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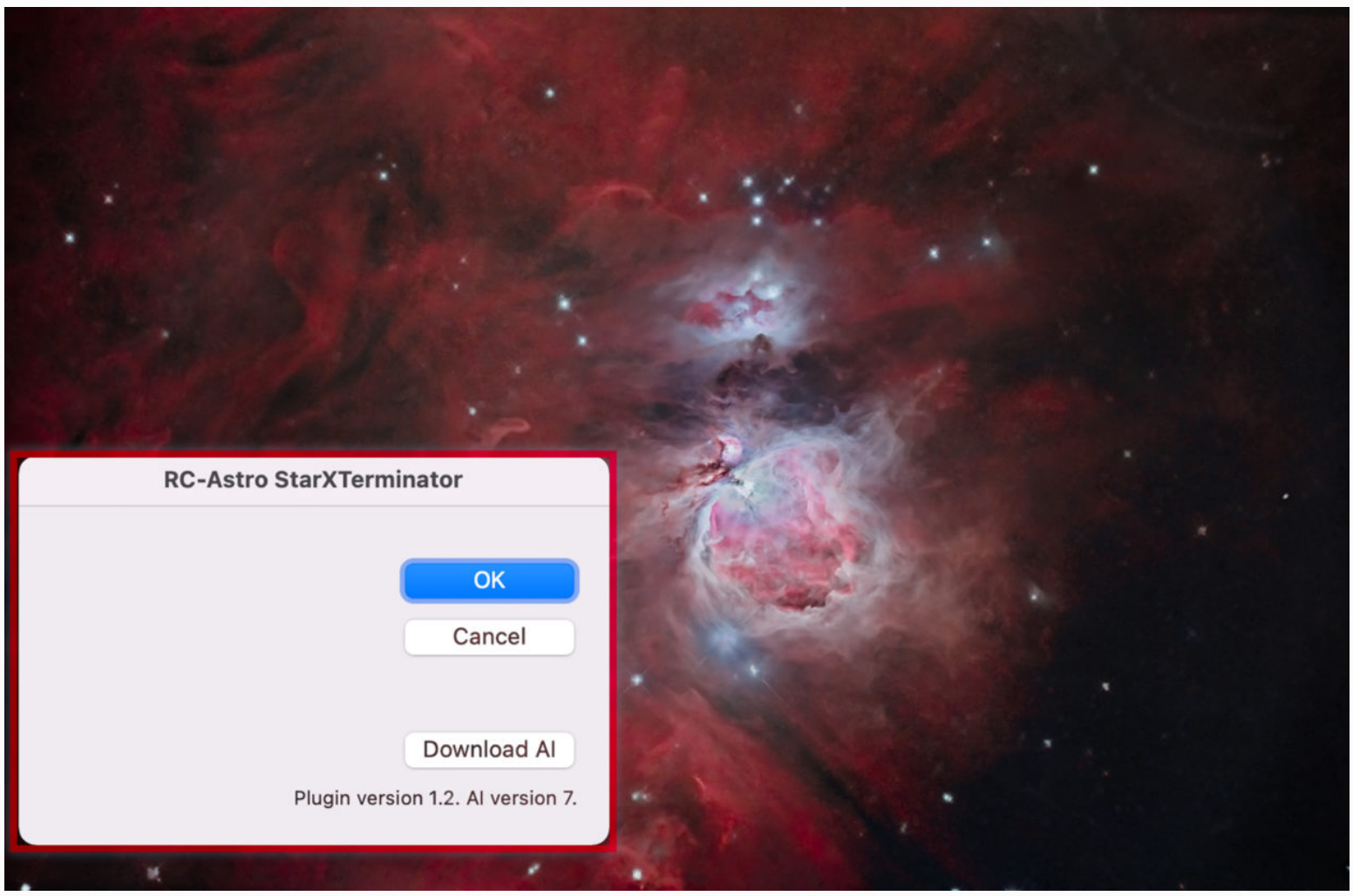
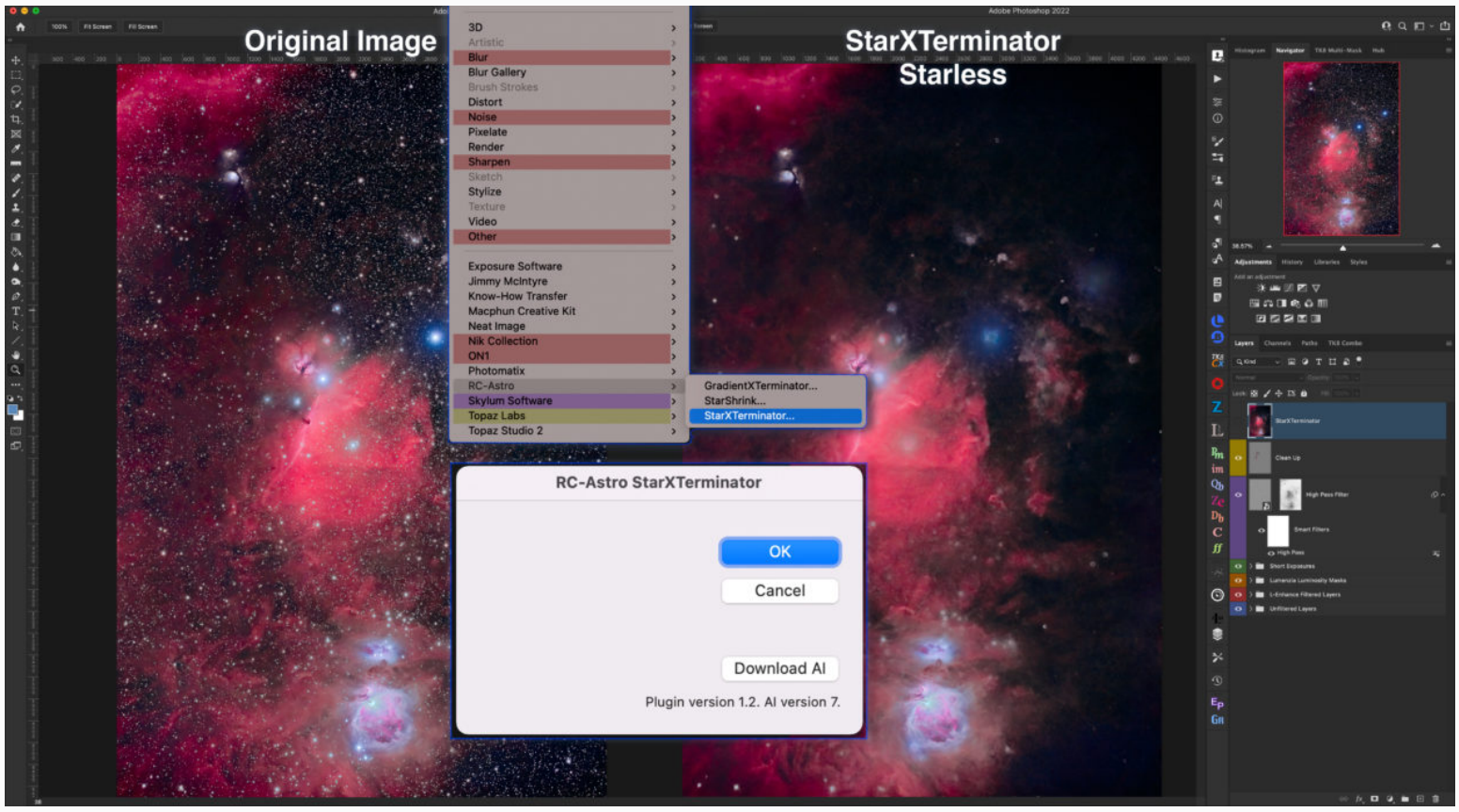
Removing Stars in Nebula Images: StarXTerminator Plugin Review

