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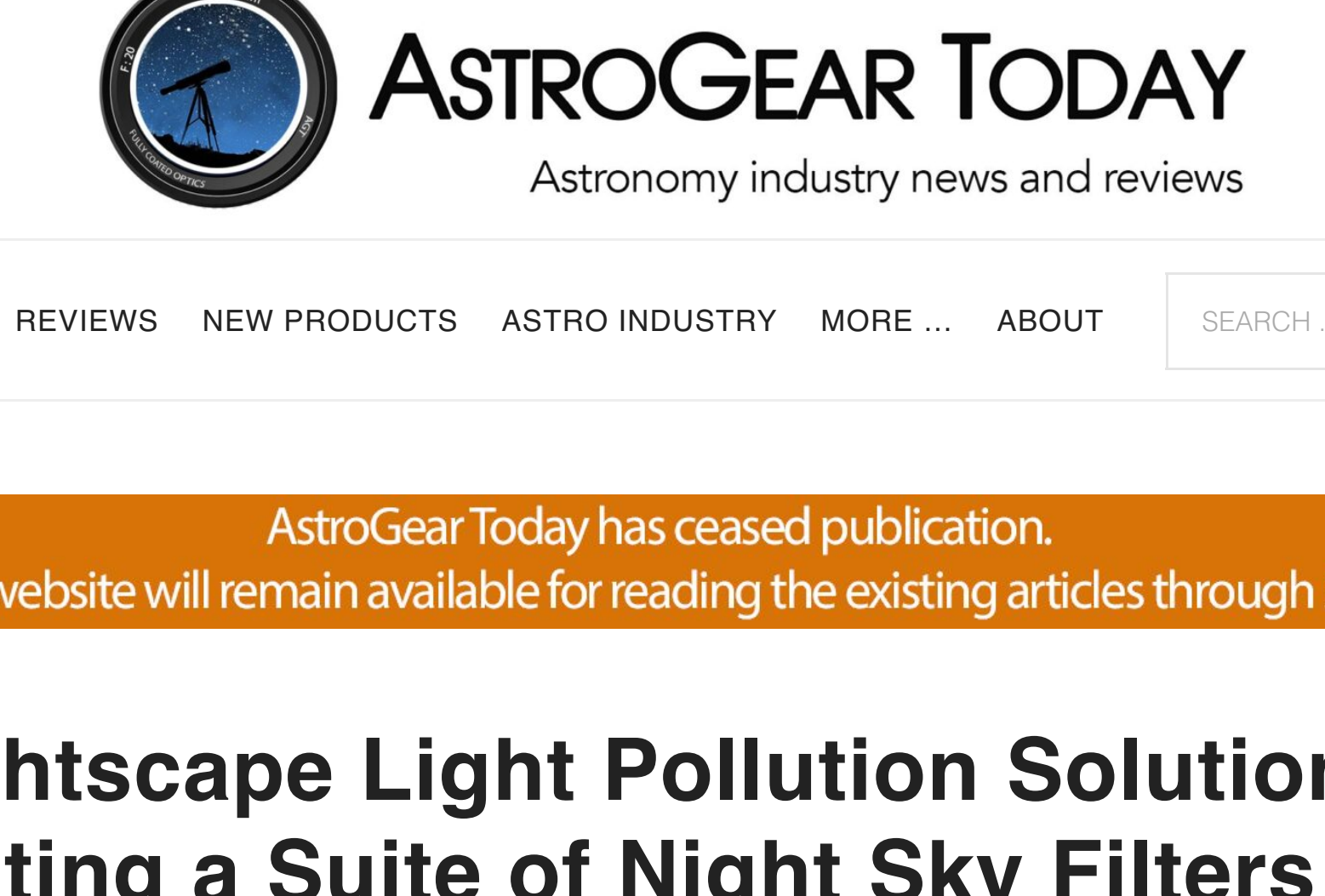
Nightscape Light Pollution Solution? Testing a Suite of Night Sky Filters

By: Alan Dyer

Published: Jan 13, 2022



These light pollution filters promise to darken light polluted skies and work wonders in nightscape images. The reality is a more subtle

improvement. Credit: Alan Dyer

Three of the filters tested here (the Haida, Kase and NiSi) are what can be classed as “broadband” light pollution reduction filters. They transmit a broad range of wavelengths in the red and green portions of the spectrum, where nebulas in the Milky Way emit most of their light, while suppressing the yellow and blue wavelengths from artificial lights.

