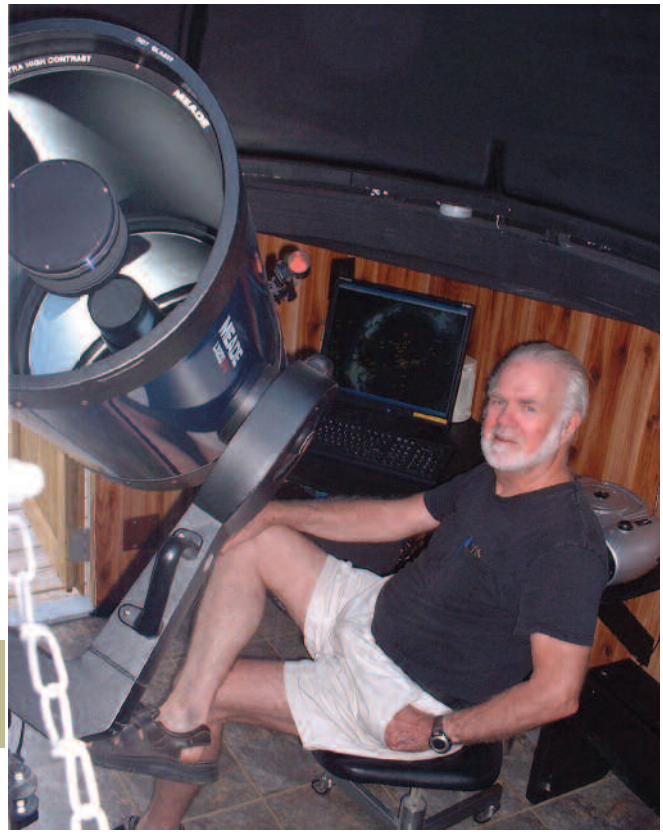
Wishing Star Observatory

It represents the cumulation of my lifetime of stargazing and wonder. The more one learns, the more one sees, the greater the awe.



By Pete Peterson

All amateur astronomers wish for the convenience and versatility that only an observatory will provide. After years of planning and spousal negotiation the Wishing Star Observatory has become a reality.

Given the proximity of neighbors, a dome was the only way I'd be able to protect my night vision, and here in Rhode Island a full shelter is most welcome in mid-winter. I teach classes in Backyard Astronomy through the local community schools, so I'd originally planned on building a 10-foot dome. Various locations throughout the small back yard had been studied, chosen and then later rejected for one reason or another. After having repeatedly consulted with the town building inspector, some architect friends, and the spouse, we'd settled upon integrating the observatory with a raised deck running from the back of the house to an ideal location pretty much in the middle of the back yard.

As the design solidified, but before I had drawn up the dome construction details, along came PolyDome, with their announcement that they'd be manufacturing an 8-foot polyethylene dome (the Explora-Dome) for the introductory price of an astonishing $395! I got my order in so fast that the Internet sizzled. (Prices have gone up a little since, but the Explora-Dome is still a huge bargain.)

The design itself was a bit of a challenge. I needed to fit myself, a 14-inch Meade SCT and more than a half-dozen adults into an observatory with an 8-foot diameter dome. The dome's bottom shutter opening must be low enough to allow viewing at my lowest horizon (a constraint on building height). The scope pier must be low enough to allow comfortable visual observing at my lowest horizon while high enough to also allow visual observing at zenith – all while seated in an observing chair. The structure should be small enough so as to not overwhelm the house or the small yard.

The 45-degree corners on the eastern wall visually minimize the 10-foot by 10-foot building base structure as seen from the street (this is a corner lot). And, by going with a flat roof, cutting down the dome's skirt, using low profile roller wheels and fabricating my own mounting ring, Wishing Star was to have an absolute maximum of possible standing shoulder room, 51 inches of comfortable headroom for seated guests, and a dome slot beginning only 13 inches higher.

Six months after starting the design layout, I again visited the town's building inspector. Originally he wasn't sure which way to jump, as there was nothing regarding observatories in the building code. I'd been in many times clarifying boundary and construction constraints and his visage changed from "oh no, not you again" to "thank goodness this is over" when I laid the construction permit application and drawing set on his desk. A week later, in late April of 2006, we had our building permit.

Construction started immediately with the demolition of a small rear porch. Home Depot's Decks 1-2-3 book emphasized that precise layout was critical, so I probably had used more batter-boards than a housing contractor would have used for an entire sub-division.

