



October, 2020

## November Meetings

The MAS is currently holding the Monthly Meetings on the third Monday of each month. The next one is scheduled for Monday, November 16<sup>th</sup>.

The **Board Meeting** starts at 7 PM, and is open to every MAS member who is interested in organizational and Observatory related issues.

The Board meeting will be followed by the **Membership Meeting** starting at 8 PM. We will have a guest speaker, Tom Field, President of Field Tested Systems LLC and Contributing Editor of Sky & Telescope Magazine.

### You can almost touch the stars

*“Even if you wanted to touch a star, they’re all impossibly distant. Despite these great distances, astronomers have learned an enormous amount about stars. How? The most common method to study the stars is called spectroscopy, which is the science of analyzing the colorful rainbow spectrum produced by a prism-like device. Until recently, spectroscopy was too expensive and too complicated for all but a handful of amateurs. Today, though, new tools make spectroscopy accessible to almost all of us. You no longer need a PhD, dark skies, long exposures, enormous aperture ... or a big budget! With your current telescope and FITS camera (or a simple web cam or even a DSLR without a telescope) you can now easily study the stars yourself. Wouldn’t you like to detect the atmosphere on Neptune or the red shift of a quasar right from your own backyard?!”*



*This talk, with lots of interesting examples, will show you what it’s all about and help you understand how spectroscopy is used in research. Even if you are an armchair astronomer, understanding this field will enhance your understanding of the things you read and the night sky”.*

We will do a live Q&A after Tom’s 45-minute presentation.

The **First Wednesday** how to get started meeting will be held through Zoom videoconference on November 4<sup>th</sup>, 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.

The **Astrophotography Interest Group** will meet on Wednesday, November 11<sup>th</sup> at 7 PM through Zoom videoconference. Gabe Shaughnessy will be presenting, and leading a discussion about the electronics used in imaging.

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.

## Membership Renewal

The Membership renewal period is underway. There are several renewal methods you can choose from. If you prefer to do it online just follow this link: <http://milwaukeeastro.org/renew>. The renewal form can also be printed out and send it back along with a check made payable to The Milwaukee Astronomical Society.

Do I need to renew my MAS membership? Simply look for your name on this list: <http://milwaukeeastro.org/membership/membersRenewed.asp>. If your name is there, your membership is active through 2021.

Thank you for being a member of the Milwaukee Astronomical Society.

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## Observatory Director Report

It has been a busy month at the Observatory with several maintenance projects being completed. First, Thanks to the efforts of Tamas, Jeff, and others, (digging four-foot-deep holes for the two posts), there is a new gate at the entrance which locks at the middle using a combination lock. This combination is available to all members, contact me if you need it.

Next, both "A" and "Z" domes have been professionally painted. Now all the domes are a glossy white finish which matches and looks great. Thanks, Jill, for making this happen!

The finder on the 18" scope in the "C" Shed has been remounted so that it will maintain alignment.

Respectfully Submitted,  
Paul Borhardt, Observatory Director

## Treasurer's Report

<b>\$7,529.04</b>	<b>Starting Balance as of 09/20/2020</b>
	<b><u>Expenditures</u></b>
\$36.58	PayPal fees
\$3000.00	Dome painting
\$36.00	Water/Sewer
\$83.48	WE Energies
\$3,156.06	TOTAL Expenditures
	<b><u>Revenue</u></b>
\$1,075.00	Private donations
\$2,089.00	Membership dues
\$1.00	Grants
\$3,165.00	TOTAL Revenue
<b>\$7,537.04</b>	<b>Ending Balance as of 10/17/2020</b>

Respectfully Submitted,  
Sue Timlin, Treasurer

## Membership Report

Since the last Report 44 members renewed their memberships and we received 3 new applications. We welcome Chris Krellwitz & Family, Peter Szczepanek, and Bob Mueller. The total number of active members is 195.

Respectfully Submitted,  
Jeff Kraehnke, Committee Chair

## Minutes

Due to the COVID-19 the monthly meeting was held via Zoom videoconference on October 19<sup>th</sup>. The meeting was called to order at 7:01PM by Tamas Kriska President.

