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**William Optics ZenithStar**

Brand and Model: William Optics ZenithStar

Price (\$USD): \$399.00

Type: Achromatic Refractor

Attributes:  Go-To  PEC

Aperture: 80mm

f Ratio: f/6

Focal Length: 480mm

Finder:

Electric Power:

Mount:

Tripod:

Weight (lbs): 5.3

Dimensions (w/h/d): Tube Length 15.0" (380 mm)

Description: Objective Type Doublet Element Design / Multi-Coated  
 Dewshield Retractable  
 Focuser 2" Crayford Focuser  
 80 mm Focuser Travel Length  
 360° Rotatable Design  
 1.25" Adapter Brass Compression Rings  
 Field Stops 15 Baffles  
 Tube Weight Stylish carrying bag  
 Dimensions 48 x 28 x 16cm (WxHxD)(Water Resistance)  
 6x30 erecting finderscope  
 power Sharp up to 100x (recommended)  
 surface Black Gloss Anodizing / Golden Rims, knobs & Cap  
 others Perfect grab-and-go scope  
 L- type L- bracket based



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Guy Consolmagno  
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Zenithstar 80 Review: Part 1

### Overview:

The Zenithstar 80 (ZS80) has a beautiful appearance. It is well constructed, both optically and mechanically. Customer care and service by its manufacturer/assembler is excellent. The visual performance is good, but awaits further testing to prove if it is on a par with Short Tube 80s (ST80s), superior to ST80s or even comparable to similar focal length apochromatic refractors.

Tom Trusock and Fred Hissink have provided excellent reviews of the ZS80. They do a fine job of reviewing mechanical particulars of this system, most of which will not be repeated here. These reviews can be found at [www.cloudynights.com](http://www.cloudynights.com)

### Equipment Reviewed:

- ZS80 OTA; metal lens cap, eyepiece end cap, soft case
- AZ3 mount/tripod (altazimuth)
- Red dot Finder 2
- 35mm Ultima, UO Orthos 12.5 and 7mm, 2X Shorty Barlow (Orion), extension tube
- Filters: Neb1(Sirius) and OIII(Lumicon), V-Block (Orion), planetary(Celestron/Meade)

### Observing Site:

A thirteen acre vacant lot, shielded from streetlights and house lights, within a city of a quarter million persons and within 2 miles of much of the retail of that city and less than a mile from a high school football field and a city park with multiple playing fields lit at night. On the best of nights, in the dark hours just before dawn, the faintest visible stars at the zenith approach magnitude 5. Magnitude 4.5 skies are common.

### Received Condition:

The OTA comes sufficiently and attractively packed. The scope, wrapped neatly in clear plastic, lies snug in its foam enclosed soft

pack. The soft pack is beautiful as well, sporting thin inch long metallic grabbers chained to the zipper on the pack. The pack is doubled boxed in attractive well-made boxes. The retractable dew cap slides smoothly with just enough resistance. The Crayford focuser is very nice in its mechanical operation. The rotating cell that contains the focuser is a bit stiff. However, I never use it as both the 2-1.5 adaptor and the 1.5 eyepiece/diagonal holder have nicely made brass retaining/tightening rings that allow smooth full circular motion. The entire OTA is attractive; jet-black with highlights of gold. The paint finish is nicely done. All screws and bolts are silver in color and substantial. The optical train revealed a noticeable lack of collimation. High magnification views of bright stars gave the appearance of an airy disk with multiple diffraction rings 2/3rds of the way around the airy disk and no rings on the other third. The appearance was nearly identical to what can be seen by inputting a coma error of .2 to .35 on Cor Berrovoet's aberrator program. The lack of proper collimation was noticed immediately upon receipt. Attempts by me to identify the source of collimation error and to attempt a correction led me to discover the baffling system used on these scopes. Reading Tom Trusock's review revealed to me that the baffle on my scope was the original inadequate one. With Tom's instructions I discovered that the effective aperture of the scope was 71mm, plus or minus 3mm.

