The Prairie Astronomer

February 2015 Volume 56, Issue #2

February Program:

Orion Launch (Video) by Hap Griffin

In This Issue:

Cover Photo:
Orange Giant HD 196819
and Nebula vdB 136
by Rick Johnson

Night Sky Network

The Newsletter of the Prairie Astronomy Club

NEXT PAC MEETING

Tuesday February 24, 2015 7:30 PM
Hyde Observatory

Program

The February program will be a video about the Orion spacecraft launch put together by Hap Griffin and edited by Jack Dunn.

Upcoming Programs (tentative):

March: Observing Lists (Jim Kvasnicka)
April: Deep Sky Observing (Dave Knisely)
June: Solar Observing Party

Pac-list Has Moved

The old pac-list listserv has been moved to Google Groups. The new email address is pac-list@googlegroups.com Everyone who was subscribed to the old list has been added to the new list. This list is open to anyone, not just PAC members. To subscribe click here: GoogleGroups.

The Prairie Astronomer is published monthly by the Prairie Astronomy Club, Inc. Membership expiration date is listed on the mailing label. Membership dues are: **Regular $30/yr, Family $35/yr**. Address all new memberships and renewals to: **The Prairie Astronomy Club, Inc., PO Box 5585, Lincoln, NE 68505-0585**. For other club information, please contact one of the club officers listed to the right. Newsletter comments and articles should be submitted to: **Mark Dahmke, P. O. Box 5585, Lincoln, NE 68505 or** mark@dahmke.com, no less than ten days prior to the club meeting. The Prairie Astronomy Club meets the last Tuesday of each month at Hyde Memorial Observatory in Lincoln, NE.

Events

PAC Meeting
Tuesday February 24th, 2015, 7:30pm
Hyde Observatory

PAC Meeting
Tuesday March 31st, 2015, 7:30pm
Hyde Observatory

Astronomy Day April 12 @ UNL Museum

PAC Meeting
Tuesday April 28th, 2015, 7:30pm
Hyde Observatory

Newsletter submission deadline February 15, 2015

Club Officers

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Outreach Coordinator	Dan Delzell dan@delzell.net
Website and Newsletter Editor	Mark Dahmke Mark@dahmke.com

Club Membership Info

REGULAR MEMBER - $30.00 per year. Includes club newsletter, and 1 vote at club meetings, plus all other standard club privileges.

FAMILY MEMBER - $35.00 per year. Same as regular member except gets 2 votes at club meetings.

STUDENT MEMBER - $10.00 per year with volunteer requirement.

If you renew your membership prior to your annual renewal date, you will receive a 10% discount.

Club members are also eligible for special subscription discounts on Sky & Telescope Magazine.

Club Telescopes

To check out one of the club telescopes, contact Dave Churilla. If you keep a scope for more than a week, please check in once a week, to verify the location of the telescope and how long you plan to use it. The checkout time limit will be two weeks, but can be extended if no one else has requested use of a club scope.

100mm Orion refractor: Available

10 inch Meade Dobsonian: Available

13 inch Truss Dobsonian: Available

Internet

PAC: www.prairieastronomyclub.org
Night Sky Network: https://nightsky.jpl.nasa.gov/
CafePress (club apparel) www.cafepress.com

www.hydeobservatory.info
www.nebraskastarparty.org
www.OmahaAstro.com
Panhandleastronomyclub.com
www.universetoday.com/
www.planetary.org/home/
http://www.darksky.org/

PAC Star Party Dates

Dates in bold are closest to the new moon

2015 Star Party Dates
Jan 16,**23**, Feb 13,**20**
Mar 13,**20**, Apr 10,**17**
May 8,**15**, Jun 12,**19**
Jul 10,**17**
NSP **Jul 12-17**
Aug 7,**14**, Sep 4,**11**
Oct **9**,16, Nov 6,**13**
Dec 4,**11**

Lunar Party Dates
Mar 27, Apr 24, Jul 24, Aug 21

(Lunar party dates are tentative, sites to be determined.)

PAC E-Mail:
info@prairieastronomyclub.org

PAC-LIST:
Subscribe through GoogleGroups. To post messages to the list, send to the address:

pac-list@googlegroups.com

Club Apparel

Order club apparel from cafepress.com:

Address

The Prairie Astronomer
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P.O. Box 5585
Lincoln, NE 68505-0585

PAC Meeting Minutes

Minutes for January 27, 2015

President, Jim Kvasnicka called the meeting to order. 20+ members present, several visitors.

Jim asked how the visitors had heard of the meeting. Several mentioned the Journal-Star, Facebook at least one mentioned the 10-11 community calendar. Thanks to everyone for coming.