Because of the irregular shape of the deck and observatory, 13 footings were required. And Code required that they be dug at least 42 inches deep! The rental post hole auger was a godsend, but after a day of digging the footings I'd been knocked on my can multiple times and felt like I'd been 10 rounds with a gorilla.

That entire long hot summer was devoted to digging and to pouring concrete. I lost count of how many bags of ready-mix I ran through a circa 1950 Sears mixer I borrowed from a neighbor, but the pier itself used about a skid all by itself.

Construction of the deck and the adjoining structure itself went relatively quickly. While my old 10-inch table saw got a lot of use, a new high-end Milwaukee Sawzall turned out to be the tool of choice for most of the work. The one challenging area was the cutout in the 3/4-inch plywood forming the observatory roof and mounting ring. It quickly became obvious that cutting 8-foot circles with a jig saw would be a lifetime commitment. And the Sawzall cut was hard to control. Securing my old router to a 4-foot board produced about 3/4 of a beautiful semi-circle in a 3/4-inch sheet of plywood before the router smoked. The answer was a top-end, high amperage professional router that made the cuts effortlessly (and that I resold to a carpenter the following week).

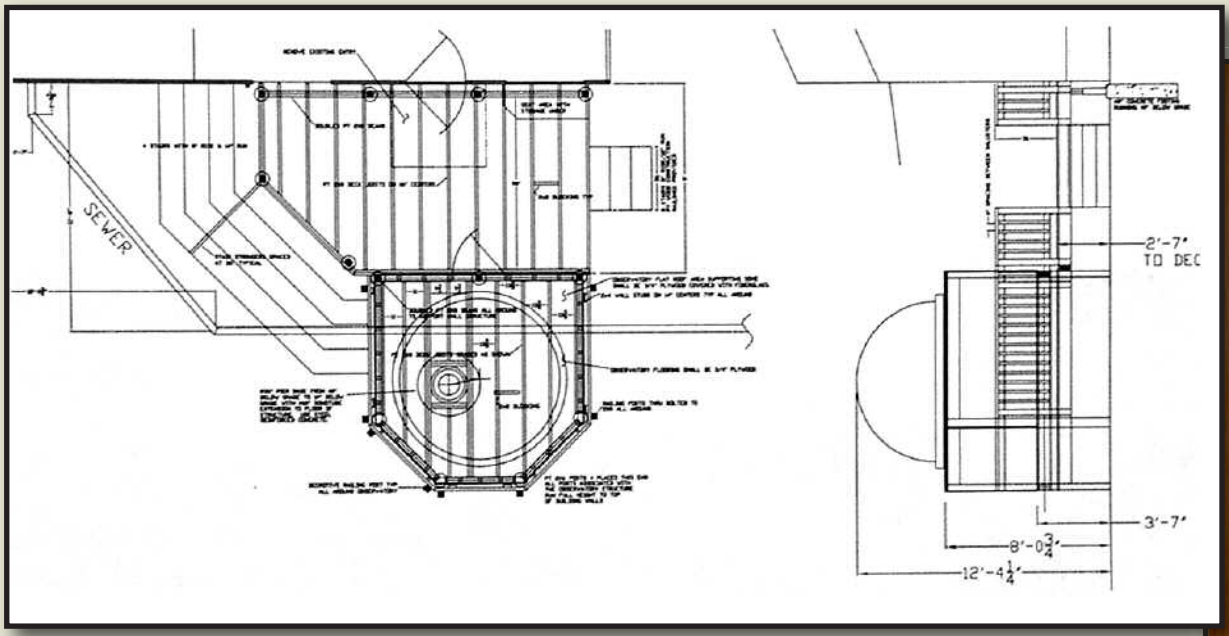
With the help of neighbors, the dome was placed in mid-November 2006, and first light occurred a month later. Since then a lot of 'finish work' has been done – wiring, paneling, flooring and landscaping. Except for a diagonal computer table built into one corner, a comfortable bench now runs completely around the interior.

Does it work? You betcha! The dome is dry, and so strong that you can pound on it with a baseball bat. When the hinged lower shutter section is closed one's eyes can achieve full dark adaptation regardless on neighborhood lighting. I've comfortably seated as many as nine guests the day/night of the neighborhood open house, viewing Venus by daylight and Jupiter in the dark. They simply play musical chairs and shift one space counter-clockwise after each individual views. Setup time from opening the door to observing or imaging is only three minutes. What's not to like?

