

Testing Askar's Versatile V Scope

This modular telescope offers the choice of two apertures and six focal lengths for a versatile astrophotography package.



Askar V

U.S. Price: \$1,695
sharpstar-optics.com

What We Like

Sharp optics

Excellent fit and finish

Versatile choice of focal lengths

What We Don't Like

Minor off-axis aberrations

Adapter threads can bind

Pungent foam in case

JIANXING SHARPSTAR OPTICAL INSTRUMENTS has certainly taken the astrophoto world by storm in recent years. The company has introduced many lines of telescopes, both refractors and reflectors, under the Sharpstar brand and also under their subsidiary Askar brand.

I previously reviewed several Sharpstar models, most recently the Askar FMA230 and Askar FRA500 astrophotographic refractors (*S&T*: July 2022, p. 64). With so many telescopes in the Sharpstar/Askar catalog, deciding which is the best for your particular needs can

◀▲ Askar's new V refractor is a versatile telescope (perhaps that's what the "V" stands for) that comes with 60-mm and 80-mm objective lenses and three field flatteners for imaging. The background photo was made with the 60-mm and reducer lens.

be confusing. Here's one solution: a modular telescope that's really six telescopes in one, dubbed the Askar V.

I tested an early unit on loan from Sharpstar. I was told the final shipping production scopes differ from the sample I tested only in having shorter threads for attaching accessories and a minor cosmetic change to the focuser.

The V Scope Concept

The idea of a modular telescope isn't new. For many years, Japanese manufacturer Borg has offered instruments with swappable front objectives and a choice of focusers.

Sharpstar takes the concept a step further by offering a single package that includes three field-flattener lenses, which each work with the included 60-mm and 80-mm objective lenses, at an attractive price.

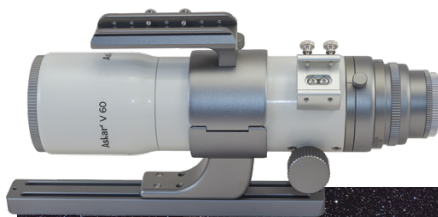
The Askar V comes in a carrying case that houses the assembled scope with its 80-mm f/6.25 objective, with room for the 60-mm f/6 objective and the three accessory lenses: a 0.75× reducer corrector, a 1× flattener, and a 1.2× extender corrector. You even get a blower brush for cleaning the optics — very nice!

In all, when first opening the case, the array of gear is an impressive sight, making for a satisfying unboxing experience. Not so impressive is the smell! I've never had to criticize the smell of a telescope case before, but the foam padding emits quite a pungent chemical odor, though it does dissipate after a few weeks.

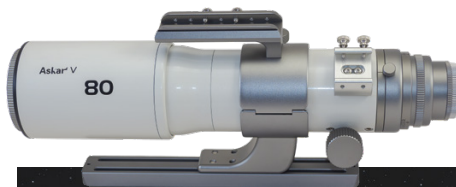
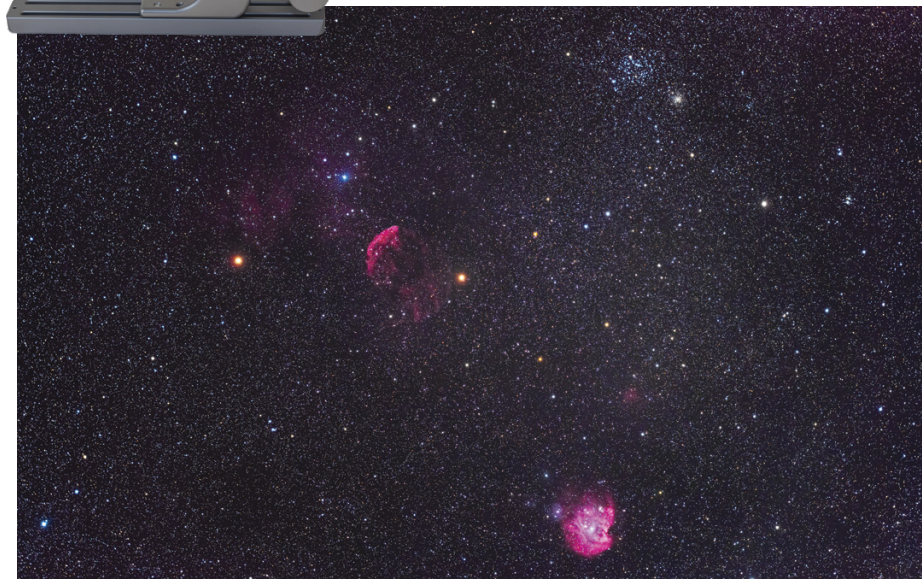
Each flattener accessory has two barrel positions: Retracted for use with the 80-mm lens, and extended when paired with the 60-mm. You change the settings by turning the black barrel until it comes loose, then pushing it in or pulling it out until a second set of threads engages to lock the lens in the new position.

