Shoalhaven Astronomers Inc.
www.shoalhavenastronomers.asn.au

Volume 24
Issue 4

Astro Flyer

APRIL 2024

Club News

President's Report. Hello Everybody,Hello All,

My trip to Los Angeles went well. I visited my brother and revisited friends I have known since I first arrived in Australia late 1971. I also visited the Griffith Observatory where I again met long time workmates (Museum Guides) Daniel Wong and David Pinsky. Little has changed at the public Observatory so my stay only lasted a little over an hour. If you are ever in Los Angeles for a few days the Griffith Observatory is a must to visit located in the Hollywood Hills at about 1100 feet (~330 meters) elevation and visible nearly everywhere in the Los Angeles Basin.

Well, I could not get into my email whilst in Los Angeles due to a secondary verification requirement. When I returned to Nowra I had to put my computer and phone into a computer fixit place and they got me back into my emails I had over 600 unread emails to go through last night.

Cont...over page.

Our next meeting will be at the Wollongong Uni, April 19th, 2024 starting at 7:00 PM.

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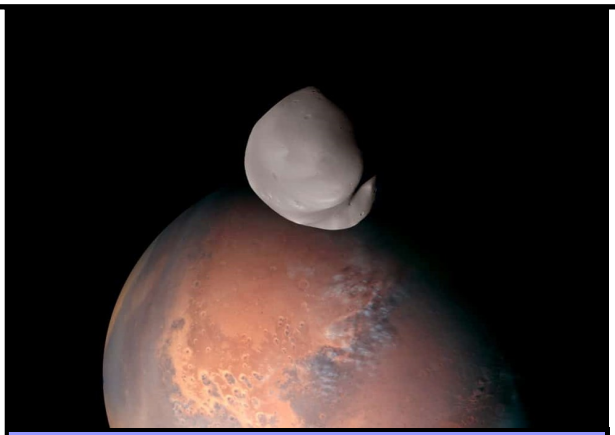

MOON PHASES

New Moon	First Quarter	Full Moon	Last Quarter
May 8th	Apr16th	Apr 24th	May 1st
	Start here ^		

Viewing Nights

We are aiming, once daylight saving is over, to make observing at Friday meetings a priority if the weather permits.

New and Last Quarter moon phases are good times for Dark Sky Observing.

More from the President

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The meeting starts at 7:30 PM on April 19th, so come at 7 PM and enjoy a coffee/tea and a chat with the gathering astrophobes. The meeting will be held at the usual venue, namely the Uni of W'Gong, Nowra Campus in West Nowra. Take Yawal Road (off Albatross Road) West and turn right on George Evans Road. Turn left at the SECOND turning circle and watch out for kangaroos.

Have you had your Shoalhaven Observatory lessons from Mark Town and signed up for a viewing/ photography session? I know the skies have been unkind but those that keep at it will eventually score a good night and learn that much more about astrophotography. Make sure you book through the club's Website www.shoalhvenastronomers.asn.au. If needed, call Mark Town and he will help you through the process of booking. His phone number is 0474 859 788.

Remember, I am NOT taking on the President's or Treasurer's position at the next AGM in July. Please think about taking on these positions so we can have a functioning club. I can help out anyone who takes on the Treasurer's position. It is easy as long as you write down incoming money (receipts) and what it is used for and expenditure.

Observatory Report Mark Town

Current Status
The observatory is now operational and can be used for both basic and more advanced activities.
Integration of the observatory systems into a cohesive whole is progressing with the system control program – called N.I.N.A. – able to exercise reliable control over the CEM120 mount, the dome/shutter and the cameras.

Equipment donated to the association has undergone some refurbishment and is now ready for use and stored in our observatory. These items are available for use onsite or for loan so you can use them at your home. The items can be checked out to you – Just like a library! – on the website. The items are:

- A pair of 8 x 50mm binoculars.
- Two 8" LX90 Meade Scmidt- Cassegrain "GoTo" telescopes fork mounted on tripods
- A Coranado solar scope mounted on a light-weight manual tripod
- A Vixen 4" refractor on a manual equatorial mount with tripod.