None are what we would call “narrowband” filters, the type favored by deep-sky photographers, such as those I tested earlier for AGT. The filters tested here go on the front of lenses for use in wide-field nightscapes and Milky Way images.

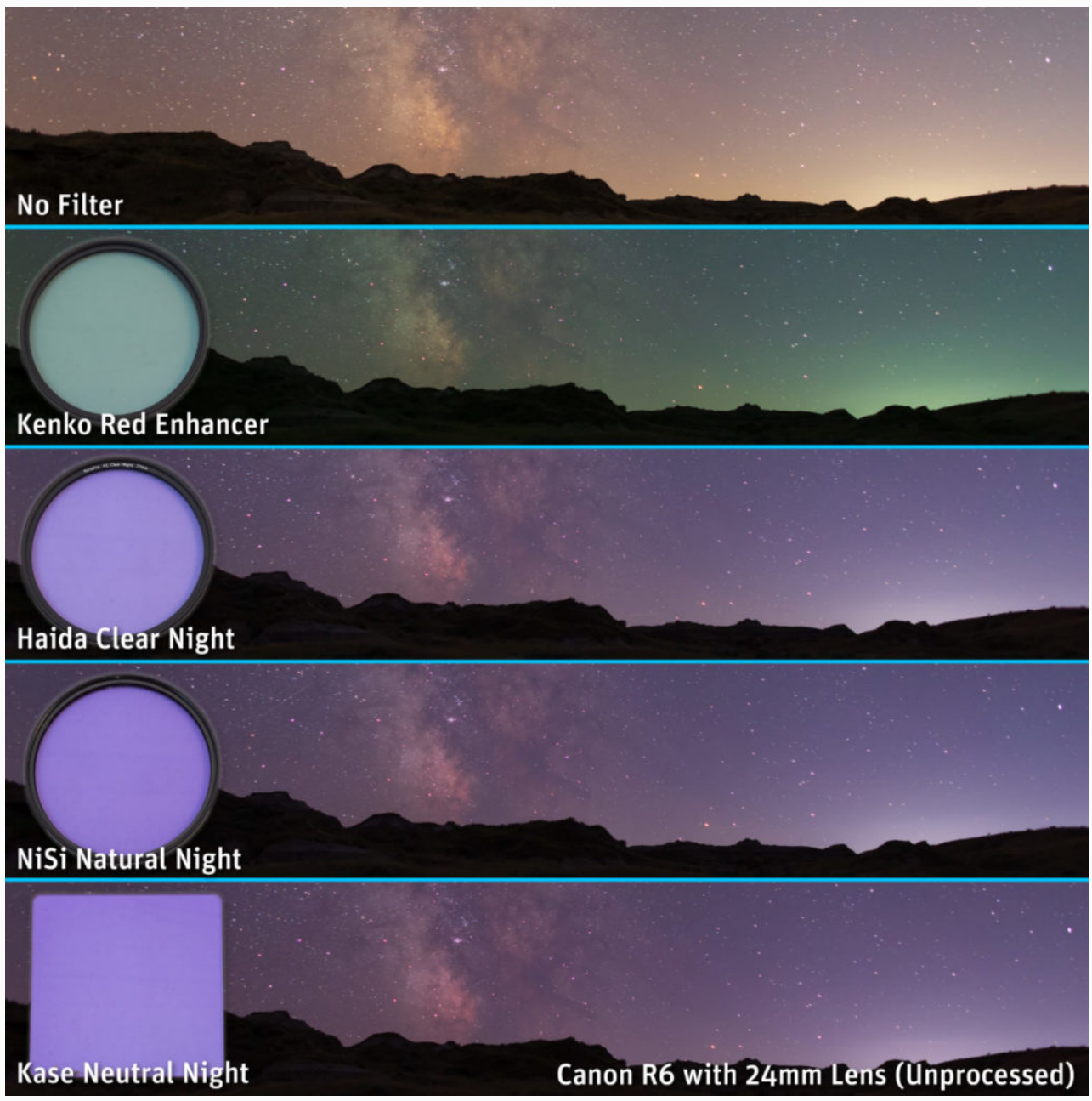
Four broadband filters we compare: Kenko Red Enhancer, Haida Clear Night, NiSi Natural Night, and Kase Neutral Night, the latter in a 100mm square format. Credit: Alan Dyer

For comparison, I also tested a Kenko Red Enhancer filter. It is not designed for astrophotography per se, but rather for enhancing the reds of autumn foliage and sunsets. However, many nightscape photographers have used such Didymium-glass enhancing filters for bringing out red nebulas. I was curious to see an example of their performance.