By: Alan Dyer Published: Feb 19, 2022



A new plug-in for Adobe Photoshop can magically eliminate most stars from deep-sky images in one click. Credit: Alan Dyer

In recent years, reducing or completely eliminating stars from astrophotos has become fashionable, and can be a useful step in the processing of deep-sky images. New software has made the complex task of erasing all stars “one-click” easy. StarXTerminator from RC-Astro is the latest, and the first (and only!) to work from within Adobe Photoshop.



StarXTerminator for Photoshop installs as a filter, and has no controls other than an OK button to apply it, and another to update the AI module. Credit: Alan Dyer

Why eliminate the very thing your astrophoto efforts are trying to record? There are two reasons. Images filled with nebulosity can look more dramatic – even artistically abstract – without any stars, revealing the intricate structures of nebulas better when the distraction of stars is removed.

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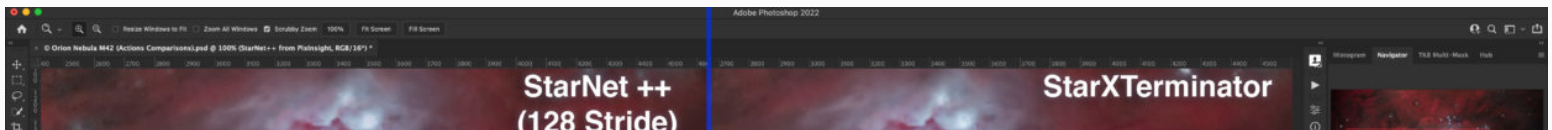
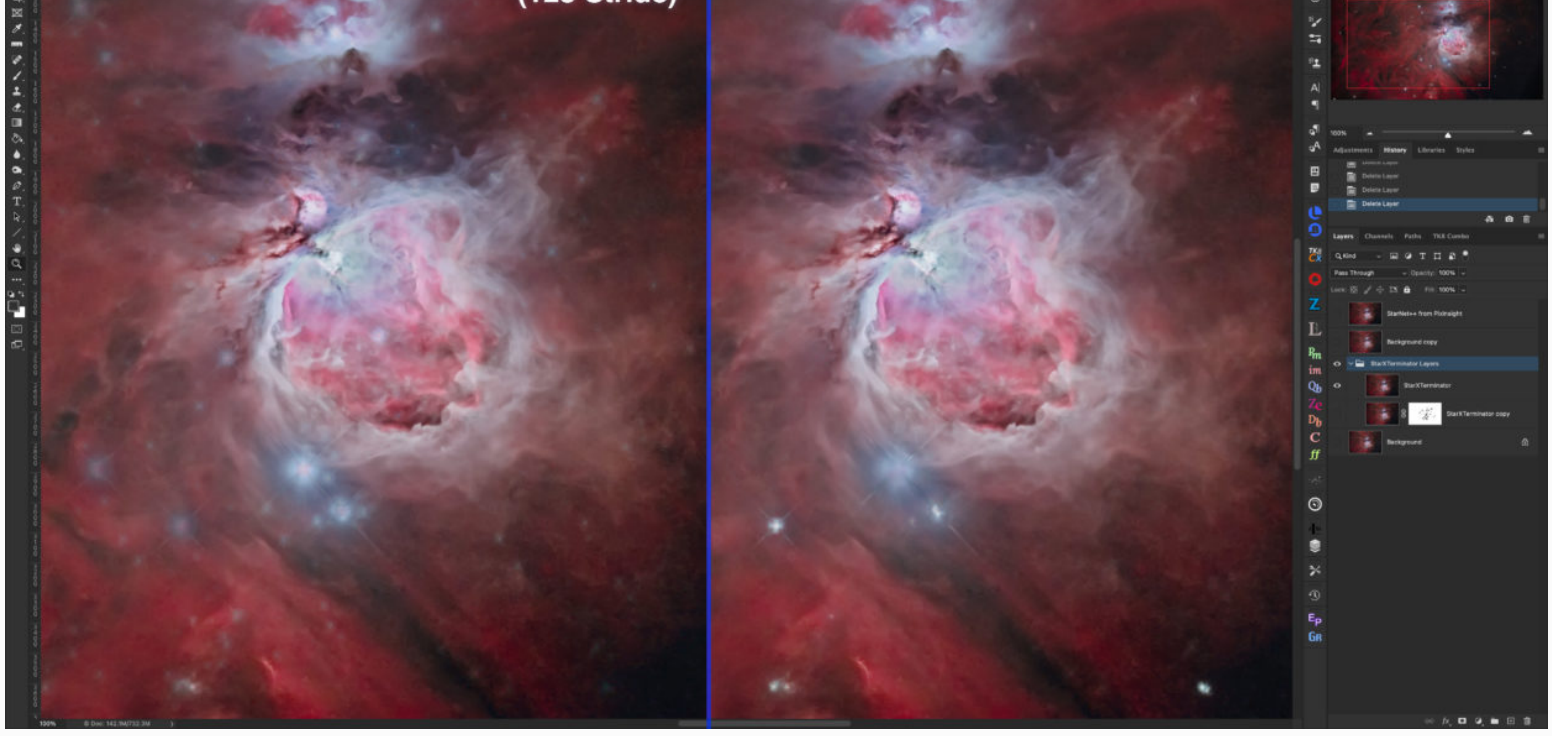
