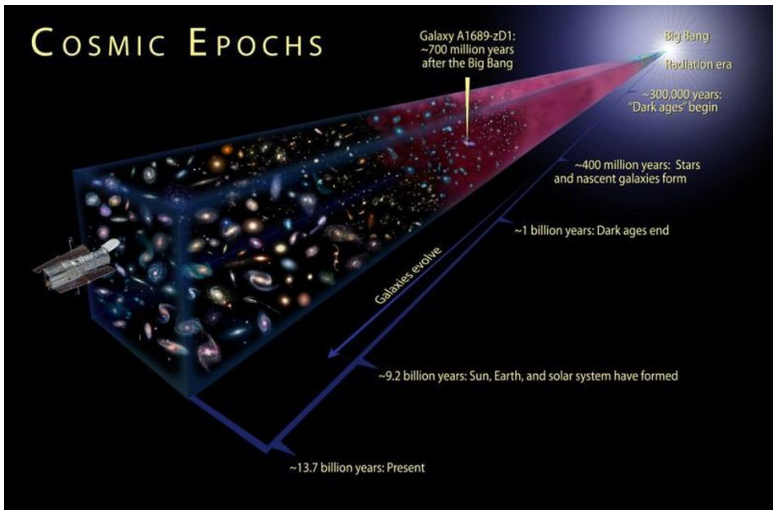
FOCAL POINT

January, 2021

Inside this issue:

February Meetings

The next **Membership Meeting** will be on Monday, February 15th from 8 PM via Zoom videoconference. We will be watching a video: **Deep Universe** as part of the Hubble's Universe broadcast from HubbleSite. Astrophysicist Frank Summers will take us on an in-depth tour of the Hubble Deep Field and Ultra Deep Field discoveries. Looking back from the present day, we can see a 'pencil beam' view of the distant Universe. But a huge number of galaxies are still undiscovered. Hubble has taken us remarkably far, but there is still farther to go. The video presentation will be followed by a discussion.



As always, the **Board Meeting** will be held right before the Membership Meeting, at 7 PM, and are open to every MAS member who is interested in organizational and Observatory related issues.

The **Astrophotography Interest Group** will meet on Wednesday, February 10th at 7 PM trough Zoom videoconference. William Gottemoller will give a presentation and lead a discussion about the influence of weather on imaging, and Jim Bakic will talk about his experiences with an Astrophotography Imaging Suite NINA.

The **First Wednesday** How to Meeting will be held through Zoom videoconference on February 3rd, from 7:30 PM. This is an informal meeting to discuss technical aspects of astronomy, however, any astronomy-related topic can be brought up. New members are especially encouraged to attend this meeting. It is a chance to receive tips on how to get started and/or get more involved in the Club's activities.

Invitations will be sent out prior to meetings.

The MAS Google Group is as active as ever. Learn about the astronomical news, follow equipment related discussions, or just check out the latest images taken by fellow Club members.

Observatory Director Report

I guess it was bound to happen, we locked ourselves out of the B-dome due to a small lever on the door lock getting tripped. After some debate as to what to destroy on the door to gain entry, Jeff Kraehnke and Mike Wagner went with the idea to cut the hinges, this worked fine, new hinges were installed, and all was done in a day.

Lee Keith with the help from his wife Karen have produced a great looking padded cover for the counterweight on A-scope. Why? Well, those of us who image on the scope tend to set equipment at the base of the pier and hit our heads on the counterweight sometimes when standing back up. Good job Lee and Karen!

A keyless entry lock has been installed on the north, (or back), door to the Quonset. This will allow members that are using the grounds, but do not have keys the ability to access the restrooms. Members wanting the pass code for the door will need to contact me directly by phone or email.

Observing at the Observatory has been awfully slow due to the continuously cloudy weather we are having for a couple of months now.

Respectfully Submitted,
Paul Borchardt, Observatory Director

Treasurer's Report

$10,327.08	***Starting Balance as of 12/21/2020***
	Expenditures
$27.23	PayPal fees
$328.20	Periodic expenses
$147.03	Observatory expenses
$112.61	WE Energies
$36.00	Water/Sewer
$651.07	TOTAL Expenditures
	Revenue
$54.00	Private donations
$1,095.00	Membership dues
-$23.08	Other revenue
$1.00	Grants
$1,126.92	TOTAL Revenue
$10,802.92	***Ending Balance as of 01/16/2021***

Respectfully Submitted,
Sue Timlin, Treasurer

Minutes

Due to the COVID-19 pandemic it was held via Zoom videoconference on January 18th. The meeting was called to order at 7:05PM by Tamas Kriska President.

