Meet a small, awesome imaging scope

Stellarvue’s SV70T 2¾-inch refractor is lightweight and gorgeous — with a bonus of high-quality images.

by Jon Talbot

The Stellarvue SV70T is an apochromatic refractor in a small package. The telescope measures 14¼ inches (37.5 centimeters) fully extended and weighs only 4.4 pounds (2 kilograms). All equipment shots: ASTRONOMY, William Zuback

Do you like the idea of wide-field views through the eyepiece? Does shooting highly corrected large astroimages with modest size sensors appeal to you? If yes, then the SV70T, a new offering from Stellarvue, may fit your needs. I had the opportunity to test this new scope recently, and I wasn’t disappointed.

Initial impressions
The SV70T is a 2¾-inch (70 millimeters) f/6 apochromatic triplet refractor made with an FPL-53 fluorite center element, and triple-tested by Vic Maris and the team at Stellarvue. It provides sharp views and excellent color in a small package.

When I first opened the padded carrying case, I was surprised at the small size of this scope. It measures a scant 14¼ inches (37.5 centimeters) long with the dew cap extended and 12 inches (30.5cm) long when it’s retracted. I was pleasantly surprised when I looked at the focuser. Instead of the typical 2” focuser found on most small scopes, a larger Stellarvue 2.5” dual-speed focuser comes standard. You can manually rotate and lock the end of the focuser into place. The company also includes a nice set of machined rings and a Vixen-style dovetail plate.

If, on the other hand, you use a Losmandy-style dovetail plate, Stellarvue offers a set of 1.5” riser blocks that attach to the rings. The blocks raise the scope, allowing some added space between it and the dovetail plate. This comes in handy when attaching cameras or accessories to the scope and when you’re balancing it.

Imaging
According to Stellarvue’s website, the optional field flattener/focal reducer (FF/FR) the company sells is designed to work with a modest size (APS-C) chip in mind. The Canon line of APS cameras (like the 60Da, which is popular with astroimagers) should work great with the SV70T.

The focal length of the SV70T measures 420mm. Using a 2” star diagonal and a 7mm eyepiece (which yielded 60x), features on the Moon’s face looked sharp with the tops of peaks popping out of the blackness and no hint of false color along the limb. Switching to a wider field 20mm eyepiece (21x), the winter Milky Way showed myriad stars — each a sharp pinpoint.

The view snapped to a sharp focus nicely with the Stellarvue focuser and its action was buttery smooth. Both the coarse- and 11-to-1-reduction fine-focusing knob worked perfectly with no slip.

Finish and optics
Stellarvue dubbed the finish on the SV70T “Instrument White.” It appears durable and blemish-free. The inside of the tube is flat black and contains two knife-edge baffles to reduce the possibility of scattered light. The part of the focuser’s drawtube that’s inside the scope is grooved and also flat black to suppress any reflections.

Externally, the dew shield is of a sliding design and was pleasantly snug. The lens cap is a slip-on design. The older Stellarvue SV80 model carried the motto “built like a tank.” I think it now has a baby brother, given the robust feel of the SV70T.
Jon Talbot, a meteorologist by trade, is an avid astroimager who resides in southern Mississippi and flies into hurricanes for kicks.

Stellarvue’s photographic field flattener/focal reducer (SF/FR-70 APO) is an option ($295) that will allow you to capture wide fields with your camera.

Stellarvue SV70T
Type: Apochromatic refractor
Aperture: 2.75 inches (70 millimeters)
Focal length: 420mm
Focal ratio: f/6
Focuser: 2.5” Stellarvue dual-speed, threaded for field flatteners
Weight: Optical tube: 4.4 pounds (2 kilograms); 5.6 pounds (2.5kg) with dual rings and Vixen rail
Length: 14½ inches (37.5cm) with dew shield extended
Price: $799
Contact: Stellarvue
11820 Kemper Road
Auburn, CA 95603
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In the end, the SV70T along with the FF/FR provided a field of view of roughly 3° by 2°, which is wide enough to fully cover large objects like the Andromeda Galaxy (M31), the Rosette Nebula (NGC 2237–9/46), and the Orion Nebula (M42). The sensor in my CCD camera has 5.4-micron pixels, which provided a resolution of 3.29” per pixel. Other cameras using sensors with small pixels, such as the new generation Sony ICX834 detector, will provide even higher resolution and be a great match with the SV70T.

My first goal was to test the flatness of the field and the vignetting (light loss) produced by the optics and the FF/FR combination. I targeted a fairly dense star field and measured the curvature with CCD Ware’s CCD Inspector software. Using 525 stars, the curvature measured a respectable 9 percent with star profiles looking excellent into the corners.

Shooting a flat field using my luminance filter allowed me to measure the vignetting, which measured a paltry 5 percent. This figure is excellent, and probably can be attributed to the larger 2.5” focuser supplied with the scope.

I used my CCD camera attached to the SV70T and FF/FR to image the Andromeda Galaxy and another winter show-piece, the Rosette Nebula. Both are large objects that fully fit into the field of view of the camera’s sensor. The system worked great on both objects, providing a wide field of view and excellent resolution. Just for grins, I also tried the scope using a Canon 6D, which contains a full-frame (35mm) chip. I shot an image of the area from the Orion Nebula to the Horsehead Nebula. This setup produced an amazingly large field of view of 6° by 4° with a resolution of 4” per pixel and captured both objects.

That said, the FF/FR did not fully correct the stars to the corners of this extremely large detector. It did, however, correct about 80 percent of the field of view extremely well. When I cropped the image a bit and showed it at a slightly reduced size, the final picture looked excellent — one I’d hang on my wall. Although Stellarvue didn’t design the SV70T for the size of a full-frame detector, this test showed that the scope with the FF/FR did offer exciting possibilities for those willing to sacrifice a small part of the field of view.

My overall impression of the SV70T is that this scope is an exciting addition to the Stellarvue line. It offers excellent value for those wanting a lightweight setup that produces great views at the eyepiece. But it also promises well-corrected images over a wide field using modest size detectors available in a variety of cameras. 

How did it work?

This image of the Rosette Nebula (NGC 2237–9/46) shows intensely red hydrogen clouds and pinpoint stars, a testament to the high quality of the SV70T’s optics. JON TALBOT

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