Each flattener has metal front and rear screw-on caps that are the same for all three units, so there's no fussing with getting the correct caps back on each. The rear of the unused objective lens also has a screw-on metal cap to protect the optics when not on the telescope. Though the two front lens caps are identical and can be interchanged, they are labeled "60" and "80".

With the 80-mm objective and heaviest flattener lens, the Askar V weighs 3.6 kilograms (7.9 pounds) and is 44.5 centimeters (17.5 inches) long with the dew shield retracted. With the 60-mm lens, the V weighs 3 kg and is 35.3 cm long. The entire package with



◀▶ The 7.5° by 5° field of the Askar V's 60-mm lens combined with the reducer is ideal for framing wide star fields in the Milky Way, such as the one shown here in Gemini. This is a stack of 3-minute exposures at f/4.5 with a filter-modified, full-frame Canon R camera.



◀▶ The Askar V with the 80-mm lens and extender provides a 3.4° by 2.3° field and 600 mm of focal length — enough reach for framing galaxy groups such as the Leo Trio. This image is a stack of 3-minute exposures at f/7.5 with a Canon R.



both lenses and the three flatteners in the case weighs 7.9 kg, within airline baggage carry-on limits, though at 23 inches long the case might exceed the length allowed.

Mechanical Quality

The Askar V tube is painted with a textured cream enamel, with all the fittings finished in a matte silver. The overall appearance is one of quality and



▲ The Vixen-style dovetail bar's long slots facilitate balancing the telescope when used with heavy cameras and accessories. Buying another dovetail bar, which is often required with small telescopes, shouldn't be necessary.



▲ The three included flatteners can each be configured to operate with either the 60-mm or 80-mm objectives by sliding their internal barrels between two locking positions. All are shown in their extended 60-mm settings.



▲ The V comes in a carrying case with labeled receptacles for the 60-mm objective and three flattener lenses. Removing a foam cutout makes room for an optional user-supplied electronic focuser.

luxury. The focuser is a 2-inch-format, dual-speed rack-and-pinion model with 90 mm of travel. That's more than enough to accommodate the various focus positions required by the three flatteners, as well as for visual use with a user-supplied 2-inch star diagonal. Despite the V's modularity, the focuser isn't removable.

There's a graduated scale on the focuser barrel for ease of resetting focus when you swap lenses and flatteners. A welcome feature is the lockable camera rotator with a degree scale. Its motion was smooth and didn't shift focus when turned, nor did it introduce any tilt of the camera that I could detect.

However, I found the single index mark could end up out of sight under the barrel, making the scale less useful in practice.

The focuser proved to be smooth and precise. With a heavy load of a two-inch star diagonal and big Tele Vue 42-mm Panoptic eyepiece, it racked in and out with no slippage of either the coarse- or fine-speed motions, even when the scope was aimed straight up. I never had an issue when focusing my Canon cameras, either.

Each flattener includes an M54-to-M48 adapter ring, for attaching camera T-rings or adapter tubes. The ring accommodates 2-inch filters and has threads that are readily accessible and not deeply recessed as in some of Sharpstar's other telescopes.

The tube is held securely in a single clam-shell cradle, equipped with a handle machined with a Synta-standard dovetail channel for accepting guidescopes or other ride-along accessories, such as a minicomputer. Another Synta dovetail bracket on the tube provides a second attachment point, and there are holes on the focuser for bolting on a third shoe if needed.

The tube comes with a generous 29-cm-long Vixen-style dovetail bar, which has dual slots along its full length. As with most anodized dovetail bars, I found this one's lovely finish was easily scratched.

Screwing the objectives off and on the tube took little effort as the threads

have a slight film of lubricant to make the motion smooth, without binding or chatter. I had no issues with collimation shifts after swapping one lens for the other.

As with the Askar scopes I previously tested, I found the rear adapters could bind, making them tough to remove at times, particularly after being inadvertently tightened when installing a camera. If this were my scope, I would apply a little lubricant here.

The 60-mm objective comes with an integrated 70-mm-deep dew shield that cannot be removed or retracted. The 80-mm lens has a sliding dew shield that extends out 65 mm. While its motion is smooth and secure, there's also a lock screw to hold it in place.

In all, the impression of the V is of a solidly made telescope with top-class fittings and no plastic parts. Even the slip-on cover for the fine focus knob is machined metal. The telescope was a nightly pleasure to use.

