

# Astronomical Adventures

## An Occasional Series on Building, Outfitting and Operating a Remote Observatory

By Manny Leinz

### Episode 1 – Dreaming to Building

#### The Dream

I've been an amateur astronomer for a long time; it's been over 30 years since I got serious about astronomy as a hobby and much longer than that that I have been captivated by all things associated with space and the exploration of it. I got my first "real" telescope in the 1980's, a used Meade LX6 that I would take out to the desert as often as I could, realistically about every month or two. Although I loved spending nights under the dome of a star-filled sky, setting up the scope was a chore. It took nearly an hour (at least for me) to set up and properly polar align, which had to be added to the time invested in driving to a dark sky site; then of course there was the tear down and return trip at the end of the observing session. As far as setting up the scope in the back yard for a quick peek at the Moon or Jupiter, I found that I almost never did it – as a husband and new father, time was a scarce resource.

A Dobsonian scope might have been a reasonable short term solution, but I wanted to get into photography as well (Alt-Az mounts need not apply).

I knew then that an observatory would ultimately be the best solution, but I didn't fancy the idea of investing in a structure that would live under the light polluted skies of suburban Southern California. The dream would have to wait.

#### The Site

Fast forward 30 years: my kids are grown, and I was about to retire after nearly 38 years as an aerospace engineer. My wife and I had been discussing a possible vacation home somewhere in the mountains, and (for me at least) away from city lights and with a site suitable to build an observatory. The search became serious in 2014, as we began to look for an affordable location with dark skies. Using the dark sky maps of David Lorenz (<https://darksitefinder.com>) as a guide, we soon

discovered there was basically no place in the local mountains that was relatively free of light pollution (map color light blue or better). Our search expanded to the Sierra Nevada, with initial thoughts being a place near Mammoth Mountain to allow for winter skiing. High cost and postage stamp lots soon cured us of that notion, however. In December of 2014 we finally settled on a home on a spacious lot outside the quaint little gold rush town of Mariposa, California, about an hour West of Yosemite (our favorite National Park!).

#### Planning

Retirement came in July of 2015 and by October, my son and I had cleared "Observatory Hill" of two small Oak trees.



*Observatory Hill, (Nearly) Cleared of Trees - October 6, 2015*

Detailed planning for the observatory finally began in earnest in 2017. I quickly decided on a roll-off roof design, as opposed to a dome. I liked the idea of an innocuous structure that fit in with the area and didn't scream "expensive optical equipment inside!".

I am interested in visual astronomy, as well as photography and citizen science projects (such as asteroid observations), so I determined that the observatory would have two piers (one for visual observing and one dedicated to photography/science).

Ultimately I want to be able to do remote imaging, so from the beginning I determined that the observatory would have all the essential components needed to allow semi or fully autonomous operation over the internet: AC power, motorized roof, local computer, computer controllable mount, camera, filter wheel, focus control, weather monitoring, UPS and of course, internet access. Since we have the benefit of our vacation home only 200 feet away, autonomy can be approached in 'baby steps': first control from within the observatory, then from the house and finally (the Holy Grail), control from Southern California. In that ultimate configuration a robust and redundant system to autonomously put the mount in a safe condition and close the roof will be essential.

### **The "Shed"**

Since space was not a constraint, I decided to make the observatory structure relatively large, on the order of 16' x 16'. Determined to do the build "the right way", I visited the local Building Department, where I immediately received a reality check. The type of structure I envisioned was definitely going to need a permit, which the inspector told me would be straightforward, especially if I got rid of the requirement that the roof slide off!

Unable to find someone with experience in performing the engineering work necessary to get a roll-off roof design past the Building Department, I reluctantly decided to downsize. If the structure is no more than 120 square feet, and has no permanent electrical service, the Building Department considers it a "shed" and no permit is required.

I initially considered a 12' x 10' structure, but finally decided that in order to squeeze in two piers, a 15' x 8' structure would be more appropriate.

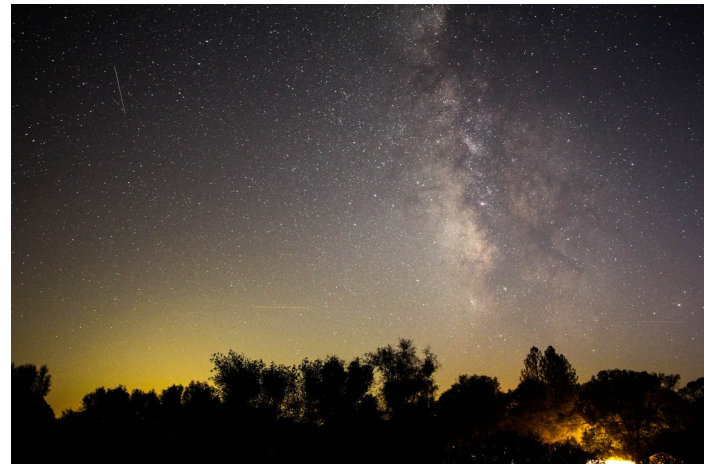
### **To Build or to Have Built?**

I'm a reasonably handy guy and so had always intended to build the observatory myself. However, after realistically considering how long it would take to complete such a project, and how many months that would take away from observing, I finally decided to have the structure built. (Anyone that

tells you that you're going to have *more* time after you retire is probably delusional.)

So in May of 2017 I contacted Scott Horstman of Backyard Observatories (BYO) and found that he planned to be in California just two months later, in July. If I could commit to having the observatory installed at that time, he'd give me a break on the price. Scott provides two options for observatory builds: slab, and deck. Since time was suddenly an issue, I was concerned that I could get concrete poured and cured in time for the slab installation. Besides that, the deck option would make it easy to route cables under the structure later, if needed. So deck it was to be.

In order for the observatory build to proceed efficiently, I would also need power routed to the site in advance. I got in touch with a local contractor, who after some delays and equipment breakdowns, was finally able to complete trenching and route two 20 Amp circuits the 240 feet from the service entrance of our property to observatory hill.



*One of the First Night Shots From Observatory Hill - Looking South (Iridum Flare Upper Left)*

All was finally ready for the observatory build. Then came the fire...

### **Next Episode: First Light**