Minutes, **and Treasurer's Report** electronically submitted ahead of the meeting were approved.

Observatory Director's Report electronically submitted ahead of the meeting was amended and approved. Amendment: Heating tape was installed on the pressure tank in the dark room. A plow worker was hired. If the parking lot is not plowed after snow, Paul should be called. **Membership Committee Report** was electronically submitted ahead of the meeting. Membership applications of Rebecca Kubisiak & family, Franklin Smith, Joel Skoug & family, Sandra Zaborowski & family, Kevin Shea, Rudy Guerrero & family, Matthew Phillips, Bill Bonow, Robert Scott, Tim Burrus, Jennea Denner, Lisa Swaney, Eric Couto & family, Galen Kelly, Keith Christ & family, Thomas Best & family, Carlos Velenzuela & family, David Frana & family, John Seymour & family, Paul Swokowski & family, Matthew Mattioli & family, Tracie Asher & family, Chris Wszalek & family, Adam La Luzerne & family, David Neyer & family, Jessica Klein and Cameron Irwin were approved.

Old Business – *Display box*: Yet to be purchased. *Bathroom access*: The combination lock has been installed. *Collimator*: Still under investigation.

New Business – *Ottawa Lake SP permission*: The permission should be renewed for 2021. Jason Doyle will be asked to take care of that.

Maintenance: A motion was made and carried that the money left from last year maintenance will be put back to the general fund.

Announcement – The next meeting will be on Monday, February 15th, 2021 via Zoom videoconference.

Program – Dennis Roscoe gave a presentation entitled: All Aboard—Destination Mars.

Respectfully Submitted,
Agnes Keszler, Secretary

Membership Report

Since the last Report 61 memberships expired and we received 4 new applications. We welcome Sandra Zaborowski & Family, Kevin Shea, Rudy Guerrero & Family, and Lucy Steffes. The total number of active members is 164.

Respectfully Submitted,
Jeff Kraehnke, Committee Chair

In memoriam: Rudy Poklar (1928 – 2020)

With sadness I have to report that our longtime MAS member, Rudy Poklar, passed away in December at the age of 92.

Rudy in 2003

Rudy joined the MAS in 1994 and was an immediate active member. He served on the Board from 1996 to 1998 and got involved with the club's variable star activities. He joined the AAVSO and would be a prolific variable star observer totaling over 10,000 CCD estimates. He remained active in the club until the end of 2001 when he retired and moved to Tucson, Arizona. But he remained a member of the MAS.

Former Observatory Director, Gerry Samolyk, shared some wonderful information from his longtime friendship with Rudy:

Gerry and Rudy in 2018

"Rudy was on the engineering team that designed and developed the guidance and navigation system for Apollo. I recall his stories about working with Stark Draper and the software team at MIT. During much of his retirement, Rudy would attend the Apollo reunions. I recall him telling me that looking back, all of the contractors were amazed that everything worked during Apollo.

Rudy was among the first members to try CCD imaging when the MAS purchased its first camera.

When Rudy moved to Tucson AZ, he purchased an LX200 telescope and an SBIG ST9 camera. He set up his equipment on a set of wheelie bars. He would store the setup under the overhang of his house. On clear nights he would roll the rig out onto his patio and gather time series photometry in Alt-Az mode. He referred to his setup as 'Rudy's rolling rig'.

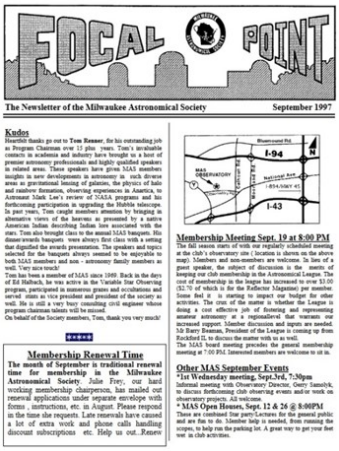
In addition to astronomy, Rudy was a master craftsman in the wood shop. He also enjoyed singing in his local barbershop quartet."