Also, separating point-like stars and extended deep-sky objects into their own layers makes it possible to stretch the nebulosity for maximum detail without bloating the stars, which can be added back into the image later in the workflow.

A favorite star elimination routine for many users has been the free but arcane utility (I hesitate to call it an application) called StarNet++, which can be run stand-alone in Windows or as a process out of the popular program PixInsight. A search on YouTube will come up with tutorials.





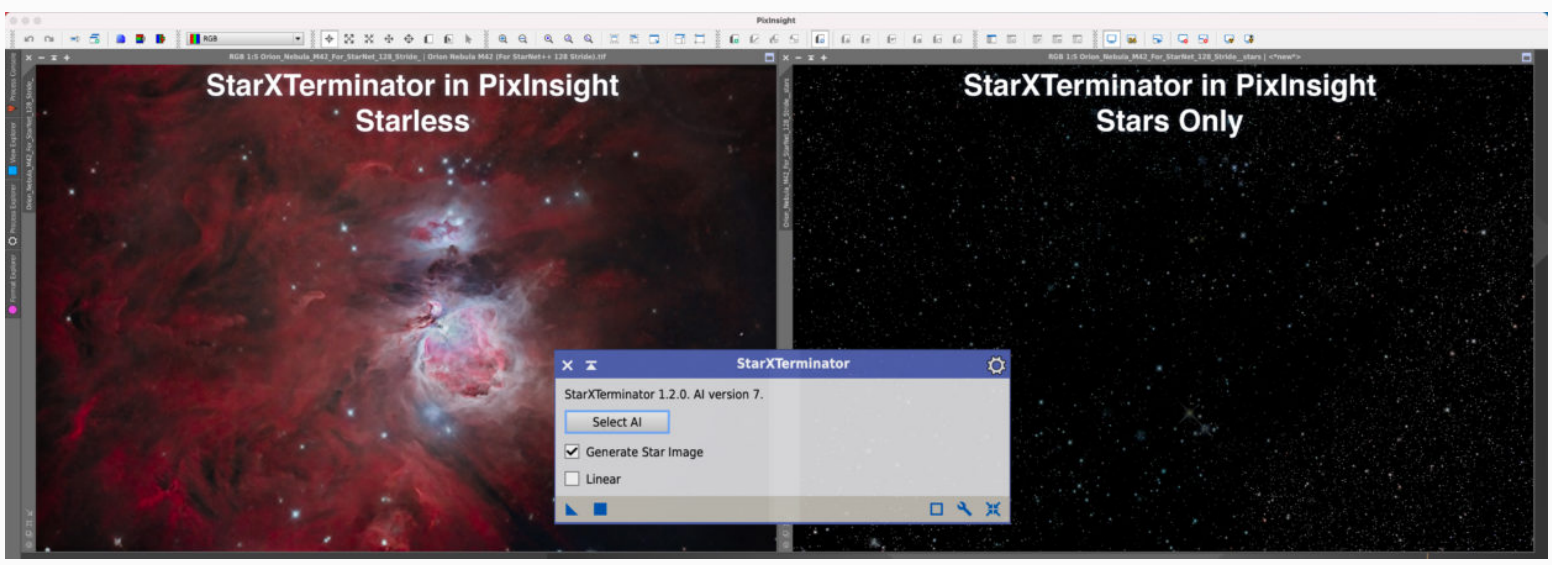
When run on the same image StarXTerminator did a better job removing most stars than did Version 1 of StarNet++, though StarNet nabbed a few StarX missed. Results will vary from image to image. Credit: Alan Dyer

Whenever I tried StarNet++, I found the results unsatisfactory on the types of wide-field and star-rich images I like to shoot. It left behind lots of dark holes and mottling where the stars were, or many ugly, half-removed stars. (Note: Just after completing the review, StarNet was updated to v2, which offers improved results.)

