

Star Dust

Newsletter of National Capital Astronomers, Inc.

capitalastronomers.org

January 2022

Volume 80, Issue 5

**Celebrating 85 Years
of Astronomy**

Next Meeting

When: Sat. Jan. 8th, 2022

Time: 7:30 pm

Where: Online (Zoom)

See instructions for joining the meeting on Page 8.

Speaker: Dr. Peter Driscoll

Table of Contents

Preview of Jan. 2022 Talk.....1

Recent Astronomy Highlights.....2

James Webb Space Telescope..2

Mariner 9 Remembered, Part 2..3

Exploring the Sky.....3

Sky Watchers.....4

Occultations.....5

NASA's Juno Records Ganymede's
Magnetic Field.....6

Calendar of Events.....7



NASA's Juno Mission took the image above of Ganymede, Jupiter's largest moon, during a June 2021 flyby which included measuring the moon's magnetic field. (See article on Page 6)
Image Credit – NASA/ JPL-Caltech/
SwRI/ MSSS

Planetary Magnetic Fields: Generation, Detectability, and Habitability

Peter Driscoll

Earth & Planets Laboratory of the Carnegie Institution for Science

Planetary magnetic fields are thought to be critical to the long-term habitability of rocky planets but are difficult to study due to their inaccessibility deep within planetary cores. Only three requirements are needed to generate a magnetic field by dynamo action: 1) planetary rotation, 2) a large volume of electrically conducting liquid, and 3) an energy source to drive convection. The first two are common planetary features but the third, convection, is more challenging to maintain over long time-scales. In this talk I will overview the magnetic fields of the solar system and the history of the geomagnetic field, and describe how dynamos generate magnetic fields in planetary cores. Finally, I will speculate on how the magnetic fields of exoplanets might be important for their habitability and remotely detectable.



Biography: Peter Driscoll is a Staff Scientist in the Geophysics Group at the Earth and Planets Laboratory of the Carnegie Institution for Science, Washington, D.C., studying the dynamical evolution of Earth and planetary interiors. He earned a B.S. in Physics and Astronomy from Dickinson College in 2003, an M.S. in Physics from San Francisco State University in 2006, and an M.A. and Ph.D. in Earth and Planetary Science from Johns Hopkins University in 2008 and 2010, respectively. He went on to become a Bateman Postdoctoral Fellow at Yale University from 2010-2013 and a NASA Astrobiology Postdoctoral Fellow at the

continued on page 2

Recent Astronomy Highlights

Possible Record-Breaking Coronal Mass Ejection From Nearby Star

Astronomers have observed superflares, flares approximately 10 times brighter than any we have seen produced by the Sun, coming from yellow dwarf stars like the Sun. Based on these observations, predictions have been made that coronal mass ejections, CMEs, eruptions of plasma from a star, accompanying such superflares should also be up to ten times as massive, but until recently observations of any CME from another star have not been made. On April 5, 2020, just such an observation may have been made for EK Draconis a young yellow dwarf star, between 50 and 125 million years old, 111 light years away. A superflare was followed approximately 30 minutes later by what appeared to be a CME with a mass estimated at ten times that of anything seen from our Sun. More information can be found at www.space.com/sunlike-star-ek-draconis-superflare.

Rogue Exoplanets

Using wide-field images collected over a period of twenty years by various telescopes, a team of astronomers was able to detect between 70 and 170 rogue exoplanets in a region of the Milky Way known as the Upper Scorpius OB Stellar Association. The astronomers searched the archive on the assumption that rogue exoplanets that were only a few million years old would still be hot and radiating enough light to be detectable by telescope. They also looked for movements of the candidates over the years. There have been two theories about the formation of rogue exoplanets, the first being that they form in protoplanetary disks of star systems and are subsequently ejected, and the second is that they form directly from the collapse of clouds of gas. The high number of rogue exoplanets detected seems to indicate that both processes are taking place and that such planets might number in the billions or even trillions in the Milky Way. More info is at gizmodo.com/astronomers-spot-upwards-of-170-rogue-exoplanets-the-l-1848257995.

Abstract and Biography – continued from page 1

University of Washington, Seattle, from 2013-2015. He joined Carnegie Science in 2015 where his research relies on large-scale numerical simulations to investigate the dynamics and evolution of planetary interiors.