Tom Trusock's review highlighted both of these defects back in May of 2005. My ZS80, with these same defects, was sold as new two months after that review. These two defects need to be considered separately.

It seems to me that a ZS80 sold as new with a defective baffle, two months or more after Tom Trusock's review, should not have happened. There had been sufficient time for dealer and manufacturer to ascertain that the defectively baffled systems had been removed from the retail stream or repaired. However, this may have been the only unit with a defective baffle that slipped through the review process. It needs be

said that the manufacturer was willing to send a replacement immediately and that the dealer in fact did send a replacement baffle at no charge for the baffle or its shipping.

The collimation error is not desirable. It is not aesthetically pleasing when looking at close bright double stars such as Castor. However, in areas other than double star observations, a quite noticeable collimation error might not detract from the visual performance of the scope. Further, even with this collimation error, the scope performed up to the advertising claims of William Optics as a well color corrected achromat allowing useable magnifications of 100X. In light of this, it seemed to me that I did not have a right to demand replacement/correction as the scope performed according to advertised expectations. However, the dealer was solicitous of my satisfaction and secured from the manufacturer the right to return it for repair or replacement; even though I told them it did perform to the advertised expectations. In light of the scope performing to the advertised standards, I asked the manufacturer if they would allow me to test my scope for six months and then, if I was still not satisfied, to avail myself of their offer to ship the scope free of charge for repair or replacement. To this, they quickly agreed.

Finally, it needs to be said that the intra and extra focal images are very similar. This is a good sign. To the best of my memory the similarity of these images was superior to an end-user improved ST80, an Orion F6 100mm, an APM 100mm Triplet achromat and perhaps better than an ED80.

#### Visual Performance Before End-User Repairs:

For about two months I used the scope with the collimation error noted above and without knowing that the scope had an effective aperture of around 71mm. Under the sky conditions outlined above, I was able to see a 12.3 magnitude star in the vicinity of SS Cygni. The companion of Polaris and the four components of epsilon Lyrae were visible at 38X. I was able to detect the companion of epsilon Bootis by means of a

brightening on the first diffraction ring at the correct position. However, I was not able to resolve zeta Herculi or delta Cygni. With averted vision, M13 showed stars at the fringes. And, with an OIII filter, I was able to detect both of the main parts of the Veil Nebula and the North American Nebula as well. Albireo was beautiful at 38X with a 12.5mm UO ortho. Finally, as to the chromatic aberration; the ZS80 does not remove color nearly as well as an ED80 (Orion's 80mm ED F7.5). However, it is better than the F5 ST80, the F5 100mm APM triplet and about equal with the Orion F6 100mm refractor.

Wide field views with a good eyepiece such as a Celestron Ultima 35X are just exquisite, combining a sharp wide field with the distinct sharp edge of the field stop. Also, nothing short of spectacular are views with a 12.5 UO ortho, without and with a Barlow. Views are crisp and sharp and snap into focus.

Even with the two defects, this is a well performing 80mm short tube refractor. Combined with its exquisite cosmetic appearance and well-designed mechanical features, I am comfortable saying it is worth the full price asked.

#### End-User Repairs:

Due to being told that an end user could not effect repair due to the cemented doublet, and knowing that an attempted repair by the end user might negate the warranty offer, I had used the scope with the noticeable collimation error for a couple months. However, once I decided that I would probably not return the scope to the manufacturer for collimation correction as it met the advertised standards, I chose to take the OTA apart and see what could be done about the collimation error.