When astrophotographer Russell Croman (aka RC-Astro) introduced his StarXTerminator plug-in for Photoshop in late 2021, I was intrigued. I have been using his other Photoshop plug-ins StarShrink and GradientXTerminator for some time and find them very useful. So I was curious to test the third member of the RC-Astro plug-in family.

XTerminator Versions

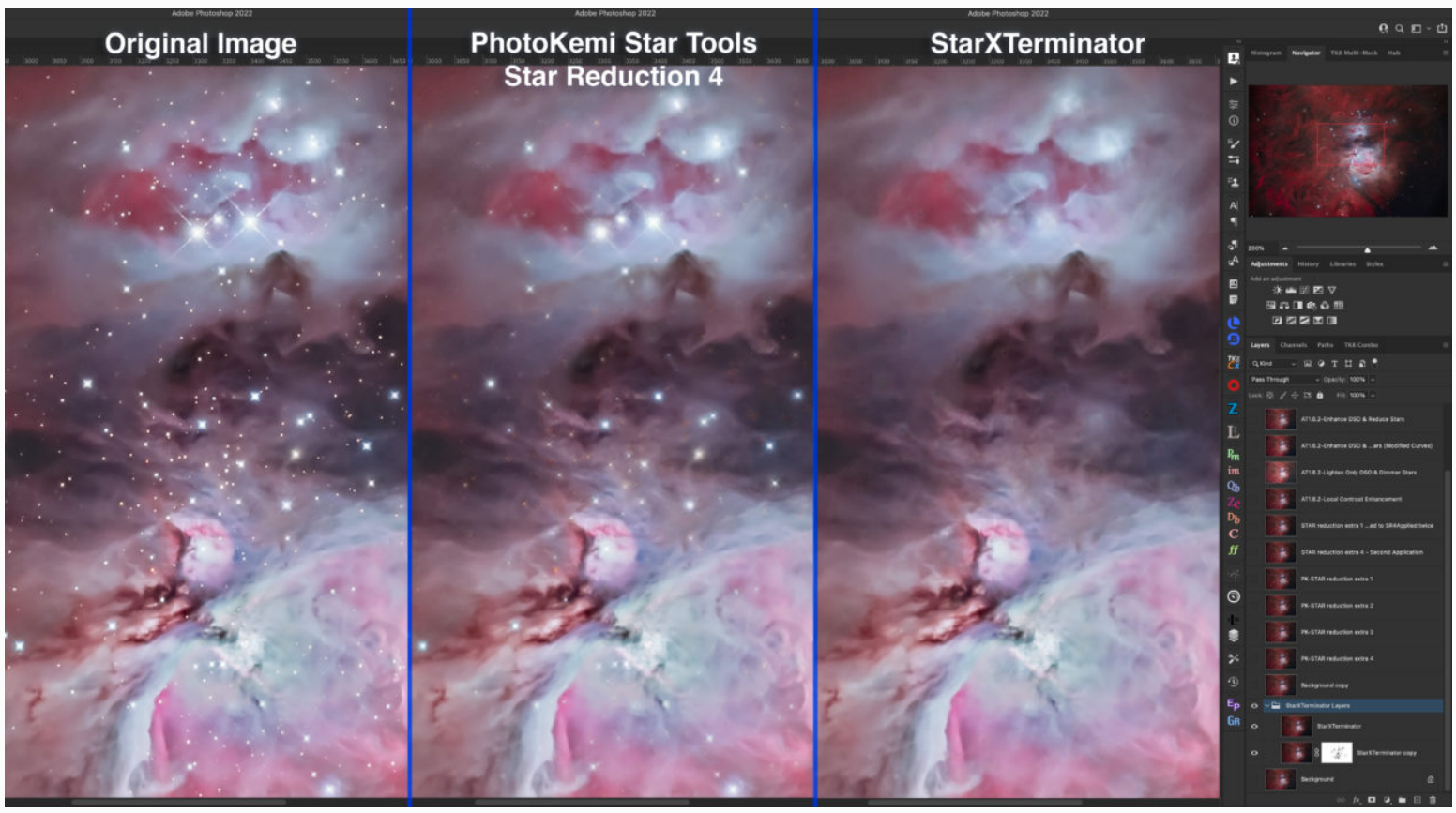
Unlike StarNet, StarXTerminator is available for Adobe Photoshop for both MacOS and Windows. It is also available as a process for PixInsight. The same activation code (a one-time purchase of $60) works on both the PixInsight and Photoshop versions.



