# REVIEWED

Acuter Elite Phoenix 40

# Two for the price of one


Acuter's Elite Phoenix 40 is not a normal solar telescope – with a few twists and turns to remove the etalon and swap the diagonals, it turns into a quality optical refractor, writes **Steve Ringwood**.

▲ Acuter's Elite Phoenix 40 is both a solar telescope and a regular visual telescope all in one.

It is now easier than ever to observe the Sun safely, with many brands offering refractors in dedicated solar telescope form – either in white light or hydrogen-alpha. At the heart of these instruments is a relatively conventional astronomical telescope, perhaps unnecessarily condemned to observe the Universe through a squeaky narrow band of solar light.

So in answer, there are now versions of such instruments that can, if required, shake off their solar shackles for use as conventional telescopes. The Acuter Elite Phoenix 40 is such a beast, able to transform itself in a trice from a 40mm hydrogen-alpha telescope for use on the Sun to its alter-ego of a general purpose astronomical instrument of double the aperture.

The stated aim of Acuter (owned by Synta, therefore it is in the same stable as Sky-Watcher) is to provide the highest quality optics but at an affordable price for those with a limited budget. I was therefore keen to find out how well this telescope served its dual observational demands.

## In the box

First impressions are very important and from the start these were very good. The solid-looking telescope comes in its own aluminium flight case, neatly cosseted within a firm foam lining, together with accessories that include a solar finder and a universal smartphone adaptor.

The Elite Phoenix arrives ready for solar observation but already looks different to the rest. Rather than being embedded within the tube, the etalon sits within a removable barrel at the front of the telescope. At the rear end there is a dedicated solar-mode diagonal, with an integrated 8mm blocking filter.

The tube comes pre-fitted with a 45mm dovetail bar (with 1/4-20 tripod threads) so it took no time at all to piggyback the telescope onto my

▲ The Acuter Elite Phoenix 40 comes well protected in its own aluminium flight case, with room for all its accessories. Image: Steve Ringwood.


▶ The Elite Phoenix shown with its optical accessories. Above is the screw-on etalon, next to it are the visual and solar diagonals, and on the right is the 5–16mm zoom eyepiece. Image: Steve Ringwood.

main LX200 instrument (displacing my protesting Coronado Personal Solar Telescope [PST] in the process!). The stouter Acuter, at two kilograms, weighs a little more than the PST's 1.45 kilograms, so that may be a consideration for those thinking of a similar swap-out.

## The Sun puts on a show

I was ready. The Sun was also ready; but alas it lay beyond visibility for seemingly weeks of leaden skies. It was worth the wait. The weather broke with a clean, blue-washed sky and I raced to get my first view. The Elite Phoenix comes with a zoom eyepiece harnessing a focal-length range of 5mm to 16mm, providing powers between 25× and 80×. The eyepiece does feel rather light and tinny, perhaps betraying Acuter's budget aspirations, but what I discovered is that the optics are superb.

Beginning at the lowest magnification, I gently focused on the Sun's glowing red orb as presented. Once I had a sharp disc, I gently rotated the pressure-tuned etalon to achieve the best detail. The view presented was nothing short of magnificent, and to be honest it took me completely by surprise.

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The solar disc was alive with incredible detail. Around the limb, several prominences stood proud. Across the disc, shadowy filaments were strewn about in dramatic relief, like writhing worms stopped in their tracks, countered by a splashed abundance of bright plages. All of this was set against the small-scale 'froth' of solar granulation.

Of course, what I was enjoying was the enhanced resolution provided by an etalon delivering a native bandwidth of better than 0.6 angstroms – and doing so without need of double-stacking a pair of 1.0 angstrom etalons as required by other brands.

Admittedly, the Sun was also putting on a special show for the occasion. One prominence, arcing high from behind the limb, fell back over the face of the Sun as a long dark filament stretching across about a third of the Sun's disc. It made for a very dramatic 3D effect. Indeed, all the visible filaments seemed to be lifted off the Sun's disc in great clarity.