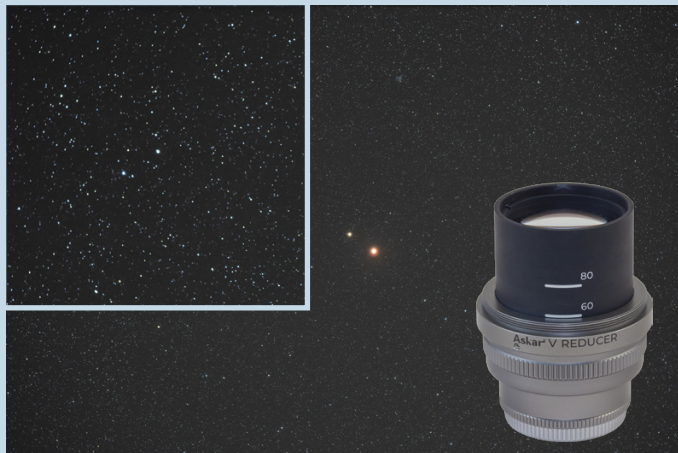
Visual Performance

While photography is clearly the main purpose of the V ensemble, both 60-mm and 80-mm objectives can be used visually with the included 2-inch visual back. In a high-power star test, I saw no sign of astigmatism from malformed or pinched optics and, once cooled down, only the barest trace of spherical aberration, true of most refractors I've tested. In focus, stars looked textbook-perfect, with cleanly defined central Airy disks surrounded by crisp first diffraction rings and suppressed outer rings.

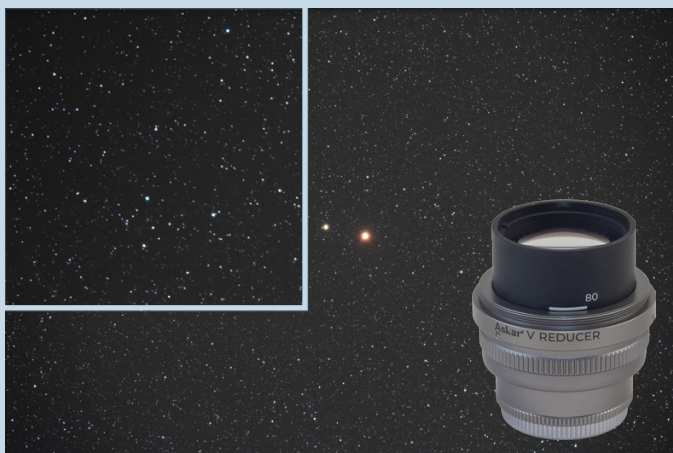
The main lenses are each triplets incorporating two ED elements of anonymous glass type. In focus, there was no sign of chromatic aberration even on Venus or on bright stars. Inside focus I detected only a trace of a magenta rim and a faint cyan rim outside focus when examining bright stars. This was color correction as good as I have seen in all but the very finest apochromatic refractors. This level of performance means either combination can serve as an excellent visual telescope even for high-magnification view-

▼ This array of pictures compares each of the Askar V's six photo combinations. The full image illustrates the level of vignetting, while an enlargement of the upper left corners displays edge aberrations. All are single images taken the same night, April 13, 2023, when Mars (on the right) was close to the star Epsilon Geminorum.

60-mm with Reducer



80-mm with Reducer



60-mm with Flattener



80-mm with Flattener



60-mm with Extender



80-mm with Extender



▲ The trio of images in this column shows the 60-mm objective with the 0.75× reducer, 1× flattener, and 1.2× extender, yielding focal lengths of 270 mm, 360 mm, and 446 mm, and f-ratios of f/4.5, f/6, and f/7.4, respectively. The reducer and extender each produce astigmatic stars at the corners, but the flattener is nearly perfect. A similar level of vignetting appears in each.

▲ This column's trio of images shows the 80-mm objective with the same reducer, flattener, and extender but now yielding focal lengths of 384 mm, 495 mm, and 600 mm, and f-ratios of f/4.8, f/6.2, and f/7.5, respectively. The reducer and flattener show very slight star elongation, but now the extender is nearly perfect. The 80-mm paired with the reducer produced the most vignetting of the six combinations.



▲ The focuser includes a handy degree scale on the camera rotator. The flatteners each present a camera-side M54 male thread, into which screws an adapter ring that presents an M54 female thread. A step-down adapter screws into that, with camera-side male M48 threads, and that can accept a 2-inch filter, as shown.

ing, with the little 60-mm particularly attractive as an airline-portable scope.

Photographic Performance

Each flattener requires the standard back focus of 55 mm to the camera sensor. I tested all six combinations with my full-frame Canon R, fitted with a Canon RF-to-48-mm T-ring.

