Brief History of the LED Flashlight

Rigel Systems was started in 1984 by Leon (PhD Astronomy, Ohio State University) & Linda (MBA UCLA) Palmer in our kitchen.

The genesis for Rigel Systems was an observing trip Leon had to Kitt Peak in 1983. At that time the "preferred" flashlight for "professional" astronomers was a Sanyo rechargable. For those that remember it (Sanyo still sells it), it was a white rectangle about 4 in long by 1.25 inches high and .75 inches wide that could be plugged into a wall socket to recharge. You push a slide switch forward to turn on one of its two light bulbs, and push backwards to turn on the other. One of the lightbulbs was protected by a clear plastic lens, the other by a red plastic lens. It was quite the thing to have, well almost.

The Sanyo's battery wouldn't last through an entire winter night's observing! There Leon was, at 3am, trying to nurse a second or two of light out of the Sanyo flashlight to read settings on the CCD camera and the telescope. Which led to wondering about red LEDs ... could red LEDs be used to make a flashlight?

After returning from Kitt Peak, Leon experimented with red LEDs, electronics, and plastic and developed our first product; an LED flashlight which we christened (and trademarked) Starlite. The basic electronic features and design are used to this day. Well the electronics was the easy part. The hard part was the packaging ... the case.

Starlite wasn't going to be just another bulb flashlight with an LED soldered into it. So Leon started experimenting in Linda's kitchen, bending white Styrene plastic over aluminum frames in Linda's oven, which led to our first version (Figure 1) and a whole new meaning to what's cooking! We cranked out about a dozen of these, and made our first trip to the Riverside Telescope Maker's Conference (an annual pilgrimage ever since) where we set up a card table and sold them all within 30 minutes! There appeared to be something to the idea!

Figure 1

After returning from RTMC, we improved the design a bit (#2 in Figure 1), making Starlite a bit easier to fabricate, but not easy enough to make money at it. A year later in July, Leon found a 9 volt flashlight at the local hardware store that we could adapt with a few zips on a table saw for our Starlite circuitry to fit into (#3 in Figure 1) and even incorporate variable brightness control. Unfortunately, the flashlight had been pulled from the market! After a little phone work we were able to track down the source of the 9 volt flashlight and the story of its disappearance from stores.

Seems two large corporations (who shall remain unnamed); one specializing in power tools, the other in chemical products, teamed up to make the flashlight to introduce the second corporation's intro into lithium batteries. Unfortunately, after the flashlight reached the stores it was recalled because the lithium batteries had too high an internal impedance ... they didn't work at the high current drains required by the lightbulb!

However, everyone Leon talked to at both corporations was helpful, and eventually we were able to track down a warehouse full of the recalled flashlights and arrange to start buying them in 1000 piece lots (We still have 5000 light bulbs in our garage). There are two morals to this story; (1) one man's lemon is another man's lemonade, (2) big corporations can be friendly and helpful even to small guys.

We finally started making money with the 9 volt version, especially when red LED technology became 10 times brighter. Within a couple of years we had a fair number of dealers and as the supply of the recalled flashlights dried up, we could afford to have plastic injection molds fabricated, and save Leon from any future table saw related hazards to his appendages. This is the version most amateur astronomers have, #4 in Figure 1.

Within a couple of years of #4's introduction, white LEDs came on the market, something we had anticipated ever since we made the original Starlite. We quickly reintroduced our original concept of a two-color LED flashlight and christened it Skylite! About that time, other companies, big and small discovered white LEDs and started replacing incandescent bulbs in their flashlight lines, with LEDs, and elbowing and jostling each other in the marketplace .. some even going so far as to sue others for violating their patent for inventing the LED flashlight! Other companies sent our flashlight to China to have it copied, down to the smallest detail and have flooded the market with these.

So given time and competition, we have continued to improve our flashlights (Figure 2), adding water resistance, easier to operate thumb wheel, and colored cases as well as adding all the other colors of the LED rainbow from infrared through ultraviolet. Rigel systems has grown through all these phases of our flashlights to almost 100 US and international dealers, reinforcing a moral of this little history that the first, Rigel Systems is still the best.

Figure 2

History of PulsGuide

Once we had a going product with Starlite, the next question was what should our next product be. Leon was writing a laboratory astronomy textbook at the time and exploring how the eye worked. Combined with his extensive experience of staring at dim stars behind dim crosshairs for hours at his time (Leon claims his longest exposure was over 10 hours) and the physiology of the eye, we developed PulsGuide (Figure 3) a pulsing reticle illuminator that makes guiding easier by pulsing the reticule illumination on and off.

Our first version (#1 in Figure 3) turned out too expensive to build as the aluminum can cost $10 apiece. We soon adapted it into a plastic tube (#2 in Figure 3), then eventually a friend with a lathe who would turn out aluminum tubes for a mere $4 apiece (#3 in Figure 4). We made some electronic improvements, moving the on/off/brightness switch to the end and switching to a larger battery and a more attractive aluminum tube (#4 in Figure 4).

For a while we made a version for Celestron (not shown) which they named PulsStar. We no longer supply these to Celestron. We still have spare electronic parts for PulsStar and still offer repair services for them.

Figure 3

History of QuikFinder

With Starlite & PulsGuide generating positive cash flow (a good thing... yes a very good thing, given two children approaching college age) we started looking around for our next product idea. Having over the years heard the lament "couldn't it be made smaller?" regarding Telrad, we decided to give it a go. Not a criticism of Telrad, it's an excellent product and Leon bought 10 of them for use on telescopes at the local community college where he teaches astronomy part-time, but as an indication of a niche unscratched. A niche now scratched down to bone by "dot finders" developed originally for the rifle and pistol market!