I gradually raised the power of the zoom eyepiece, and the solar disc ballooned accordingly. The eyepiece was not exactly parfocal throughout its range, but only a slight retouch on the focuser was required. A magnification of 80× was handled very well indeed, despite the focus growing a little tighter. There was such a wealth of detail that I do not think I could have been better satisfied. What was additionally satisfying, at all powers, was that I could tune in the whole disc at once, rather than having to retune depending on which doppler-shifted hemisphere I wanted to study.

## At a glance

**Aperture:** solar 40mm, visual 80mm (achromatic objective)
**Focal length:** 400mm
**Focal ratio:** solar f/10, visual f/5
**Etalon:** pressure tuned
**Bandwidth:** <0.6 angstroms
Integral 45mm dovetail
**OTA length/weight:** 412mm/2kg
**Accessories:** solar and visual diagonals, 5–16mm zoom eyepiece, red-dot finder, solar finder, smartphone adaptor.
**Price:** £999
**Details:** opticalvision.co.uk

▲ The reticule of the solar finder, which worked very well. Image: Steve Ringwood.

I did not restrict myself to the zoom and swapped it out for a range of fixed focal length hydrogen-alpha biased eyepieces. The views were cleaner, but barely. I think that potential users can choose their option on this purely from a point of convenience.

## Imaging the Sun

With the telescope delivering such a great visual performance, I quickly moved to see how well it could image. For this, I entrusted my Altair Hypercam 533c. A welcome bonus that immediately became obvious was that there was plenty of back-focus available for the camera's sensor – no need here for the intervention of a Barlow lens to push further out an otherwise inaccessible focal plane.

Prime focus imaging results were as impressive as the visual ones, and the clarity prevailed even after I bumped up the image scale with Barlow lens projection. It was impressive for a 40mm aperture solar telescope.

## The transforming telescope

In the meantime, I turned to checking out Acuter's party trick, the telescope's transformation into a purely visual instrument in which the 40mm f/10 solar telescope becomes an 80mm f/5 visual performer. I will admit that it almost felt Bond-like, taking just simple steps to transform an innocent-looking 40mm solar instrument into a rich-field 80mm astronomical refractor.

The first step is to remove the etalon, which simply unscrews from the front of the telescope. The dedicated solar diagonal housing the blocking filter is then replaced by the supplied one of

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conventional design. That is all there is to it. The procedure takes seconds. Fortunately, the winter sky was affording a wealth of subject matter with which to test the mettle of the metamorphosed instrument.

Being December, and my new plaything now being a suitably rich-field f/5, the great nebula in Orion was an obvious target. I treated the telescope to a wide-field eyepiece and drank in the view. Simply gorgeous. Within an extended translucent glow, the fiery Trapezium of stars at its heart were sharp and stark.

There were other prey to hand. The sky was awash with planets. Despite the f/5 configuration aiding observation of deep-sky targets, the 400mm focal length still offered the potential for planetary magnifications – if the main lens was good enough.

Using the zoom at its lowest setting of 16mm, the 25× Moon was seen in a field of a little less than 1.5 degrees. It was bright, as a nearly full Moon is allowed to be. I drifted its limb towards the eyepiece's field edge, looking for distortion or false colour – a test it passed creditably, with no discernible aberrations. What I would say is that some lunar light was flooding the background sky – which may mean that the instrument could benefit from additional internal baffling, or is perhaps lacking something else that I will mention shortly. But there were no internal reflections, which is remarkable considering that I was using a budget zoom eyepiece full of multiple floating elements.

I pushed the zoom to its highest setting of 5mm, eliciting a power of 80×. This made visible a very slight blue fringe at the lunar limb, but a check with one of my own eyepieces at the same magnification revealed that this was contributed by the zoom, not the optics of the telescope.