Rudy building wooden helicopters

As a variable star observer, he also co-authored a couple of papers: "The 2009 Eclipse of EE Cephei" with Gerry Samolyk, and "The Pulsation Spectrum of VX Hydrae" which you can read here:

https://iopscience.iop.org/article/10.1086/630211/pdf

But Rudy's greatest contribution to the MAS was as editor of the Focal Point. He took over as editor for the September 1997 issue, after at a year and a half hiatus in the publication. He would continue as editor until the Nov/Dec 2001 issue. What immediately changed in the publication was the number of photographs included in very decent quality, something I immediately noticed as I read the issues in Arizona when I was living there full time.



FOCAL POINT

The Newsletter of the Milwaukee Astronomical Society — September 1997

Kudos

Membership Renewal Time

Membership Meeting Sept. 19 at 8:00 PM

Other MAS September Events

In 2014 I started scanning all the Double Domes and Focal Point newsletters I could locate that were stored at the observatory. But though scanning would be "good enough" a direct publication to PDF would be preferable because it would result in a smaller output file size and the text would then be fully searchable.

When I noticed that Rudy was the editor (a fact that I had forgotten!) during that period, I contacted him and to my delight he had most of the issues in the original Microsoft Publisher format! A side benefit was I could extract the images in full resolution for inclusion in the MAS history section. I spoke to Rudy on the phone a couple of times to get some question answered and to just chat he was simply euphoric that his issues would be placed on the MAS website.

Group picture of MAS members attending the 2003 Spring Meeting of the AAVSO. From left: Rudy Poklar, Bob Manske, Gerry Samolyk, Ed Halbach, and Gene Hanson

RIP, Rudy!

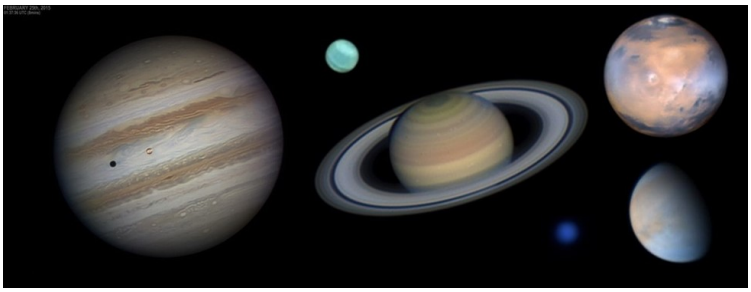
Gene Hanson

A Brief History of Astronomical Imaging (part I)

With apologies to Stephen Hawking

With all the excitement over the Mars opposition last fall and the almost daily images of the planet I shared with the membership, many members may wonder why I am so excited and enthusiastic about imaging the planets. As a long time amateur astronomer and imager, I have seen the technology morph from inefficient (analog) photographic film to efficient digital cameras. I want to share this transition with members so they also will appreciate the sea change and the great simplification of digital imaging, especially of the planets, in the hope that some of you will gather the courage to take advantage of the incredible expertise in the Society and dive into imaging.

Since cold, snowy winter is typically a slower time for amateur astronomy (and there are no naked eye planets up), I want to take this time to create a 4 part miniseries of posts celebrating the digital revolution, especially as it applies to planetary imaging where it has made the greatest difference. I invite the many other deep sky imagers to add their comments along the way or even make their own posts. This is a Society of members who want to share their enthusiasm and expertise with other members. That's why one joins a group like the MAS after all.



Taken by Amateur Astronomers! Yes, you can do this too!

Since the mid-19th century, the only way to record the sky was to record an image on some form of light sensitive emulsion that was placed on glass plates then later on a flexible cellulose base which we knew as "safety film" in rolls. These rolls could be put in cameras and pictures taken. The exposed film then needed to be chemically processed either by sending it somewhere or doing it yourself if you have the right equipment & all the chemicals. There were some processes you could apply to the film to make it more sensitive like soaking the film in "forming gas" which was a combination of hydrogen (!) and nitrogen under pressure and high temperature which then had to be frozen and only lasted a few weeks or months. Ugh! Not exactly simple or cheap!

Images using film were possible but took a lot of effort and time and big telescopes. Due to the inefficiency of film, you needed as large a telescope as possible and exposed for as long as possible, often many hours. In addition, during the long exposures you had to guide the telescope by looking through an eyepiece constantly during the entire exposure to be sure the object did not move during the long exposure. This was done outside with the bugs or in the cold. Ugh!

