The Observer

The Official Publication of the Lehigh Valley Amateur Astronomical Society
https://lvaas.org/
https://www.facebook.com/lvaas.astro
May, 2020
Volume 60 Issue 05

ad astra **********

As I'm writing this, I just came in from doing some observing. It's Saturday, April 18, and the sky is clear and still, and dominated by Venus slowly setting in the West. I am sure there are some LVAASers out there still, taking advantage of it. As usual, I think I have something better to do, such as getting started on this column.

My target tonight was a to see a few of the Starlink satellites that were launched by SpaceX back in March. These are a big concern for us, because the company is planning to launch thousands of them, and some fear that during the hours just after sunset and before sunrise, it will be impossible to look anywhere without seeing them. If this is something you're concerned about, my advice is to check heavens-above to find out when some of them will be visible from your location, and if it's clear get out there and look for them.

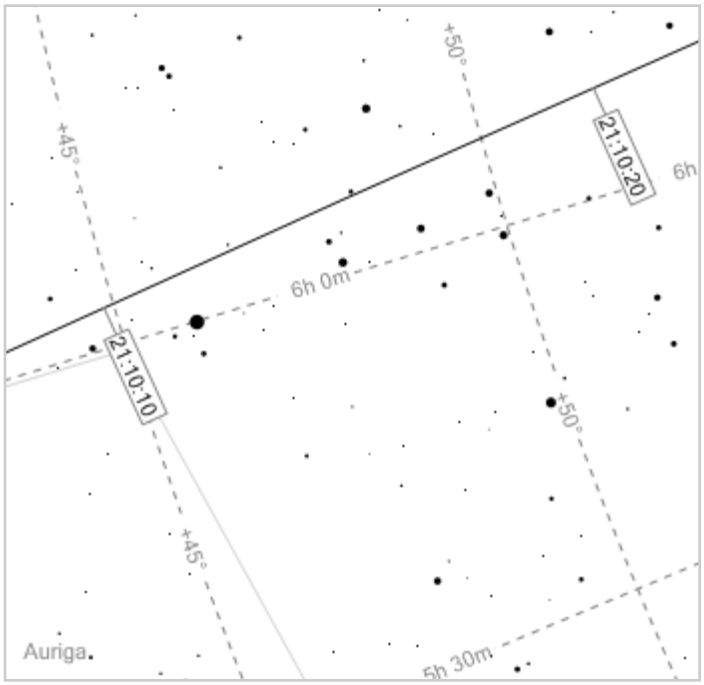
I've found it's not that easy, though to be honest I haven't been giving it a fair shake. The sky from my back deck is not that great; my neighbors have their outside lights on, and car headlights from five miles away, halfway to Walnutport, keep shining in my eyes. I was finally able to pick out Cassiopeia, about 10 degrees above the northern horizon, a few minutes after the satellites I was looking for had already passed through it. I just wasn't giving myself enough time, instead proving myself an embarassment as an observer.

Earlier I had managed to catch one of the beasties as it passed within a fraction of a degree β Aurigae, or Menkalinan, at just about the exact time (to the second) as reported by the website. I was using 10x50 binoculars. Some combination of my eyes, my skies, and my skills are keeping me from seeing them naked-eye.

So basically, here is my advice if you want to see a Starlink satellite, or even a train of them, for yourself.

1. Give yourself plenty of time. Prepare in advance. Know your observing location and what's visible. Check the website when clear skies are expected, after signing up and entering your more-or-less exact location, to within a few miles. The satellites are only a few hundred miles away, so you won't get an accurate prediction if it doesn't know where you are.

2. Pick a specific target object and plan where you will look for it. Check the star chart for it, and look for when it will pass near something you can find in the sky. Click on that location in the star chart and study the detailed map. (For my one success tonight, I knew the bird would fly just under 1 degree from that fairly bright star next to Capella, at 10 minutes and 12 seconds after 9 p.m., as shown in the chart at right.)



3. Use an accurate clock with a seconds display (I have an app on my smartphone) to know exactly when to look, and then give yourself enough time to get settled and oriented so that you're looking in the right place at the right time, with the binoculars pointed in the right direction. Good luck!

LVAAS goes on-line

Whatever you want to call it — social distancing, quarantine, hiding from the bugs or just doing our part to help fight the scourge — the radically modified lifestyle that we are all currently experiencing includes some radically modified LVAAS events. So far, we have had one Board of Governors meeting and one General Meeting using the Zoom on-line teleconference system. We recorded the General Meeting, which included a great presentation by Peter Detterline, and it's up on Youtube for your viewing enjoyment (https://www.youtube.com/watch?v=WNvhdbqdbIs.) It looks like we will be doing a fair amount more of that before we get back to anything like normal.

I'm really glad that the Internet hasn't crumbled under the weight of almost everybody being stuck at home, either trying to work or just trying to avoid going crazy, doing something or other on it. I have spent a lot more time on Zoom than I ever thought possible, since I decided early on to splurge on a paid account so I would not have to worry about the time limits. I ended up hosting 3 events every week for my various groups of friends, and I'm signing in to two more that someone else is hosting. I'm spending more time just virtually hanging out with people than I did when it was possible to hang out in reality.

Zoom works really well, so well that I have had no motivation to go explore the alternatives. For now it seems to have won the popularity contest of this crisis, and it has received its share of bad press. I do take that stuff seriously, and I have read the reports and thought about the implications of what was reported. Yeah, some people have had some bad experiences using Zoom, but I think they have done a decent job of fixing the problems and I don't think we are at any serious risk from using it.

More irony?