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

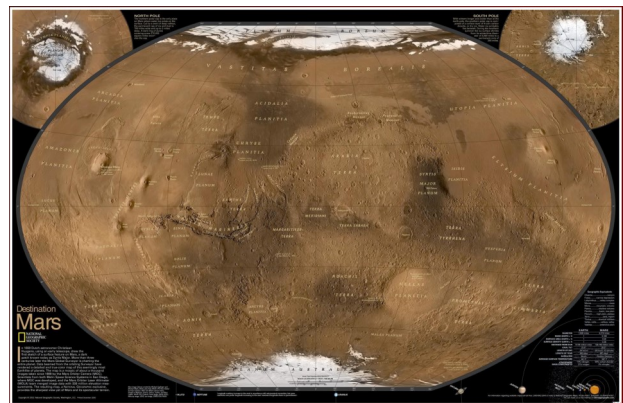
**Observatory Director's Report** electronically submitted ahead of the meeting was amended and approved. Amendment: A-dome was repaired before painting. The damaged power cords supplying the Toeller and Tangney Observatories were repaired. New concrete pad was poured around the hydrant. The new house for the hydrant was completed and installed.

**Membership Committee Report** was submitted electronically ahead of the meeting. Membership applications of William Gottemoller, Julien Rosso, Julie Gottemoller & Family, Chris Krellwitz & Family, and Peter Szczepanek were approved.

**Old Business – Painting of A and Z domes:** The work was completed by K2 Paint. **Entrance gate:** The installation has been finished. The gate is closed with a combination lock. Those members who don't know the combination, should see the Observatory Director. **Acrylic display box:** The box will be purchased and installed. **Restroom accessibility:** The lock on the Quonset back door will be replaced with a combination padlock.

**New Business – Collimator for the SC telescopes:** Jeff suggested to purchase a professional collimator for the Club's four Schmidt-Cassegrain telescopes. The discussion will be continued on the next meeting.

**Program –** Randy Culp gave a presentation on Mars.



You can watch the talk here:

<https://www.youtube.com/watch?v=4KLzWw5I4GI>

Respectfully Submitted,  
Agnes Keszler, Secretary

## Maintenance

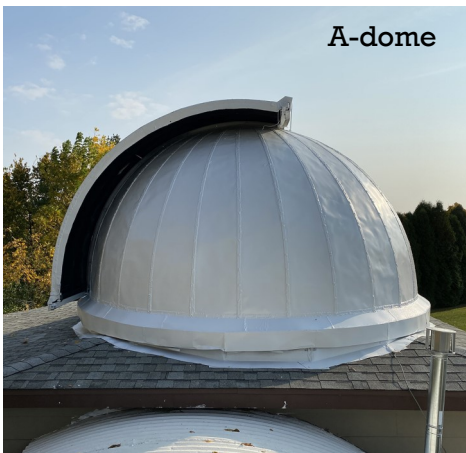
Both A and Z domes were professionally painted to matching white colors that the other two domes (B, and Solar) and the Tangney Observatory roof have.

We have poured a new concrete pad for the yard hydrant, and replaced the old wooden house with a new, more durable one made from PVC.

We have finished the installation of the new gate, which replaces the old chain.



The Z-dome  
before and after  
painting



A-dome



## In the Astronomical News

### NASA's SOFIA Discovers Water on Sunlit Surface of Moon

NASA's Stratospheric Observatory for Infrared Astronomy (SOFIA) has confirmed, for the first time, water on the sunlit surface of the Moon. SOFIA has detected water molecules in Clavius Crater, one of the largest craters visible from Earth, located in the Moon's southern hemisphere. Data from this location reveal water in concentrations of 100 to 412 ppm – roughly equivalent to a 12-ounce bottle of water – trapped in a cubic meter of soil spread across the lunar surface.

"We had indications that H<sub>2</sub>O – the familiar water we know – might be present on the sunlit side of the Moon," said Paul Hertz, director of the Astrophysics Division in the Science Mission Directorate at NASA Headquarters in Washington. "Now we know it is there. This discovery challenges our understanding of the lunar surface and raises intriguing questions about resources relevant for deep space exploration."

As a comparison, the Sahara desert has 100 times the amount of water than what SOFIA detected in the lunar soil. Despite the small amounts, the discovery raises new questions about how water is created and how it persists on the harsh, airless lunar surface.

SOFIA's results build on years of previous research examining the presence of water on the Moon. When the Apollo astronauts first returned from the Moon in 1969, it was thought to be completely dry. Orbital and impactor missions over the past 20 years, such as NASA's Lunar Crater Observation and Sensing Satellite, confirmed ice in permanently shadowed craters around the Moon's poles. Meanwhile, several spacecraft – including the Cassini mission and Deep Impact comet mission, as well as the Indian Space Research Organization's Chandrayaan-1 mission – and NASA's ground-based Infrared Telescope Facility, looked broadly across the lunar surface and found evidence of hydration in sunnier regions. Yet those missions were unable to definitively distinguish the form in which it was present – either H<sub>2</sub>O or OH.

