STARLIGHT INTEGRATED PARACORR SYSTEM

While attending the 2010 Winter Star Party, I spent some time talking to Al Nagler about the new Type II Paracorr that Televue would be delivering later this year. The new Paracorr came about to address the significant amount of coma inherent in the current breed of sub F/4.0 mirrors, something the original Paracorr was not optimized having been designed around a focal ratio of F/4.5. Al indicated that by revising the optical design, Televue was able to attain a diffraction limited field of 40mm diameter at F/3, equivalent to an F/12 system. Compare that to the original Paracorr whose diffraction limited field at F/4.5 spanned a diameter of only 16mm.

In addition to the standard drop in Paracorr with Tunable Top, reviewed elsewhere in this issue by Mike Harvey, Televue entered into a collaboration with Starlight Instruments. It made the Paracorr available as part of an integrated system with Starlight's Feathertouch focuser thereby eliminating the tunable top. Al proceeded to show me a prototype of the new SIPS, as it would later come to be known, that he had brought to WSP. I had a few opportunities to use a similar prototype Feathertouch/Paracorr system that was mounted onto a 20" F/3 Starmaster Telescope brought by noted optician Mike Lockwood. The views with this combination were quite spectacular, both on deep sky and planetary objects, a testament to both the Paracorr II and Lockwood mirror. The telescopes I've built over the past 25+ years have all been F/4 and used a Paracorr since its introduction in 1989. Having only tasted a sample of the new version really whetted my appetite to try the new integrated system on my own scope.

I was increasingly curious as to when the new Paracorr would be available as the year progressed. By the time July rolled around, I figured I would give Al a call to find out how close Televue was to releasing the new Paracorr with the hopes of having one available in time for this years Stellafane convention. Al indicated that the drop in Paracorr II would be available very shortly while the SIPS would not be available until early September. He indicted he had an extra prototype available and asked would I be interested in installing it on my 32" F/3.9 to obtain additional feedback from attendees at Stellafane. It took all of about a nanosecond to say yes.

Two weeks before Stellafane a package appears at my door containing the as yet unnamed SIPS along with a special Televue 1x spacing "eyepiece", a 40mm Televue Plossl and Al's hand written instructions, Fig. 1. Fortunately the weather cooperated enough so that I could install and try out the system to make sure everything worked properly prior to the convention. I'll describe the installation and setup further into the review.

Fig. 1 Prototype SIPS

Fast forward two weeks and as luck would have it the weather cooperated for all three nights of the Stellafane Convention allowing many hundreds of people, both seasoned and new observers alike, to view. As I indicated earlier in the review the unit I had was a prototype, however, the differences between it and the production unit are a few minor mechanical changes, optically they are identical. To fully test the new Paracorr's enhanced correction abilities I limited the eyepieces to the Televue Ethos as their 100 degree field would help to show any residual coma at the edge of the field. The 21mm assumed yeoman's duty with the 17mm and 13mm Ethos filling in when warranted for smaller objects. So how did the system perform? In a word, wonderful! The field was peppered with tiny pinpoint stars all the way to the edge of the 100 degree field. Best views for me were the Witches Broom of the Veil Nebula and also the Dumbbell nebula. It was incredible to see 52cygni at the edge of the field and the associated nebulosity sweep across the entire sharp flat field to the opposite edge. The appearance of the Dumbbell seemingly suspended in space wasn't too shabby either. The reduced coma compared to the Type I Paracorr wasn't the only thing that gave the above impressions. It was the perception of increased contrast. The background just seemed darker with filamentary structure in the objects noted above standing out in bolder relief. A number of the other observers present over the three nights commented similarly. Was this due to just coma reduction? Maybe the coatings and/or glass type are improved? I don't honestly know but I'll defer to Mike Harvey to speculate further in his review.

