A Box of Bino Fun

Big binoculars open up a universe of observing opportunities.

Bill Faatz's 5-inch "bino box" provides stunning views of the night sky. It's built with mostly commercially available components.

BEING AN AVID binocular observer and equipment nut, I'm very fond of telescope-making projects involving binoculars. This is especially true when the instrument is nicely crafted and relatively easy to build, such as the one described here by northern California amateur Bill Faatz.

Telescope makers are motivated by many factors, but one of the most common is the desire to obtain equipment that isn't commercially available. Bill owned 25×150 Fujinon binoculars, and though the views through them were excellent, they weighed 150 pounds (68 kg) with the mount. He also found that the straight-through viewing angle and fixed magnification were limiting.

So Bill set out to build his own big binoculars. What I find very appealing about his design is that there are very few tricky parts to make. The main component is a plywood box measuring 20 by 15 by 8 inches. Everything else is available off the shelf.

The heart of the system is a pair of Istar 127-mm (5-inch), f/5.5 achromatic objective lenses from **www.istar-optical.com**. The remaining optical parts are mirrors and eyepieces. "Because my bino box uses three mirrors, the odd number of reflections yields the same image orientation as a refractor or Cassegrain used with a star diagonal," Bill explains. Inside the box, a pair of standard 3.1-inch (minor-axis) Newtonian secondary mirrors feed 2-inch star diagonals. These, in turn, direct light to 1¼-inch star diagonals that hold the eyepieces. As Bill reports, "The helical focusers allow inter-ocular spacing adjustment of the eyepieces, and the star diagonals provide a 90° viewing angle."

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Each half of the binocular uses a pair of star diagonals — a 2-inch model and a 1¼-inch that holds the eyepieces. Inter-ocular spacing and rough focusing is done with helical focusers, while fine focus is achieved by sliding the eyepieces in and out of the star diagonals.

In addition to cost savings, the optical configuration of the bino box yields two advantages over many commercial big binoculars. The first is the ability to vary the magnification using different eyepiece pairs. The other involves the use of first-surface mirrors rather than prisms, which helps ensure excellent image contrast and good illumination across the field of view. "By ray-tracing the design and carefully positioning the mirrors," Bill explains, "I was able to achieve nearly 80% illumination at the edges of my low-power eyepieces."

Those of us who routinely use 10×50 binoculars can imagine how great the views in 5-inch binos are. Bill doesn't have to imagine. "Last summer I tried the bino box on the Veil Nebula using 24-mm (29×) and 19-mm (36×) Tele Vue Panoptic eyepieces equipped with ultra-high-contrast nebula filters," Bill recalls. "I saw lots of detail in the main halves of the Veil and all kinds of bits and pieces of bright nebulosity in between, including a well-defined Pickering's Wisp."

Dark nebulae dotting the summer Milky Way are another prime target. "The area around Gamma Cygni clearly shows a wealth of bright and dark nebulae, and Barnard's 'E' in Aquila stands out boldly," says Faatz.

Readers can learn more about Bill's binoculars by e-mailing him at **bfaatz@windjammercable.net**. ✦

Contributing editor and avid telescope maker ***Gary Seronik*** *writes our Binocular Highlights column (page 45). He can be contacted through his website,* ***www.garyseronik.com****.*