"Prior to the SOFIA observations, we knew there was some kind of hydration," said Casey Honniball, the lead author who published the results from her graduate thesis work at the University of Hawaii at Mānoa in Honolulu. "But we didn't know how much, if any, was actually water molecules – like we drink every day – or something more like drain cleaner."

Using its Faint Object infraRed CAmera for the SOFIA Telescope (FORCAST), SOFIA was able to pick up the specific wavelength unique to water mol-

ecules, at 6.1 microns, and discovered a relatively surprising concentration in sunny Clavius Crater.

"Without a thick atmosphere, water on the sunlit lunar surface should just be lost to space," said Honniball, who is now a postdoctoral fellow at NASA's Goddard Space Flight Center in Greenbelt, Maryland. "Yet somehow we're seeing it. Something is generating the water, and something must be trapping it there."

Several forces could be at play in the delivery or creation of this water. Micrometeorites raining down on the lunar surface, carrying small amounts of water, could deposit the water on the lunar surface upon impact. Another possibility is there could be a two-step process whereby the Sun's solar wind

delivers hydrogen to the lunar surface and causes a chemical reaction with oxygen-bearing minerals in the soil to create hydroxyl. Meanwhile, radiation from the bombardment of micrometeorites could be transforming that hydroxyl into water. How the water then gets stored – making it possible to accumulate – also raises some intriguing questions. The water could be trapped into tiny beadlike structures in the soil that form out of the high heat created by micrometeorite impacts. Another possibility is that the wa-

ter could be hidden between grains of lunar soil and sheltered from the sunlight – potentially making it a bit more accessible than water trapped in beadlike structures.

"It was, in fact, the first time SOFIA has looked at the Moon, and we weren't even completely sure if we would get reliable data, but questions about the Moon's water compelled us to try," said Naseem Rangwala, SOFIA's project scientist at NASA's Ames Research Center in California's Silicon Valley. "It's incredible that this discovery came out of what was essentially a test, and now that we know we can do this, we're planning more flights to do more observations."

SOFIA's follow-up flights will look for water in additional sunlit locations and during different lunar phases to learn more about how the water is produced, stored, and moved across the Moon. The data will add to the work of future Moon missions, such as NASA's Volatiles Investigating Polar Exploration Rover (VIPER), to create the first water resource maps of the Moon for future human space exploration.

SOFIA is a joint project of NASA and the German Aerospace Center.

Felicia Chou, Alison Hawkes, nasa.gov



## Adopt a Telescope Program - Signup Sheet

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

### At Your Service

#### Officers / Staff

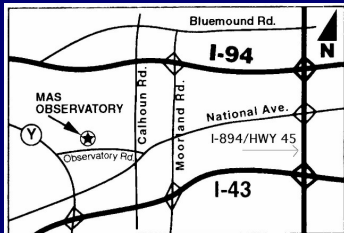
President	Tamas Kriska	414-581-3623
Vice President	Lee Keith	414-425-2331
Treasurer	Sue Timlin	414-460-4886
Secretary	Agnes Keszler	414-581-7031
Observatory Director	Paul Borchardt	262-781-0169
Asst. Observatory Director	Jeff Kraehnke	414-333-4656
Newsletter Editor	Tamas Kriska	414-581-3623
Webmaster	Gene Hanson	262-269-9576

#### Board of Directors

Jim Bakic	414-303-7765
Mike Bauer	262-894-1253
Jill Roberts	262-765-7092
Clark Brizendine	414-305-2605
Jason Doyle	414-678-9110
Dennis Roscoe	608-206-0909
Jeff Kraehnke	414-333-4656
Jim Schroeter	414-333-3679
Gabe Shaughnessy	262-893-4169
Steve Volp	414-751-8334
Mike Wagner	262-547-3321

#### November Keyholders

11/07	Tom Schmidtkunz	414-352-1674
11/14	Steve Volp	414-751-8334
11/21	Sue Timlin	414-460-4886
11/28	Mike Bauer	262-894-1253



### MAS Observatory

18850 Observatory Rd  
New Berlin, WI 53146

[www.milwaukeeastro.org](http://www.milwaukeeastro.org)