

WALTERLEE

HELIFOCUS

A Versatile, Affordable Motor-Focus Solution

By Neil Heacock

I attended the 2010 OMSI Astrophotography Conference in Portland, Oregon, where Tom Carrico's presentation, *What 20 Years of Imaging Has Taught Me*, included among other hard-earned nuggets that we should keep our hands off of the focuser. I took his advice to heart and decided to look for a good electronic focus motor to use with my various imaging systems. Even though there are focuser-specific motors by major manufacturers, I wanted something versatile – something that would adapt to the various scopes I have and also work with my wide-field camera lenses. I had to look no further than the WalterLee heliFocus motor drive. It had everything I was interested in: (1) belt drive or direct drive for both scopes and lenses (including my Coronado solar scope) and (2) the options of control by a standalone hand-held controller or via computer software.

The Deluxe heliFocus system is housed in a die-cast aluminum case enclosing the high-torque, planetary-gear, 6-12v DC motor and features an LED indicator for pulse-width modulation (PWM) and direction of focus. The unit includes a 1/8-inch thick by 1-inch wide by 6-inch long aluminum bracket. A 1/8-inch mono phone jack provides the con-



Image 1 - The author's heliFocus-equipped Canon USM 75-300 lens is shown mounted together with a mini guide scope on his Celestron CG-5GT mount. The versatile bracket included with each heliFocus unit makes it very easy to create a mounting solution for a wide range of equipment configurations.

troller to power connection.

Cost

As a rule, focuser motors are not exactly inexpensive; it's not unusual to see a good motor for several hundred dollars or more. I ordered the WalterLee Package 1 that included the Deluxe heliFocus unit, a Shoestring Astronomy FCUSB controller, and

extra belts for a total price of \$219US. I also ordered a custom direct-drive coupling (as opposed to the direct-drive gears) and the Rigel nFocus hand controller, as well as the Rigel nFocus USB adapter. Basically, I wanted to try it all, so I ordered it all. The products sell at modest prices, with reasonable shipping rates and discounts for bundled hardware packages.



Image 2 - Another of the author's heliFocus units automates focus of his Vixen ED103s refractor.








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Purchasing Related Equipment

The WalterLee heliFocus website, <http://helifocus.walterleetechnology.com>, makes ordering everything you need easy; you can purchase related Rigel Systems and Shoe-string Astronomy products without having to leave the WalterLee site.

Initial Thoughts

My heliFocus equipment arrived in a compact 5-inch by 9-inch by 2-inch Priority Mail box with speedy delivery from shipping confirmation to in-hand receipt. The box was marked as fragile and packed very well with medium-sized bubble wrap. I was pleased to see that the components were individually wrapped in cellophane to keep the items free from packing debris and the cords neat and un-crimped. It was obvious that a lot of care went into packing this little box.

As I opened it, my initial thoughts were, "Wow! This is has a real quality feel to it." The heliFocus unit was sturdy and solid, without being unduly heavy (just 8.1 ounces). And something I always enjoy seeing, a prominently-displayed "Made in the USA" sticker, was right on top.

Manufacturing Quality

I'm one of those guys who often take things apart before using them (it gets me in trouble sometimes), and this was no exception. I was rewarded with an impressive hardware design and choice of internal components. Every portion of the design and manufacturing detail showed quality and pride: No sloppy soldering jobs or even a crooked sticker. The little motor box is packed with quality components in organized, well-engineered care.

Hardware Quality

The die-cast aluminum enclosure is solid and sturdy: no gaps or non-square edges. The pulley fitting is tight with no play at all, ensuring virtually zero backlash or slop when performing focusing routines. The mono plug fits snugly into the receptacle, and nothing is loose or flimsy. The mounting bracket, thumbscrews and bolts are also good

components. Even the belts are of excellent quality; all belts included in the package were professional-grade, nylon-covered, fiberglass-reinforced, neoprene.

Aesthetics

The powder coating on the enclosure is gorgeous. Mine is metallic black with a matching bracket. I honestly didn't expect it to look so good, figuring this coating was strictly a functional utility until the welcome addition to the visual appeal of my white Vixen refractor became so obvious.

LED Light

It may seem strange that I'd dedicate an entire section to the LED light on the device, but it's actually very important and this design is simply awesome.

First of all, the single LED shines red when you are focusing in one direction and blue when you are focusing in another direction, providing instant and obvious critical visual clues. The LED also stays on as long as you are sending a command to the

motor, and it pulses according to the speed at which you are moving the motor, providing a visual representation of what's going on at the software level. This is particularly helpful for autofocus routines with software that supports autofocus "V Curves."

Second, the light is recessed in a beveled housing so it's not just sticking out on top shining onto everything. Of course, when you're focusing that's not a huge issue, but it is helpful and a nice design nonetheless.

Third, and most importantly to me, is the brightness control. After seeing this, I thought to myself, "Why don't other manufacturers do this? Don't they realize we use their gear at night – in the dark, where we want to preserve our dark adaptation?" Folks, this is simply brilliant! If you are in a place like an observatory where you need the light to shine brightly, you can turn it up to "ludicrously bright." Alternatively, if you are under a dark sky at a star party and you don't want to blind your neighbor (or yourself) with an intense red or blue light, you can turn it down to an extremely-faint glow. Se-

riously, more manufacturers should implement this feature. My hat is off to Walt Davis on this one.