James Webb Space Telescope Launch

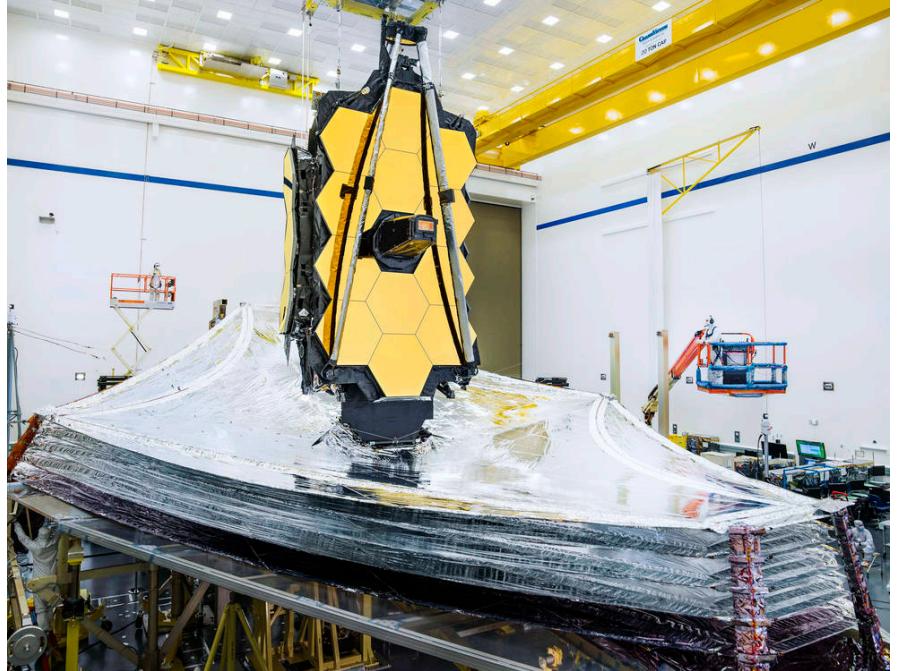
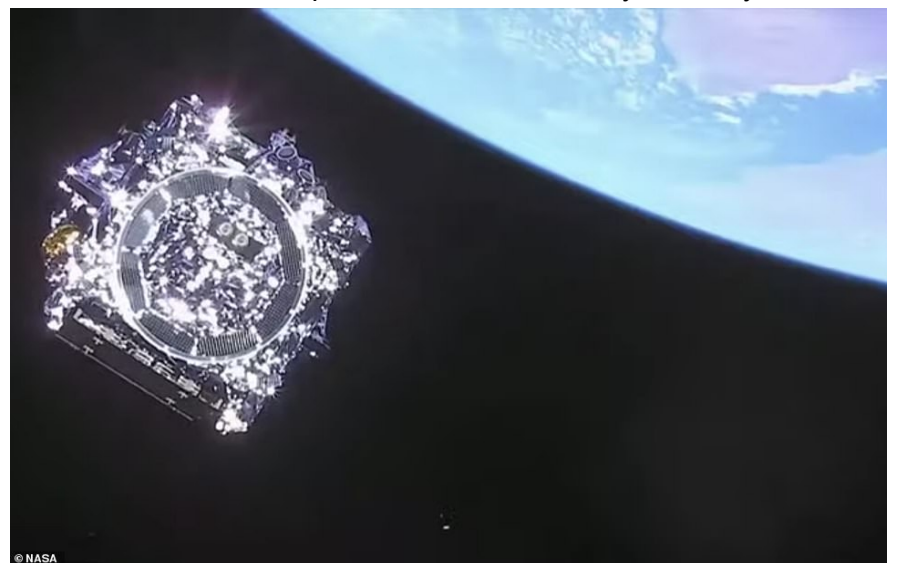


Image Credit – NASA/Chris Gunn

After years of delays, the James Webb Space Telescope was launched on the morning of December 25, 2021. Afterward officials proclaimed that the launch was perfect. Indeed, it was revealed that the launch had left the telescope so close to being on target for its destination that it had saved fuel which could help extend the mission beyond ten years.



A final view of JWST on its way to Lagrange Point 2. Image Credit - NASA

continued on page 3

Exploring the Sky



“Exploring the Sky” is an informal program that, for over 70 years, has offered monthly opportunities for anyone in the Washington area to see the stars and planets through telescopes from a location within the District of Columbia. Presented by the National Park Service and National Capital Astronomers, sessions are held in Rock Creek Park once each month on a Saturday night from April through November. Beginners (including children) and experienced stargazers are all welcome—and it’s free!