I discovered that this scope is so well designed that disassembly is easy. One looses the outer retaining ring on the dew cap, slides the cap back down the OTA revealing the felt lined edge of the objective lens cell. Then, one unscrews the lens cell from the OTA. Once loose, I then realized that the baffle was attached to the objective lens cell. I also discovered that this baffle could be unscrewed from the lens cell thus

allowing the objective lens to be lifted from the objective cell. Using non-cosmetically treated tissue paper, I removed the objective from the cell and discovered a one to two millimeter flange or lip on which the cemented objective rested. At one spot on this lip I placed a shim made of a piece of index card one millimeter wide and three to four millimeters long. Then I replaced the objective and screwed on the baffle. I reinserted the cell into the OTA and then proceeded to star test. The effect was noticeable and positive. There was noticeably less flaring on the one side and the multiple rings had been decreased in brightness if not in number. I then disassembled the dew shield and rotated the lens cell a bit over 1/2 turn counter-clockwise (loosening the cell) on the theory that different positioning on the objective cell on its screw might effect another slight correction to the overall collimation of the system. The effect was, again noticeable and positive; improving on the previous improved result. On bright stars highly magnified the diffraction ring totally encircled the airy disk. The diffraction ring was brighter on about 2/3rds of the ring. The other third of the ring was fainter and slightly red. At magnifications of 140X and above the airy disk was slightly elongated. There were also slight indications of very faint notches in the diffraction ring indicative of a bit of pinching or astigmatism. My best guess is that the retaining ring of the baffle pressed against the objective, now elevated at one point by the shim, created a slight amount of pinch.

As stated before, it was during this process that I discovered that the inadequate baffle had been installed. After placing emails and calls to the dealer and manufacturer, I received a new baffle within five days of the first email. Having become familiar with the objective lens cell and baffle system, replacing the baffle was an easy affair.

#### Visual Performance After End-User Repairs:

The improvement of visual performance, though not great, has been noticeable. Before, I had to stare and sometimes use averted vision to detect

Polaris companion at 38X, 68X and 120X. Now, Polaris is easily visible with direct vision at both 38X and 68X. Also, on extended objects like the moon, planets and terrestrial objects it seemed that the sharpness visible before at 100X was now apparent at 120X and 140X. The appearance of detail on Mars was improved by tiny bits with each step of magnification increase from 68X to 80X to 100X to 120X to 140X to 175X. On the moon, though no new detail could be seen above 120X, details on the terminator retained a decent contrast even up to 400X. Color correction is about the same. Though there is no significant change, there may be a bit more color present; a little more purple during the daytime, a little more red on Mars, a tiny violet edge on the moon.

To Be Continued:

On a scale of 0 (poor) to 10 (excellent), the attractiveness of this scope is a 10, the mechanical functionality is a 10 and the price is a 10. The visual performance was a 7 and is now, an 8. Whether or not it is a 9 will depend on the scopes performance over the next few months on Saturn, the Trapezium and rima Birt.

The optics deserves a solid seven for the similarity of the intra/extra focal patterns and for the excellent baffle. There is pleasantly little stray light that enters the optical stream. Whether or not the end-user collimation repair will prove beneficial will need to still be proven. There are three indicators though that will indicate that this is an all around superior system: visual detection of rima Birt, a clear and often visible Cassini division and finally, the visual detection of star "e" in the Trapezium. Once I have sufficiently looked for these objects I will write up Part 2 of this report.

**Overall Rating: 9**

**Optics:8 Ease of Use:10 Value:10**

Weight: 5 (**Veritable Vote**)

Date: 09/11/2005 09:38:38 pm GMT

By: Anonymous (xxx.xxx.223.10)

Link to this vote: <http://www.excelsis.com/1.0/displayvote.php?voteid=454954>

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I bought the zenithstar to replace my beloved Orion shorttube. Mechanically and esthetically it is an easy 10. However, I had another experience with the optics. Star tests showed severe astigmatism, I'd say worse than 1/2 wave. I couldn't even focus to a decent airy disk. I sent it back and eventually, after much back and forth correspondence, got the objective replaced along with a new baffle. The lens was better, but still showed astigmatism and SA to about 1/4 wave. I still enjoy the scope, it gives breathtaking views of the milky way and is a pleasure to use, but the astigmatism is annoying. The color correction is above average for an achromat, and low power views of the moon and planets are pleasing. William optics explanation to me about the optical quality is that I shouldn't expect it to work like a an apo. I don't, but I expected a better star test than my \$100.0 shorttube. Caveat Emptor!