The 60-mm objective and reducer combination produced the worst off-axis performance, with stars beginning to elongate beyond a 30-mm image circle. The 60-mm plus flattener combination yielded nearly perfect stars to the corners of a full-frame detector.

The same objective mated with the extender showed some elongation at the frame corners.

The 80-mm and reducer pairing had only minor star bloating at the extreme corners but did show the most darkening of the corners from vignetting. The 80-mm and flattener combination exhibited only minor aberrations at the corners, while the 80-mm and extender lens pairing produced nearly perfect stars corner to corner. Test images recorded only a trace of chromatic aberration, which added slight blue halos to stars in most of the combinations.

Mix and Match

One important consideration is the field size each combination offers. The 60-mm with the field flattener provides a nearly identical field (5.6° by 3.8° with a full-frame sensor) as the 80-mm with the focal reducer (5.5° by 3.7°). Likewise, the 60-mm and extender (4.7° by 3.1°) is similar to the 80-mm with the flattener (4.1° by 2.7°). However, in both cases using the 80-mm lens provides about a one-stop faster photographic speed.

The little 60-mm objective is most useful when combined with the reducer for a generous 7.5° by 5° field and 270-

mm focal length at $f/4.5$, great for large nebulae and star fields. The 80-mm with the extender provides the other extreme choice: 600 mm of focal length at $f/7.5$ for a 3.4° by 2.3° field of view. That's tight enough to be useful for bright galaxies and groups of galaxies.

The 80-mm with the reducer (at $f/4.8$) or flattener (at $f/6.2$) will be the prime combinations for most other targets. However, the 60-mm will have the advantage of providing similar fields in a smaller package, useful for travel to remote dark-sky sites or to eclipses.

So, while the Askar V ostensibly allows users to choose between six focal lengths, in practice only four are likely to be employed, with the 60-mm lens reserved for targets that need its wide field with the reducer, or when portability is paramount.

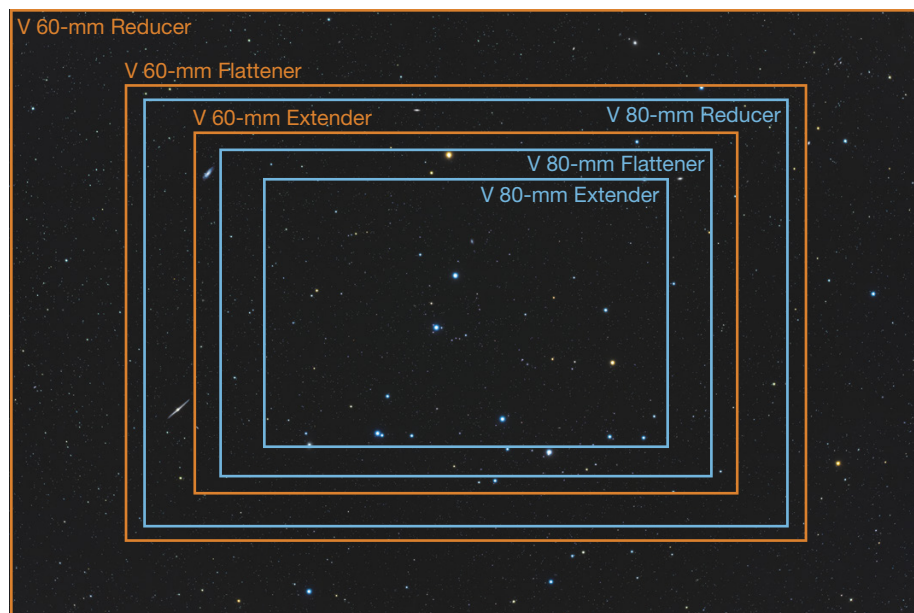
Recommendations

The Askar V is such a good deal that I have to wonder if Sharpstar Optical isn't undermining sales of its other telescopes by introducing it. The cost of buying three or four separate telescopes and their optional reducers makes the V an extremely attractive package.

It's not quite a jack of all trades, but for a portable apo astrograph it comes close, without the downfall of being a master of none. While individual telescopes optimized for each focal length might provide slightly better performance on- and off-axis, I saw no aberrations with the Askar V, either visually or photographically, that would make me not recommend it. And its mechanics had no compromises to speak of.

For someone willing to spend a little more than for one apo refractor (for example, the Sharpstar 61 EDPH III with reducer is \$750), you get a very versatile package, good for both Milky Way star fields and bright autumn galaxies. If the V stands for "versatile," the model is well-named.

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▲ The above picture illustrates the fields of view that each V combination delivers, on a background image of Melotte 111 taken with the 60-mm lens and reducer for the widest field. Two pairs of combinations produce similar fields of view.