Hosted by: [National Capital Astronomers, Inc](#) and [Rock Creek Park](#)

Due to the ongoing Coronavirus Pandemic, Exploring the Sky sessions are canceled. When the situation changes, sessions will once again be scheduled.

More information can be found at NCA’s web site, www.capitalastronomers.org or the Rock Creek Park web site, www.nps.gov/rocr/planyourvisit/expsky.htm. You can also call the Nature Center at (202) 895-6070. For general information on local astronomical events visit www.astronomyindc.org

The article-submission deadline for February’s issue of Star Dust, is January 21st.

Clear Skies!

James Webb Space Telescope Launch – continued from page 2

With the launch successfully completed, a period described as ‘29 Days on the Edge’ began, during which the unfolding and deployment of JWST’s components will take place. At the time of writing of this article, one of the most critical sequences, the deployment of the sunshield is ongoing. A video giving an overview of all that is involved in this process can be found at www.youtube.com/watch?v=uUAvXYW5bmI. Another video, showing the incredible engineering involved in the creation of JWST is at www.youtube.com/watch?v=aICaAEXDJQQ. The video even has talk of the possibility for a robotic mission to refuel the telescope to extend its lifespan well beyond a decade.

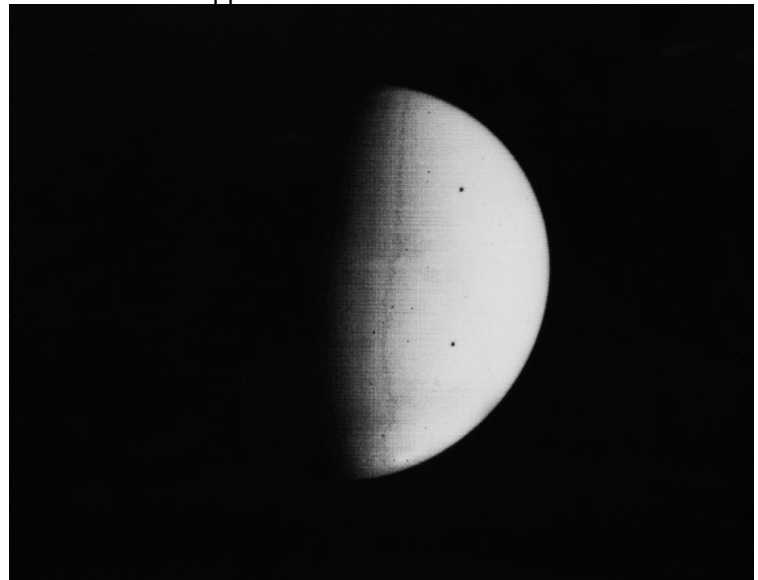
In real time, one can keep up with the deployment of JWST at jwst.nasa.gov/content/webbLaunch/whereIsWebb.html and blogs.nasa.gov/webb/.

As for what the telescope will eventually see, the speculation is that it will be able to detect the earliest galaxies, and perhaps even give information about the first stars that were formed. Whatever it does see, it will undoubtedly further our understanding of the history and nature of the Universe. Brian Greene recently put out a video in which he interviews some prominent scientists about what JWST is expected to study. The video is at www.youtube.com/watch?v=WtjkNsnC--A.

Mariner 9 (1971&1972) Remembered @ Fifty, Part 2

Daniel J. Costanzo – NCA Past President (1991-1992)

(Part 1 in this series appeared in the December 2021 issue of Star Dust)



Mariner 9 Mars approach image presenting a global-dust-storm-enshrouded disk. Image Credit - NASA

Exactly fifty years ago, as 1971 turned into 1972, Apollo’s three true science Lunar missions were in full stride. (Apollo 15 launched in July 1971, Apollo 16 in April 1972, and Apollo 17 in December 1972 as Apollo’s final Moonshot.) Yet, 1972 would end with the Apollo Moonshot Era coming to an abrupt end as well. For NASA was directed to wind it down, having met President Kennedy’s national challenge to win the Space Race by putting “A Man on the Moon” in America’s Cold War battle against Communism.

continued on page 4

Sky Watchers

January/February

Mercury will be lower in the evening sky as the days progress. Venus will transition from the evening sky, to the morning sky in early January. Mars will be in the morning sky. Jupiter and Saturn will be in the western sky at sunset through January, but the ringed planet will reach solar conjunction, beginning to transit to the morning sky on Feb. 4th.