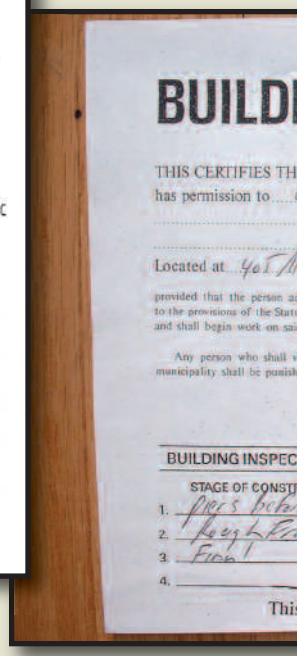
The purposes of the Wishing Star Observatory are: to function as a research and development facility for the test of new astronomical hardware; to serve as an instructional facility to promote a deeper public awareness, and to this end the Observatory is associated with local adult education centers; and to serve the scientific community by providing precision photometric and astrometric data from observations of asteroids and comets.

The facility houses a 14-inch aperture Schmidt Cassagrain telescope. It represents the cumulation of my lifetime of stargazing and wonder. The more one learns, the more one sees, the greater the awe.

The following pages show an almost step-by-step photo tour of the building of the observatory.



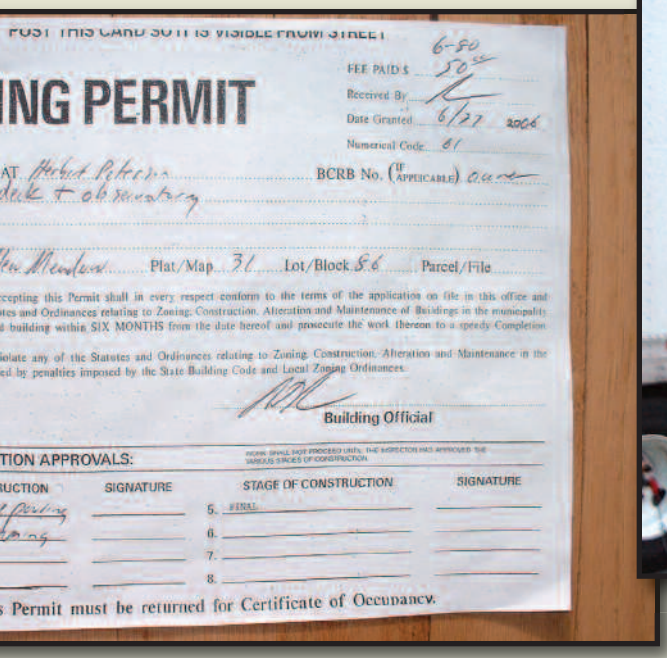
After having repeatedly consulting with some architect friends the design solidified. And here's the result of 6 months of planning.



The hardest part o

Carrie tried it out for size.....

Before demolition of porch begins.



f the project - the permit.

The first truckload of Explora-Domes pulled up, oh happy day!

Rear porch demolished.

I lasted about 1/2 hour before my son took over for the rest of the day.

I'd been cautioned that the foundation layout is critical. So I laid out batter boards galore.

Because of the irregular shape of the deck and observatory 13 footings were required. And Code required that they be dug at least 42 inches deep! The rental post hole auger was a godsend, but after a day of digging the footings I'd been knocked on my can multiple times and felt like I'd been 10 rounds with a gorilla.

The 18-inch culvert pipe goes into the hole. The welded reinforcing bar goes into the culvert pipe. The steel pier will go on top of the concrete base.

Many, many bags of ready-mix later…

I lost count of the number of bags of ready-mix used.