Enter the CCD or Charged Coupled Device. It was invented in the late '60s-early 70's and was first used by reconnaissance satellites in 1976 to replace the scanning of photographic film in returning images to the ground. It was an array of light sensitive photodiodes that recoded an image which could then be read by a computer and transmitted. Today, CCDs have been superseded by CMOS cameras and have become ubiquitous. There is a CMOS in your smartphone, in the back up camera in your car, in the camera in your laptop, in your TV, in your Ring camera at your front door, in DSLRs and every other digital camera on the planet!

When it comes to shooting in low light conditions, digital image sensors blow away film. Film can usually be found available in speeds between 100 and 3200, although 6400 film does exist. Today's digital camera systems can push their sensitivity many stops higher. Consumer digital cameras such as Fujifilm's X100T can simulate sensitivities as high as ISO 51200 while professional Nikon systems, such as the D4s, can shoot as high as ISO 409,600!

What this means is that digital imagers can use shorter exposures and smaller telescopes and still get great results. But they do need some processing to bring out the details. All of this can be done on a small computer in the comfort of a warm room with free or low cost software.

This is why I am so excited about the digital imaging of planets as the results are nothing short of magic compared to images like that. And it's as easy as imaging can be once you get some practice. The MAS has all the equipment including the telescope, camera and even a laptop, though I recommend you bring your own with software already installed.

Next time I will show you some examples of the hassles & limitations of film using some of the images I have taken in the past.

Lee Keith

(to be continued in the February issue)

Member's Story

My Obsession with Astronomy

I remember the exact date where my obsession with astronomy began. Before that, it was an interest where I'd look up at the moon every once in a while in wonder. However, after seeing a newspaper clipping and an airing of Jack Horkheimer - Stargazer (I loved that show) showing the event coming up in the next week, 10 year old me was very excited to see it. As luck would have it, we had great skies that night. It was June 15, 1991, and it was a very rare triple conjunction of Venus, Mars, and Jupiter with Venus near greatest Eastern elongation. This trio stayed up quite a while after sunset. Along for the ride too that night was a slender crescent moon. That was it for me - it was an absolutely breathtaking sight. Three of the brightest planets all hanging up there together. After that, I was obsessed with all things astronomy.

The timing was great because next month was a partial solar eclipse on July 11 where I was able to see the Sun turn into a little Pacman. Ever since I've had in my mind the special dates that are coming up, including the 1994 annular eclipse (I skipped school for this one under the request the Principal made that I'd write a report about it), the 1999 Leonids, among other. The big one on that list for me was the 2017 eclipse, and we were lucky to have great weather for it at our planned site.

The conjunction last week between Jupiter and Saturn flew low on my radar since I'm not as much a planetary observer anymore, and mostly do deep sky imaging. However, that did get me thinking about how it all started for me, and left me wondering how common triple conjunctions are. I found this site which lists only 19 such conjunctions with separation between the pairs of planets being at most 1 degree. http://climate.gi.alaska.edu/Curtis/astro5.html

It's incredibly rare, more-so than the Jupiter-Saturn conjunction that's occurring this week (December 21, 2020), which happens once every 20 years. Although, the closeness of their pairing on Monday hasn't happened in the past 800 years.

The 1991 event is listed among the 19, with the next being in 2136. The next closes conjunction that rivals these is the Grand Planetary Conjunction that happens the next time Jupiter and Saturn come together in 2040. That even will also include all the other bright planets as well. That's right! Mercury, Venus, Mars, Jupiter, Saturn all together, and on Sept 8, the moon joins the party. This is now one of the items on my astro-list that I'll look forward to seeing.

Gabe Shaughnessy

Here is the 1991 "conjunction" Gabe was referring to. I was coming down from the "Devils Head", SW of Denver, in twilight (it was a bit creepy, and I've since learned the area is known for Bigfoot sightings) and managed to get this shot.

The black object on the right is a rock outcropping.

John Asztalos

In the Astronomical News

Earth Is Whipping Around Quicker Than It Has In a Half-Century: It Could Mean a "Negative" Leap Second

Even time did not escape 2020 unscathed.