1/17	Full Moon at 6:51 p.m.
------	------------------------

All times are in EST (Eastern Standard Time)

Mariner 9 (1971&1972) Remembered @ Fifty, Part 2 – continued from page 4

Meanwhile, come January 1972, across the proverbial ethereal gulf of interplanetary deep space between Earth and Mars, little Mariner 9 was about to complete her second month in Mars orbit, having successfully inserted herself into it without any major problems in November 1971.

Because Mariner 9's twin sister-craft, Mariner 8, was destroyed in a failed launch attempt shortly before the former's successful launch in May 1971, NASA reprogrammed Mariner 9 to accomplish all the objectives originally planned for the twin spacecrafts' complimentary missions under NASA's Mariner Mars 71 Project.

Yet, there now was a big problem, not with the spacecraft, but with Mars. For, while Mariner 9 was still on her 398-million-kilometer (247-million-mile), 167-day-long flight to Mars, Planet Number Four had brewed up one of the largest global storms ever observed, as if consciously reluctant to give up his secrets. So, upon the spacecraft's arrival, Mars presented a disk that was bland and featureless, except for two partially obscured polar caps, and four mysterious dark spots. This storm was so strong that even the bright polar caps were occasionally briefly hidden from view.

So, Mariner 9 waited patiently in orbit above this global dust storm as it raged week, after week, after week, burning her limited supply of attitude control gas as she waited.

However, though this storm was inconvenient, it offered the first ever prime science opportunity for any spacecraft to study one of these dramatic and dynamic Martian events close up, and investigate how they influence Mars' atmosphere and surface. For Mariner 9's primary goals not only were mapping Mars's surface from pole-to-pole, but also monitoring Mars' atmosphere over time.

So, while Mariner 9's television photography cameras waited to start imaging Mars' surface, the craft's then state-of-the-art ultraviolet and infrared sensors gathered data on the global dust storm itself, while radio occultations plumbed Mars' atmosphere.

Finally, by January 1972's second week, seemingly consciously reluctant Mars dissipated enough of his global dust storm for Mariner 9 to start her full mission in earnest, particularly by capturing her first sharp images of the surface. They (along with all the other scientific data she gathered on all matters Martian) were poured back across

continued on page 6

Star Dust is published ten times yearly September through June, by the National Capital Astronomers, Inc. (NCA).

ISSN: 0898-7548

Editor: Todd Supple

Editorial Advisors:

- Michael Chesnes
- John D. Gaffey, Jr.
- Jeffrey Norman
- Elizabeth Warner
- Wayne Warren
- Marjorie Weissberg
- Harold Williams

Electronic Distributor: Jay Miller



Please Get Star Dust Electronically

NCA members able to receive Star Dust, the newsletter of the NCA, via e-mail as a PDF file attachment, instead of hardcopy via U.S. Mail, can save NCA a considerable amount of money on the printing and postage in the production of Star Dust (the NCA's single largest expense), save some trees and have one-click access to all the embedded links in the document. If you can switch from paper to digital, please contact Henry Bofinger, the NCA Secretary-Treasurer, at hbofinger@earthlink.net

Thank you!

Recent Astronomy Highlights – continued from page 2

'Touching' the Sun

At 9:33 a.m. (Universal Time) on April 28th 2021, the Parker Solar Probe crossed through what is known as the Alfvén Surface into the corona, or atmosphere, of the Sun, at a distance of 14 million kilometers from its surface. The event was only recently announced, after the data had been downloaded from Parker and analyzed. The crossing took Parker from a region dominated by the high-speed solar wind into a region with slower winds and lower plasma densities. The probe orbited through the region for approximately five hours as part of its eighth of a proposed 24 orbits. More information on this historic accomplishment can be found at www.sciencedaily.com/releases/2021/12/211214134947.htm.