Training
If you are concerned that the training you have done has departed your brain since you completed it - don't worry! We are going to set up some dedicated training sessions – both during the day and in the night hours – so you can have some practical experience to refresh your memory and give you the confidence to operate the observatory. Dates and times will be publicised once we organise it….

The training is easy to do and done in the observatory in small groups so each person gets some practical experience of using the systems - in the meantime you can accompany an SA member who has done the training so you become familiar with the observatory equipment and how to operate it.

Observatory Access
The observatory is locked and the key is now stored in a lock box at the door. You will need the current access code (available on the website) to open the lock box. Check the access code before going to the observatory!
Time on the observatory can be booked via the Members Area / Observatory Activities page on our website. You will need a username and password to login so message or email myself for that information.

Thanks and
Best Regards,
Mark Town
M: 0474 859 788 | marktown@shoal.net.au

Observation Report Andrew Wood

What's on in the Cosmos April –May 2024

Our April 19 meeting occurs midway between First Quarter and Full Moon. The club's viewing night at the Shoalhaven Observatory on April 20 will see sunset about 5:30PM with full darkness by 7. We will, however, be accompanied by a waxing gibbous Moon. With darkness coming earlier due to the end of daylight saving and the naturally longer nights of autumn and winter, let's hope for some clear nights ahead.

Moon Phases

First Quarter	16th April	Dark after midnight
Full Moon	24th April	Enjoy the Moon
Last Quarter	1st May	Dark before midnight
New Moon	8th May	Dark all night [Total Solar Eclipse North and Central America]
First Quarter	15th May	Dark after midnight

Planets

The evening sky during this period is devoid of planets. For anyone who likes watching the morning sky, especially planetary and lunar conjunctions, the following events may be of interest (Ref: *Astronomy 2024* yearbook; April and May sections). **There are also two Lunar-planet occultations**.

Venus is sinking in the eastern dawn and will be visible until late April.
April 19: **Mercury** 2° north of **Venus**, low on the eastern horizon during dawn.
April 29 & 30: **Mars** and **Neptune** 0.5° apart. A telescope or binoculars will be needed for Neptune.
May 4: **Saturn** near the crescent Moon in the early morning until dawn.
May 4: The Moon occults Saturn. This will occur in daylight. The times for Sydney are 9:03AM for Saturn's disappearance behind the dark limb of the Moon followed by its reappearance from the bright limb at 9:22AM. A telescope or binoculars will be required to see Saturn.
May 5: The rising Moon occults Neptune. The time given for Sydney for the reappearance of Neptune from behind the bright limb of the Moon is 3:55AM.
May 5: **Mars** near the crescent Moon in the early morning until dawn.
May 6: **Mercury** near the crescent Moon in the early dawn.

Comets

There are eight comets listed for the April and May sections of the *Astronomy 2024* yearbook. None are easily observable in terms of brightness or position. If you do not have a copy of the yearbook, a great reference online can be found at https://theskylive.com/comets. It is possible to put in your location for the best information.

Meteor Showers

	Active	Maximum	ZHR at maximum	Moon phase at maximum
Lyrids	**April 14-30**	**April 22-3**	**18**	**Full**
Pi-Puppids	**April 15-28**	**April 23**	**Low**	**Full**
Eta-Aquarids	**April 19-May 28**	**May 6**	**40**	**New**