I realized something funny just now, after writing about my observing experience and then about the ramifications of the coronavirus situation. Observing, for me, is a social experience. I know it's different for some people. But, while I don't at all mind spending hours by myself working on the computer, and while I am willing to set up outside and plan some observing if there is something specific I want to accomplish, the only time I really enjoy hanging out under the night sky and just messing around with a telescope is when I am doing it with some of my friends. Maybe this ought to be obvious, but I really never thought about it before. But hey, that's one of the things that makes LVAAS great.

And with everybody leaving their cars parked at home, the skies are probably clearer on average than they have been for decades. Oh, well. Whatever silver linings we find, we're all eager for the metaphorical cloud of this pandemic to blow over. And it will, and the more fully we accept its limitations and keep our cool, the sooner it will be over. Hang in there. Ad Astra!

— Rich Hogg

***Cover image credit*: Lynn Krizan. Sh2-171 plus NGC 7822.**

Hubble palette image with Ha = Green, OIII = Blue and SII = Red. Taken 11-18-16. Scope = Takahashi FSQ106ED at F5. Camera = Starlight Xpress Trius 694. (Wikipedia)

Minutes from the LVAAS General Meeting – April 5, 2020

The April 2020 LVAAS General Meeting was conducted electronically using an online service in an effort to adhere to the social distancing guidelines outlined by the Governor of Pennsylvania with regard to the COVID-19 pandemic. Approximately 40 people were in attendance.

Director Rich Hogg opened the meeting at 7:07 p.m. It was noted that this is the first online General Meeting following a successful Board of Governors meeting the prior week using the same format. The General Meeting was recorded and uploaded to YouTube for viewing.

Rich next introduced the guest speaker, Pete Detterline. Pete teaches part-time as an Astronomy Professor at local colleges and universities and was Planetarium Director at Boyertown Area School District. He is an active LVAAS member. Pete has a Bachelor's Degree from Kutztown University and a Master's Degree from West Chester University.

Pete has worked with the Mars Society where he designed and helped to construct the Musk Observatory for the Mars Society. He is also a member of the Astronomy in Chile Educator Ambassador Program. As an amateur astronomer he has traveled the globe observing. His talk this evening, Astronomy Down Under, discussed southern hemisphere observations: Africa in 2001, Chile in 2015, and Australia and New Zealand in 2019.

After Pete’s talk concluded, the meeting moved to LVAAS business.

Education: Blaine Easterwood

Blaine is continuing his work on the LVAAS Book Club. About half a dozen people have expressed interest. If you are interested, please contact Blaine.

Membership: Gwyn Fowler

2nd Readings:

Varsha Borkar

Daniel Floryshak

1st Readings:

There were no first readings.

Treasurers Report: Scott Fowler

2020

Income $9,046.82

Expenses $(4,227.01)

Net $4,819.81

General Fund Balance $43,831.09

General Comments:

LVAAS Pulpit Rock and South Mountain sites are closed except for essential maintenance activities by authorized personnel.

All LVAAS face-to-face gatherings/events have been canceled until further notice in an effort to adhere to the social distancing guidelines outlined by the Governor of Pennsylvania with regard to the COVID-19 pandemic.

The Board of Governors and General Meetings will continue to be conducted electronically using an on-line service.

UACNJ had an on-line Star Party. LVAAS is also considering the possibility of having on-line Star Parties.

NEAF talks are available on-line through YouTube. Look for NEAF virtual experience.
Fall NEAF is scheduled for September.

Next General Meeting:

The May 2020 General Meeting will be conducted electronically.

The meeting was adjourned at approximately 8:17 PM.

Submitted by Dennis Decker, Secretary

~~~~~~

UACNJ Reminder

LVAAS is a member organization of the **United Astronomy Clubs of New Jersey**, (uacnj.org) which means that LVAAS members may acquire observing privileges at the UACNJ observatories at **Jenny Jump State Park**, near Hope, NJ. There is a fee of $50.00 per year, plus a commitment to assist at UACNJ Public Nights. Normally, this commitment is for five Public Nights during the year, but it has been reduced to four this year, due to the shortened observing season. The 2020 Observer Form can be found on their website: http://www.uacnj.org/observers/2020ObserverForm.pdf. LVAAS liaison is Earl Pursell.

Also check out the **Meteor Shower Calendar** courtesy of Ken Taylor of UACNJ and thrillist: https://www.thrillist.com/news/nation/meteor-shower-calendar
~~~~~~

May 2020 LVAAS Meeting Announcement

This month's LVAAS General Meeting on Sunday, May 3 at 7 p.m. will be held on-line, using the Zoom teleconferencing system. The program will feature a group viewing of "**NASA’s Incredible Discovery Machine: The Story of the Hubble Space Telescope**," in recognition of the 30th Anniversary of the instrument's launch. The video will be followed by group discussion and then a brief LVAAS informational meeting.
LVAAS members will receive an email with instructions for joining the meeting. A link to the recording will be posted afterwards for anyone who missed the meeting and the general public.

The link to April's general meeting is https://www.youtube.com/watch?v=WNvhdbqdbIs