The 28 fastest days on record (since 1960) all occurred in 2020, with Earth completing its revolutions around its axis milliseconds quicker than average. That's not particularly alarming — the planet's rotation varies slightly all the time, driven by variations in atmospheric pressure, winds, ocean currents and the movement of the core. But it is inconvenient for international timekeepers, who use ultra-accurate atomic clocks to meter out the Coordinated Universal Time (UTC) by which everyone sets their clocks. When astronomical time, set by the time it takes the Earth to make one full rotation, deviates from UTC by more than 0.4 seconds, UTC gets an adjustment.

Credit: Stocktrek Images via Getty Images

Until now, these adjustments have consisted of adding a "leap second" to the year at the end of June or December, bringing astronomical time and atomic time back in line. These leap seconds were tacked on because the overall trend of Earth's rotation has been slowing since accurate satellite measurement began in the late 1960s and early 1970s. Since 1972, scientists have added leap seconds about every year-and-a-half, on average, according to the National Institute of Standards and Technology (NIST). The last addition came in 2016, when on New Year's Eve at 23 hours, 59 minutes and 59 seconds, an extra "leap second" was added.

However, according to Time and Date, the recent acceleration in Earth's spin has scientists talking for the first time about a negative leap second. Instead of adding a second, they might need to subtract one. That's because the average length of a day is 86,400 seconds, but an astronomical day in 2021 will clock in 0.05 milliseconds shorter, on average. Over the course of the year, that will add up to a 19 millisecond lag in atomic time.

"It's quite possible that a negative leap second will be needed if the Earth's rotation rate increases further, but it's too early to say if this is likely to happen," physicist Peter Whibberley of the National Physics Laboratory in the U.K., told The Telegraph. "There are also international discussions taking place about the future of leap seconds, and it's also possible that the need for a negative leap second might push the decision towards ending leap seconds for good."

The year 2020 was already faster than usual, astronomically speaking (cue sighs of relief). According to Time and Date, Earth broke the previous record for shortest astronomical day, set in 2005, 28 times. That year's shortest day, July 5, saw Earth complete a rotation 1.0516 milliseconds faster than 86,400 seconds. The shortest day in 2020 was July 19, when the planet completed one spin 1.4602 milliseconds faster than 86,400 seconds.

According to the NIST, leap seconds have their pros and cons. They're useful for making sure that astronomical observations are synced with clock time, but they can be a hassle for some data-logging applications and telecommunications infrastructure. Some scientists at the International Telecommunication Union have suggested letting the gap between astronomical and atomic time widen until a "leap hour" is needed, which would minimize disruption to telecommunications. (Astronomers would have to make their own adjustments in the meantime.)

The International Earth Rotation and Reference Systems Service (IERS) in Paris, France, is responsible for determining whether adding or subtracting a leap second is necessary. Currently, the IERS shows no new leap seconds scheduled to be added, according to the service's Earth Orientation Center.

Stephenie Pappas, lifescience.com

Adopt a Telescope Program - Signup Sheet

	Adopter	Scope	Location
1	Sue Timlin/John Hammetter	18" F/4.5 Obsession	Wiesen Observatory
2	Steve Volp	12.5" F/7.4 Buckstaff	B Dome
3	Robert Burgess	12.5" F/9 Halbach	A Dome (Armfield)
4	Russ Blankenburg	18" F/4.5 Obsession	Albrecht Observatory
5	Jeff Kraehnke	14" F/7.4 G-scope	Z Dome
6	Lee Keith/Tom Kraus	12" F/10 LX200 EMC	Tangney Observatory
7	Herman Restrepo/Colin Boynton	10" F/6.3 LX200	Ray Zit Observatory
8	Tamas Kriska	Stellarvue SVQ 100 F/5.8	Jim Toeller Observatory
9	Paul Borchardt	Solar scope	SkyShed POD

At Your Service

Officers / Staff

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Vice President	Lee Keith	414-425-2331
Treasurer	Sue Timlin	414-460-4886
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Observatory Director	Paul Borchardt	262-781-0169
Asst. Observatory Director	Jeff Kraehnke	414-333-4656
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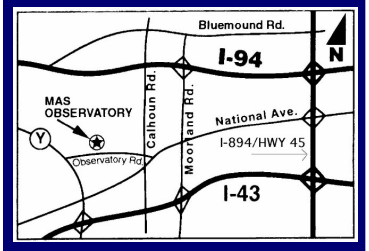
Steve Volp	414-751-8334
Mike Wagner	262-547-3321



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February Keyholders

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02/20	Jeff Kraehnke	414-333-4656
02/27	Tamas Kriska	414-581-3623