

Product Review: Helios Star Field 2 x 40 WA Galilean Binocular.



The Helios Star Field Wide-Angle 2 x 40 Galilean Binocular package.

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Product: Helios Star Field 2 x 40WA

Country of Manufacture: China

Magnification: 2x

Aperture: 40mm

Coatings: Fully Broadband Multi-Coated

Eye Relief: 10mm

Close Focus: 2m advertised

Field of View: 445m@1000m(24 Angular Degrees)

Weight: 189g advertised and measured

Size: 12.2 x 4.9 x 3.8cm

Accessories: Neck strap, semi-hard zipped case, microfibre cloth, instruction sheet

UK Price: £99.00

There's nothing new under the Sun, and then some. Opera glasses have enjoyed a long history owing to their ability to generate low power, wide-angle views, enabling the theatre goer to get an ultra-stable view of the stage. In the past few years though, the opera glass has been modified to create a new type of observing experience under the starry heaven – enter the super-wide angle constellation binocular, employing powers not much more than 2x and offering up exceptionally large fields of view up to 36 degrees or so. Several models offering this kind of experience have been launched by companies such as Vixen, Orion USA and Svbonny. But recently the well-known company Helios, now owned by Optical Vision Limited, has also produced their own rendition of this binocular to sate the demand of this niche observing experience; enter the Star Field 2 x 40 WA Galilean binocular. Having owned and tested out the Svbonny SV 407 2.1 x 42, I was curious to learn about the Helios model, owing

to its significantly smaller size and lighter weight, which would naturally lend itself to longer hand-held views.

Before getting into the details of this model, let's look at the optical concept behind all these devices. First off, these are not true opera glasses – the eyepieces have additional lens elements to reduce aberrations inherent to the Galilean telescope design and greatly widen their field of view. This means that there will exist models that boast the same fields of view but at higher power, mostly attributed to the design of the eyepiece. The next thing to remember is that the human eye cannot harness the full light gathering power of these binoculars. On paper the exit pupil of the Helios Star Field 2 x 40 is 20mm. The human eye pupil however has a maximum aperture of 7mm, and as we age the aperture of the exit pupil decreases somewhat. So, let's just say we have a 6mm exit pupil (which is probably realistic for a middle-aged individual like me). Thus, the effective aperture will be $2 \times 6 = 12$ mm. So, effectively we're dealing with a 12mm binocular offering a 2x magnification. So what's the deal with the 40mm aperture of the objectives? Well, it turns out that in the Galilean optical design, the field of view it delivers is dictated by the size of the objectives – the larger their size, the greater the effective field of view. The reader will note that this principal does not apply to conventional binoculars.

The 2x magnification will darken the sky by a factor of 2^2 or 4 times, and it's the combination of the effective 12mm aperture and the 4-fold darkening of the sky that limits the faintness of stars visible through the instrument. In practice, this results in a boost of about 1.5 magnitudes – a useful gain in sensitivity over the naked eye view.

Owing to the nature of the design of these super-low power modified Galilean binoculars, there is no well-defined field stop and since the exit pupil of these designs is virtual, that is, it's positioned inside the optical train, there is no fixed locus to image the field of view. What this means in practice is that the closer one can get to the ocular field lenses the wider the field of view experienced. Unfortunately, eye glass wearers will not, in general, be able access the same size fields as non-eye glass wearers, so these are ideally suited to the latter group of individuals. Finally, despite their advertised field sizes, off-axis aberrations significantly curtail the size of the field that offers up well corrected stellar images. And this is where the quality of the optics gets factored in. Poorer quality instruments will manifest off-axis aberrations closer to the centre than better made brands.

Now let's take a closer look at the Helios Star Field WA 2 x 40

Ergonomics

The first thing I noted about the Helios Star Field is its light weight. At only 189g, it's nearly half the weight of the Svbony SV 407 2.1 x 42. And its considerably smaller too. Take a look at the size comparison below:



The Helios Starfield WA 2 x 40 (top) is smaller and considerably lighter than the Svbony SV 407 2.1 x 42(bottom).

The optics are fully multicoated on all lens surfaces. I was unable to detect any internal reflections when pointing the instrument at a bright artificial light source.



The optics are fully multi-coated throughout the optical train ensuring bright, high contrast images with no internal reflections.



Another view from the eyepiece end comparing the size of the Svony glass(top) to the smaller Helios Star Field(bottom).

The eyepieces must be adjusted individually by turning them clockwise or anti-clockwise. The dioptre compensation range is from -5 to +3. Turning the oculars is slow but all the while smooth.



The nicely machined aluminium eyepieces are rough textured for easy turning.

The chassis is made from high-quality machined aluminium. And while lightweight, it has the feeling of quality when you hold it in your hands. Indeed, the Svbonny model, in comparison, is just plain over-built. There's absolutely no need for a device like this to weigh so much!

