Lunatico Astronomia's Seletek Platypus and Firefly

By Austin Grant

Three summers ago, my father and I built a large concrete pier in my backyard. I'd convinced myself that if I could stop dragging out a tripod, leveling it and then setting up my mount, I'd finally be happy. It didn't last, and a year later I had built a roll-off observatory around the pier. I teamed up with our Managing Editor, Gary Parkerson, and we built most of it on the fly with no plans (**Image 1**). Surprisingly, it worked. In fact, it worked well. It was simple to operate, and the roof slid off with a gentle push.

Now, nothing would be able to stop me from imaging any time I pleased. That was two summers ago, but it also did not last. Just like every other aspect of this hobby, my simple expectations snowballed into serious demands. I wanted to motorize the roof, and then automate the entire observatory. My wife was thrilled!

I started by motorizing the roll-off. I'd seen lots of solutions for making that work, but I decided that for my needs, a simple garage door opener would do the trick (**Image 2**). I called Gary, and we had it installed in an afternoon.

At this point, I could operate all of my gear from the house. It was quite a satisfying experience. I even bought a cloud sensor so that I could monitor the weather and shut it all down from the house if necessary. I made it a whole two months before digging into remote control systems. That may be a record for me, as I'm always looking for the next upgrade.

Why Lunatico Astronomia?

I considered several observatory-control solutions, but finally decided to contact Jaime Alemany at Lunatico Astronomia (Lunatic Astronomical). Jaime is one of the most enthusiastic guys in astronomy, and his passion for continually improving his products really makes for some cool opportunities for his customers. Over several email exchanges, he asked plenty of questions to get an idea of exactly what I expected out of the control system. He helped me expand and refine my vision of what I could get out of it, and even suggested additional options for incorporating his gear into my imaging sessions.

My initial concerns were quite basic. I wanted to be able to power the entire system remotely, verify the parked status of my mount, and have the roof remotely close in the event of unsafe conditions. I also wanted sensors to confirm the open and closed status of my roof.

I designed the observatory with low walls for maximum telescope visibility, and with that came the fact that if my mount isn't parked just so, the roof can collide with it during the open and close procedures. Jaime pointed me to his Seletek line of products, and from there we decided on the Platypus and Firefly components (**Image 3**).

The Platypus

The Platypus is the controller that makes the automation happen. If you are familiar with Lunatico Astronomia products, it's similar to the Armadillo line, but it adds an Ethernet connection and a third peripheral port.

Image 1 - Austin's home roll-off observatory.

Right off the bat, it's got two features that I didn't know I'd ever use, but that have become an integral part of my imaging sessions. The Platypus is able to run the Firefly control box as well as two extra peripheral ports. I utilized the extra ports to attach control cables for both of my Moonlite focusers, and immediately gained full control over the high-precision stepper motors.

The benefit here is that I was able to remove the existing stepper-motor controller from the Moonlite equation. It worked fine but only controlled one focuser at a time, and I had to swap the cables when I wanted to use the other telescope. Plus, I paid more for that single stepper controller (and sold it for more)

Image 2 - Garage Door Opener (Cutline To Come)

than I paid for the entire Platypus setup.

Because I was going to be controlling the focusers, Jaime recommended that I also add the external temperature sensor so that I could get accurate temperature compensation data for my autofocus. Lunatico Astronomia makes a cable adapter that uses the main peripheral control port to read data from the external temperature sensor without sacrificing the use of that port for focusing. I now have temperature-compensated autofocusing on two telescopes, controlled by the Platypus, and I didn't even know that feature existed when I started looking.

The other killer feature that the Platypus offers is the Ethernet port. I'd planned to just use a remote access program like *TeamViewer* to control my observatory PC, but Jaime pointed out some possibly serious flaws. What happens, for instance, if the computer locks up while I'm sleeping? On a clear night, not much, but if the weather turns bad, it can be a disaster. Or forget a weather event; just imagine it shuts down while you are halfway across the country. Those concerns were the main reason I had avoided automation in the first place. It just didn't seem worth it to ever have the roof open when I wasn't right there and able to shut it myself. The Platypus has alleviated that fear.

The Platypus can be accessed via USB, local network or the Internet. Though I've mainly used the USB option, I do have the setup configured so that I can control components remotely over the Internet. For my use, the main purpose of that feature is to remotely power down and restart the computer in the event it hangs. For most users, you would be able to completely start up or shut down your observatory directly via the Platypus, but my interference-positioned mount prevents that.

It's a mount-design issue, not any Platypus problem. I have a hardware park option on the mount, so that the Platypus could just send a signal directly to the mount to park and then close the roof, but that option is not yet enabled on the mount. Hopefully it will be functional in the future. Until then, I still have the option to remotely reboot the computer, and run shutdown sequences via that route.