The PixInsight version of StarXTerminator can automatically create both the starless and a “stars only” star mask, and can work on linear (unstretched) images early in the workflow. Credit: Alan Dyer

I tested the Photoshop version (v1.2 current as of early 2022), as it is easy to incorporate

I tested the Photoshop version (v1.2 current as of early 2022), as it is easy to incorporate into my preferred Photoshop-only workflow. However, running the same image through the PixInsight version (also v1.2) of StarXTerminator produced nearly identical results. The MacOS version I tested requires Photoshop CC (i.e., the latest subscription software); it will not run on older "boxed" versions of Photoshop such as CS6.



An example from the PhotoKemi Star Tools action set is shown at center. While it and other Photoshop actions can nicely reduce stars, none can cleanly eliminate them. Credit: Alan Dyer

Photoshop's own filters do offer methods of reducing stars but none can eliminate them. For example, ProDigital's Astronomy Tools, Starizona's Action Pack, and PhotoKemi's Star Tools are sets of pre-recorded actions that use Photoshop filters such as Minimum and Dust&Scratches to reduce stars by various amounts. While their instructions might suggest several actions run cumulatively can erase all stars, I found none produced clean results.

What makes StarXTerminator better is that while it runs as a Photoshop filter, it installs a proprietary artificial intelligence (AI) module that can do much more than any existing Photoshop filter can. The AI has been trained on many images to recognize stars vs deep-sky objects. The StarXTerminator panel has a button for downloading a new and improved AI module when one is released by RC-Astro. The version of the AI module is independent of the version of the plug-in itself.

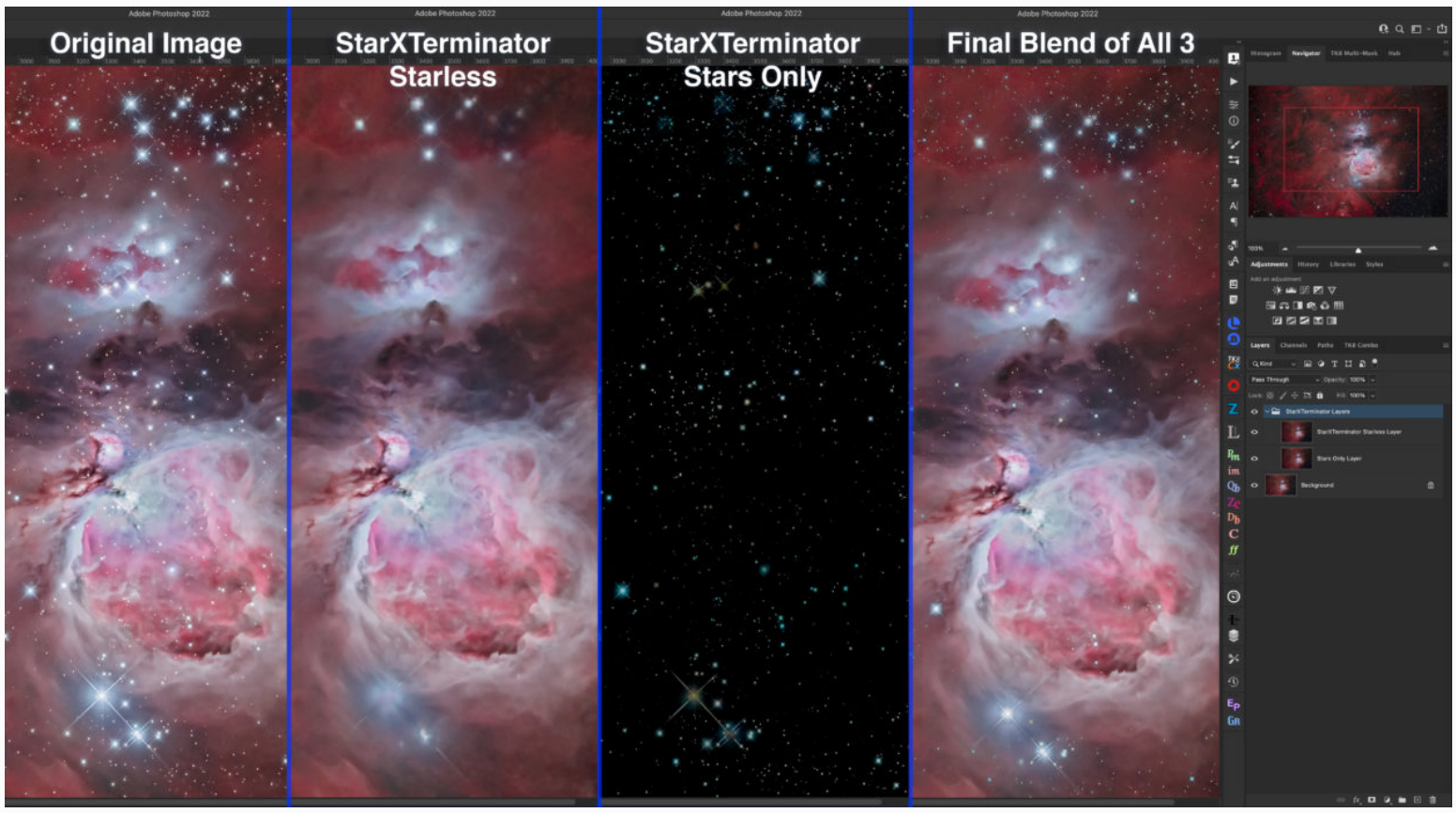
I found one glitch when attempting to update from AI v5 to v7, which downloaded but refused to run on my Mac with OS 11. Russell Croman sorted that out, but having the ability to choose which AI model to run, an option the PixInsight version offers, would be a welcome addition to the Photoshop version in case a new AI module is incompatible for some reason.