continued on page 7

Occultation Notes

- D following the time denotes a disappearance, while R indicates that the event is a reappearance.
- The times are for Greenbelt, MD, and will be good to within +/-1 min. for other locations in the Washington-Baltimore metropolitan areas unless the cusp angle (CA) is less than 30 deg., in which case, it might be as much as 5 minutes different for other locations across the region.
- Some stars in Flamsteed's catalog are in the wrong constellation, according to the official IAU constellation boundaries that were established well after Flamsteed's catalog was published. In these cases, Flamsteed's constellation is in parentheses and the actual constellation is given in the notes following a /.
- Mag is the star's magnitude.
- % is the percent of the Moon's visible disk that is sunlit, followed by a + indicating that the Moon is waxing and - showing that it is waning. So 0 is new moon, 50+ is first quarter, 100+ or - is full moon, and 50- is last quarter. The Moon is crescent if % is less than 50 and is gibbous if it is more than 50.
- Cusp Angle is described more fully at the main IOTA Web site.
- Sp. is the star's spectral type (color), O,B,blue; A,F,white; G,yellow; K,orange; M,N,S,C,red.
- Also in the notes, information about double stars is often given. "Close double" with no other information usually means nearly equal components with a separation less than 0.2". "mg2" or "m2" means the magnitude of the secondary component, followed by its separation in arc seconds ("), and sometimes its PA from the primary. If there is a 3rd component (for a triple star), it might be indicated with "mg3" or "m3". Double is sometime abbreviated "dbl". Often, rather than the separation, I give "dTime" or "dT", the time difference of the secondary star occultation relative to the primary star's occultation.
- Sometimes the Axis angle (AA) is given. It is the angle measured around the Moon's disk, from the Moon's axis of rotation. It can be used with a lunar map to tell where a star will reappear relative to lunar features.

Mid-Atlantic Occultations

David Dunham

Asteroidal Occultations

2022	Day	EST	Star	Mag.	Asteroid	dmag	dur.	Ap.	Location
Jan 7	Fri	3:59	TYC18930322	11.5	Peraga	0.6	12	5	s&wMD,DC,nVA,COH
Jan 9	Sun	1:25	4UC61233094	13.8	Zeuxo	0.8	5	11	s&wMD,DC,nVA,OH
Jan 12	wed	4:04	4UC59029795	14.0	Velleda	0.3	4	11	MD,DC,nVA,SWPA
Jan 12	wed	20:36	4UC63025932	14.1	Durech	3.8	1	11	nNJ,sePA,CMD,nVA
Jan 14	Fri	19:53	4UC61042203	12.3	Theobalda	1.0	6	6	NJ,eMD,CVA;DC?
Jan 15	Sat	2:04	SAO 80222	7.8	wells	7.4	3	2	SNC,nSC,nGA,SAZ
Jan 19	wed	20:00	4U452122804	13.4	Patria	3.4	.8	10	nVA,CMD,SNJ;DC?
Jan 24	Mon	22:17	SAO 110026	9.8	walkure	5.5	1.5	4	SAZ,SKY,SWV,CVA
Jan 25	Tue	22:39	4UC45216423	10.0	Herluga	5.2	5	4	eNC,se-CVA,WV,OH
Jan 27	Thu	19:59	4UC50619927	14.4	Luscinia	0.8	10	12	DE,c&wMD,DC,nVA
Jan 30	Sun	23:12	4UC52549807	14.4	Musa	0.5	2	12	SMD,nVA,COH;DC?
Feb 5	Sat	1:49	4UC47741001	13.7	Prokne	0.3	10	9	eNC,c&nVA,SWPA
Feb 8	Tue	0:05	4UC47944449	13.4	Vundtia	0.9	7	8	MD,s-wPA;DC,nVA?
Feb 10	Thu	3:12	4UC51652583	13.0	Eucharis	0.3	9	8	se-nVA,wMD;DC?
Feb 11	Fri	4:56	4UC34789304	13.4	Arenda	3.8	1.2	9	COHio,nwV,nCVA

Lunar Grazing Occultations

2022	Day	EST	Star	Mag	% alt	CA	Location, Notes
Jan 7	Fri	17:56	ZC 3516	8.4	32+	42 16S	CrmlChrch,VA;Shilo,nwyeMls,MD
Jan 27	Thu	4:50	SAO 183967	8.8	29-	19 17S	ClrkSbg,witeok,sLnhm,6Flgs,MD
Feb 4	Fri	20:39	ZC 49	6.1	17+	8 10S	nEmporia,nSuffolk,nNorfolk,VA
Feb 9	wed	20:19	56 Tauri	5.3	64+	65 9S	Cumbrlnd,MD;nYork,nLancstr,PA

