exposure of the region around the Orion Nebula was made with a 180-mm lens and full-frame DSLR camera.**

Despite his enthusiasm for telescope-making projects, senior editor ***Dennis di Cicco*** *doubts he'll ever make another driven platform for cameras now that SkyTracker exists.*