At this point, if you are like me, you are overwhelmed by all that is going on with the Platypus controller. It seems that with so many options, you'd have to have a degree in computer programming to get

everything configured properly. In fact, nothing could be further from the truth.

Once you download the free software, you simply tell it what accessories are connected to each of the peripheral ports, and it will configure them from there (**Image 4**). All I had to do for the focusers was check a box indicating that they were Moonlite stepper motors. The same goes for the Firefly controller – all I did was indicate that it was plugged in to a specific port.

As for setting up the Internet connection, it just took a quick email to Lunatico Astronomia to confirm some details from the manual, and I was off to the races. One cool thing that is coming soon is the addition of smartphone control of the system. All the features you can imagine at your fingertips!

Image 3 - The Seletek Platypus and Firefly controllers, as delivered by Lunatico Astronomia.

The Firefly

I mentioned earlier that the other control unit I ordered was called the Firefly. Where the Platypus is the brains of the operation, the Firefly can be thought of as the enforcer. It's a series of relays and input sensors that allow it to monitor and control every single component of the observatory.

I had hoped to be able to remotely power my entire system on or off, but the Firefly allows me to control each component individually. It includes eight relays: four of them double NO/NC and four of them NO. It also has eight input sensors.

I wired my computer, mount, camera, dew heaters, garage-door power,

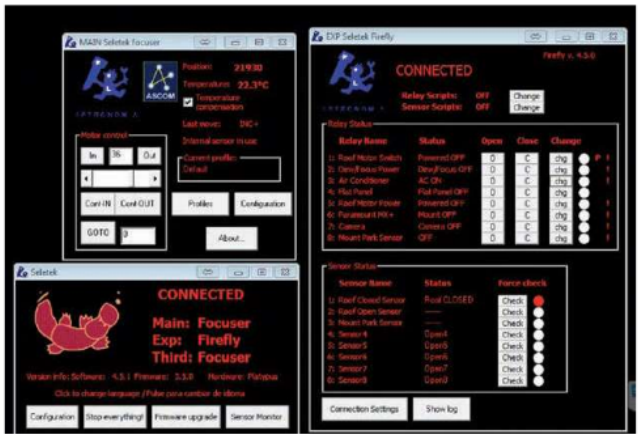

Image 4 - Platypus and Firefly control screens.

Image 5 - Magnetic switches confirm the roof position.

garage-door switch, IR park sensor, AC, and flat panel through the relays. I can turn each on and off as needed, and many of them are controlled automatically with scripts.

For sensors, I decided to utilize two magnetic proximity sensors for the roof position (**Image 5**) and an IR sensor (**Image 6**) to verify the mount is parked. There are several different sensor options, and whatever you decide on, you have the ability to get custom-length sensor cables if you relay the measurements to Lunatico Astronomia. I chose to get some fairly long cables, because I was unsure of how I would mount mine. In fact, the original mocked-up positions have worked so well, I've never gone back and finished with a neat and tidy install.

The magnetic sensors work by being close enough to interact. I found that distance to be pretty forgiving – anything within about three-quarters of an inch would cause them to register. That's a very reasonable goal for even a cheap garage door opener to achieve.

The IR sensor for my mount park position is mounted on the inside wall of the observatory, and shines a beam of IR and measures how much of it is reflected. My shiny counterweights worked well enough to get the job done, but I also put a piece of metallic tape on the bottom of my counterweight shaft to get maximum reflectance. There is about a one-degree range, within which the mount can park, that will cause the sensor to read that it is in fact parked, and that's never been an issue.

There are also level sensors that you can use, if you prefer. If you go with the IR sensor, it is recommended that you wire it through one of the relays so that you can turn it off while you are imaging. It can't be good for your images to be bathed in a flood of IR light.

Scripting Made Simple

I was worried about scripting all of the interactions with the Platypus and Firefly, but it turned out to be pretty straightforward. There are sample scripts included with the software downloads, and if you have questions you can simply get in touch with Lunatico Astronomia. I did, and after a couple of emails I was very quickly able to setup a script that would turn off the AC, check that the mount was parked and then open the roof. From there, it was pretty easy to reverse that operation to close everything down.

The biggest part for me was creating a loop to check that the roof actually did close when it was commanded to, and to resend the signal until the action was completed. Call it paranoia, but I just had a small doubt that a garage-door opener would function properly. In fact, I tested it by blocking the beam on the garage-door sensors and then by physically blocking the roll-off another time. In each case, the script caused the controllers to catch the flaw and resend the close signal.