Lunar Total Occultations

2022	Day	EST	Ph Star	Mag	% alt	CA	Sp. Notes
Jan 8	Sat	21:39	D ZC 95	7.0	43+	23 82S	F8 close double??
Jan 8	Sat	22:23	D SAO109441*	7.7	43+	15 55N	G5 Azimuth 258 degrees
Jan 9	Sun	19:28	D 95 Piscium	7.2	52+	53 88S	G0 ZC 212, close double
Jan 11	Tue	23:53	D ZC 450	6.4	72+	32 50S	K3
Jan 13	Thu	18:56	D ZC 688	6.8	86+	57 43N	F2 mg2 10 dTime -2s
Jan 14	Fri	0:08	D SAO 76720	7.0	87+	50 59S	B3 dist. comp. of tauTauri
Jan 14	Fri	0:09	D tau Tauri	4.3	87+	50 63S	B3 ZC 709, close double
Jan 14	Fri	1:17	D SAO 76729*	6.9	88+	37 44S	B9 close double??
Jan 14	Fri	21:00	D SAO 77200	6.7	93+	71 44N	B9 comp. of 118 Tauri
Jan 14	Fri	21:00	D 118 Tauri	5.8	93+	71 44N	B9 ZC 822, +16s from prev.
Jan 25	Tue	2:57	R SAO 158313	7.5	52-	26 63S	K5
Jan 27	Thu	4:50	G SAO 183967	8.8	29-	19 17S	F8 MD graze, see above
Jan 27	Thu	5:12	R ZC 2281	7.1	29-	21 65S	A0
Jan 28	Fri	5:50	R ZC 2442	5.9	19-	15 70S	M1 Azimuth 141 degrees
Jan 28	Fri	5:57	R 26 Oph	5.7	19-	16 84N	F3 ZC2443, close double
Feb 2	wed	17:53	D ZC 3323	7.5	4+	13 -2N	A5 Sun -5, Az. 240 deg.
Feb 4	Fri	17:49	D SAO 128698	7.0	16+	38 30N	G5 Sun alt. -4 deg.
Feb 4	Fri	20:22	D ZC 49	6.1	17+	12 40S	K1 Az. 257 deg.; VA graze
Feb 6	Sun	18:04	D ZC 283	6.6	34+	56 84S	M0 Sun alt. -6 deg.
Feb 7	Mon	21:20	D ZC 406	7.9	45+	36 50S	F5 mg2 10.6 dTime -3s
Feb 7	Mon	23:30	D SAO 93121	8.2	46+	12 63S	G0 Azimuth 279 deg.
Feb 8	Tue	20:42	D SAO 93468*	8.1	54+	54 31N	F8
Feb 8	Tue	21:02	D SAO 93476*	8.2	54+	50 52N	A0
Feb 8	Tue	23:06	D ZC 519	7.6	55+	27 88N	K5
Feb 9	wed	23:39	D kappaTauri	4.2	64+	32 82S	A7 ZC 656, close double?
Feb 9	wed	23:44	D 67 Tauri*	5.3	65+	31 59S	A7 ZC 657, close double?
Feb 10	Thu	17:57	D 103 Tauri	5.5	72+	62 70S	B2 Sun -4,ZC 767,close dbl
Feb 11	Fri	16:48	D 139 Tauri	4.8	80+	41 14N	B1 Sun +9,ZC 900,close dbl
Feb 11	Fri	19:24	D SAO 77880	8.0	80+	69 79S	F6 mg2 10.2 dTime +0.6s
Feb 12	Sat	0:43	D TU Gem	7.3	81+	40 77N	*6 ZC 932,mg2 9 dTime +1s
Feb 12	Sat	20:51	D 39 Gem	6.2	88+	74 77S	F8 ZC1061, close double??
Feb 12	Sat	21:55	D 40 Gem	6.4	88+	76 19S	B8 ZC1062, close double??
Feb 13	Sun	3:19	D ZC 1085	7.1	89+	20 82N	G8 mg2 7.8 sep 124" dT +4m

*in Kepler2 program so occultation light curves are sought.

More information is at <http://iota.jhuapl.edu/exped.htm>
David Dunham, dunham@starpower.net

Results of Recent Asteroidal Occultations by David Dunham

On Dec. 17, David Dunham gave a presentation about the results of several 2021 asteroidal occultations at the online meeting of the East Valley Astronomy Club in Gilbert, AZ. Paths for some future events are shown and a final slide with resources for new observers is included. You can obtain it at <http://iota.jhuapl.edu/DunhamMemberPresentationLong.pdf>.