Virtually everyone who used the new system came away impressed although I did have 3 people comment to me that they could not quite reach focus with the 21mm. The position of the focal plane on my scope puts the 21mm about 3/32" above the fully racked in focuser position regardless of what version Paracorr was used. It's really a only a function of how I have the focal plane positioned on my scope. Apart from the optical performance, the ability to switch eyepieces and not have to concern myself with the tunable top settings made the SIPS worthwhile on that basis alone. This really comes onto its own later at night when you start to go a bit brain dead and try to switch eyepieces, let me see, do I use #1 or #5, letter A or letter D? Ah, forget it, I'll go to bed.

Another advantage of the SIPS I discovered is that eyepieces are easier to reach and focus at higher elevations as the entire unit sits 2.3" higher than just focuser alone. On the

downside, you must be careful while transporting the secondary cage as its much easier to hit something. As I tend to be a bit clumsy I replaced the set screws on the base with nylon thumb screws so I can just remove the SIPS for transport.

Production units of the SIPS finally became available about the middle of September and Starlight Instruments was kind enough to send me a unit to try out for this review. I was pleased to see that the fit and finish was at the same superb level as all of Starlight's previous products, although I did encounter one minor problem. The SIPS has an O ring mounted inside of the extension tube to prevent the Paracorr from vibrating loose during transport. I found it quite difficult to remove the Paracorr assembly initially as the fit of the O ring was far too tight. By repeatedly removing and reinserting the Paracorr I was able to loosen things up a bit. I think a better alternative would be to have the O ring mounted directly on the Paracorr. It would avoid any fitment issues while still preventing it from vibrating loose. In any event, I installed the production unit on a friends 20" F/5 Obsession to see how much of a difference there would be at F/5 compared to the Type I Paracorr. I only noted a very modest improvement in coma, as did my friend, at the edge of the field compared to the earlier version. We did notice the same type of contrast improvement as noted earlier. The background just seemed darker, go figure.

The SIPS is available in two variations, with or without a FeatherTouch focuser to accommodate those who already own a Feathertouch and is designed to work only with a FeatherTouch. So if you own another brand of focuser unfortunately you'll have to switch to a FeatherTouch if you want to take advantage of the SIPS. Two things to note, if you have a very early Feathertouch (pre 2005) I would contact Starlight to verify that the focuser will work and also that the drawtube is a 1.5" travel version. If the focus travel is longer than 1.5", then you run the risk of the drawtube striking the rear element of the Paracorr with eyepieces that focus far in like the 21mm Ethos, again if in doubt contact Starlight.

The basic SIPS is comprised of a threaded extension tube with knurled locking ring and the Paracorr lens assembly. Also included is a machined Delrin spacing tube for initial setup and a cd disc with a set of instructions stored in PDF format, Fig. 2.

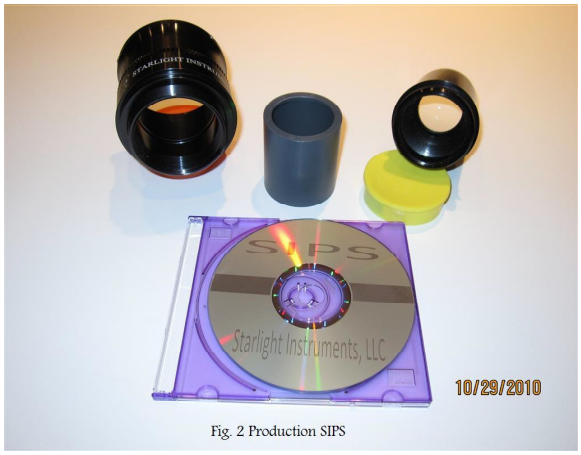

Fig. 2 Production SIPS

Installation of the SIPS is easy and straightforward. Since I already owned a FeatherTouch focuser I simply removed the focuser from its base and attached it to the top of the SIPS extension tube via three set screws. The entire assembly is then mounted back on to the flat base. Fig. 3