Mounting

I've gone through several different mounting applications with the heliFocus now and the provided bracket has been versatile enough to meet all of my needs so far.

I fabricated an aluminum mounting plate for my wide-field camera lenses and the adjustable bracket design worked perfectly with it. I have three different wide-field lenses I use for astrophotography and they all are different sizes with the focuser rings in different places. A switch of the lens and a quick adjustment of the bracket to put the belt where it needs to be is a snap.

My Vixen refractor has motor-mounting threaded holes under the focuser and the heliFocus bracket fits perfectly for either direct drive via the coupler or belt drive directly onto the focuser knob. I found the belt drive works best for this particular focuser. For improved grip of the belt to the focuser knob, I

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put a strip of non-skid traction tape around the knob and even the smallest movements are registered.

My William Optics refractor has a Crawford focuser and the bracket fits nicely when held on by the tension bolt. A rubber washer is helpful to stop the bracket from moving as it's held on by only one screw. This particular configuration works best when the knob is replaced by the coupler.

Interface Controllers

As I mentioned, I have both the FCUSB and the Rigel nFocus with the Rigel USB adapter. Both setups work perfectly. The clean no-driver, plug-and-play nature of both devices makes computer control an absolute snap. The Rigel nFocus hand controller is perfect for when I don't have the laptop with me or my computer is in use with the scope system and I'm doing wide-field at the same time. Focusing the lenses with either con-

troller is so much better, faster and easier than doing it by hand.

Software

Since the motor is controlled via a USB interface, any software that can talk to an FCUSB will control the motor. In my case, I primarily use a Macintosh laptop so I use *Shoestring Focus* from Stark Labs (www.stark-labs.com), a simple and intuitive focus-control program. Since it only sees the FCUSB, however, Craig Stark also wrote a utility called *Rigel Focus* for the new nFocus USB device. Both are Mac-only utilities, but there are other Windows-based focus-control programs as well.

Shoestring Focus controls the motor with six buttons: Step (in and out), Move (in and out), Fast (in and out), and three adjustable parameters for PWM Frequency, Speed and Duration. I found pretty quickly that any speed below 45 does not move the motor.

That's not a problem because the Step settings go from 10 to 300. Setting 10 is so small that I had to push it dozens of times to see a change in focus. Setting 300 is great for larger steps. On my VixenED103s for example, I found that my fine-focus settings are a speed of 80 and a step of 100. The Fast buttons give my focuser a 360-degree knob rotation in 3 seconds. That's really nice for those long coarse adjustments.

Rigel Focus is a little more basic in nature. It has the same six buttons, but no parameter for speed control, only step duration. The step-duration slider ranges from 20 to 250, which range works well. In my experience, settings below 45 don't do much, and if you need anything greater than setting 250, you can simply use the In/Out buttons or the Fast buttons. I thought it would be worth noting that the Pulse-Width and Pulse Interval knobs on the nFocus unit itself do not change anything in the software; the soft-

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ware runs at the same speeds regardless of where these knobs are set.

Actual Use

So, after all of that, this is where the real world meets the cool gizmo in my hand. I didn't hold back and threw the toughest challenge at it right up front: Focusing the Canon EF-S 18-55mm kit lens, known by many as one of the hardest lenses on the market to focus manually. I used the Rigel hand controller and the 11-inch belt to focus the lens and was absolutely blown away by the results. Using *Nebulosity's* fine focus method, it took me just seconds to achieve perfect focus. For the first time since owning the lens, I was able to make minuscule adjustments – it was a snap!

The next challenge was using the focus system to aid in narrowband imaging through a Canon USM 75-300mm lens. The clip-in filter cuts out so much light that it's usually very difficult to find initial focus – it's hard to find rough focus from which to start, so I have to make both large and small adjustments to find focus. But using the FCUSB and full computer control, the belt-driven heliFocus motor was perfectly smooth and helped me to quickly find that perfect focus. Through the software I could make adjustments to my focus steps and range from large steps to very tiny steps to achieve sharp spot-on focus faster than I ever had before.

Moving to the Vixen refractor and using the belt drive on the focuser wheel again, I confirmed that Tom Carrico was right; keeping my hands off of the focuser makes things so much easier. I use a Bahtinov mask for focusing, which makes finding the perfect focal point fast and easy. A few step taps of the software and the Bahtinov spikes are right where they should be. Focusing with the heliFocus takes seconds rather than minutes.

Recently, I was shooting M42 in sub-freezing conditions and was concerned that the belt would slip, or get brittle, or that the motor would somehow malfunction after sitting idle and frozen for hours. To my surprise, when I went to re-focus I had no slip or backlash, no slop, and the exact same

focus-control accuracy as in much warmer temperatures during previous sessions.

Examples of astro-images captured using the WalterLee heliFocus units are available at www.gallery.me.com/nheacock. Among my favorites are (1) a tree-framed Big Dipper, shot through the heliFocus-equipped Canon EF-S 18-55 kit lens, (2) the H-alpha filter view of the North American Nebula captured using a heliFocus unit on a Canon USM 75-300 lens, and (3) the Veil shot with a heliFo-

cus-assisted Vixen ED103s.

Conclusion

I love the WalterLee heliFocus system so much that I now have three of them. I've used them under radically different scenarios, given the range of telescopes and lenses to which I've installed them, and can't imagine imaging without one. I highly recommend this product for its quality, craftsmanship, and usability. **AM**

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