2021-2022 Officers

President:

Harold Williams
haroldwilliams@me.com or
Harold.Williams@montgomerycollege.edu
 240-461-4948

Vice-President:

John Hornstein
jshgwave@yahoo.com
 301-593-1095 (h)

Secretary-Treasurer:

Henry Bofinger
hbofinger@earthlink.net
 202-675-1075

Asst. Secretary-Treasurer:

Jeffrey B. Norman
jeffreynorman@comcast.net

Trustees:

- Michael Brabanski (2022)
- Guy Brandenburg (2023)
- Jack Gaffey (2024)
- Benson Simon (2025)

Appointed Officers and Committee Heads:

Exploring the Sky

Jay Miller
jhmillier@me.com

Telescope Making

Guy Brandenburg
gfbrendenburg@yahoo.com
 202-262-4274 (leave message)

NCA Webmaster

Elizabeth Warner
warnerem@astro.umd.edu
 301-405-6555

Star Dust Editor

Todd Supple
NCAStardust@gmail.com
 301-595-2482 (h)

Social Media

Twitter: [@NatCapAstro](https://twitter.com/NatCapAstro)

Mariner 9 (1971&1972) Remembered @ Fifty, Part 2 – continued from page 4

deep space to Earth at what then was an excellent maximum rate of 16,200 bits per second, to be picked up by the NASA Deep Space Network's sensitive radio dishes, and sent to the Jet Propulsion Laboratory (where mission control was located) for analysis.

Upon Mariner 9's finally exhausting her attitude control gas supply and being turned off on October 27, 1972 (thus, she operated in Mars orbit almost an entire Earth year), she not only became humanity's first spacecraft to attempt to, and succeed in, orbiting another world beyond the Moon, but also became the first to explore from orbit almost that world's entire surface in relatively high spatial detail, radioing earthward what was then considered a tremendous scientific data treasure trove totaling 54 billion bits (in 8-bit bytes, that was 6.75 gigabytes). That included capturing 7,329 images covering almost all of Mars' surface.

Though Mariner 9's scientific data haul was miniscule by today's standards, it fostered astounding discoveries about Mars that sometimes even grabbed from Apollo's three final Moonshots newspapers' front page space exploration news "Above The Fold" headlines.

(Those discoveries, and their reverberations, throughout both science and society, will be summarized in this series' later parts.)

Fifty all too short years later, NASA's Internet/Web pages give a full, but dry, account of this intrepid robotic explorer's achievements in Cosmic Discovery thanks to her dedicated team of scientists, engineers, and support staff.

Yet, those achievements' real contribution to humanity's long journey of reaching for the stars was dramatically explained to me in 1999, during Apollo 11's 30th Anniversary celebration at the Smithsonian Institution's National Air and Space Museum. That was when I had a chance to talk with the renowned Apollo Moonshot Era geologist Farouk El-Baz. So, I asked him, not about Apollo's legacy, but about Mariner 9's. And El-Baz summed up this outstanding Mars mission in his colorfully exuberant way that helped convert Apollo's originally reluctant astronauts into certified field geologists: "MARINER 9 SCARED THE HELL OUT OF US!"

NASA's Juno Spacecraft Records Ganymede's Magnetic Field

On June 21, 2021, NASA's Juno spacecraft flew within 645 miles of the surface of Jupiter's largest moon, Ganymede, also the largest moon in the Solar System. During that flyby, Juno's Waves instrument, which was designed to monitor radio and plasma waves around the gas giant, took measurements of Ganymede's magnetic field. Those measurements were later converted into an audio recording which was recently released and is available at earthsky.org/space/juno-discoveries-jupiter-magnetic-field-audio/.

The Waves instrument has also mapped out Jupiter's magnetic field over the years in which it has orbited the planet. Those measurements have shown changes in the magnetic field, particularly around what has been designated Jupiter's Great Blue Spot. Blue refers not to the color of the region, but to the fact that magnetic regions are generally classified as blue for south and red for north. More on these findings can also be found at the link above.

Recent Astronomy Highlights – continued from page 4

Magnetic Field Likely Detected Around An Exoplanet For The First Time

Using the Hubble Space Telescope, astronomers observed the planet known as HAT-P-11b, a Neptune-sized planet, 123 light years from Earth, during six transits of its host star. During those transits, the scientists detected carbon ions surrounding the planet and streaming away from it at approximately 100,000 miles per hour in a long tail that is over one Astronomical Unit (AU – the average distance from the Sun to the Earth) in length. The most probable explanation for observations is that a magnetic field is being generated by HAT-P-11b and is deflecting the carbon ions as observed. The discovery will likely help in further understanding of how magnetic fields form around planets and exoplanets. More information, as well can be found at phys.org/news/2021-12-astronomers-signature-magnetic-field-exoplanet.html.