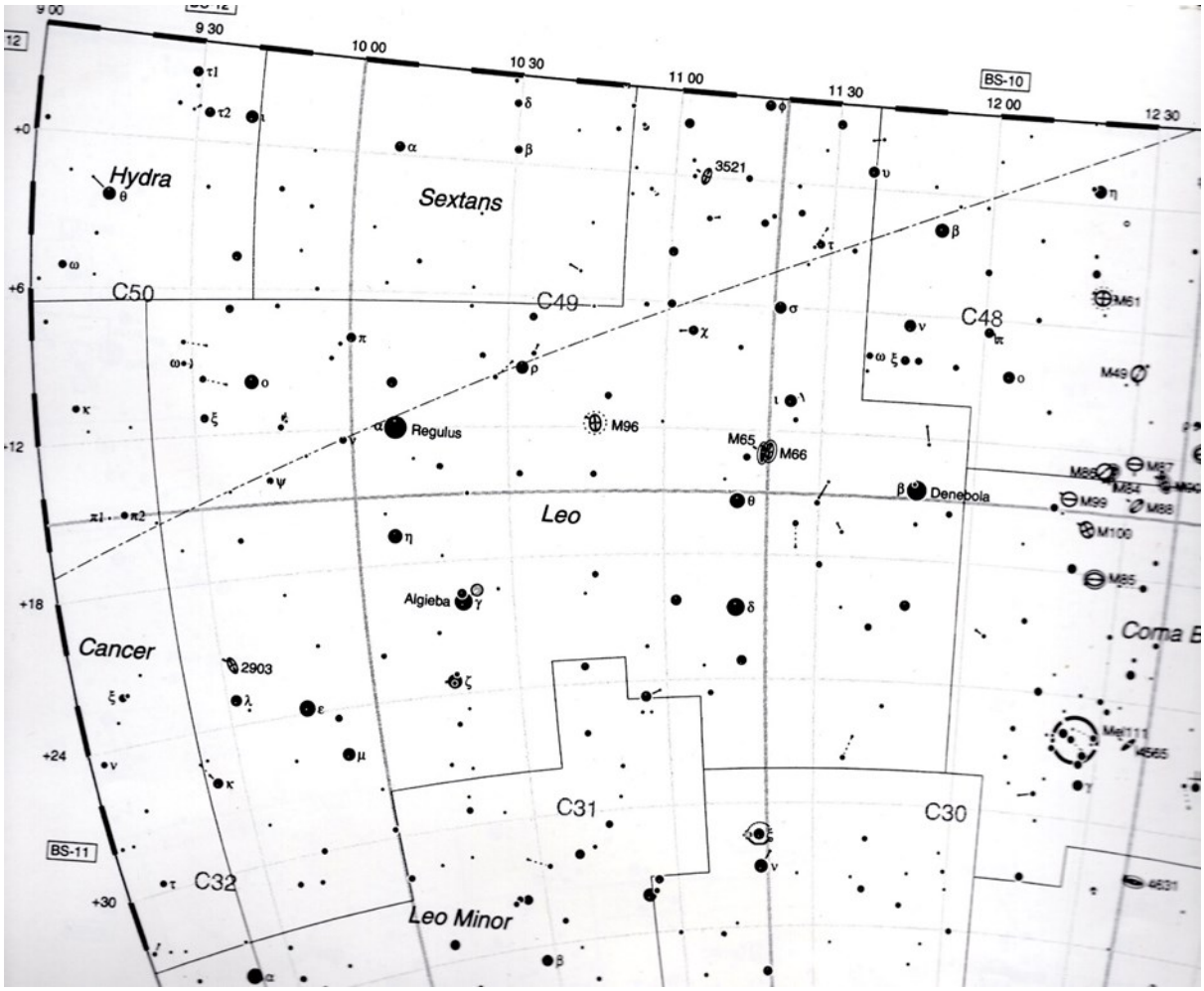
Beyond the Solar System

Observation Report Andrew Wood

Cont...2

Beyond the Solar System

At 9PM toward the end of April and beginning of May, the constellation Leo The Lion – lying on his head from our southern hemisphere position, takes up prime position high in the north. As far as deep sky objects go, Leo has galaxies galore; some of them bright and easy telescopic objects. The figure below, copied form the *Herald-Bobroff Astoratlas*, shows some of the best of these galaxies.



Easy to find from a relatively non-light polluted sky such as the suburbs of most of the Shoalhaven are M65 (NGC 3623 – magnitude 9.3) and M66 (NGC 3627 – magnitude 9.0), lying midway on the line between θ- and ι-Leonis. These two face-on spirals can be seen together in a wide field of view; with the added bonus of another galaxy, NGC 3628 (magnitude 9.5), an edge-on spiral with a dark lane, also being visible. These galaxies make up the Leo Triplet. An image taken from Wikipedia is shown below. A good imaging opportunity for the astro-photographers among us.

Observation Report Andrew Wood

Cont...3

Another bright Messier galaxy, M96 (NGC 3368, magnitude 9.2) is shown on the map above. Also very close to this galaxy, once again in the same low magnification wide-field, are M95 (NGC 3351, magnitude 9.7) and M105 (NGC 3397 magnitude 9.3). So Leo has yet another galaxy triplet.