Purchased in 2020, the Kenko Red Enhancer I tested appears to be no longer offered, However, others such as Hoya’s Red Enhancer and Tiffen’s Enhancing filters will almost certainly be similar. Red Enhancers do work but, as I show below, they aren’t quite as effective as broadband filters for combatting light pollution.

Nightscape Test

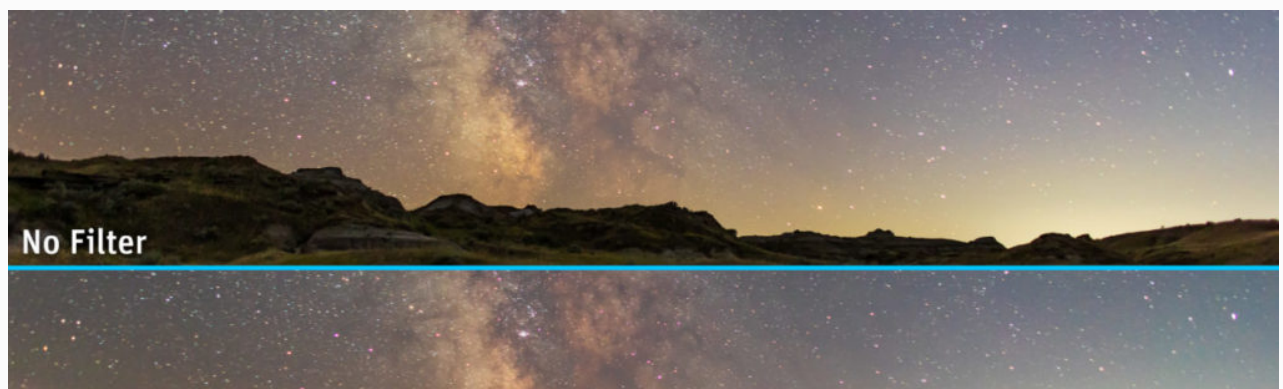
For this test I shot at a scenic site, Dinosaur Provincial Park, Alberta. While it is dark, there is a strong horizon glow from urban and industrial lighting to the southwest, near where the Milky Way core was setting on my test night. I wanted to see which, if any, of the filters would best suppress the skyglow while accentuating the Milky Way.



Unprocessed images show the sky glow from a distant city in the unfiltered image at top, and the shift in color balance imparted by the four filters. All were shot with a stock Canon R6. Credit: Alan Dyer

Images taken with the Kenko Red Enhancer have a green tint. Images with the three broadband filters each have a magenta tint. At first, you might wonder why you spent your money on such a weirdly discolored filter!

The magic comes when you readjust the white balance for a more neutral tone and apply some contrast enhancement, as per the “processed” set below. As you can see, it was a close draw. However, the Kenko didn’t provide quite as good suppression of the sky glow as did the broadband filters, leaving a brighter and greener sky.



Processed: Correcting the color balance returns the images to a more natural appearance, with the sky glow diminished. The Haida, NiSi and Kase broadband filters provide the best reduction. Credit: Alan Dyer

The Haida, Kase and NiSi broadband filters were all closely matched, with perhaps the Kase Neutral Night and NiSi Natural Night filters slightly outpacing the Haida Clear Night filter. But the difference is slight, and the Haida has the advantage of being the least expensive of the trio.

I did not shoot from an urban location for this test. When I have done so in the past using just the NiSi Natural Night on very clear nights, I found it did provide a more pleasing color balance — more blue and less yellow — and did darken the sky slightly. But much of that improvement can be obtained simply by adjusting the color balance and contrast of an unfiltered shot.

From my experience, I advise buyers not to expect the dramatic improvement you might see depicted in manufacturers' "Before and After" advertising photos.

None of these filters can do magic, turning a light-polluted sky into a dark sky. That's especially true now with cities converting to broad-spectrum LED lighting, replacing the yellow sodium lights of the past which these filters would be more effective at reducing.

In addition, because filters absorb light (it's what filters do!), filtered exposures have to be longer. The Kenko Red Enhancer had the highest "filter factor," exhibiting a light loss of about 0.8 stops. Surprisingly, the three broadband filters were better, requiring only about 0.65 (two-thirds) of a stop more exposure. Even so, that penalty is something to keep in mind when shooting tripod-mounted nightscapes where exposures are already limited by the moving sky.