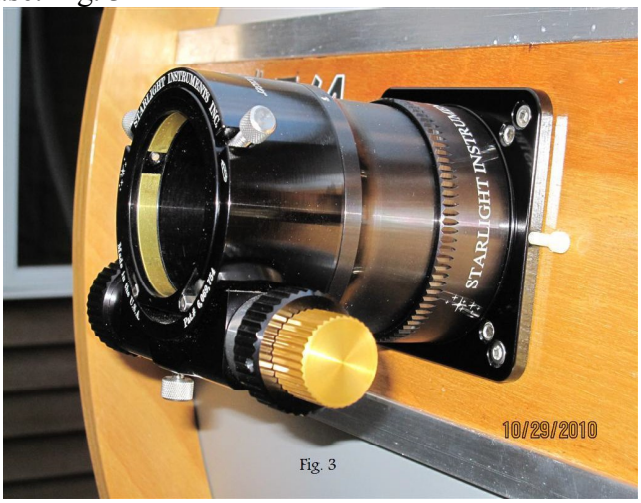

Fig. 3

Next, the Paracorr lens assembly is threaded into the bottom of the extension tube from inside the secondary cage. Fig. 4 & 5

BTW, the lens assembly must be removed when the scope needs to be collimated in order to see what's going on. The removal is easily accomplished as the threading is coarse with only a turn and a half is rotation required to remove the assembly. The proper position of the Paracorr lens assembly relative to the focal plane must next be determined. The included Delrin spacer (Al's new "eyepiece" included with the prototype) needs to first have a piece of frosted tape stuck across the opening to form an imaging surface and is then fully inserted into the focuser drawtube until it contacts the rear surface of the Paracorr lens. Fig. 6 & 7

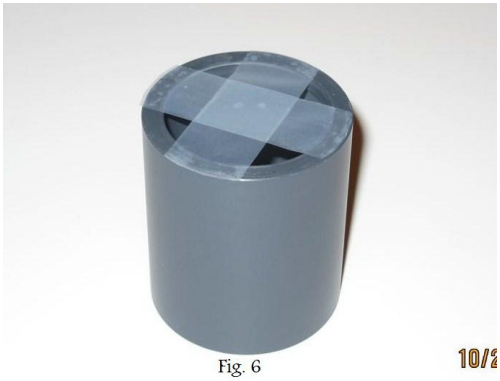

Fig. 6

Fig. 7

The telescope is then pointed at either a bright star or the moon and positioned until an image, more than likely out of focus, appears on the frosted tape. The image then needs to be focused, by loosening the knurled locking ring at the base of SIPS and rotating the entire unit to raise or lower it until the image is at its sharpest. I found it helpful to use a magnifier such as a low power eyepiece to see the image as the frosted tape tends to distort the view. I used the 40mm Plossl supplied with the prototype although none is included with the production unit any type of magnifier will suffice. Once the image is focused to your satisfaction, the locking ring is threaded down to the base and tightened to hold everything in position and the SIPS is ready to be used.

For those that use a non Televue bino viewer you may be better off purchasing the removable tunable top Paracorr. Otherwise, you'll have to remove the SIPS and return the focuser to its original position to reach focus. For those that do own a Televue Binovue, there will soon be a 2" diameter extension adapter that attaches to the Binovue and accepts the 2x amplifier with no increase in magnification allowing you reach focus. You only need to remove the Paracorr lens assembly from the SIPS to use it. Lastly, for those that image with a DSLR or do video astronomy with a Mallincam, the addition of the SIPS should not change your ability to reach focus compared to your present setup.

Overall I'm quite impressed with the SIPS. The fit and finish is excellent and the ability to change eyepieces without any fuss enhances the enjoyment of the superb views afforded by the Paracorr Type II. Although a bit pricey, I think the SIPS an essential requirement for anyone that owns a top shelf short focal ratio scope and wants to extract the maximum performance and convenience from it. Most highly recommended.

Picture courtesy of Dave Mitsky