The eyepieces have 10mm of eye relief; that's not bad considering other models only have 8.5mm or so. That said, one of the things that niggles me about all these devices is that the lenses can get smudged from eyelashes rubbing against the surface, necessitating more frequent cleaning. This is not directed at the Helios Star Field 2 x 40 per se. All the other models have the same issue.

There's no provision to mate the Star Field to a tripod, but such a lightweight device doesn't need one. Indeed, I think it even defeats the purpose of these devices which were surely created to enjoy hand-held.

The instrument comes complete with a quality neck strap but I elected not to use it as it is so lightweight and small enough to put in a medium sized pocket.

I love the carry case that accompanies the instrument; its sturdy hard shell will protect your investment from knocks and bumps while not in use. It zips closed to keep out dust and moisture and has a neat little carry strap attached for transport.



The carry case is small and elegant. It zips closed to protect the instrument from the elements and can fit inside a jacket pocket.

Daylight Optical Testing

If I'm being honest, I was quite underwhelmed by the performance of the Svbony SV 407 2.1 x 42. It had too much off axis aberrations in both daylight and night-time tests. These observations coloured my opinion of these devices so much that I was under the impression that they were all pretty much the same. Thankfully, nothing could've been further from the truth! Comparing the Helios Star Field 2 x 40 and Svbony 2.1 x 42 in A/B tests confirmed that the Helios was in a completely different league to the Svbony. The Helios was slightly sharper

on axis, with better contrast, and had a much larger sweet spot than the Svbonny. I would estimate that the effects of field curvature were not at all intrusive in the central 50 per cent of the field of the Helios Star Field but was more like ~ 30 per cent in the case of the Svbonny. These differences were striking and completely unexpected!

After adjusting the eyepieces to accommodate my eyes and setting them at infinity focus, I was immediately taken by the huge contrast boost, as well as the resolution gain over the naked eye. The image showed colours far more vividly and I was able to see much finer details on high-contrast objects like the grain of wooden fences in the middle distance. Field depth is extraordinary in the Helios Star Field 2 x 40. I estimated close focus at infinity to be about 4.5-5m! After a few minutes glassing with this instrument, the view becomes so immersive and thought-provoking you can easily forget that the view is magnified. I was especially thrilled when I brought the instrument for a stroll through my local woods, where I could view vast swathes of forest with excellent clarity and depth perception. It was like having bionic eyes! Adjusting the eyepieces, I was able to obtain tack-sharp images of Red Campion beds as close as 1.9m away, so a little better than advertised. Indeed, when they come within about 10-15 metres from you, the Helios Star Field 2 x 40 served up excellent details of Blackbirds, Chaffinches and Song Thrushes foraging in the leaf litter on the forest floor. I was even lucky enough to watch the climbing antics of a little Tree Creeper inching its way up the trunk of a majestic Scots Pine some 12 metres in the distance.

One of the most unexpected dividends this neat little instrument provided was its ability to be used profitably in a moving vehicle. I brought the Helios Star Field along with me in the car. My wife was driving, and I was sat in the front passenger seat. We arrived at a stretch of road a few miles long between Strathblane and Milngavie, where I was able to enjoy stunning views of the Campsie Hills drenched in gorgeous evening sunshine. The enhanced resolution and contrast over the naked eye view turned already stunning views into sublime vistas! The magnificent escarpment came alive with intimate details of the exposed igneous rocks near their summits, with wonderful views of careening waterfalls and the ravines they had carved out over the millennia. Stunning too were the vast swathes of bracken and heather traversing the lower slopes of these ancient hills. I was amazed just how relaxing the views were. These kinds of mobile observations are quite beyond the powers of regular binoculars. If you're ever travelling through great mountain ranges, these super-low power, wide-angle glasses are sure to enthral you with the details you can make out – and you won't feel in the slightest way discombobulated for doing so!

Achtung: The above activities should never be carried out by car drivers!

Another daytime activity one can engage in with this instrument is cloud watching. What's better than a cloudless summer day? A day with sunshine and white, fluffy clouds! The Helios Star Field 2 x 40 is an excellent tool for watching clouds morph in real time as they race across the sky. The obvious gain in contrast and resolution can transform a rather ordinary looking cloud mass into a veritable labyrinth of form and structure. I enjoyed a few passing minutes

in the late evening sitting back in my zero gravity chair watching clouds catch the last light of a setting Sun. And even after dark, it's wonderful to watch clouds passing by or near a bright Moon, creating wondrous spectacles of light and colour. And though I was too late this year, I very much look forward to studying noctilucent clouds into the wee small hours next summer.

Twilight can also be a wonderful time to admire beautiful silhouettes of trees, their branches showing up much more vividly compared with the naked eye. Horizons become fascinating targets with this low power glass too, with old and abandoned farmhouses, hilltops, farm silos and even windmills making fascinating targets for study as the Sun races towards the netherworld.