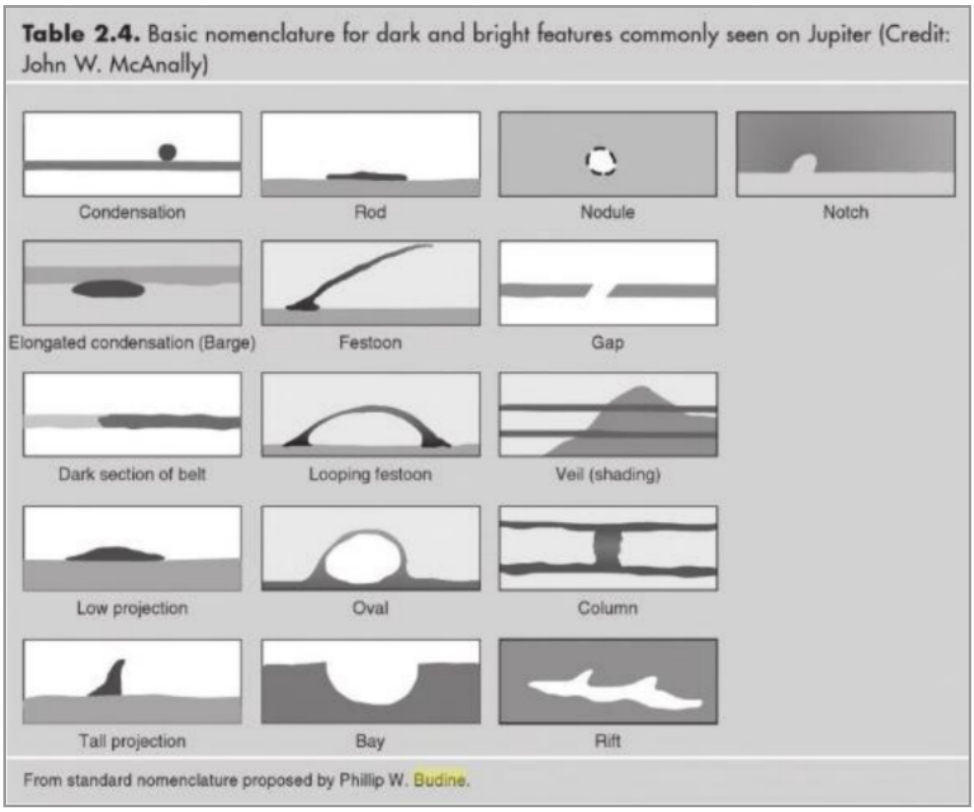
From the LVAAS Archives:

Drawing Jupiter

by Sandy Mesics

The April 1970 LVAAS general meeting featured a lecture on the planet Jupiter by Philip Budine of the Franklin Institute. According to The Observer, “Mr. Budine detailed the surface features [sic] of the planet and included many interesting comments based upon both his own observations and those of others.”

At the time Budine had been observing and drawing Jupiter for 18 years. He was a member of the Association of Lunar and Planetary Observers (ALPO), and Jupiter Section Coordinator and Recorder for that organization. Budine was mentioned in a 2007 book, Jupiter and how to Observe It. He was credited for developing a system of terms and nomenclature for dark and bright features on the planet, and he also developed the “three-minute rule” which posits that the human eye may perceive an object to beat the central meridian for up to 3 minutes.



1. Jovian feature nomenclature from "Jupiter and How to Observe It."

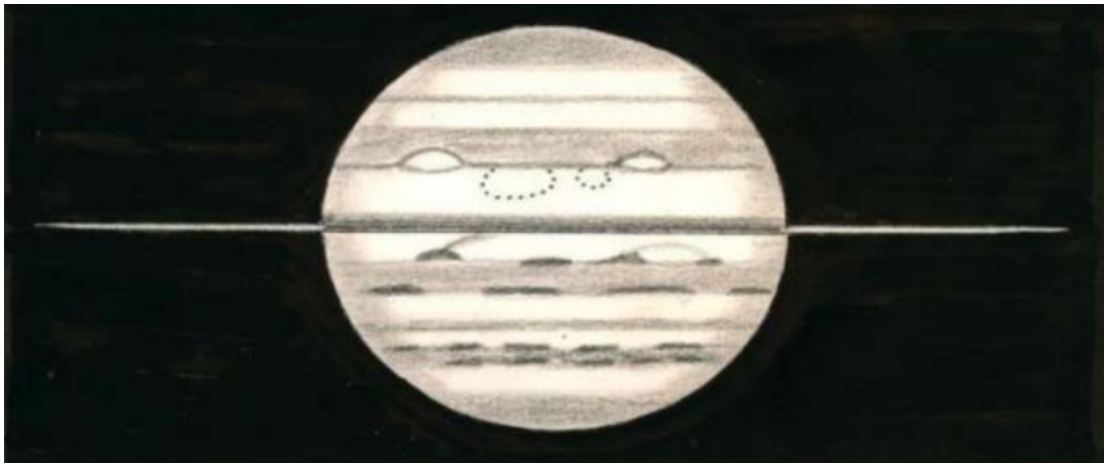
In a 2002 interview in The Strolling Astronomer, Budine recounted his observing history with some very good telescopes. “Back in 1948, I first started observing Jupiter with a 1.6-inch Unitron refractor and a 2.4 inch Bushnell refractor. By the 1951-52 and 1952-53 apparitions, I had employed a 3.5-inch SkyScope reflector, a 3-inch Unitron refractor and a 4-inch Unitron refractor. During the 1960's, I was observing with a 10-inch Cave reflector, the 4-inch Unitron and a 3.5-inch Questar. By the 1990's, I was observing with a 6-inch Meade APO refractor. Now in the 2000 era, I have primarily used a 4-inch Celestron refractor, a 5-inch Meade APO refractor and a 5-inch Maksutov-Cassegrain catadioptric reflector. All together, I have owned and employed 20 telescopes over the period 1948-2002.”

2. The author with his 1952 vintage 4 inch Unitron refractor in his tip-off roof observatory. The Strolling Astronomer, Vol 44 no. 4, Autumn 2002.

One of Budine's favorite Jovian objects to observe was the Great Red Spot: "Over the past 50 years, it has been a 'joy' to observe Jupiter's Great Red Spot and its behavior and different aspects. If you were to ask me what period was the most interesting and exciting for observing the Red Spot, I would have to answer the 1960's and early 70's. During those years, the Red Spot was very dark and yet later went through changes as it had interactions with other phenomena in the 70's. In any case, each observer should keep 'looking up' at Jupiter's Red Spot, because one thing is for sure, the Great Red Spot will 'change' again!!"