Applying StarXTerminator

While the filter can run as a non-destructive smart filter on a Photoshop smart object, there's little point in doing so as there's nothing to adjust by re-opening the filter, unlike

GradientXTerminator and StarShrink which have several adjustments to vary their strength.

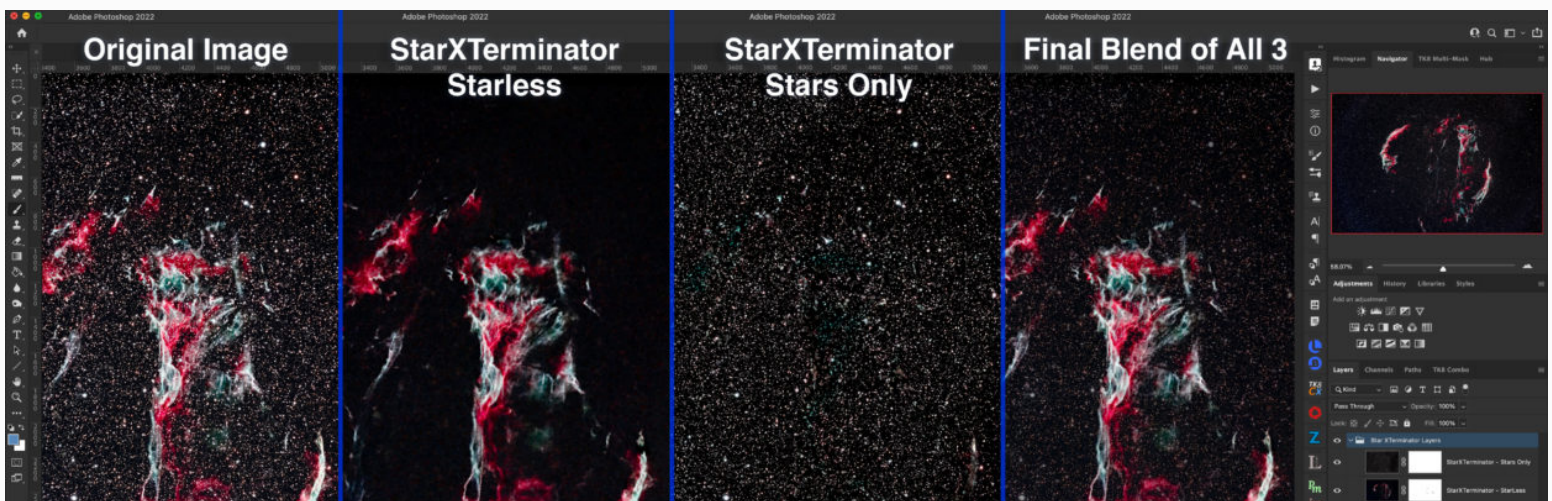
StarXTerminator is best run on a new merged copy of the various image and adjustment layers below in the layer stack. (With the top layer selected, hit Option (Mac)/Alt (Windows) while choosing the Layer>Merge Visible menu command.)

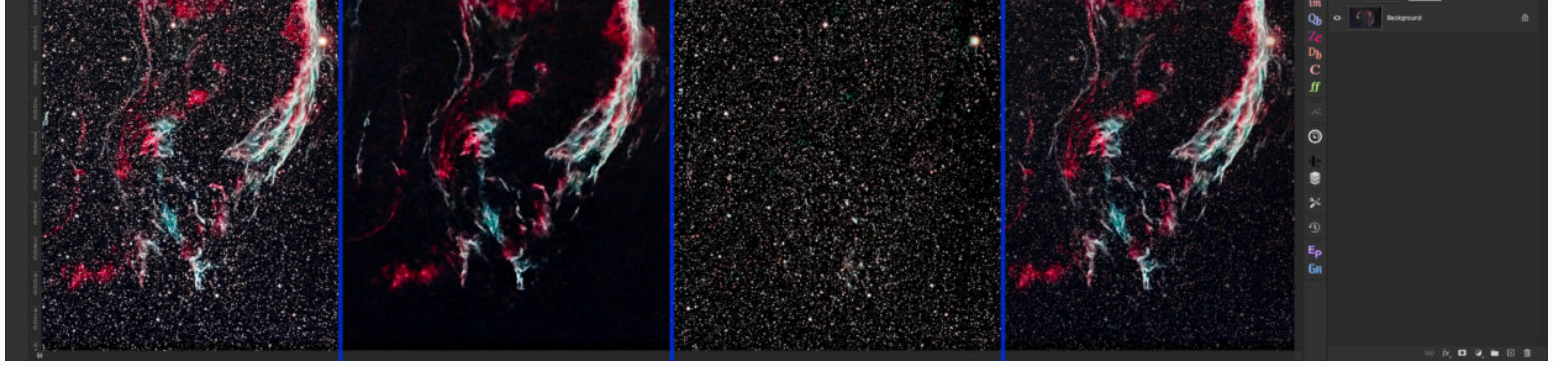


StarXTerminator produces a starless layer (here with M42). Duplicating it, then changing that layer's blend mode to Difference or Subtract produces a stars-only layer, if the original image remains below. Credit: Alan Dyer

On the 30-megapixel (6720 x 4480 pixels) images from my full frame Canon Ra, I found StarXTerminator took just under a minute to perform its magic, and that's on a five-year old iMac. By comparison, processing the same image in StarNet++ via PixInsight took three minutes with StarNet's Stride value set to 128, or 11 minutes with Stride at 64 for slightly more aggressive star elimination.