The other two Leo galaxies shown on the map, NGC 2903 and NGC 3521, both magnitude 8.9, are also easy targets. You will also notice a heap of galaxies in the following constellation of Coma Berenices. This is the time of year for galaxy hunting. Get a more detailed star map and there are hundreds of fainter galaxies to hunt down with large aperture instruments.

Not needing large aperture are double stars. A couple of interesting examples in Leo are ι-Leonis (magnitudes 4.1, 6.7, separation 1.7") and Σ-1527 (magnitudes 7.0, 8.1, separation also 1.7"). [Ref: *The Cambridge Double Star Atlas*] ι-Leonis is easy to aim at: one of the stars, along with θ, between which M65 and M66 lie. Σ-1527 is also not far from M65/M66 at RA 11h 19m and Dec +14°16'. These two will be a good test for a telescope's double star splitting ability.

Clear skies and happy viewing.
Andrew Wood.

Always great to read and hear reports of observations of Solar System and Deep Sky Objects made by members, either visual descriptions or via images. Write a report of your observations for the *Astroflyer* or request a spot to speak at meetings.

Astro Quiz Andrew Wood

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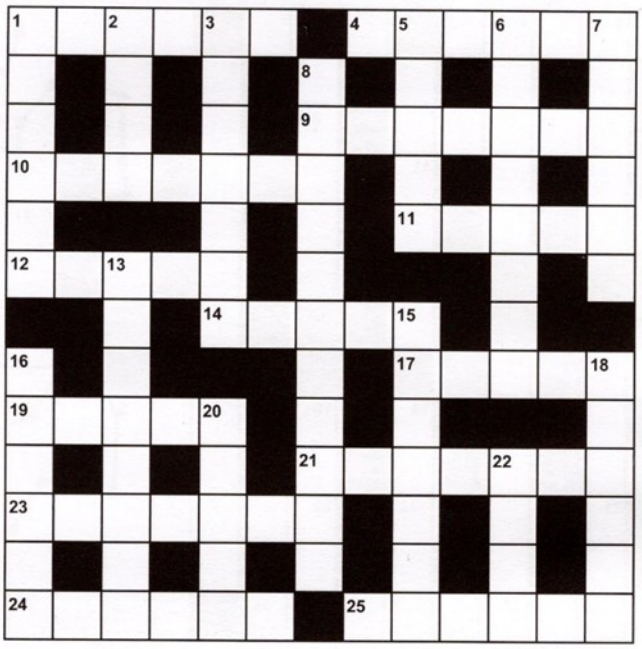
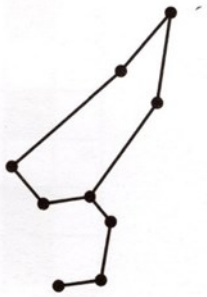
Crossword 2024





Across

1 Disengage (6)
4 Whipped cream dessert (6)
9 Moon of Uranus (7)
10 Become rigid (7)
11 Small constellation that is part of the zodiac (5)
12 More pleasant (5)
14 Shaped up (5)
17 Go in (5)
19 An orrery as a representation of the solar system, for instance (5)
21 Third-largest moon of Saturn (7)
23 Italian astronomer born in 1564 (7)
24 Sample of cloth (6)
25 Collect or store (6)

Down

1 Small oval plum (6)
2 Cab (4)
3 Solace (7)
5 Ellen ___ : first Hispanic woman in space (5)
6 Most foolish (8)
7 Pass (of time) (6)
8 This occurs when two planets or stars appear to be close together in the night sky (11)
13 Innermost most of Uranus (8)
15 Part of the ocean (4,3)
16 Pictorial representations (6)
18 Register of duties (6)
20 Sweet-scented shrub (5)
22 Rotate (4)