Jim presented upcoming events. The next PAC meeting will be Tuesday February 24 at Hyde. Hyde is open each Saturday 7-10 during the winter months. This year Astronomy Day at Morrill Hall will be Sunday April 12 from 1:30PM to 4:30PM. There are some changes this year. We be limited to the first floor of Morrill Hall and have 3 stations: A PAC/Hyde table, telescope displays and solar observing. Dan Delzell will be coordinating, so if you're interested in helping, contact Dan. Finally the Nebraska Star Party will be July 12 to 17 this year.

Jim discussed membership, dues, benefits and how to join. If visitors are interested in joining, contact club treasurer, John Reinert.

Jim provided the monthly observing report for February. The next club star parties will be February 13th and 20th.

Observing Award:

Dan Delzell has completed the Caldwell list. He is the first member to complete this list and his third list completed. Congratulations, Dan!

Former director of Mueller Planetarium, Jack Dunn has served Lincoln's astronomy community for over 40 years. He recently retired from the planetarium and moved to South Carolina with his wife. At the last meeting of the PAC board, we unanimously voted to make Jack Dunn an honorary, lifetime member of the Prairie Astronomy Club. Bob made a motion, Lee Taylor 2nd. Motion carried.

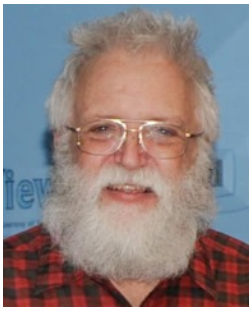
Former PAC president, Jason Noelle is moving to Maryland for a new job. We thank him for his service and commitment to Hyde and PAC and wish him the best in his future endeavors.

Adjourn to program, the workshop for new telescope owners, etc.

Standing room only at our annual "How to Use Your Telescope" event at Hyde Observatory.

Cover Photo: HD 196819 and Nebula vdB 136

Rick Johnson



HD 196819 is a magnitude 7.5 K3III (orange giant) star in Cygnus SSW of Deneb located about 2500 light-years away according to Hipparcos data. It is rather rare for such a star to illuminate a reflection nebula. In this case it creates a rather yellow orange nebula rather than the blue color usually associated with reflection nebula. The Nebula is known as vdB 136 as well as GN 20.36.5. The field has lots of H alpha emission of warm ionized hydrogen gas. That has to be illuminated by a super hot blue star in the area though. The bluest star above BD+41 3833 is a B8 star at a bit less than 2600 light-years by Hipparcos. It may be providing the needed UV radiation. Only a guess as I couldn't find anything definitive.

The field is full of bright and dark nebulae. I gave up trying to identify them when I found many dark nebula centered on bright HII emission and bright nebula centered on dark obscured regions.

The night, like many in August was very hazy. This tends to weaken faint blue light to the point I can't recover it. Most images of this area show a faint blue haze over the field. Apparently my haze absorbed that blue haze. I gave up trying to bring it out as it was just too noisy. I tried many nights to capture this one over 5 years but the sky gods had it in for this one over and over again. After three nights of mostly failure last August I finally got this weak data. I had good nights but as soon as I'd move to this object the sky gods would send in fog, clouds, smoke or something to kill the attempt. I have two or three others that have met with similar sky god interference that I've never gotten anything worth processing on so at least this one has something. Not what I wanted but it will have to do.

For some reason nearly all images of this field put south up. I decided to stick with my usual presentation of north up which makes it upside down compared to most images of this field on the net. Most however are much wider field views.

The haze put halos around the stars I had problems dealing with. Since blue light scatters best even white stars like the G0 HD 197037 in the upper left corner had severe blue halos not matching their true color. I could deal with most but that one was just too severe at magnitude 6.8. The blue dart coming in from the bottom left of center is caused by 9th magnitude SAO 49897 just off the edge of the chip. I sometimes clone these out but since blue was so rare in this image left it in. The star is slightly red so why it created a blue spike I don't know.

14" LX200R @ f/10, L=8x10' RGB=4x10', STL-11000XM, Paramount ME

Link only at 1" per pixel for those printing these or just have to see it "full" size.

March Observing: What to View

Jim Kvasnicka

This is a partial list of objects visible for the upcoming month.

Planets

Venus: Very bright in the west at magnitude -4.0. Venus will be visible 2-3 hours after sunset.
Mars: Below Venus about 4° and much dimmer.
Uranus: Near Venus on March 4th just 0.3° below the bright planet.
Jupiter: Shines at magnitude -2.3 with a disk 41" wide.
Saturn: Rises around midnight at magnitude 0.3 with a disk 17" wide and its rings wide open.
Mercury: Low in the east at dawn and difficult to see.
Neptune: Too low in the dawn to be visible.