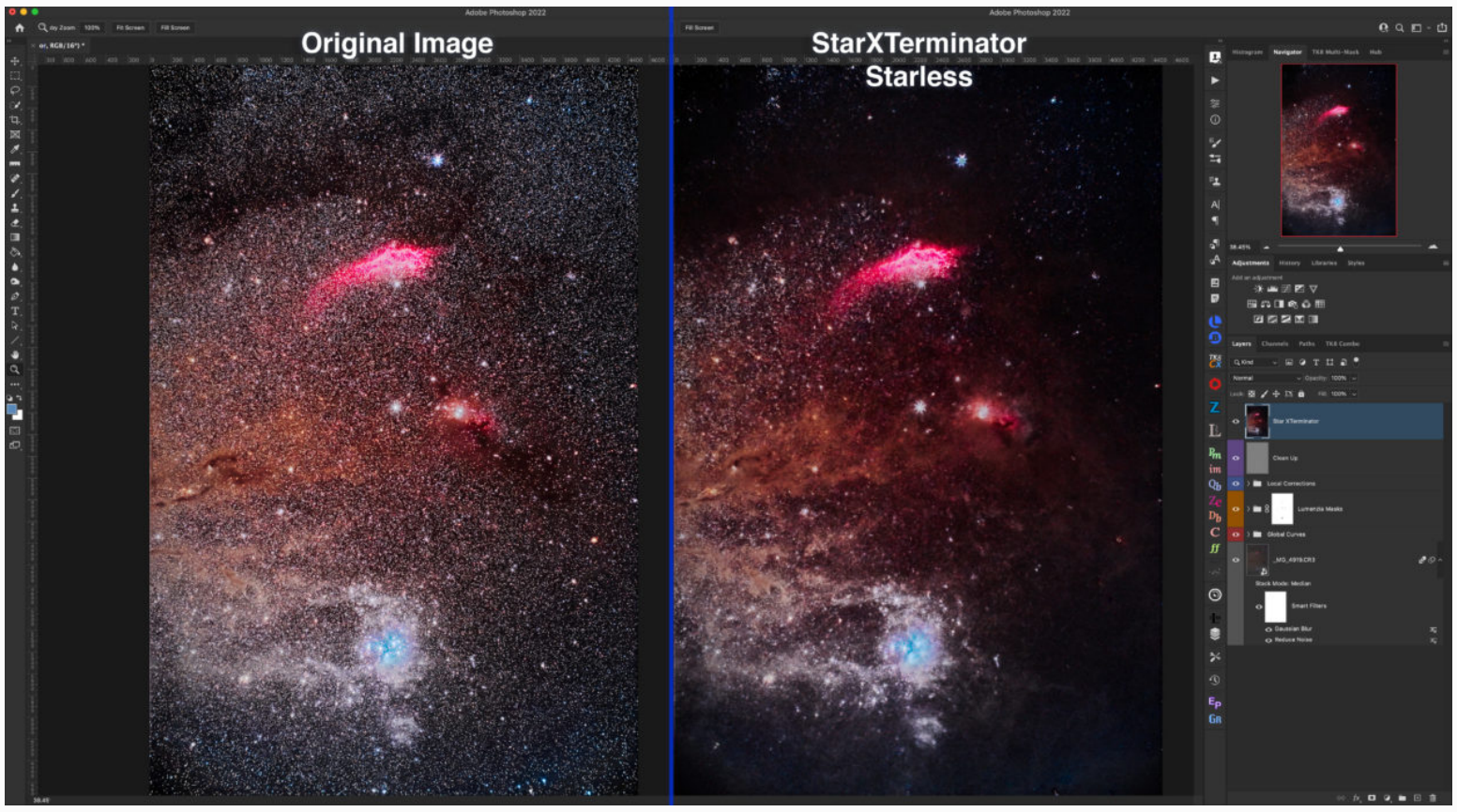
As run, StarXTerminator creates a single starless image. Creating a separate stars-only layer in Photoshop is easy to do but is left to the user — RC-Astro's download page contains instructions. Having both starless and stars-only layers allows processing the two images differently, with the ability to then mask and blend them back together for best effect.





This Veil Nebula example shows the elimination of all stars, and the rich stars-only layer. Dimming the stars brings the nebula to the fore, but balancing the two is a matter of taste. Credit: Alan Dyer

While the total elimination of all stars might work for some targets, with the wide-field nebulas I like to shoot I've used masks to retain a reduced starfield over some of the frame while wiping out stars where nebulosity is most intense, except perhaps for a few key bright stars I "allow" back into the picture.