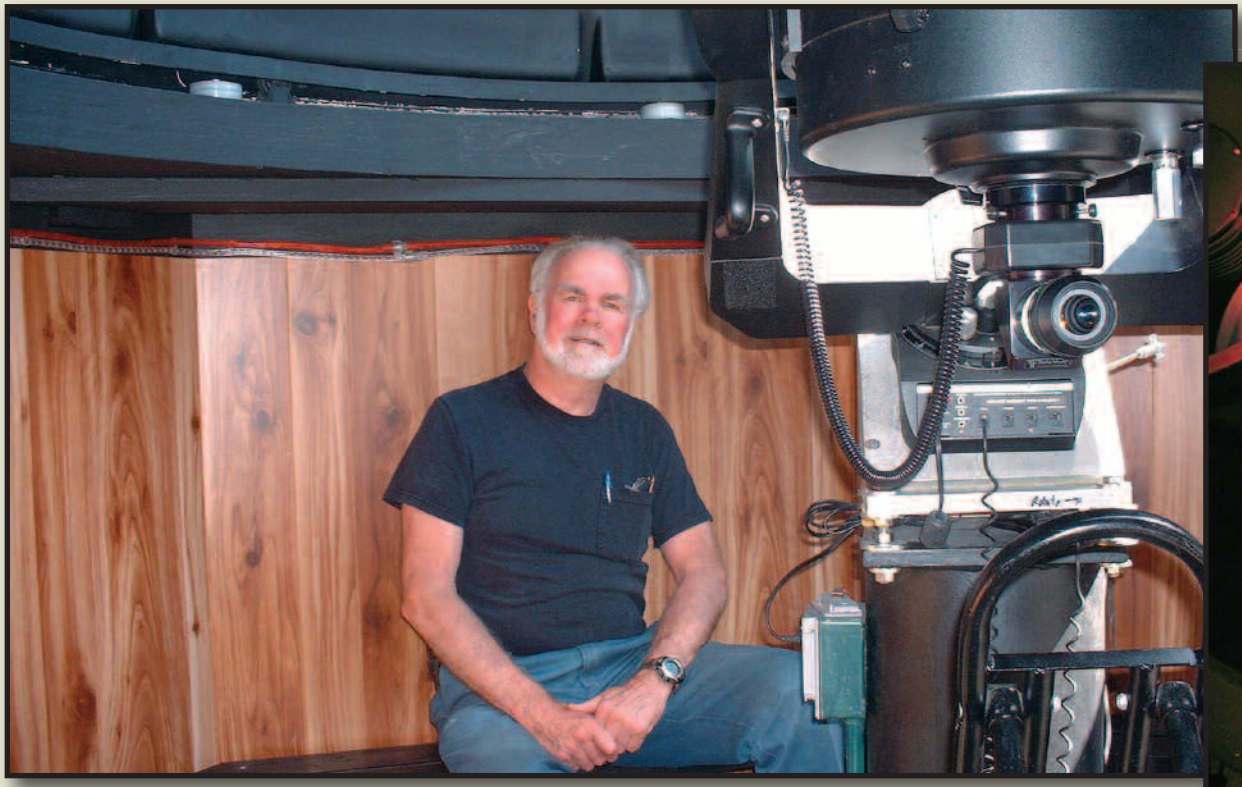
Now it's time to work on the pier foundation. It's 6 feet deep.

Things were slow in the office so I took the afternoon off to do a bit more work. The deck leading out to the observatory already has a half dozen joists in place. The beams around the observatory structure are now in place and ready for floor joists as well.

The decking is down and most of the floor is down. The 400-pound top pier section is installed and aligned, and Dave helped me mount the 14-inch this evening so that I could confirm correct observatory wall height while still being able to view at my lowest horizon. Once the floor is finished the walls are next.

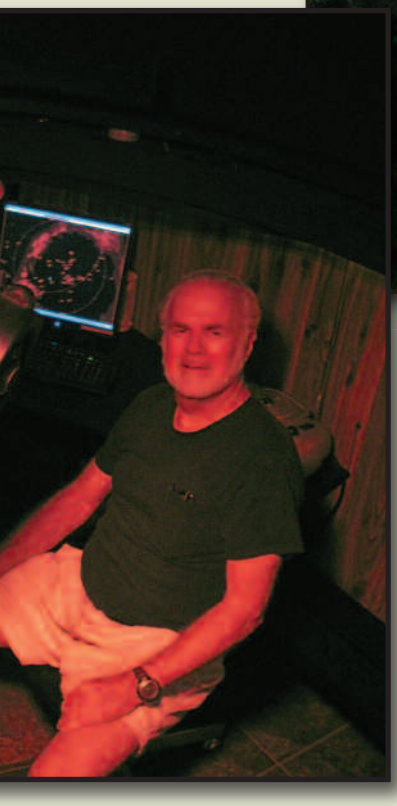
Cutting Dome Ring

Here's the structure with the dome ring fabricated & mounted, the dome rollers installed, and the first coat of rubber roof painted on.



July 1, 2007 - the interior is complete and on the four hundred and twenty seventh day, he rested.

And finally railings are installed on the stairways to provide full compliance with local codes. The observatory was blessed by the Building Inspector on 19 Jan 07.



Interior of the dome bathed in red light.

The observatory plaque.