Budine returned to the area in 1981, attending AstroCon '81 at Kutztown University. AstroCon was a combined effort of LVAAS and the Astronomical League. Budine presented a paper on "Jupiter's South Tropical Zone Disturbance." At an ALPO meeting during this convention, Budine proposed that ALPO set up a Solar section, which was accepted by the membership.

Budine was also a skilled Saturn observer. His work was featured in the book, Saturn and How to Observe It. Some of his sketches were also featured in the book, Binocular Stargazing, 2005, by Mike Reynolds.



3. Budine sketch from "Observing Saturn." Drawing contributed to the ALPO Saturn Section by Philip Budline of Binghamton, NY using a 25.4cm (10 in) Newtonian at 350x in excellent viewing conditions on 10/21/1966 at 02:50 UT. Saturn's rings appear edgewise to our line of sight, where equal portions of Saturn's two hemispheres are visible. Credit: Philip Budline; ALPO Saturn Section.

References:

The Strolling Astronomer, Vol. 29, No. 3-4, Dec. 1981, p. 60-61

The Strolling Astronomer, Vol. 44, No. 4, Autumn 2002.

Saturn and how to Observe It, John W. McAnally, Springer Science & Business Media, Apr 3, 2007

Jupiter and how to Observe It, John W. McAnally, Springer London, Nov 30, 2007

Exciting, New, Live-Action Game!!!

RED SHIFT REVENUE

- **Operate an Astronomy Club Gift Shop!**
- **Optimize product lines!**
- **Purchase inventory!**
- **Manage production!**
- **Complete sales!**
- **Report revenue and expenses to the Board!**
- **Help a great organization do a valuable public service!**

As our LVAAS Member Services Director, you will enjoy the challenge of operating the Red Shift Gift/Snack Shop at LVAAS Public Star Parties.

The only way to lose is to not play!

Contact *director@lvaas.org* to sign up!

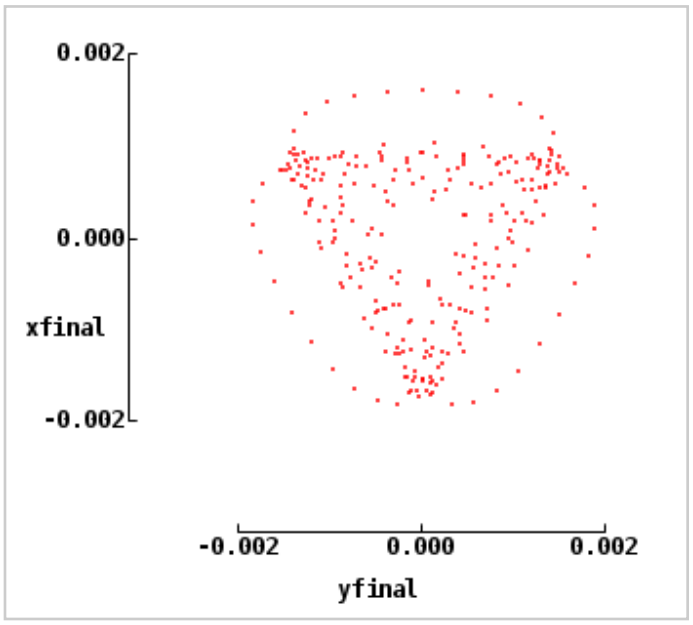
Schlegel Observatory Report

by Rich Hogg – May 2020

I imagine that loyal readers are eagerly awaiting the resolution of last month's cliffhanger. After all that effort I put into doing an optical simulation based on the output from the mechanical analysis, did I eventually get it to work? Or was it all for nothing?

Well, you can breathe again. The problem with BEAM 4 was exactly what I thought it was, and fixing it took less than an hour. If I had been more confident I would have pressed forward so that I could report on it in April. I chickened out and decided to punt, and that turned out to be a good thing, because although I got some good results, I did not at first understand them.

My first run was a worst-case experiment, with the telescope pointed straight up and no air in the air bag, so that the mirror was supported only by the three hard pads. I was looking at "spot diagrams" from tracing individual light rays through the distorted optical system, and I expected to see stars that were triangle-shaped as a result of the trefoil distortion of the mirror. And I did, as shown at right.



But there is a surprising detail, and that is the size of the triangle, based on the scales shown (which are in inches.) Don't mind the outer smooth arcs of single dots, which represent a small amount of light energy. Most of the light is falling within a distinctly triangular shape. with a dimension of about 0.003 inches on the image plane.

For our telescope, with its 551-inch effective focal length, 0.003 inches corresponds to just over 1 arc-second on the sky. To say the least, I was expecting worse. The theoretical resolution limit of this instrument (the Airy limit) works out to about 5 times smaller, but let's be honest, this is not a 1-meter mirror precision-figured by the University of Arizona that will be orbiting weightlessly above the atmosphere. If we get close to 1-arc-second stars under our Pennsylvania skies, I'll be deliriously happy.

I spent a couple of days thinking about this. I reviewed all of my programming and tried a couple of debugging experiments. One simple experiment was to inspect the mechanical results visually, finding the steepest slope in the topography of the deformation, and then estimating the slope error, by manually taking the deformation at two points 100mm apart, and subtracting. The answer is 0.17μm, less than two parts per million. Double that once to get the Snell's Law deviation of a light ray from its ideal path, and double it again to get the total width of the distorted star. The answer is 1.4 arc-second.

The problem with this is, the mechanical deformation of the reflective surface seems huge, in terms we are used to talking about: wavelengths of light. The peak-to-peak deformation is 629 nm, almost two wavelengths of blue light! But, we are talking about a smooth deformation spread over a large surface, and simple geometry dictates that the wider you spread out a hill of a given height, the smaller the slope. Ultimately, after a bunch of reading about optical performance criteria and metrics, I decided that the ray-traced spot size was not the best measurement for evaluating our mirror support schemes and their effect on optical performance.