**Overall Rating: 8**

**Optics:6 Ease of Use:10 Value:10**

Weight: 1 (**Unreliable Vote**)

Date: 01/01/2006 08:49:32 pm GMT

By: Anonymous (xxx.xxx.153.57)

Link to this vote: <http://www.excelsis.com/1.0/displayvote.php?voteid=481681>

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By: Anonymous (xxx.xxx.223.10)  
In Reply to: Anonymous (xxx.xxx.223.10) ([Original Vote](#))  
Date: 10/16/2005 06:52:41 pm GMT

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Zenithstar 80 Review: Part 2

Summary of Previous Report:

This telescope is excellent in terms of mechanical functionality and cosmetic appearance. It's visual performance is good. The quality of the optical components and the optical system is very good. As received, this scope matches or slightly exceeds its advertised performance. It gives superb crisp views with a snappy focus up to 100 to 120X (30 to 40X per inch of aperture).

Customer service by William-Optics is excellent and always a pleasant experience. For example, though William-Optics was under no obligation to do so since my scope matched advertised performance expectations, the manufacturer was willing to check, fix or replace the objective for no charge and assume the cost of shipping. Later, when I lost the screw that tightens the Crayford focuser, William-Optics offered to send me a replacement free of charge.

As received, my scope contained two optical path defects. First, mis-collimation resulted in slightly less than diffraction-limited instrument. Second, the installation of an incorrectly designed baffle cone resulted in a significant loss of effective aperture. Due to matching advertised performance parameters and due to the support of William-Optics and the seller, I chose to attempt an end-user improvement of the collimation. Disassembly of the optical components allowed me to analyze the baffle-cone. Comparison of the baffle-cone with the description given in Tom Trusock's article revealed the presence of a baffle-cone design flaw.

The end-user is able to perform some improvement of less than optimal collimation. These end-user improvements are made possible due to the simple and excellent design of this instrument. I need

to credit Jeff Barbour for facilitating my comfort of disassembling optical systems. Having performed the end-user improvement described in the first report, I am satisfied that this scope exceeds diffraction limited performance. There is no astigmatism. Color correction is better than a well collimated and planarised (thanks go to Jeff for teaching me how to do this) ST80 but not as good as an ED80. The intra-extra focal images are beautifully similar. Images of third and second magnitude stars at 140X do show images indicative of about a total 1/5 waverfront error (.15 waverfront error of coma and .1 waverfront error in pinch). The improved collimation resulted in reducing multiple diffraction arcs on one side and a single faint arc on the other to a single ring. This improvement accomplished in collimation was offset to a degree by the single diffraction ring being slightly green on the brighter side and slightly red on the fainter side. The overall improvement allows superb views with a snappy focus up to 140X (45X per inch) and crisp views in steady seeing up to 190X (60X per inch).

The second defect with my scope was that it contained the original baffle cone that cut off some 10mm of its 80mm of aperture. The purchaser needs to check to make sure that the purchased unit contains the new baffle that allows full use of all 80mm of aperture. This check can be done by following directions readily provided by William-Optics. However, now that it is some six months since Tom Trusock's review of this problem, the purchaser has every reason to expect the seller to ascertain that the correct baffle is in place. In my case, the seller willingly and quickly without charge shipped a replacement baffle when informed that I was aware of this defect.

#### Second Visual Assessment:

This scope provides a visual performance superior to an optimally collimated and planarised ST80; though not as good as a properly collimated ED80. Visual results in steady seeing include the

following:

- Using an Agena-AstroProducts 70mm Baader solar filter (a well designed and attractive filter that cosmetically complements this scope), rice grain is easily seen.
- Rima Birt is visible, but barely so, with direct vision. (The moon was two days past sunrise on Rima Birt and at an elevation of 30 degrees above the horizon.
- Two craters are seen within Plato.
- The Cassini division is easily visible with direct vision, but not dark-pencil-sharp. (45 degree elevation, with a full moon, in a steady but not perfectly steady sky, with a less than optimal ring orientation)
- Trapezium e is not seen.
- Resolved and visible as separate components are alpha Piscium and Epsilon Arietis. Both are at the resolution limit of an 80mm scope (1.46 arc seconds). According to 33-doubles, the difficulty index (DI) factor of alpha Piscium is 84.1. According to this scale, a superb 4 inch instrument is needed to see doubles with a DI of 85 to 90.