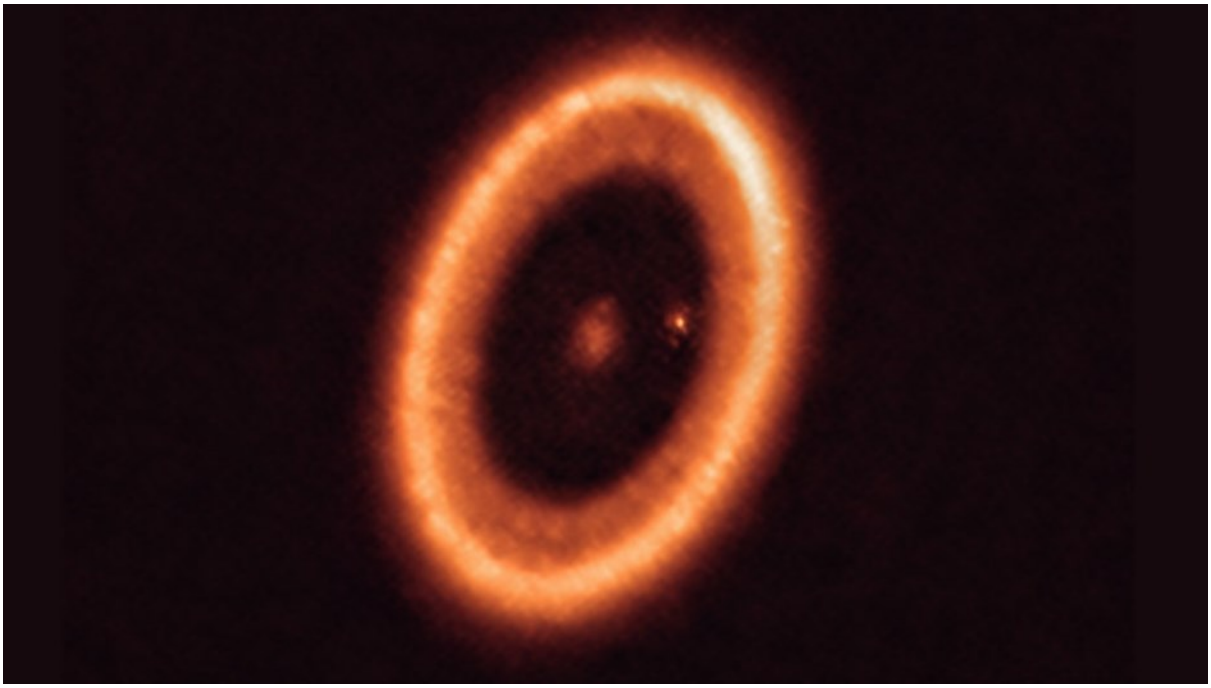
Solution to March Crossword

Astro Events from Frank Gross

James Webb Space Telescope spots hints of exomoons forming in infant star system

By Robert Lea

"PDS 70 is special as it is the only protoplanetary disk so far where all astronomers agree that we have found forming planets caught in the act."
The protoplanetary disk around the infant star PDS 70, which may contain the seeds of a third planet. (Image cred-



it: ALMA (ESO/NAOJ/NRAO)/Benisty et al.)
Three definitely isn't a crowd for planets around a distant infant star.

Astronomers had already discovered two planets forming in the disk of gas and dust, or protoplanetary disk, around the infant star PDS 70. Now, using the James Webb Space Telescope (JWST), astronomers with the MIRI mid-infrared Disk Survey (MINDS) project have seen hints of a third world taking shape around the fledgling star located around 400 light-years from Earth.

In addition to this, using JWST's Near Infrared Camera (NIRCam), the MINDS crew also saw a large spiral stream of material feeding the growth of one of the previously discovered planets, PDS 70C. This giant planet is already surrounded by its own disk of material, which is also being fed by this stream and is expected to birth moons.
"We found new evidence for the presence of a third planet in the system, which was proposed based on VLT observations," Valentin Christiaens, MINDS team member and postdoctoral researcher in astrophysics at KU Leuven and the University of Liège, told Space.com. (The VLT is the Very Large Telescope, which is operated by the European Southern Observatory in Chile.)
"Furthermore, the new infrared measurements we obtained for the two known protoplanets suggest the presence of heated material around them — which may be the building blocks for moons forming around them," Christiaens added.

The PDS 70 system has already been well-studied by a plethora of telescopes, including the ground-based Atacama Large Millimeter/submillimeter Array (ALMA) and the VLT.

