Hi,

I'm sure everyone who attended my virtual star party on December 21 managed to get something out of the event. I thought a recap would be helpful.

This is a photo of the Saturn-Jupiter conjunction as taken by a 1 meter telescope in Chile. The image was post processed by Damien Peach, a master Astrophotographer. It appears that there are five moons around Jupiter, but the dot to the left of Io (Io is the first dot to the left of Jupiter) is actually a star. There are actually five visible moons around Saturn. All of the moons are named in another image below.
As you know, I had my telescope trained on the event on 12/21, but in my total excitement, I forgot to save any images. I was prepared for the worst, so in advance I took this photo on 12/19. One thing to note here is that the full Earth Moon would fill the field of view top to bottom in this image.
Here’s a screen shot from the planetarium program SkySafari showing no stars. Notice the position of all the moons.
Same screen shot with the names of the moons.
Here’s a screen shot showing a close-up of the conjunction.

What follows are images that I actually did take that night. The images show exactly what was seen by the camera. The anomalies of circles and bars are an artifact of the camera and can be removed by serious attention to post processing.
Uranus and moons. The three small dots next to the central bright “star” (actually, Uranus) are moons of Uranus.

Galaxy M74
And I thought you might like a photo tour of my observatory.

It starts with a view of the observatory from my back porch. The observatory is just a standard 10’ x 12’ metal storage shed converted to allow the roof to roll off on garage door rails. It is quite heavy. The inside of the shed is fully insulated and paneled - except for the roof. The top of the roof has a double coating of reflective white paint. Sad to say, but I don’t think the shed can withstand a 120 mph wind. I’ve had gusts up to 68 mph that haven’t done any damage. The roof was assembled in my garage and then placed on top with the help of a crane (could have done it with four strong, tall men).
Once inside, the 14” Celestron telescope is seen in the parked (Home) position (left image). The pier was made by Advanced Telescopes in Prescott, AZ. The mount is a Losmandy Titan 50 capable of carrying the oversized load that I have put on it. Those four counterweight are 21 lbs each. The telescope needs to be balanced in both the horizontal and vertical axis. As can be seen at the base of wall, I have had some water get into the shed, but nothing other than the discoloration of the panels was affected.

In the right image, you see a white board on the wall. This is for taking images called Flats. The board is partially illuminated either by opening the observatory door or shining an LED light panel on it. A Flat is a grey scale image of even luminosity. The purpose of a Flat is to remove dust mote artifacts that are in every camera. Those dust motes, if left in the image, are quite distracting. Two other types of images called a Dark and a Bias are also combined with the Light image. The Dark image contains hot pixels that are also part of every camera. These show up as red, green, and blue dots in the Light image if not removed. The Bias image contains the noise signal produced by every camera. The Flats, Darks, and Bias images together are called calibration images.
In the left image below is the control station. This image show a MacBook Pro laptop with a 27” monitor. The laptop was temporary and is now replaced with a Mac Mini. The Mac is bundled with an app called Parallels Desktop for Mac that allows me to install a Windows operating system as a guest OS and run Windows apps at the same time as Mac apps. All but one app needed for my Astrophotography is Windows based. The white module on the right side is a Netgear Orbi Mesh Network satellite. It provides both Wi-Fi and Ethernet in the observatory and it gets it signal via a third Wi-Fi channel (at a frequency below the standard 5 GHz and 2.5 GHz signals) from the main router in the house. This provides the full signal strength of both Wi-Fi and Ethernet in the observatory even when the roof is closed. And once I set up the observatory, I go into the house and do all my work from there.

In the right image, you can see the strap (orange thing in the center) that locks the roof down (although, the garage door rails might suffice). Barely noticeable is a screwdriver (pointed out by the arrow in the center) that is placed in a hole that locks the roof from moving back and forth. The left arrow is pointing to a rag that is placed in every corner to block the one place that can’t be covered up any other way and keep the wind and rain out. On the left side is a string of red LED lights for when I’m working inside the observatory at night. These lights can be set to any of 16 different colors and at 16 different intensities.
The left image shows the roof open and locked down with the strap.

The right image shows the attached equipment on the main Optical Tube Assembly (OTA). There are three cameras, two telescopes, and a Telrad Finder. By the numbers, (1) is a high resolution astronomical camera, QHY128C. (2) is a modified and cooled Canon 6D. The modification removes the IR filter resulting in very red images. It is attached to (5) a Stellavue SVQ100 APO refracting telescope. The APO nomenclature means that the red, green, and blue colors converge at the focal point, which is not typical of less complex and less expensive refractors. Refracting means all glass, no mirrors. (3) is a Meade DSI-II Color CCD used only for guiding. It is attached to (6) an Orion 50mm guide scope. (4) is a Telrad Finder. This is used to manually assist in centering the telescope on an object as a last resort. (7) is a 0.7x focal reducer for providing a slightly wider field of view than without. (8) is an electric focus motor than is controlled by software. (9) is the 14” Celestron EdgeHD optical tube assembly, or in layman’s terms, a telescope. And specifically, a Schmidt Cassegrain reflecting telescope. It is refrequenztly referred to as an SCT. The EdgeHD nomenclature means that stars are round from edge to edge, which is not typical of most reflecting telescopes. Reflecting means all mirrors, no glass - except for the correcting lens at the front of this telescope. With this telescope, as is fairly common with most new Celestron SCTs, there is an add-on feature that enables the secondary mirror (up front) to be replaced with a HyperStar lens. The camera is then attached to that lens instead of at the back. The result is that the SCT is converted from a narrow field telescope to a wide field telescope, nearly equivalent to the view of the SVQ100.
The left image shows the telescope in what is called the counterweight down (CWD) position. This is the position that the scope must be in before powering it on. Obviously, I have to power it on first to get it there, then power cycle the mount to be ready for astrophotography.

The right image shows the telescope actually looking at Jupiter - during the day. Yep, Jupiter, Saturn, and Venus are all bright enough to view during the day. but they just look like very bright and very large stars.

The left image below is a close-up of the focus motor. This moves the primary mirror in and out to obtain a sharp focus. Another way to focus would be to attach a focuser inline with the camera, which is actually a much better arrangement because it allows the mirror to be locked down and thus prevent it from moving as the telescope moves from side to side. That kind of focuser is primarily used on refracting and Newtonian style telescopes.

The right image is a close-up view of the Telrad Finder. When turned on, you see those three concentric circles displayed on the glass. When the target object is placed in the center circle, the main telescope will be centered on the target.
The left image below shows a close-up of the Canon 6D with the cooling fans mounted below. The camera is actually cooled by a Peltier device attached directly to the imaging chip. It is possible to use this camera for landscape and portrait photography - just detach the cooling fans and attach any standard EOS lens. Three features would be missing though. One is that the “through the lens” feature has been removed. The other is that image stabilizing lenses won’t work, and neither would auto focus.

The right image shows how I put the control center to bed.

The image below shows how I put the telescope to bed.

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