Our first foray into the reflex sight product line is #1 in Figure 4. About the size of a pack of cigarettes, aluminum construction, narrow viewfield. They worked, but were hard to fabricate. Leon soon found gray PVC square tubing and started fabricating the next incarnation of QuikFinder in the garage, banned from Linda's kitchen forever! (#2 in Figure 4). Soon we added a dew shield, thanks to customer feedback, and incorprated a pulsing circuit (#3 in Figure 4). After running up annual sales into about a 1000, could justify the $15,000 expenditure to have plastic injection molds fabricated to make the current (and final) incarnation shown #4 in Figure 4.

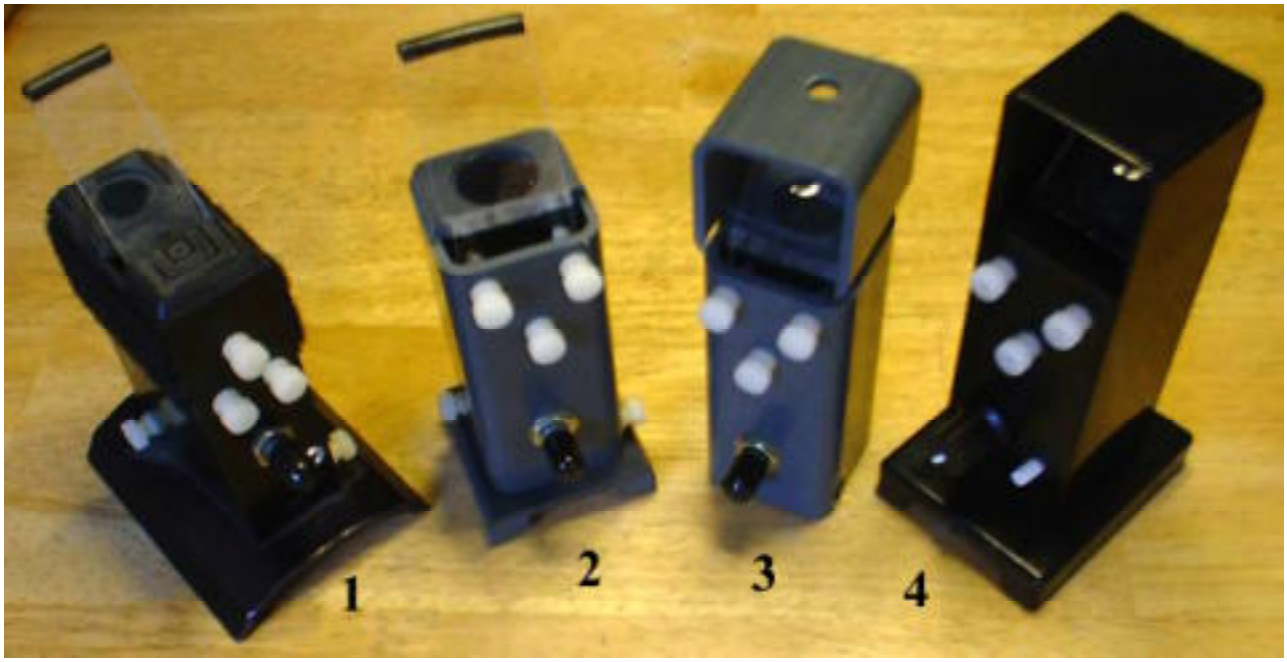

Figure 4

History of nFOCUS

Always looking for ways to make amateur astronomy easier, Rigel Systems developed a two-speed pulse-width-modulated focus motor controller, christened nFOCUS. It avoids the problems with the focus motor controllers which adjust voltage to adjust speed, and thereby don't have the umph to turn the motor over at low speed. The nFOCUS whacks the motor with a full 12 volt , short duration pulse to overcome stiction at low speed operation, providing plenty of umph! In addition, by depressing one button and continuing to hold it down while depressing the second, nFOCUS kicks into high speed mode so you can change focus fast when you change eyepieces. It is amazing to see it work, to see the focus change step by step till it's just right. No more coasting past then back past then past again.

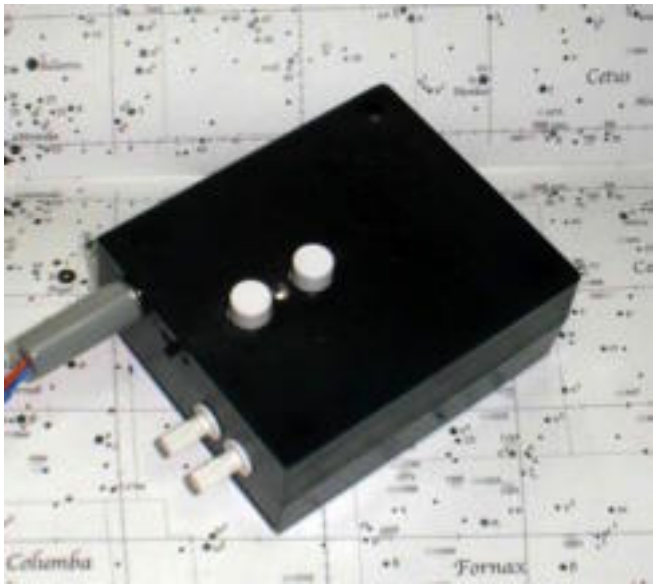

Figure 5

Some circuitry changes are in the works to make the electronics easier to fabricate, but this time we had injection molds for the plastic case fabricated from the git-go. We are now working with a number of focuser manufactuers to motorize their focusers with nFOCUS control (have to pay off those molds!).

History of What's Next

With almost a hundred dealers in the US and around the world, we are still looking for ways to make amateur astronomy easier, with a couple of neat ideas on the drawing board (not in Linda's kitchen, repeat, not in Linda's kitchen).