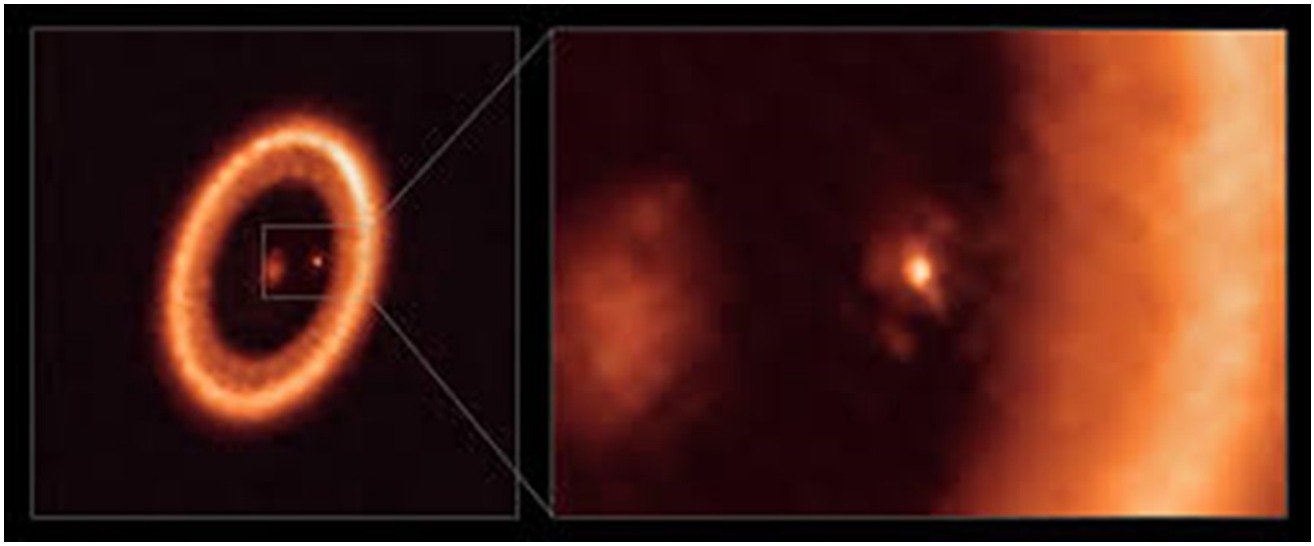
It remains a fascinating system for astronomers because the protostar and its protoplanetary disk are estimated to be no older than 5.5 million years — a cosmic infant compared to our 4.5-billion-year-old solar system.

Cont...2

"PDS 70 is special, as it is the only protoplanetary disk so far where all astronomers agree that we have found forming planets caught in the act," Christiaens said. "Detailed study of this system has thus allowed us to learn a lot about planet formation."

The researcher said that little is known about the properties of the potential third planet around PDS 70 thus far. The planet — which, if confirmed, would be designated PDS 70D — appears to be shrouded in a vast amount of dust, and it orbits its infant star at around 13 times the distance between Earth and the sun.

"What is interesting is that this separation places it near 1:2:4 mean-motion resonance with planets PDS 70B and PDS 70C. This means its orbit would be almost exactly twice as short as B and four times shorter than planet C, respectively," Christiaens said. "This is a situation we know in the solar system with the three innermost Galilean moons of Jupiter: Io, Europa, and Ganymede."



Obsevations of the exoplanet PDS 70b taken with ALMA that show it being tailed by a cloud of dust indicating a "Trojan planet." (Image credit: ALMA (ESO/NAOJ/NRAO) /Balsalobre-Ruza et al.)

Spiral accretion streams like the one spotted by the team have been previously predicted theoretically in the protoplanetary disks around young stars. Signals of these streams have even been seen in other young systems. Yet this new discovery still stands out, team members said.
"It's the first time that we can directly connect this feature to a forming planet," Christiaens said. "This may suggest that some of the spirals observed in other protoplanetary disks may also be associated with forming planets. Thus, these findings have led to an increased suspicion that spirals observed in other disks may very well also be directly connected to planets embedded in their disk."

"The most surprising aspect to me was certainly finding this signal consistent with a third planet, as I was originally very suspicious about the original claim made in the first work — I thought the signal may have been tracing the tip of the inner disk," he said.