The Platypus has a standard ASCOM driver that I used in conjunction with *Sequence Generator Pro* to complete the automation puzzle. This allowed me to integrate it with the readings from the cloud sensor and force action when an unsafe event occurred.

Speaking of the cloud sensor, it's actually the one component of this system that I didn't get from Lunatico Astronomia. Before I decided on the system, I had already ordered an Aurora Cloud Sensor III from Aurora Eurotech (**Image 7**). It's brilliant, and integrates seamlessly with both *Sequence Generator Pro* and the Seletek System. I'll have more details on that in another write-up. If you don't already have one, you probably already guessed that Lunatico Astronomia offers a great cloud sensor as well.

One cool thing that I haven't already mentioned about the Lunatico Astronoma system is that there are so, so many options. From standalone components to complete remote automation, they offer it all. The software is continually evolving, and features are constantly being explored and added. They even have an app called *Good Night System* that

Image 6 - An IR sensor confirms that the mount is in the park position. A piece of metallic tape was added to the bottom of my counterweight shaft for maximum reflectance.

Image 7 - The controllers monitor outside conditions via an Aurora Cloud Sensor III from Aurora Eurotech.

will monitor your imaging session and components, and will wake you up via your computer or smartphone if something goes wrong.

Or, does all of this sound too complete to you? Would you rather do some of the building and designing yourself? If so, you are in luck, because there is also a line of products called L.Y.S., or Lunatico Yourself! They create a prototype to confirm that everything works as it should, then simply sell kits of the parts for you to assemble yourself. It's a great way for you to save a few bucks while allowing the crew at Lunatico to focus on innovation. Don't feel pressured though, because they also love to build complete parts for you.

This has been one of the smoothest

Image 8 - The Iris Nebula captured with Austin's automated home observatory using a TPO 8-inch Ritchey-Chretien carrying a QHYCCD QHY9M camera (Astronomik 36-mm LRGB filters) on a Software Bisque Paramount MX+ mount. 5.5 hours total integration.

Image 9 - The Heart and Soul Nebulae captured with Austin's automated home observatory using an Orion ED80 carrying a QHY5L-II mono camera (Astronomik 36-mm 12-nm SII, 12-nm OIII and 6-nm Ha filters) on a Software Bisque Paramount MX+ mount. 10.0 hours total integration.

upgrades I've encountered in my amateur-astronomy career. Everything has just worked, from beginning to end. In fact, as I write this, I'm watching asteroid 15 Eunomia slowly make its way across my screen, one 5-minute frame at a time.

As it's happening, the cloud sensor is telling me that the weather is right at the threshold of what I predetermined as not clear. When it hits that point, *Sequence Generator Pro* will park the mount and then tell the Platypus to close the roof. The Platypus will confirm with the Firefly that the mount truly is parked and then power on the roof motor and shut the roll-off. Next, the flat panel will turn on and the system will shoot some flats. Finally, the mount, camera and dew heaters will turn off, and the AC will power on to keep the room dry until the next imaging session.

I'll be asleep while all this happens, and the Platypus and Firefly from Lunatico Astronomia will run the show. I will have to go outside tomorrow though, because somebody's got to put the cover back on the telescope, and take it off before the next session. Well, for now somebody has to do that. I think Lunatico Astronomia sells a remote scope cover, as well! ATT

Lunatico Astronomia Platypus Features and Specifications

- CPU: Atmel AT91SAM7X256.
- Six analog-digital inputs plus five digital inputs.
- 12 powered digital outputs (up to 1.0 amp per port), four in each port.
- 10-bit (0-1024) ADC.
- PC connection through USB and Ethernet (Internet).
- Module dimensions: 185 by 124 by 60 mm (7.3 by 4.9 by 2.4 inches), including DB9 connectors.
- Power supply: 12- to 24-volt DC (depending on motor used), typically 12-volt DC; RCA and standard 5.2 power connectors.
- Software support for any current Windows version (32- and 64-bit).
- ASCOM-compliant software.
- Compatible with FocusMax, MaximDL, CCDCommander, ACP, CCD AutoPilot, plus any ASCOM-aware astronomy software.
- Included accessories: USB 2.0 cable (controller to PC connection) and power jack plug.

Lunatico Astronomia Firefly Features and Specifications

- Manages eight relays (four double NO/NC and four NO) to switch DC or AC.
- Eight input sensors (magnet, contact, etc.).
- Extreme protection against noise.
- Uses one port of the Seletek, Armadillo or Platypus controller (EXP or THIRD).
- Module dimensions: 125 by 60 by 205 mm (4.9 by 2.4 by 8 inches).