

Greg Smith – editor

**Volume 26, No.9
December 2020**

**Program: "Ocean Worlds Exploration by
NASA" - Greg Cermak**

**Meeting: December 16, 2020
Online at 7:00 p m**

Once in 800 years.

On December 21st, the winter solstice, a planetary conjunction will take place that is being called a "Christmas Star". Just after sunset in the low southwestern sky, Jupiter and Saturn will be aligned less than one tenth of a degree apart.

It has been 800 years that Jupiter and Saturn has been this close together in the night sky. It is known that about every 20 years Jupiter and Saturn are close together, but not this close and this far away from the setting sun. Most of the time they are hidden in the glare of our star.

For some, this closeness will be seen as a very bright single star. With **good** vision and a clear sky, you will just be able to see the separation. Of course, any magnification will allow you to be able to split the two planets. Binoculars can be your easiest attempt to see them as separate. A telescope will allow you to see the moons of Jupiter in close proximity to Saturn.

Probably about a half hour after sunset (4:29 pm) on that Monday, you will see Jupiter and Saturn about 10 degrees (a fist at arm's length) above the southwestern horizon. So, be sure to find a place with a clear (no trees or buildings) view of the sky.

Unfortunately, the long term weather forecast does not look favorable. A Christmas Star miracle would be in order for us to see it.

While we are at it, why not a White Christmas while we are wishing. Just a light coating with no icy streets is enough.

It seems amazing that it is this year that has seen so much loss and despair, that we should get this much needed sign from the sky that beauty is still around, and amazing things still happen.

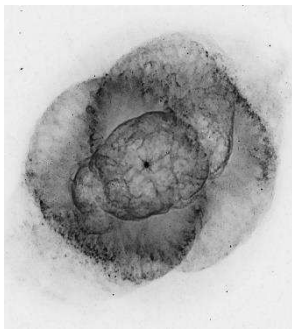
Though this is not the same Christmas Star that is so famous and dear to us, it is still a heavenly sign to us not to give up. This alignment comes on the darkest night of the year. The days will get brighter from here on out. The majesty of creation is still on display and available to all to see and wonder at.

This past year has been one of challenges. Our club has been tested in how many 'attend' our meetings. I hope by Spring that we may be able to meet again. We also face the challenge of finding a new place to gather. So, anybody have any ideas on a meeting place?

I am happy for Steve to be able to retire and have more time for family and doing what he wants to do.

Here to wishing that you all have a good holiday season, even in this strange year. Let us look with hope to the New Year and getting back together.

**Every Day is a Star Filled Day,
Every Night is a Starry Night**



Arecibo
is gone.



After Arecibo, NASA isn't sure what comes next for planetary radar

By Meghan Bartels

Arecibo Observatory's massive radio telescope has collapsed; with it has gone a crucial tool in understanding asteroid risks to Earth — and it would take a serious government initiative to replace.

Before the facility sustained irreversible damage in a series of cable failures this year, Arecibo Observatory was Earth's most powerful planetary radar system. Astronomers can't use radar to discover new asteroids, but the data that these systems provide can give scientists the details about an object's size, shape and location they need to better and more quickly evaluate the threat that individual asteroids might pose to Earth.

"This is a hard thing to have to take [down] an iconic facility like this that's provided so much for the radio astronomy and planetary radar community over so many decades; it's really sad to see," Lindley Johnson, who leads NASA's Planetary Defense Coordination Office, said during a virtual meeting of NASA's Planetary Advisory Committee held on Nov. 30, the day before the structure collapsed. "It's certainly not an ideal situation, but I think it really comes down to, it's time to really get moving on investing in a new planetary radar capability."

But that's easier said than done. There are two key complications at play when it comes to investing in planetary radar capability.

One is bureaucratic: Planetary radar has to be done from Earth's surface. And while NASA leads the country's asteroid-focused work, the U.S. National Science Foundation (NSF) heads the federal government's ground-based observations, as it does Arecibo Observatory; NASA merely paid for observation time on the radar system. With the sole exception of NASA's Infrared Telescope Facility in Hawaii, all of the agency's observing facilities are in space.

(This is also complicated. Technically, the world's other planetary radar facility, at Goldstone in California, is run by NASA, but that's because its primary duty is to communicate with spacecraft traversing the solar system. The radar facility recently completed an upgrade and is back to normal observations, although it has a less flexible schedule than Arecibo did and can't see objects as far from Earth.)

"The way our agencies are tasked, ground-based observations are the responsibility of NSF," Lori Glaze, who leads NASA's Planetary Science Division, said during the same meeting. "It's not in NASA's purview."