When the researchers applied their best image-processing algorithms, they saw an extra signal in their images, which did not seem to correspond to the disk or to the other known planets. This signal also happens to be where they'd expect the candidate proposed earlier to be now, if that signal indeed traces a planet moving in its orbit.

Cont...3

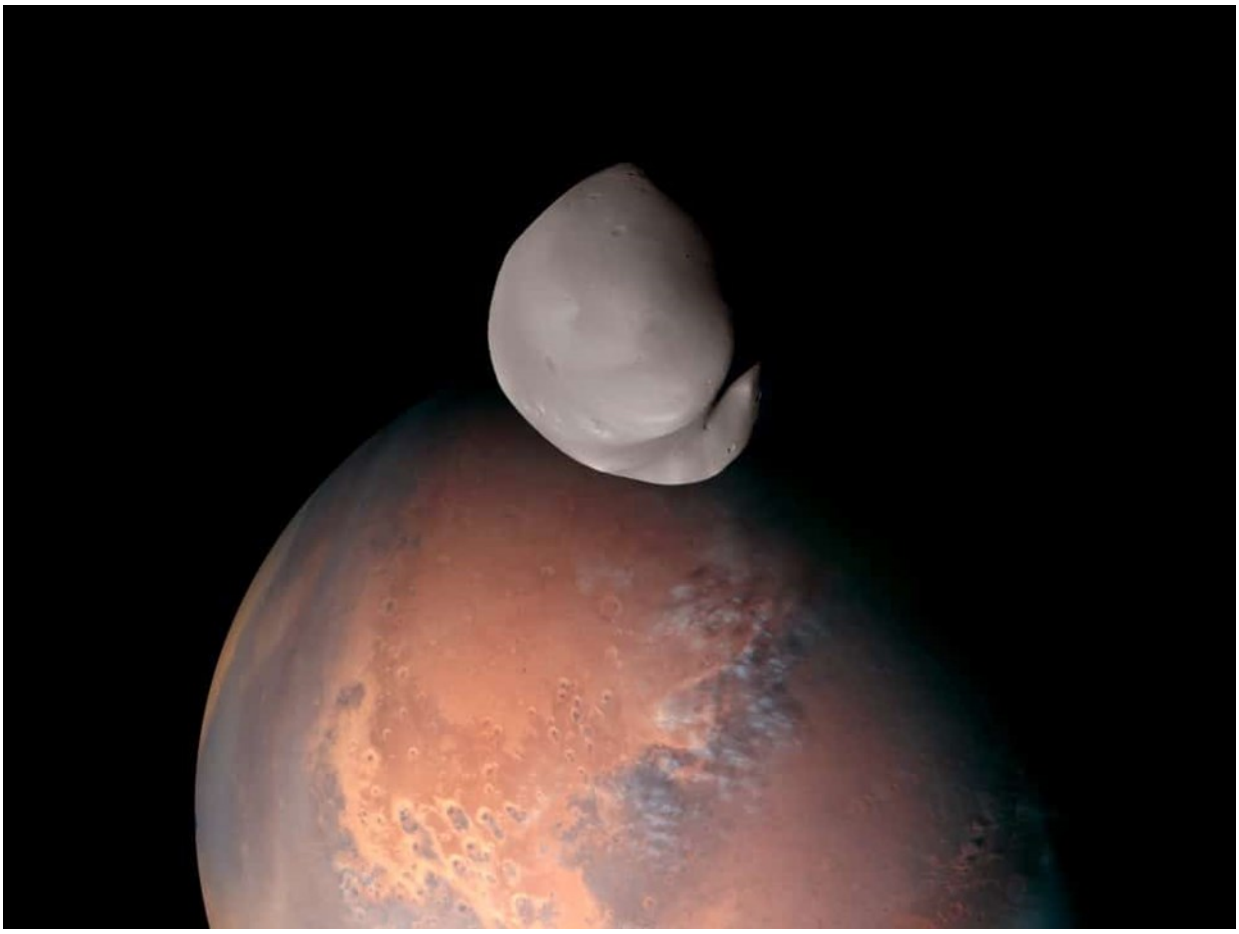
"The third planet was first detected in ground-based observations. We did not expect to re-detect it," Christiaens said. "It was not the original goal at all of this observation to confirm it!"