Deep-Sky Test

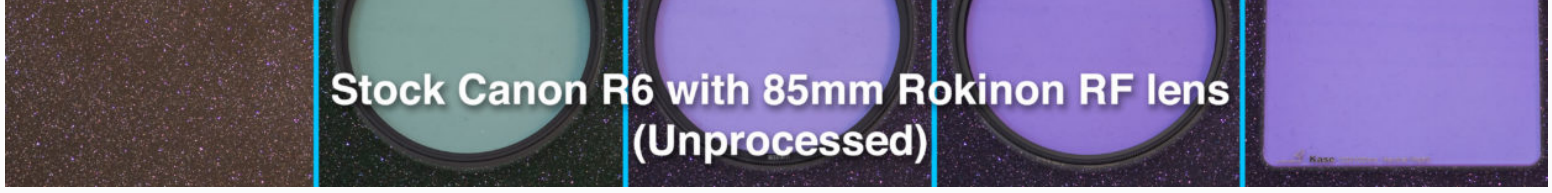
Where I find these filters most useful is for shooting tracked images of the Milky Way at

dark-sky sites. With the longer exposures a star tracker makes possible, the loss of light from a filter is not so critical.

Broadband filters, such as the Haida Clear Night used here, work well under dark skies for emphasizing nebulosity, though the enhancement can be subtle. Credit: Alan Dyer

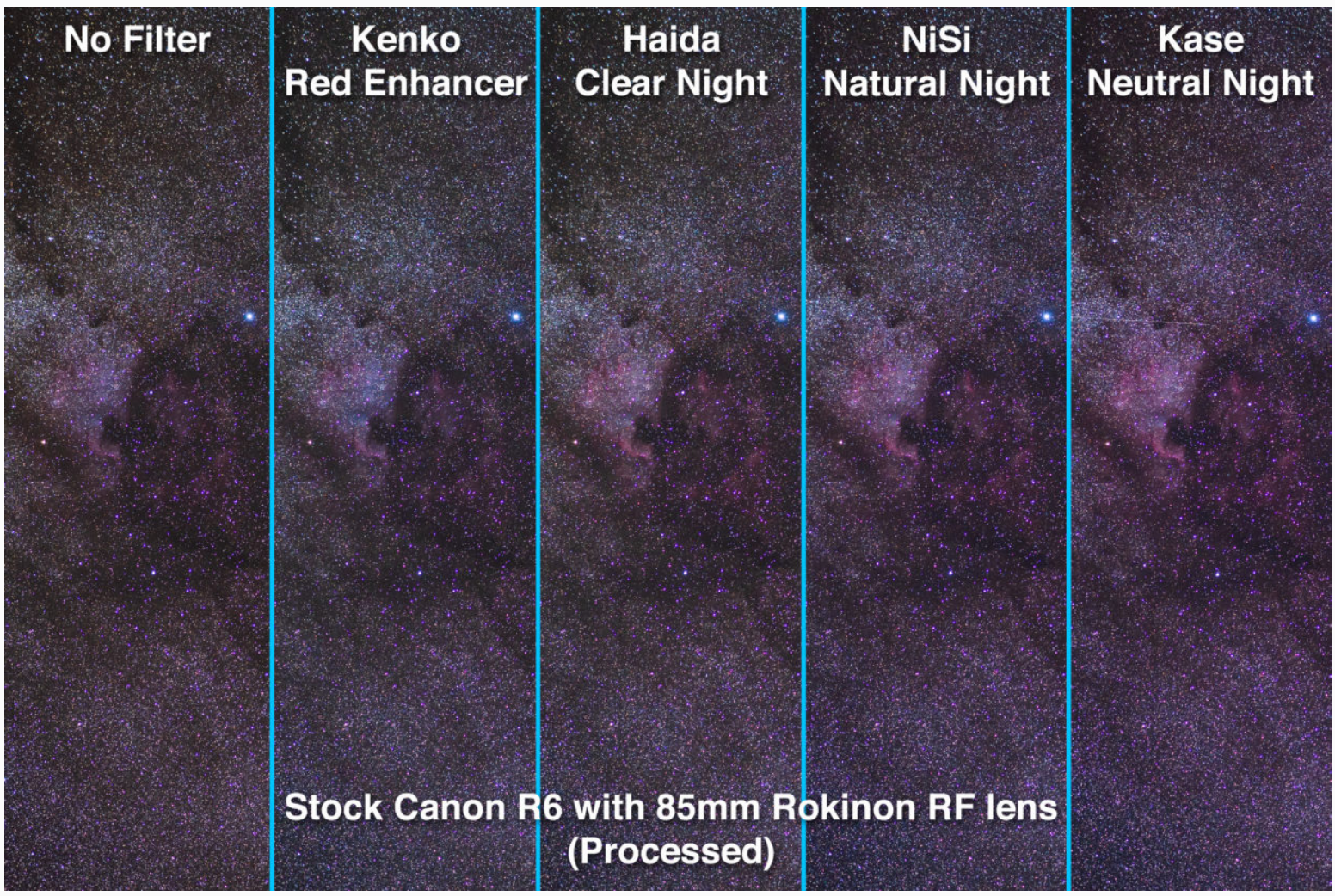
The benefit of a filter is that it can reduce not only artificial light pollution but also natural airglow present at dark sites, increasing contrast and punching up faint nebulosity. By suppressing unwanted light, these filters are good for reducing sky gradients.