Calendar of Events

NCA Telescope Making, Maintenance, and Modification Workshop (TM3W) (previously the NCA Mirror- or Telescope-making Classes): The Chevy Chase Community Center has reopened and classes have resumed. Classes will be Tuesdays and Fridays, from 5:00 to 8:30 pm at the Chevy Chase Community Center (intersection of McKinley Street and Connecticut Avenue, N.W.) Please contact instructor Guy Brandenburg at 202-262-4274 (leave message) or at gbrandenburg@yahoo.com if you plan to attend. Note that masks are mandatory, as in all DC government buildings. More info is at guysmathastro.com.

Open house talks and observing at the University of Maryland Observatory in College Park are temporarily suspended. When they resume, they will be on the 5th and 20th of every month at 8:00 pm (Nov.-Apr.) or 9:00 pm (May-Oct.). Updates are posted at www.astro.umd.edu/openhouse.

Next NCA Meeting: 12 February 7:30 p.m. February 12 Rita M. Sambruna (GSFC) **Relativistic Jets from Black Holes** (Tentative)

The APS Mid-Atlantic Senior Physicists Group: (Zoom Meeting) January 19th at 1:00 p.m., James Drake, University of Maryland, will give a talk entitled "Magnetic Reconnection and Particle Acceleration in Space and Astrophysical Systems". More information on the meeting is available at www.aps.org/units/maspg/meetings/meeting.cfm?name=SENIOR0122. If you're interested in attending the meeting, please email units@aps.org.

National Capital Astronomers Membership Form

Name: _____ **Date:** ___/___/___

Address: _____ **ZIP Code:** _____

Home Phone: ___ - ___ - ___ **E-mail:** _____ **Print / E-mail Star Dust (circle one)**

Membership (circle one): Student..... \$ 5; Individual / Family.....\$10; Optional Contribution.....\$__

Please indicate which activities interest you:

- Attending monthly scientific lectures on some aspect of astronomy _____
- Making scientific astronomical observations _____
- Observing astronomical objects for personal pleasure at relatively dark sites _____
- Attending large regional star parties _____
- Doing outreach events to educate the public, such as Exploring the Sky _____
- Building or modifying telescopes _____
- Participating in travel/expeditions to view eclipses or occultations _____
- Combating light pollution _____

Do you have any special skills, such as videography, graphic arts, science education, electronics, machining, etc.?

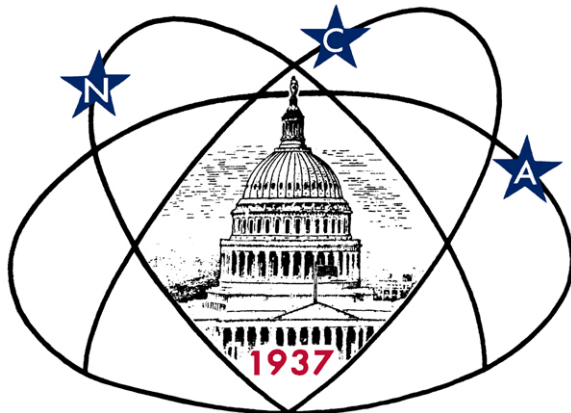
Are you interested in volunteering for: Telescope making, Exploring the Sky, Star Dust, NCA Officer, etc.?

Please mail this form with check payable to **National Capital Astronomers** to:
Henry Bofinger, NCA Treasurer; 727 Massachusetts Ave. NE, Washington, DC 20002-6007

National Capital Astronomers, Inc.

If undeliverable, return to
NCA c/o Elizabeth Warner
400 Madison St #2208
Alexandria, VA 22314

First Class
Dated Material



Celebrating 84 Years of Astronomy

Next NCA Meeting:

2022 January 8th

7:30 pm

(On Zoom)

Dr. Peter Driscoll

To join the Zoom meeting, use the following link:
umd.zoom.us/j/96856095178?pwd=cWhyNE92bGFYUkYxZnl6eWVlK0lKdz09

Please download and import the following iCalendar (.ics) files to your calendar system: umd.zoom.us/meeting/tJlIcu-opz4rHdxfgBb8Lh5wRlgETFQ8lnI5/ics?icsToken=98tyKuCupj4sGt2QsR6PRowAGo_4M_TxmCVcgqdFmhjHAXh_albhBO5FF4ZZIYDc

Please note that NCA Zoom meetings are often recorded.

Inside This Issue

Preview of Jan. 2022 Talk.....	1
Recent Astronomy Highlights.....	2
James Webb Space Telescope.....	2
Mariner 9 Remembered, Part 2.....	3
Exploring the Sky.....	3
Sky Watchers.....	4
Occultations.....	5
NASA's Juno Records Ganymede's Magnetic Field.....	6
Calendar of Events.....	7