And the team has more JWST observations of the PDS 70 system to analyze.

"In the mid-term future, it will be a very interesting system to follow up with the Extremely Large Telescope (ELT), in particular, to confirm and potentially characterize the third planet candidate," Christiaens concluded. "This could help us better understand the composition of the forming planets and the properties of the material around the planets, the building blocks for potential moons."

Emirates Mars Mission takes first high-resolution images of Mars' moon Deimos

25 Apr 2023



Close-up: Deimos with Mars in the background as taken by the Emirate Mars Mission on 10 March 2023 (courtesy: Emirates Mars Mission)

The United Arab Emirates' Mars probe has taken the first high-resolution images of Deimos, the smaller and lesser observed of Mars' two moons. The images were released yesterday at the week-long European Geosciences Union meeting in Vienna.

Astro Events from Frank Gross

Cont...4

The Emirates Mars Mission, also known as Hope, was launched in July 2020 and arrived at Mars in February 2021. The probe carries three instruments: an ultraviolet spectrometer, an infrared spectrometer and a high-resolution imager.

The image above, taken on 10 March, shows Mars and the near-side of Deimos captured in their exact relative positions. According to Hope science lead Hessa Al Matroushi from the Mohammed Bin Rashid Space Centre, the craft's orbit allowed many flybys of Deimos that resulted in the clear images with the closest distance the probe came to the moon being 100 km.

"Because of our orbit we are able to take pictures not only from the near-side, but from the far side as well," Al Matroushi told *Physics World*. "We are looking at Deimos from all sides."

Data from Hope's ultraviolet spectrometer matches that from Mars' other moon – Phobos. This suggests that the two moons likely have their origins from breakoff matter from Mars, which has a basaltic make-up.

The main aim of Hope is to study the atmosphere of Mars and the mission has been extended for one more year. Al Matroushi hopes to now observe the effects of the varying solar cycle on the planet.

Al Matroushi also expects Hope's findings to benefit other missions such as Japan's Martian Moon Exploration, which is set to launch next year and plans to study Phobos and Deimos as well as retrieve samples from Phobos.
"It is very important how missions can benefit one another," adds Al Matroushi. "No one mission can do it all."

Club News

The AGM was held at the July 2023 monthly meeting. Elected officials for 2023- 2024

Executive
President: Frank Gross
Vice President: Laurence Wakelin
Secretary : Andrew Wood
Treasurer: Frank Gross
Public Officer; Frank Gross

Andrew Wood
Mark Town
John Gould
Ian Scott

Operation Positions
Website Manager: Steve Holloway
Observation Officers: Andrew Wood, Mark Town and John Gould
Editor: Kaye Johnston
Librarian: Chris O'Hanlon
Equipment Officer: Andrew Wood

Committee General Members:
Laurence Wakelin
Frank Gross
Andrew Wood
Mark Town
John Gould
Ian Scott

Club Notices

Astronomy yearbook and calendar

This year, we will not be ordering these publications to sell to members. For anyone wanting to purchase them, the details are as follows:
Astronomy 2024 can be purchased through Quasar Publishing https://quasarastronomy.com.au/ . This publication, once it becomes available, can also be found in bookshops and newsagents.
Astronomy Calendar 2024 can be purchased through Astrovisuals https://astrovisuals.com/ .
National Australian Convention of Amateur Astronomers (NACAA)
NACAA will be held in Parkes over the Easter weekend of 2024. See https://nacaa.org.au/2024/programme .

Dear Members of Shoalhaven Astronomers
This is a reminder to members who paid last year, and have not yet paid membership for 2023-4, that fees are due. My apologies if there has been a mistake. If you have paid let me know and I will check with our treasurer Frank Gross. I know that in some cases illness may be a factor at the present time.

Payment ($30) can be made at club meetings.

Or Pay by direct deposit into the club IMB account – Please ensure your name is in the reference section. BSB 641800 Account 009135475

Hoping for your continuing membership – the Shoalhaven Observatory is now open and functional!

Kind Regards Andrew Wood Secretary

Check out the Astro Flyer on the web site: www.shoalhavenastronomers.asn.au

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The deadline for Articles for the Astro Flyer is The First Friday of the Month.

Editor Kaye Johnston