BEAM4 can also report "wave front error," or WFE, summarized using the well-known "root-mean-square" or RMS formula. A figure that is quoted frequently for "well-corrected optics" is a maximum RMS WFE of 0.07 wavelength, which for light at the blue end of the visible spectrum would be 26.6nm. The RMS WFE from the no-airbag simulation I've been beating to death in this article is about 282nm. Another optical simulation, using an ideal Classical Cassegrain model of our optics with no deformation, gives 31nm. (This is for a pattern of nine stars spread across the field, in a distribution that I frankly have not given a lot of thought to. If we used only one star, the ideal system's WFE should be zero. You can get different results with different assumptions, and you can't achieve perfection with any realistic goal.)

Turning gravity back on, and putting roughly the right amount of pressure in the axial airbag (still pointed straight up, towards the zenith) gives a result of 31.5nm. With this, I concluded two things: one, that I am still very happy with the axial airbag support designed by the folks who worked on this telescope before I got involved, and two, that this WFE criterion is a reasonable metric for evaluating the radial support options.

The next page lists a bunch of options that I simulated, with the predicted RMS WFE listed for each.

By the way, these simulations accounted for the deformation on all three axes. The axial, or longitudinal deformation directly impacts the optical path, as noted, whereas sideways deformations need to be multiplied by the (undeformed) slope of the optical surface. The deformations are small enough that this "perturbative" or linearized method of combining them is accurate enough.

No gravitational load on optics (zero deformation) - RMS WFE **31nm -** benchmark for best achievable

ALT 90° (axial support only), no air bag - RMS WFE **282nm** - worst case, unacceptable based on WFE

ALT 90° (axial support only), main air bag pressure 0.46PSI - RMS WFE **31.5nm**

Hub support option:

ALT 30°, axial air bag 0.23PSI, hub support system with preloaded springs for thermal expansion - this is the hub support design presented in the March Observer - RMS WFE **32.5nm**

Rim support options:

ALT 30°, axial air bag 0.23PSI, rim supported by just 1 hard pad at bottom (no radial airbags) - RMS WFE **54nm**

ALT 30°, axial air bag 0.23PSI, rim support with two hard pads at bottom (radial whiffle tree) - RMS WFE **51nm**

ALT 30°, axial air bag 0.23PSI, rim support with airbags, pressure adjusted for lowest deformation - RMS WFE **37nm**

ALT 30°, axial air bag 0.23PSI, rim supported by just 1 hard pad at bottom (no radial airbags), with radial offset added to primary to account for thermal expansion of mirror cell - RMS WFE **76nm**

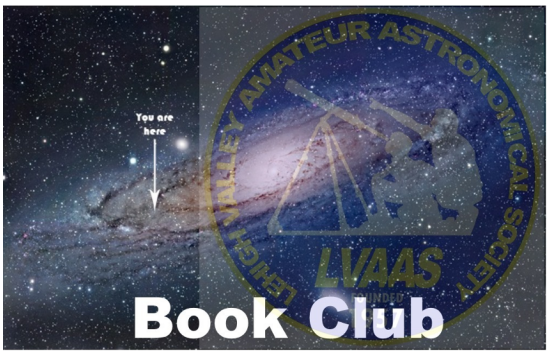
Conclusions:

- It's a lot more important to have good support in the axial direction than in the radial, as I've previously surmised. In the axial direction, the mirror lies flat, and bends "like a floorboard." In addition, this bending directly impacts the optical path length. In the radial direction, the mirror bends "like a floor joist," or a lot less; and this bending is mostly perpendicular to the optical path.
- The hub support idea I presented previously seems to perform very well in these simulations. Again, I guessed this would be the case from evaluating just the mechanical simulation result, but until now I had no way to quantify the optical impact.
- The dumbest, easiest thing we could build - just a bunch of rigidly mounted hard pads around the edge, carefully adjusted so that the mirror is always resting on one or two of them near the bottom, and even allowing for some movement due to the extra clearance when the mirror cell is warm, will only add 45nm to the RMS WFE, for a total of 76nm, according to this exercise.

That last point is key. We're doing our best in this project to anticipate the problems and solve them in advance, but we're probably going to run into some problems we don't expect. And, we're not forever locked into whatever we decide now. But based on these results, I'm thinking we should opt for the easy, inexpensive solution, and see how well it performs in reality. If the only stars that are sharply focused are the ones straight overhead, then we can re-evaluate and invest in an improvement.

from the field: Mike Waddell

"Linda and I just got back from a long overdue road trip (March, 2020) that took us to Williamsburg, Clarkesville GA, Tampa (saw the Yankees at Steinbrenner Statium!), Ocala, St. Augustine and a nice ride home on the AutoTrain. One of the draws to this adventure was the promise of dark skies in Clarkesville and then some bonus dark skies in Tampa and St. Augustine giving me the opportunity to do some nightscape imaging and create some unique shots like the ones with the palm trees!"



Looking for something to read? Looking to share the experience with fellow LVAAS members? Join our book club!

Here's the Plan:

Step One: Express your interest. If you are interested, let me know either in person, or via email: blaine@ieee.org. I will add you to our private Facebook group. If you don't have Facebook, let me know, we can setup an email list and communicate that way too.

Step Two: Choose a book. We will do this via our private Facebook group and email (if there are any who do not use Facebook.) So far the following are in the running:

1. The Big Picture, by Sean Carroll
2. Astrophysics for People in a Hurry, by Neil deGrasse Tyson
3. Moonshot: What Landing a Man on the Moon Teaches Us About Collaboration, Creativity, and the Mind-set for Success, by Richard Wiseman
4. The Trouble with Gravity: Solving the Mystery Beneath Our Feet

Step Three: Set the meeting schedule. Our plan is to meet in the library, but we can augment that with online conversations.