Messier List

M41: Open cluster in Canis Major.
M44: The Beehive Cluster in Cancer.
M46/M47: Open clusters in Puppis.
M48: Open cluster in Hydra.
M50: Open cluster in Monoceros.
M67: Open cluster in Cancer.
M81/M82: Galaxy pair in Ursa Major.
Last Month: M1, M35, M36, M37, M38, M42, M43, M45, M78, M79
Next Month: M40, M65, M66, M95, M96, M105, M106, M108, M109

NGC and other Deep Sky Objects

NGC 3384/3389: Same FOV with M105 in Leo.
NGC 3521: Galaxy in Leo.
NGC 3628: Part of the Leo Triplett Group.
NGC 4125: Galaxy in Draco.
NGC 4179: Elongated galaxy in Virgo.
NGC 4244: The Silver Needle Galaxy in Canes Venatici.

Double Star Program List

Epsilon Canis Majoris: Bright white and light blue stars.
Delta Geminorum: Wasat, Yellow and pale red stars.
Alpha Geminorum: Castor, White primary with a yellow secondary.
12 Lyncis: Close yellow-white pair.
19 Lyncis: Pair of white stars.
38 Lyncis: White and yellow stars.
Zeta Cancri: Yellow primary with a pale yellow secondary.
Iota Cancri: Yellow and pale blue pair.

Challenge Object

NGC 4291/4319: Galaxy pair in Draco. Quasar Markarian 205 lies 40" south of NGC 4319 resembling a 14th magnitude star.

NGC Objects: NGC 4244

Jim Kvasnicka

NGC 4244: The Silver Needle Galaxy

NGC 4244 is a 10.4 magnitude edge on spiral galaxy in Canes Venatici. It was discovered by William Herschel in 1787. NGC 4244 is 14 million light years away and has a listed apparent size of 17 x 2.2 arc minutes.

The Silver Needle Galaxy gets its name from its long thin appearance as we see it edge on. The galaxy itself is 65,000 light years across and part of the Canes Venatici I Group. Through a 10 inch telescope the Silver Needle Galaxy has an apparent size of 15 x 1.25 arc minutes. The galaxy extends NE-SW with the SW tip touching an 11th magnitude star.

NGC 4244 is part of the Herschel 400 list and Caldwell Object 26.

Visitors getting help setting up their telescopes at the annual "How to Use Your Telescope" event.

January Star Party Reports

Bob Kacvinsky

January Star Party Reports
Submitted by Bob Kacvinsky

The regularly scheduled star party on Jan 16 was clouded out. Yet over the weekend the temps warmed up and provided an unusual opportunity to get some winter observing in without the bitter cold. So several members decided that Sunday night, Jan 18th offered a great chance to get out and observe.

On Jan 18 Dan Delzell, Jim Kvasnicka, Mike Kearns, Beth Janckes and myself held a star party at The Farm. I arrived early by 5:30 to get set up in the light. Most all arrived before 6:30 and got set up. A thick haze developed at sunset blocking much of the deep sky objects. We started out looking at several familiar objects and once it got fully dark we all observed the comet Lovejoy. It was difficult to discern a tail area, but in the telescopes it filled over a 1/4 degree of field. The "head" formed a distinctive dispersal pattern showing the effect of the solar winds. Lovejoy was able to be seen as an unaided visual object. Beth had a nice binocular view of the comet.

We also attempted to find comet Linear, but it was hidden in the close moon glow and not able to be seen. Several of us were working on observing programs and began to settle in to the night. I had a friend who is interested in the club join us till about 7:45 so spent time doing a general sweep of the M objects. The haze was making details difficult to bring out but the skies were slowly improving.

This was my first opportunity to view through the new Meade MWA 15 and 21mm eyepieces. After several observations, Dan offered the opportunity to compare his 21 Ethos to the 21 Meade MWA. I compared them on the double cluster and Orion Nebula. The Ethos was sharper on the outside 10% or so, but the eye relief of the MWA provided at minimum 10-15% more FOV without having to turn your head to the sides. The MWA sports a 20mm eye relief claim, compared to 15-16mm for the Ethos, and the extra eye relief is substantial. I'm very happy with the initial views from the new eye pieces.

Most of the group left by 8:15 just before the skies began to really clear. Dan and I remained and by 8:30 the skies cleared out and the seeing jumped from 4 to a good 2 on the 1-5 scale. I was working on several Herschels in Puppis. The finder stars of the constellation were all visible so it made the viewing much easier. I was able to log the Herschels I needed. Dan was working on several Camelopardalis objects.

The wind began to pick up around 11 pm and the temps reached the dew points so the sky quality dropped and we decided to pack up and leave.

On the following Friday night, Jan 23, the scheduled star party again began with marginal skies. This was the last star party for Jason Noelle, and he was joined by Dan Delzell, Jim Kvasnicka, Mike Kearns, Billy Allan, and Myself Bob Kacvinsky. I apologize if I forgot someone else.

The skies were clouded over for the first hour after darkness with a few small cherry holes keeping us viewing. As in the previous week, a little after 7 pm the clouds began to clear and the night sky transparency and seeing improved substantially.