The optical performance of this scope is not magical. But it is good for an 80mm aperture and very good for an F6 80mm achromat.

A Comparison:

I am not a professional astronomer. I am not even a serious amateur. Though in the view of those who have no interest in astronomy or telescopes my fascination may seem obsessive, compared to most of the persons who read reviews such as this I am a leisurely scopist and stargazer and have been so for over forty years. I feel it is unreasonable for me to expect perfection from any optical instrument. In the words of my mother-in-law, one needs to be satisfied with less than the whole pie. Smart person, she. In a similar vein, I feel that amateur telescopes of today (with the exception of the ubiquitous department store telescope) are much like modern automobiles, there really aren't any bad models, though individual examples may be lacking.

In light of the foregoing inexpert opinion I preface the following by saying that all of the following have been good satisfying performers. I have learned much about telescopes and a bit about astronomy from the use of each. These include the Orion Short Tube 80 (ST80), the Orion ED80 (ED80), the AstroRubinar100 (AR100), the ETX90 (ETX90), the 100mm APM Triplet-Achromat (TA100), the Celestron C90 (C90) and the Zenithstar 80 (ZS80). In each of the following categories, my rating goes from pleasing (good) to wow! (very good).

Visual Performance (crisp, good detail, snappy focus):

- C90, ST80
- AR100, TA100, ZS80
- ETX90, ED80

Aesthetic Appeal (cosmetics-looking at the scope):

- AR100, ST80, C90
- TA100, ED80
- ETX90, ZS80

Mechanical Functionality:

- ST80, C90
- AR100, TA100, ETX90, ED90
- ZS80

Aesthetic Appeal (looking through the scope):

- C90, ST80, AR100, TA100
- ETX90
- ED80, ZS80

Portability and Ease of Use:

- AR100
- ETX90, ED80, TA100
- C90, ST80, ZS80

A Third Assessment:

This second visual assessment was performed over a series of nights in good but not superb seeing conditions. I am sufficiently pleased with the performance of the ZS80 that I will not be availing myself of the offer by William-Optics to correct or replace the optics. The performance is

satisfying. The Zenithstar 80 now exceeds advertised performance expectations. In light of the latter, asking William-Optics to repair or replace the optics without charge would be unjust.

As I have not yet used the scope under superb seeing conditions, I feel that there is a reasonable chance that the ZS80's visual performance will more nearly approach that of the ED80/TA100 in terms of crisp detail. In particular, giving a sharp rendition of Cassini and Rima Birt, and a glimpse of Trapezium e. Should an experience of such seeing provide these results, I will offer up a third assessment.

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Subject: Great Little Scope  
By: Anonymous (xxx.xxx.63.253)  
Date: 01/27/2005 08:00:05 pm GMT

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I have the ZenithStar 80mm. It is simply a joy to use. The rotatable focuser makes it really easy to scan and pan. It has some false color. Very mild purple fringing around the edge of the moon, but not worth using an MV filter. Your better of with a variable polarizing filter that Orion has on sale.

Very high contrast with this scope up to 100x as it states on the WO website. Saturn is OK through it and the most moons that I have seen off and on were 4 or 5. All and all not a scope that I would choose if I was just viewing the planets.

The wide field views are amazing? Peiades looks terrific! Its very easy to spot open clusters, such as M37 & M36.

I have never looked through a SV Nighthawk, but I'm sure that the views would be simular.

The travel case that comes with the scope is great. Room for 1 2" EP, 3 1.25" EPs, and other accesories.



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