Step Four: Read, enjoy, discuss, and learn! We can do this both in-person and through online discussions.

This is the first time we are doing this, so I consider it "experimental." I am completely open to suggestions and changes as we go.

Thank you!

Blaine Easterwood, Education Director

StarWatch

by Gary A. Becker

Ad Astra: Look to the Stars

In this time that challenges the national spirit, we need to remain strong. Our lives have changed as we are struggling to keep up with an uncertain landscape. For us today as we move towards the future, we look for ways to do honor to an Almighty Spirit, as well as to Nature as a place of wonder, support, and regeneration.

Early humans were mesmerized by the luminescence of the night sky, the moon, the independence of the planets, and the tiny twinkling of a thousand points of light. That wonder which led us to understanding seems to be built into our DNA, even as we continue to quantify more and more of the universe around us. Still, marvel at the mysterious—dark matter and dark energy, composing 95 percent of the universe's existence—secrets that must still be understood.

If you wish to immerse yourself in the awe and wonder of the night sky, you might also realize that at the edge of our understanding is the panorama of trillions of unexplored worlds waiting for humanity's discovery. Looking upwards imbues us with the serenity of the timeless stars; seeing the gossamer path of the Milky Way arching across the summer sky. We realize that we are citizens of the cosmos. For astronomy there always has been a contemplative aspect to gazing upward, a certain astonishment regarding the glory that anyone with sight can view on a moonless, clear night. Astronomy truly is the beautiful science.

Times of great crisis beckon us to reach within ourselves for comfort and solace as we gaze upward towards the heavens. It strips away the false sense of having "unwavering control over our destiny." It reduces us to living more in the moment, day by day, not insensitive to the conflicts raging around us, but more focused on the "now," not the "what ifs" of the future.

Irrational fears of the future ruin the present. We only have today, this moment—except when looking at the stars whose light we see tonight as having journeyed across the vast distances of time and space. You are witnessing their past, so far back in the case of galaxies,

that their existance in the present may be uncertain and their futures still in the realm of the unexplained. Looking at the Deep and Ultra-Deep fields that the Hubble Space Telescope imaged many years ago have always been inspirational and regenerative. At first, you might think the fuzzy patches of starlight were the actual stars. Surprisingly, they were all galaxies, a photo of nothing *but* galaxies, composed of trillions of stars, and quite possibly quadrillions of planets, some that could possibly support sentient life. How wonderfully mind-blowing; how ecstatic a thought!

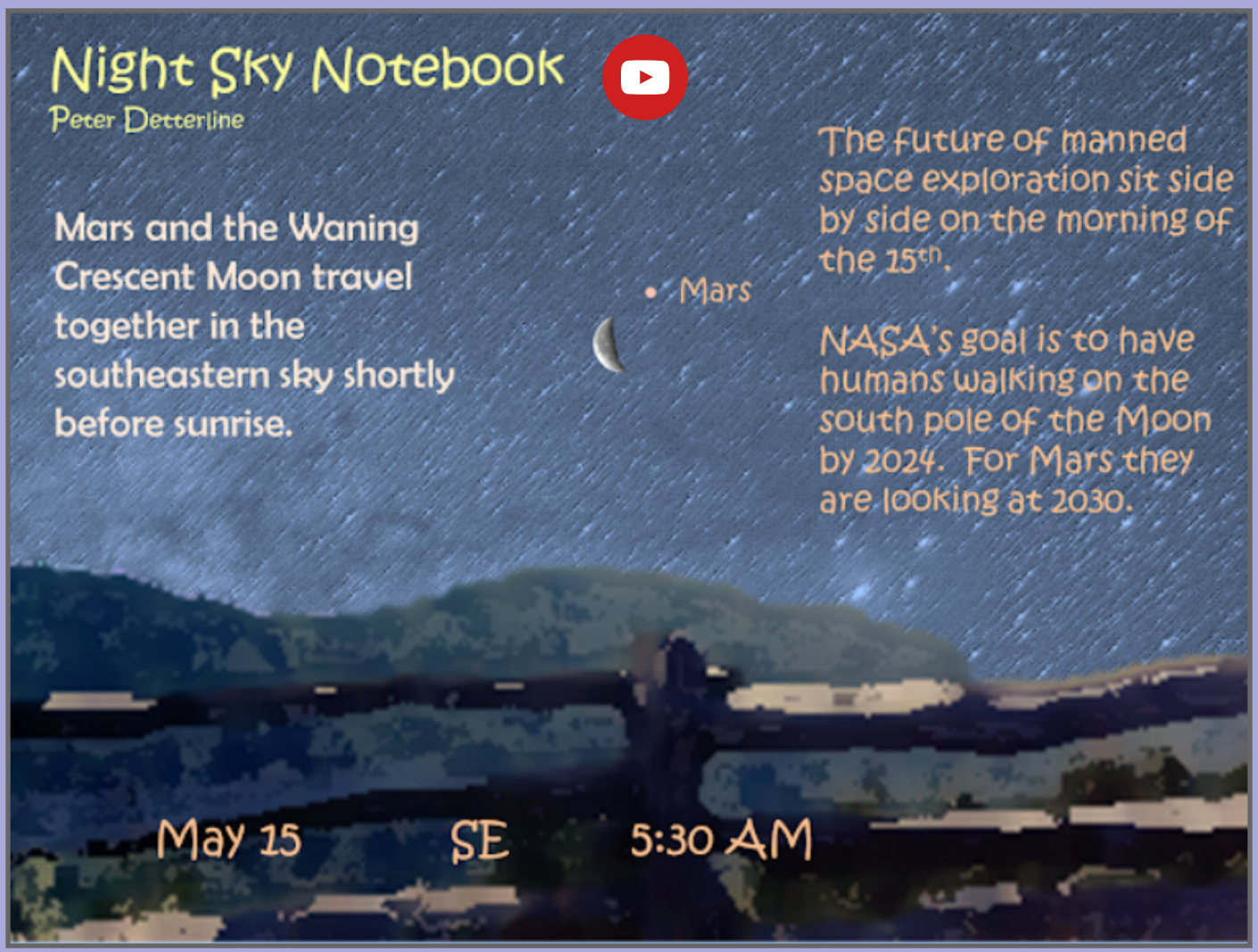
Every society has a point where it can succeed brilliantly or not. Belief in the goodness in us, of our accomplishments, in our feats of triumph should make us want to aspire to continued greatness. How tragic it would be if humanity sidestepped its responsibilities after four billion years of evolution. As much as examples from astronomy were used, such illustrations can come from any of the sciences or the humanities. On Earth, the wedding of our collective accomplishments with the spiritual aspect of our being is a trait that perhaps only the human species possesses. Each day, new mysteries confront us, amaze and delight us, and challenge us to new heights of achievement. Find wonder, comfort, and regeneration in your own sphere of influence. We're all in this together, and collectively with focus, determination, and perseverance we will succeed!