Where StarXTerminator (and all star elimination routines) can fail is on wide-angle images rich in tiny stars mixed in with extensive nebulosity. Don't expect great results on every image! Credit: Alan Dyer

StarXTerminator Shortcomings

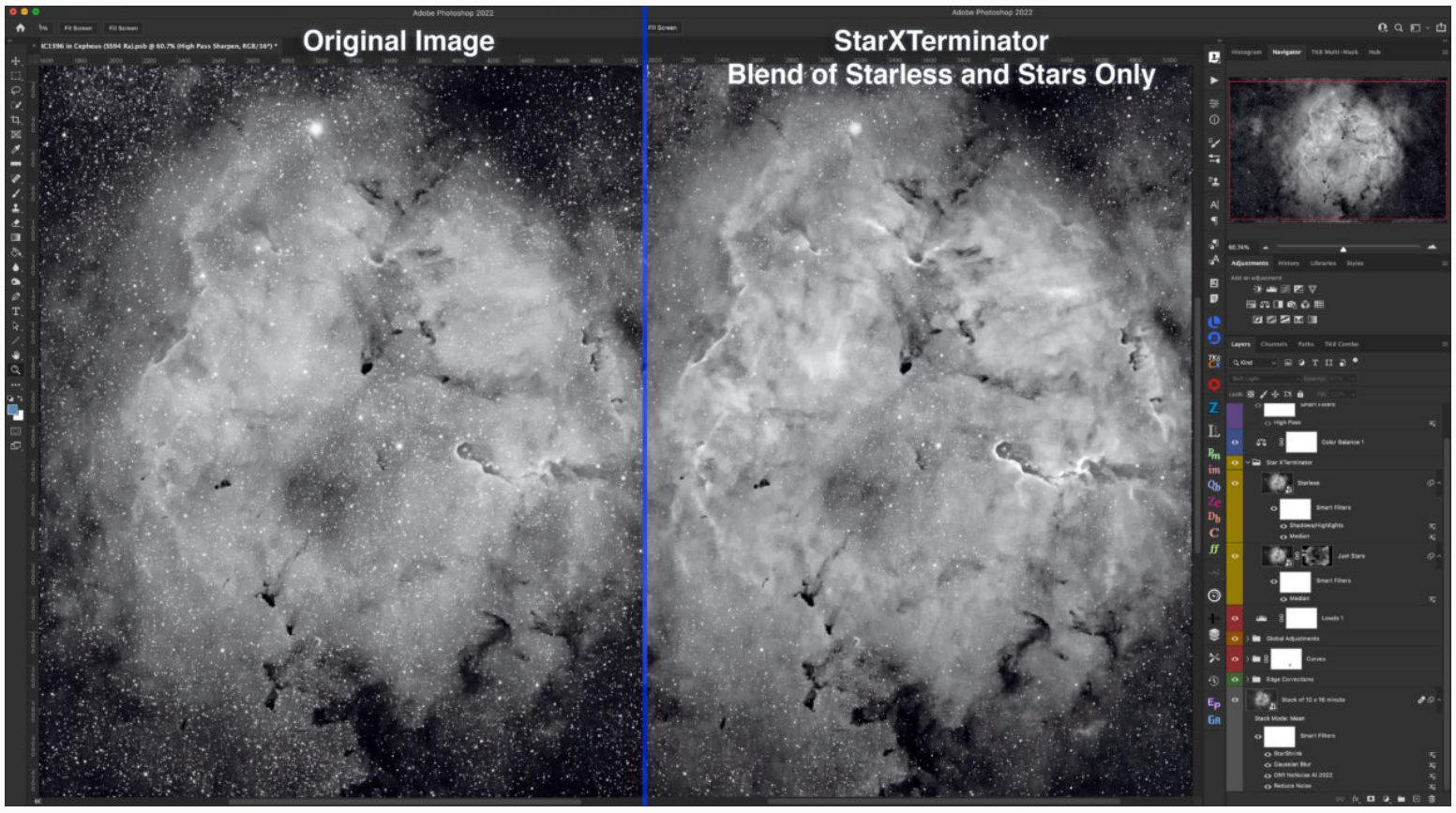
Is the elimination of stars perfect? No. StarXTerminator can leave unsightly remnants behind if the stars are surrounded by bright reflection nebulas, or haloes from atmospheric haze or chromatic aberration. Stars with dark halos from over-sharpening can also leave ring-like artifacts.

It also can't eliminate diffraction spikes very well. But neither can StarNet. So, reflector users take note!

On galaxies (here M96,M96,M105), StarXTerminator can do a superb job eliminating even stars embedded in spiral arms. But it can also interpret elliptical galaxies as stars … and so they're gone! Credit: Alan Dyer

Small bright galaxy cores, featureless spherical galaxies, and the brightest parts of small nebulas can also be interpreted as stars and get faded back or wiped out.

I also found results were best with images taken at longer focal lengths with the deep-sky target filling much of the frame. Star elimination looks great when applied to large swaths of nebulosity to bring out its structure.



StarXTerminator works best when used judiciously to fade back the stars from rich regions of nebulosity, like IC 3196 here, making the object stand out even better. It works great on monochrome images. Credit: Alan Dyer

How well StarXTerminator works will vary from image to image. However, overall, I found it better than the alternatives, and it should improve with smarter AI modules. For Photoshop users, it's not just the best choice, it's the only choice!

But as good as the *artificial* intelligence might get, achieving the best results from any

But as good as the *artificial* intelligence might get, achieving the best results from any star elimination routine will still require your *human* intelligence in blending starless and stars-only images, as each object will require its own mix of masks and layers — and your personal judgement about what looks good!

StarXTerminator is a specialized tool to be sure, but a great one to have in the processing toolbox. I can recommend it, as well as RC-Astro's other plug-ins.

Plus: Mostly artifact-free star removal; easy to use within Photoshop

Minus: No user settings; will miss some stars and wipe out some non-stars

Price: $60; Free 30-day trial copy available

Systems: Windows 10 and later; MacOS 10.15 Catalina and later (including native support for Apple Silicon M1); Linux Ubuntu 18.04 and later

Website: https://www.rc-astro.com/resources/StarXTerminator/

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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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