For the filter face-off, I chose a very clear night at a dark site. I shot the complex of nebulosity overhead in Cygnus (so in the darkest part of the sky) using an 85mm lens and two cameras: a stock Canon R6 (reviewed here on AGT) and a filter-modified Canon Ra, a camera with extended red sensitivity made specifically for bringing out nebulas.



With a stock Canon R6 camera, the filters impart the same color shift as in nightscape images. Unprocessed images might not show a significant improvement in deep-sky photos. Credit: Alan Dyer

Again, unprocessed “out-of-camera” images with the stock R6 showed the green cast of the Red Enhancer, and the magenta cast of the three light pollution filters. Without processing, it’s tough to see that any of the filters have made an improvement worth their cost.



With the same images processed for correct color balance, the three broadband filters now show more nebulosity. The Kenko Red Enhancer made little improvement here. Credit: Alan Dyer

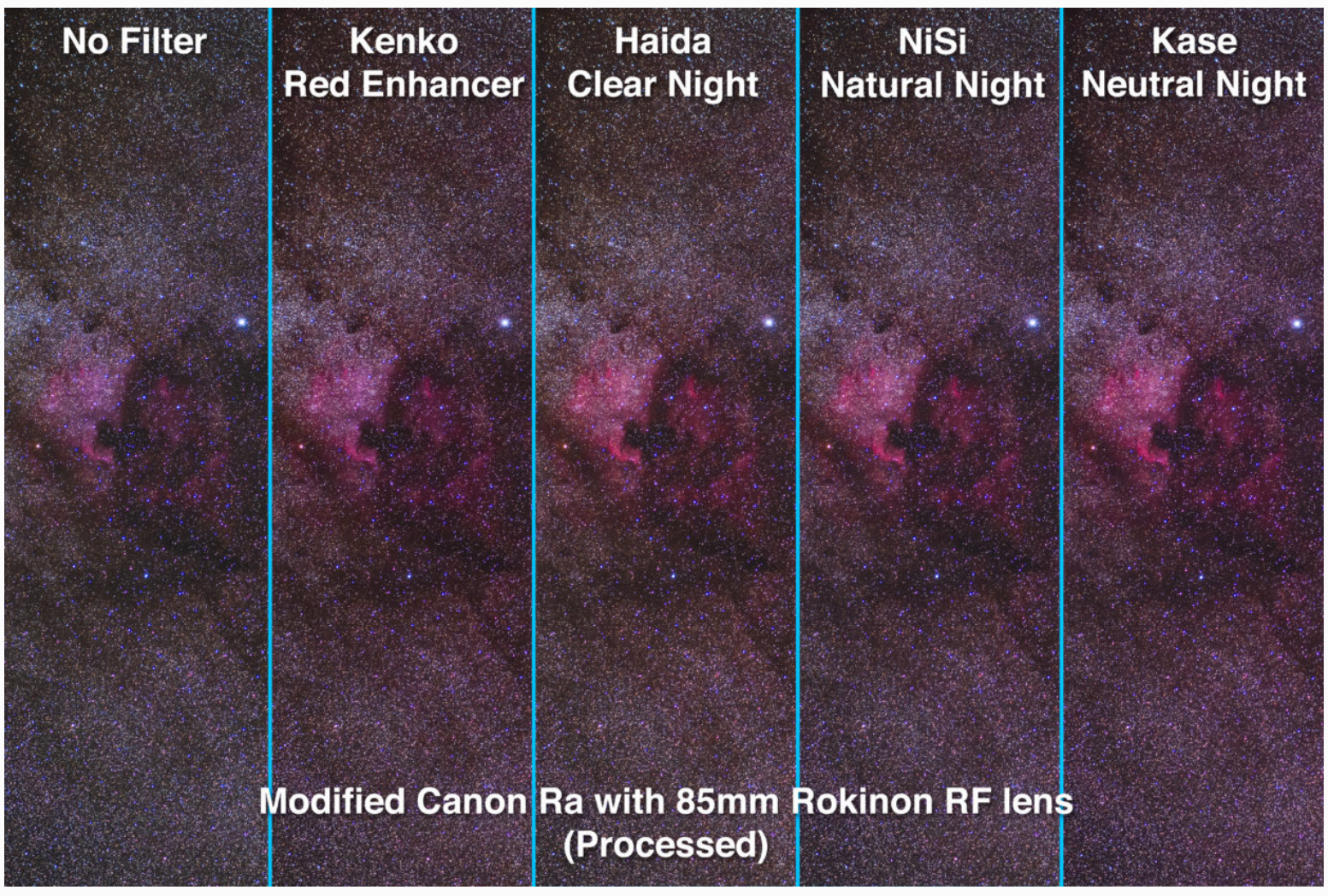
But neutralize the white balance and enhance the contrast and you begin to see the difference. The Kenko brought out the North America Nebula only marginally better than the “control” image shot with no filter.