beckerg@moravian.edu or garyabecker@gmail.com
astronomy.org facebook.com/StarWatchAstro/

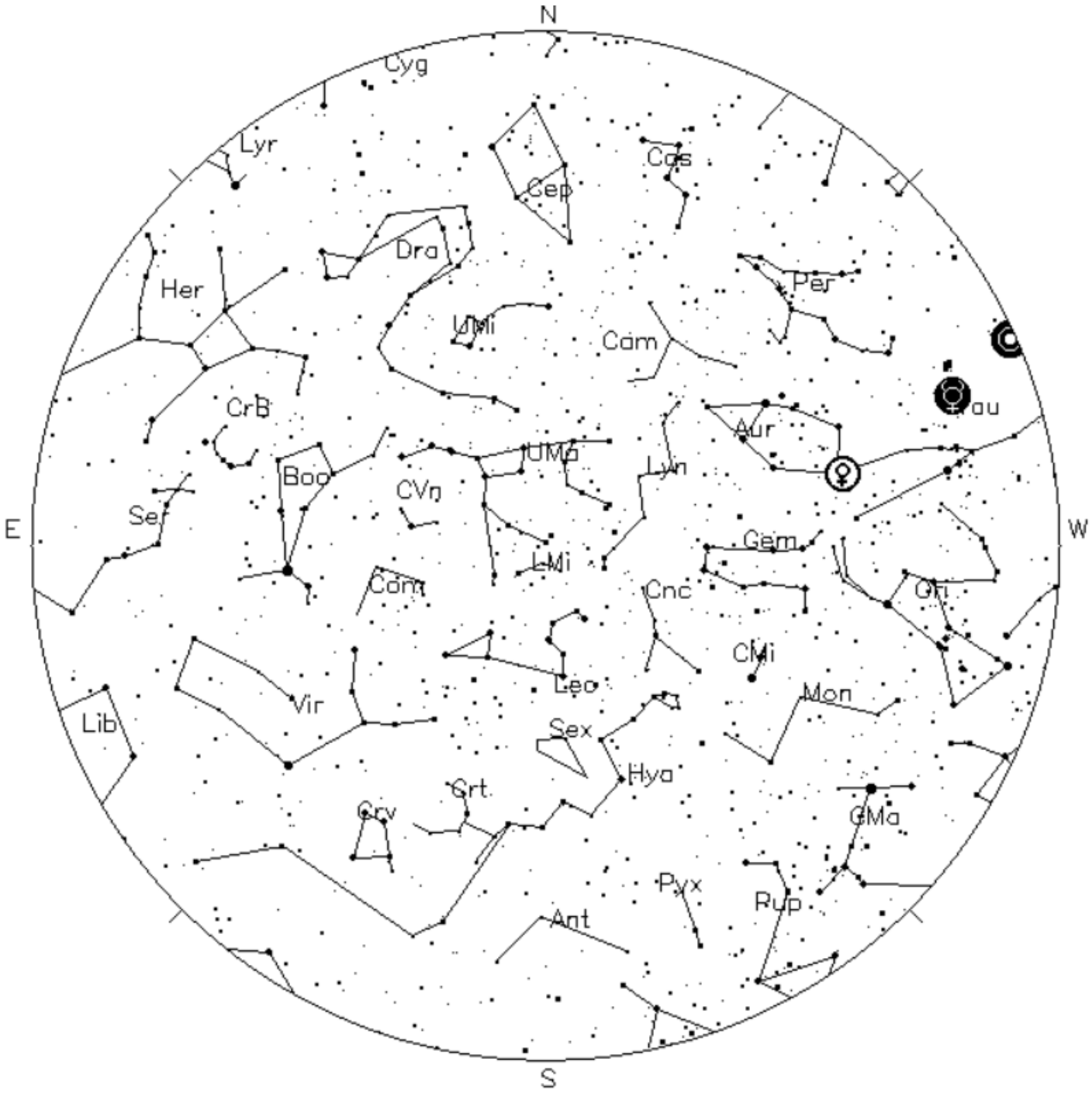
Night Sky Notebook for May

by

Peter Detterline



Sky above 40°33'58"N 75°26'5"W Wednesday May 13 2020 00:00 UTC



Your Sky was implemented by John Walker in January and February of 1998. The calculation and display software was adapted from Home Planet for Windows.