A second complication is the cost. A radar beam as powerful as Arecibo's requires both a powerful transmitter and a massive radio dish, neither of which is cheap.

Taken together, the challenges mean that NASA would likely need to work out agreements with one or more government counterparts before a new planetary radar system comes online.

"This kind of thing really takes a partnership of agencies," Johnson said, adding that Arecibo itself traced its roots to a Department of Defense-led partnership. Something similar could rev up planetary radar, he said. "We do definitely have an opportunity and an interest in partnering with the U.S. Space

Force on a more capable radar system." The military branch is interested in the technology as a way to track satellites between Earth and the moon, he added.

A reduction in planetary radar doesn't strike at the heart of NASA's planetary defense system, which focuses on discovering and tracking relatively large asteroids that come relatively close to Earth. Spotting such objects relies on facilities that detect optical and infrared light and scan large swaths of the sky regularly enough to notice when a new, fast-moving dot appears against the background of stars.

Radar can't do that; it requires that scientists have a good idea of precisely where the object they want to study is, so that they can point the narrow radar beam precisely enough to bounce off the object. Instead, planetary defense experts use radar to more quickly plot an object's orbit farther into the future and to determine characteristics of the object like its shape and density that might affect attempts to deflect an asteroid if it does appear to be on course to impact Earth.

"As far as planetary defense and NEO [near-Earth object] observations are concerned, it's only a slight negative impact," Johnson said of the loss of Arecibo's radar system. "It doesn't affect our discovery rate of near-Earth objects at all, it only has some impact on the opportunities we have to characterize these objects."

Nevertheless, radar data is nice to have — and definitely the sort of thing Johnson would want for the planetary defense community.

Green Bank Observatory in West Virginia was already planning to add radar capability to its primary radio dish before the loss of Arecibo, scientists say, although the system, like that at Goldstone, won't replicate Arecibo's specific skills. And even that new capability would build on an existing facility, rather than starting from scratch, which comes with both benefits and risks.

"In a perfect world, I would pursue a new planetary radar capability," Johnson said, even before Arecibo's final collapse. "Trying to keep these old facilities going — they are high maintenance."

But new capability wouldn't mean a copy of Arecibo's iconic dish, he emphasized. "It's really time to be looking at the next generation of planetary radar capabilities," he said, in particular hypothesizing that an array of dishes may be a more appealing approach now than Arecibo's single massive dish.

"Technology has moved on since the 30, 40 years ago that the radar capability was installed at Arecibo," Johnson said. "We need to take advantage."

Minutes of the November Meeting

Ted Gruber opened the meeting at 7pm and welcomed the zoom attendees.

Greg Babcock talked on using simple Planetary cameras in photographing the moon and the sun. The more pixels per inch the sharper the inch and the larger the chip is the more area of the sky can be seen. These cameras hook up to a laptop and allow a larger image to be seen and sharper focusing to be done. This works great for high detail moon surface display or a planet on a large screen for public viewing at a sidewalk star party. His website is: stargazingnow.com

Ted then gave the star report –

December 21st Great Conjunction of Jupiter and Saturn only .1 degrees apart and in same field of view with a telescope.

Solstice Walk this Dec 19th. Has been **Cancelled**.

We are to seek a one-year membership in the North American Sundial Society and have our sundial placed on a national registry.

A Christmas meeting is planned for Dec 16th with a Christmas themed program. Oregon Star Party is being planned for the new moon of August of 2021.

☞ **December 2020 Meeting** ☞

DATE: **Wednesday December 16**
TIME 7:00pm
PLACE: Your Laptop / Tablet / or Smartphone.

A **Zoom** enabled meeting

PROGRAM: "Ocean Worlds exploration by NASA"
Greg Cermak, NASA Ambassador

Drinks : Your Choice
Snacks : Whatever is in your Cupboards

Friends of Galileo Club Officers

PRESIDENT	Ted Gruber
VICE-PRESIDENT/ PROGRAM CHAIR	Mark Thorson
SECRETARY	Greg Smith
TREASURER	Steve Powell
WEBSITE	Ted Gruber
NEWSLETTER ED.	Greg Smith
ALCOR	Tom Meek

Next Month's Newsletter Deadline

The deadline for items in next month's newsletter is:
Wednesday: seven days before next meeting.

Please feel free to send in your thoughts and experiences about your astronomical adventure.

Submit your material by E-mail to: gryth@msn.com

Greg Smith
 1622 22nd Ave
 Longview, WA