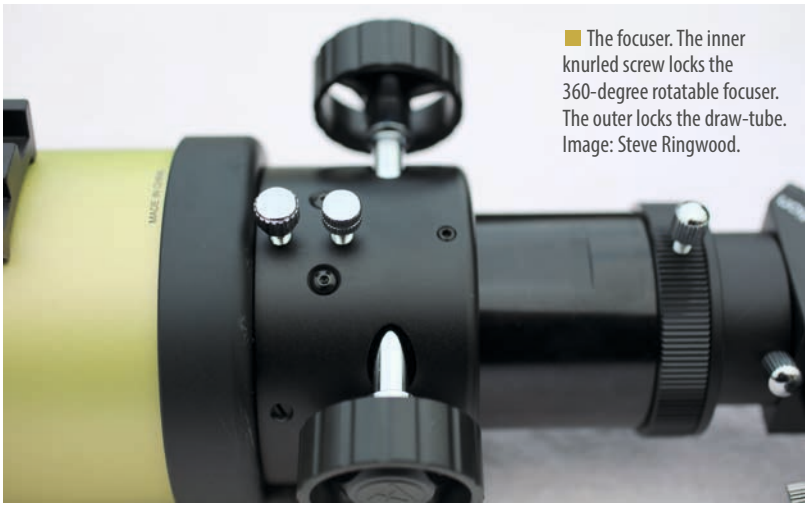
The best view of the Moon was provided by a 10mm eyepiece, which held the Moon very nicely within a field of just under one degree. The Moon presented a great amount of detail, despite the almost 100 per cent phase, and the telescope was equal to the task even at 40×, showing some craggy detail at the limb still in shadow.

▼ The etalon simply unscrews from the main refractor body. Image: Steve Ringwood.

## Taking on the planets

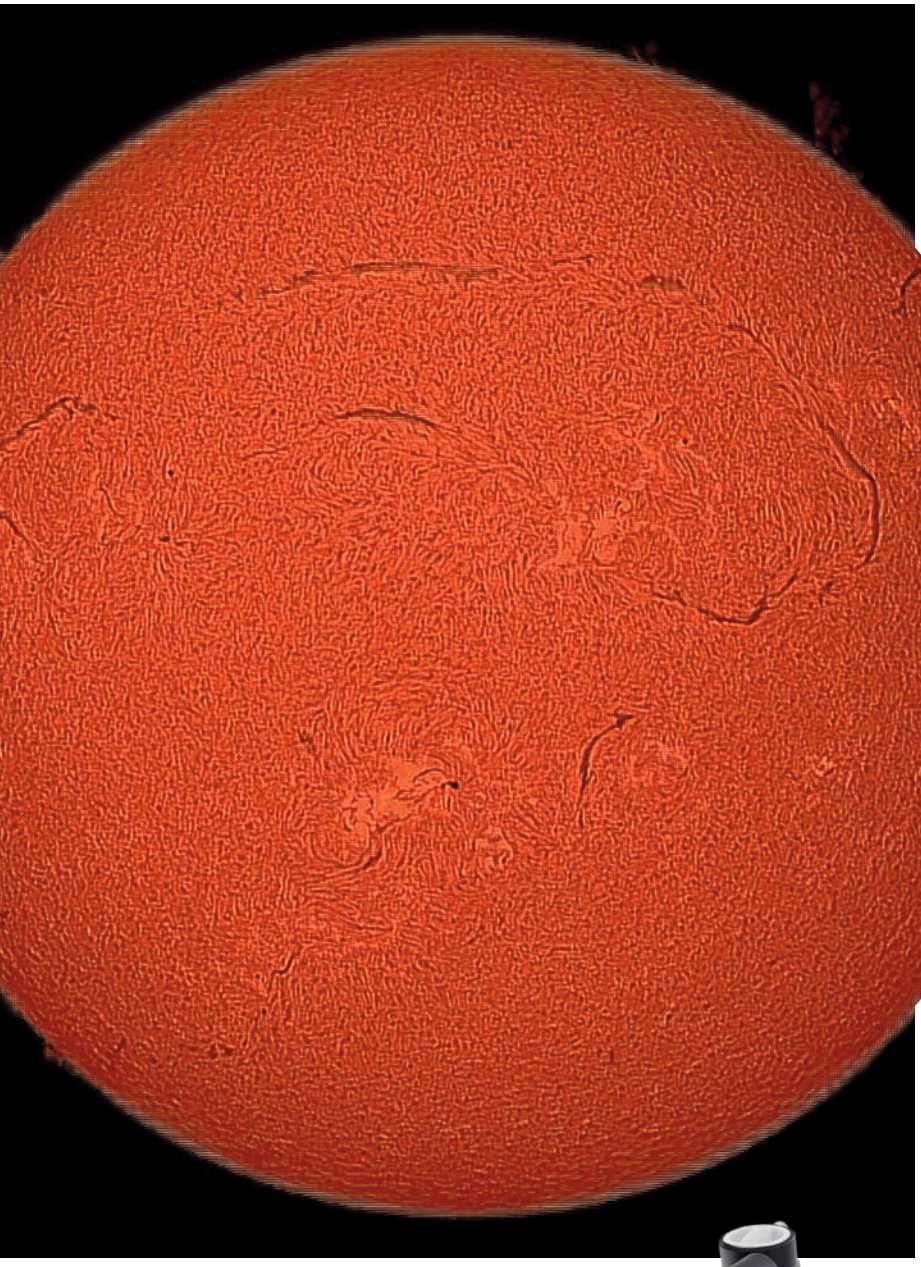
Riding high in the sky, a blazing magnitude –2.7 Jupiter was shouting "me, me, me." It must have known I was coming, for it was putting on a show with all four Galilean moons strung out beside it. Not only that, the Great Red Spot had turned towards me. I was already on the zoom's 5mm setting and at 80× it was sufficient to elicit Jovian detail.