The GIF output file generation is based upon the ppmtogif module of Jef Poskanzer's pbmplus toolkit, of which many other components were used in creating the images you see here.

ppmtogif.c - read a portable pixmap and produce a GIF file

Based on GIFENCOD by David Rowley

Lempel-Zim compression based on "compress"

Modified by Marcel Wijkstra

Customize Your Sky -> *at* : **http://www.fourmilab.ch/yoursky/**

MAY 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					01	Star Party CANCELED 02
General Meeting - 7 p.m. (will be held on-line) 03	04	05	06	Full Moon 07	08	09
10	11	12	13	Last Quarter Moon 14	15	Astro Imaging - 7:00 PM - CANCELED 16
17	18	19	20	21	New Moon 22 MegaMeet CANCELED	MegaMeet CANCELED 23
MegaMeet CANCELED 24 Deadline for submissions to the Observer	25	26	27	28	First Quarter Moon 29	30
LVAAS Board of Governors Meeting 31						

JUNE 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	01	02	03	04	Scouts at Pulpit Rock 05 Full Moon	Scouts at Pulpit Rock 06
Scouts at Pulpit Rock 07	08	09	10	11	12	Last Quarter Moon 13 Astro Imaging - 7:00 PM
General Meeting - South Mountain 7:00 PM 14	15	16	17	18	19	20
Deadline for submissions to the Observer 21 New Moon	22	23	24	25	26	Star Party 27
First Quarter Moon 28 LVAAS Board of Governors Meeting	29	30				

2020 LVAAS Event Calendar

**** Due to the COVID pandemic, please see the website for updates on all events ~ editor***

2020 LVAAS Event Calendar

	Sundays				Thursday	Saturday	Mondays	Multi-Day Weekends	Moon Phase			
	General Meeting time	Date/location	Board meeting	Observer submission deadline	Astro Imaging	Star Parties	Scouts at S. Mountain	Scouts at Pulpit R.	New	First	Full	Last
January	2:00 PM	12 Muhlenberg	26	19	16	no mtg		no camping	24	2	10	17
February	2:00 PM	9 Muhlenberg	23	16	13	no mtg		no camping	23	1	9	15
March	2:00 PM	8 Muhlenberg	29	22	12	7		6 – 7 – 8	24	2	9	16
April	7:00 PM	5 S.M.	26	19	18	4		10 – 11 -12	22	1 30	7	14
May	7:00 PM	3 S.M.	31	24	16	2		8 – 9 – 10	22	29	7	14
June	7:00 PM	14 S.M.	28	21	13	27		5 – 6 – 7	21	28	5	13
July	5:00 PM	11 S.M.	26	19	18	25		3 – 4 – 5 31	20	27	5	12
August	7:00 PM	8 Pulpit	30	23	15	22		1 – 2	18	25	3	11
September	7:00 PM	13 S.M.	27	20	12	26		4 – 5 – 6	17	23	2	10
October	7:00 PM	11 S.M.	25	18	15	24		2 – 3 – 4 30 – 31	16	23	1 31	9
November	7:00 PM	8 S.M.	29	22	12	21		1	15	21	30	8
December	**	12	27	20	10	no mtg		no camping	14	21	29	7

July, Aug & Dec are Saturday meetings with rain date on Sunday
Jan, Feb & March meetings are at Muhlenberg College
August meeting is at Pulpit Rock
December meeting / Holiday Party ** check website for time

NEAF	April 4 – 5
Cherry Springs S.P.	June 18 – 21
Stellafane	Aug 13 – 16
Black Forest S.P.	Sept 18 – 20 (not confirmed)
MegaMeet	May 22-24

Contributed by Bill Dahlenburg

Publishing images is a balancing act!

When preparing your images for publication in The Observer, please consider the following guidelines:

Put the quality in:

- Considering the "print" size of the image, make sure you have at least 150 pixels/inch.
- Use a reasonably good quality for the JPEG compression ratio.

But watch the "waistline"!

- Don't go too much above 200 pixels/inch max.
- Use the lowest JPEG quality that still looks good!
- Shoot for <300KB for a 1/2 page image or <600KB for a full page.

Tip: If you're not Photoshop-savvy, you can re-size and compress undemanding images ("human interest" not astroimages), with an online tool such as: https://www.ivertech.com/freeOnlineImageResizer/freeOnlineImageResizer.aspx. It will also tell you the pixel size and file size of your original, even if you don't download the processed copy.

The Observer is the official monthly publication of the Lehigh Valley Amateur Astronomical Society, Inc. (LVAAS), 620-B East Rock Road, Allentown, PA, 18103, and as of June 2016 is available for public viewing. Society members who would like to submit articles or images for publication should kindly do so by emailing The Observer editor, Frances Kopy at editorlvaas@gmail.com. Articles submitted prior to the Sunday before the monthly meeting of the board of governors (please see calendar on website) will appear in the upcoming month's issue. PDF format is preferred. Early submissions are greatly appreciated. Articles may be edited for publication. Comments and suggestions are welcome.

LVAAS members please feel free to submit ads for astronomy equipment you have for sale, and additionally you may sponsor a maximum of three ads from non-members per year. Every attempt will be made to include submissions in a timely manner.

Every effort will be made to properly credit the sources of the material used in this publication. If additional credit is required, please notify editorlvaas@gmail.com.

No permission is required for non-profit educational use of the material in this publication. Please send a link to, or copy of the publication containing the reprinted material to the editor at the above address. ***Some material in this publication may be copyrighted.***

To become a member of LVAAS, please complete and submit an application form, which can be downloaded at https://lvaas.org/filemgmt_data/files/LVAAS_New_Member_Form.pdf

Existing members please update your LVAAS profile information by emailing the membership director at membership@lvaas.org