However, with the three broadband filters, the faintest regions of nebulosity next to the North America now show up better. And this is with an off-the-shelf camera not designed to record such deep red nebulas.

The red-sensitive Canon Ra camera brings out more nebulosity even in the unfiltered image. In addition to correcting their color shift, the filters also require longer exposures at the camera. Credit: Alan Dyer

Now let's switch to the red-sensitive Canon Ra with a set of single-exposure images through each of the filters, first unprocessed out of camera (above) and processed identically (below), except for the different white balance needed for the Red Enhancer vs. the broadband trio.

Using a camera made for this type of astrophotography, you see how each of the filters did enhance the red nebulosity. The Haida, NiSi and Kase filters perform the best, not surprising as this is what they are designed to capture.



While rebalancing the color shows a bit more nebulosity with the Red Enhancer, the best results are with the broadband filters, though with little difference among the trio. Credit: Alan Dyer

But which of that trio is the best? I'm hard-pressed to see a difference. All show very similar levels of faint nebulosity. And none exhibit any halos or ghost images on the bright star Deneb. Though it did a very good job, the NiSi Natural Night did not display any benefit significant enough to warrant its premium price. It was not more contrasty.

With the Haida, the most affordable (at least when comparing prices for a common 77mm filter size), it might be considered the winner for best value.

But any of these broadband filters will work well. And there are others on the market, such as the Hoya Starscape and Cokin Clearsky filters that I have not tried. Your choice might be influenced more by a filter's availability in the size you want, and the format, such as those that screw onto lenses vs. square filters that slide into a more versatile but bulkier filter holder. I would strongly suggest avoiding clip-in filters that insert into a camera body, at least for use with wide-angle lenses; clip-ins shift the focus so much many lenses can exhibit terrible corner aberrations with such filters.

Based on my testing, my conclusion is that when buying a broadband filter I would not fuss over whether one brand is better than the others. All can do a good job but do temper your expectations on how much improvement any can make.

Plus: All slightly reduce light pollution and accentuate nebulas in a dark sky

Minus: With the switch to LED lighting, none are as effective as in years past

Kenko Red Enhancer
Price: Discontinued, but similar to $75 Hoya Red Enhancer RA54
Website: https://kenkoglobal.com

Haida NanoPro Clear Night
Price: $90 (77mm size)
Website: https://www.haidaphoto.com/en/

Kase Neutral Night
Price: $135 (77mm size)
Website: https://kasefilters.com

NiSi Natural Night
Price: $165 (77mm size)
Website: https://en.nisioptics.com

About Alan Dyer

http://www.amazingsky.com

Alan Dyer is an astrophotographer and astronomy author based in Alberta, Canada. His website at www.amazingsky.com has galleries of his images, plus links to his product review blog posts, video tutorials, and ebooks on astrophotography.

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