For the (usual!) devilment of it, I swapped out the supplied zoom and replaced it with a 2.5mm Nagler. The telescope handled the doubling of magnification with alacrity. The 160× image was good, but I was not tempted to raise the magnification any further.



The focuser. The inner knurled screw locks the 360-degree rotatable focuser. The outer locks the draw-tube. Image: Steve Ringwood.

The Elite Phoenix in solar mode shown mounted on the author's LX200, configured for Barlow projection imaging with an Altair Hypercam 533c. Image: Steve Ringwood.



▲ An image of the Sun taken using Barlow projection through the Elite Phoenix with an Altair Hypercam 533c. This is a 40 per cent cut of 4,400 frames processed afterwards with *Registax* and *PaintShopPro*. Image: Steve Ringwood.


▲ Acuter's Elite Phoenix 40 in solar observing mode with its etalon attached at the front.

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Mars proved equally interesting through the Nagler, and as it was near opposition with an apparent disc of 15 arcseconds, I was able to see distinct markings. However, what the Elite Phoenix also revealed was bright off-axis lunar light flooding the view from a Moon almost three degrees away.

This was the result of the telescope's incomplete transformation, for in removing the etalon the telescope subsequently lacked an essential refractor element – a light shield for the object glass, for now it was exposed to the whole sky. This could be simply remedied by the introduction of a tube that screws onto the convenient thread left by the etalon. I am rather bemused as to why Acuter's optical engineers have not included as simple a thing as a screw-on empty cylinder. Enterprising purchasers can of course remedy this problem with a piece of rolled up cardboard, but they shouldn't have to.

While I was in a planetary mood, I swung the telescope westwards and alighted on Uranus. At the highest power of the zoom, the planet was still star-like, but the Nagler was able to make out its disc.

Of course, some might agree with a view of "Why have one telescope, when in a trice you can have two?" Others might prefer to leave a specialised solar telescope as is and not compromise on a telescope moonlighting (however well) as a white-light instrument. I am indeed a bit concerned that there is a chance, however slight, of users forgetting to completely re-establish the solar elements when returning to hydrogen-alpha. The etalon may be obvious, but the correct diagonal needs to be replaced, together with its non-integral screw-on infrared filter that may have been removed.

That said, I have to say that Acuter's Elite Phoenix solar telescope has given me some of the best hydrogen-alpha views of the Sun that I have seen. The detail afforded by the narrow bandpass and great contrast across the whole of the solar disc is riveting, and even more remarkable given its economical aspirations.

Acuter's Elite Phoenix 40 is currently retailing at about £1,000, which is not at all bad for the punch it packs. I understand that they may be cutting production costs, but I would be happy to pay just an extra £20 or so if they added a white light-mode dew-shield.

**Steve Ringwood is a regular contributor to *Astronomy Now*.**