As mentioned previously, the instrument showed up no annoying internal reflections when turned toward a bright artificial light source at night or on a bright full Moon, so this will be a good glass to enjoy panoramic views of cityscapes and harbour lights at night. I can also see a use for these glasses for short-range birding in the garden. If you have a bird table or feeder near to your windows, the excellent natural, immersive views of the Helios Starfield 2 x 40 will serve as a great tool for those who want to get just a little bit closer to the action.

Night Sky Testing

My first test of the Helios Starfield 2 x 40 under the stars in my rural Scottish backyard setting came when I compared it briefly to the Svbonny model described earlier. Turning the instruments towards the main stars of Cygnus lying nearly overhead, I could immediately see a significant difference between them. Specifically, when I centred Sadr(Gamma Cygni) in the field, I noticed that Epsilon Cygni was clean and sharply focused in the Helios Star Field but conspicuously blurred in the SV 407 2.1 x 42. This confirmed what I had noticed during daylight testing. It was at this point that I put the Svbonny away in its case and concentrated on the Helios. I consider the latter to be poor value for money, as it actually retails for about £20 more on Amazon compared with the Helios glass.

I was immediately struck with the sheer clarity with which I could make out the entirety of Cygnus, most of Lyra and even Vulpecula. Stars quite invisible to the naked eye popped into view while glassing with the Helios and I can confirm that a solid magnitude gain of about 1.5 magnitudes was indeed realistic. I also enjoyed the view of Delphinus with its distinctive diamond-shaped asterism, as well as exploring the glories of Aquilla sat next door to it, as it were, to the west. I could immediately see how this little super-low power glass will serve as a great tool for teaching youngsters the constellations, even from a light polluted town or city.

In yet another test, I centred the Big Dipper in the Helios Star Field 2x 40 and was delighted to see that it was quite well delineated throughout. Furthermore, several 'new' 6-7th

magnitude stars popped into view in the bowl asterism confirming its modest increase in light grasp over the naked eye view.

The Andromeda Galaxy(M31) was easy to make out above and to the east of the Square of Pegasus but when I scanned the region of the sky in Triangulum, try as I may, I could not make out even a trace of the famous Pinwheel Galaxy(M33), but my luck was to change when I brought the Helios Starfield 2 x 40 along with me on vacation to Pembrokeshire, south Wales. Here, miles away from big towns and cities, the sky is gloriously dark and transparent, and even though the Moon was in the sky, it skirted the horizon for the most part, setting early enough for me to enjoy the night sky without its 'light pollution.'

Here, I was easily able to make out a faint smudge of light marking the spot of M33, but I also enjoyed many short spells, lying flat on my back on a sun recliner, in absolute awe of the view served up by this low power super-wide angle binocular. The Milky Way running through Cygnus was absolutely stunning, where I could make out shoals of stars interspersed by dark, cavernous regions completely devoid of star light. In my mind's eye, I remembered the star gazing adventures of the young Edward Emerson Barnard (who's life is celebrated in my historical work, *Chronicling the Golden Age of Astronomy*), as he lay down on the back of a wagon at night, mesmerized by the blazing heavens above his head. Looking east towards Perseus I was delighted to scoop up several bright shooting stars emanating from the radiant of the Perseid meteor shower culminating on the night of August 12. And while it was still quite low in the eastern sky at or around local midnight from this vantage, I came to appreciate just how useful this instrument will be for observing other meteor showers active throughout the astronomical year.

The 'Wonky W' of Cassiopeia was beautifully framed in the Helios Star Field and below it, the famous Double Cluster was very easy to pick off. An instrument like this is brilliant for highlighting the smaller, fainter or more obscure constellations like Lacerta, Sagitta and Cepheus. I was also struck by how easily I could make out the colours of fainter naked eye stars. For example, Mu Cephei- Herschel's Garnet Star – stood out as distinctly but faintly red, whereas, using the naked eye its colour is quite beyond me.

Though there were no bright comets in the sky during my testing, I can easily see how a glass like this would be awesome for observing the tail of a bright, icy interloper from the Kuiper Belt or Oort Cloud. Here's hoping I get a chance to put this idea to the test!

It is undoubtedly the case that an instrument such as the Helios Starfield 2x 40 works best under dark, pristine skies, but I can also see many uses for it in light polluted places, where its ability to darken the sky significantly will help urban or suburban amateurs to find their way round the sky more easily.

In summary, I really enjoyed the views through the Helios Starfield 2 x 40 and would heartily recommend it to anyone. For a very modest investment of £99.00, you'll get a nicely engineered super-wide angle binocular that delivers excellent enhancements over the naked eye. It does exactly what it says on the tin. I can't wait to explore the glories of Taurus and Orion later in the season with this quirky little naked eye 'extender,' when it will help to lift the spirits above the cold and the dark of long winter nights.

Watch this space!

Dr Neil English is currently writing his 8th title: *Choosing & Using Binoculars: A Guide for Star Gazers, Birders and Nature Enthusiasts*, which will hit the bookshelves in late 2023.