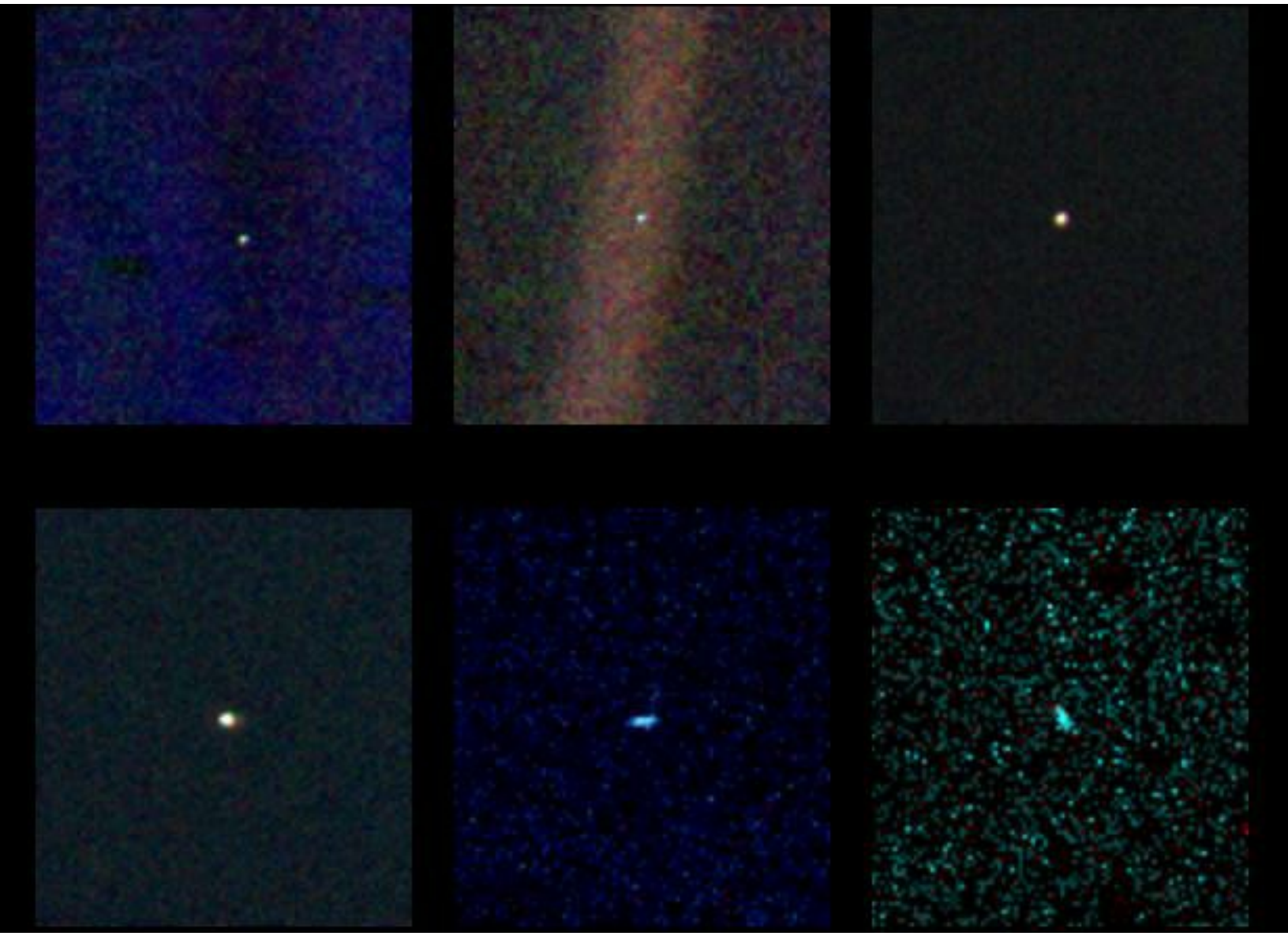
Everyone enjoyed time working on familiar and observing program objects. Jason had a new eye piece for Christmas and was having a great time testing it out on several objects. He also commented that this might be the last time he would be able to enjoy such dark skies due to moving to Maryland. We will all miss having him as a member, friend, and observing partner over the last few years.

The weather cooled, winds came up, and moisture soured the night skies and we packed up by a bit after 10 pm again. Jim stuck around with me for the last half hour so that I could finish up the last of the Herschels observing list.

This is the first winter in several in which we were successful in having a winter star party. The winter skies hold many of the objects we were all missing in our observing lists. It was great to be able to observe together again.

The winter air offers excellent clarity and stability. This winter also offers an opportunity to view Mars, Venus, and Jupiter along with a couple of comets in the evening skies. Dress warmly, pack a thermos of hot chocolate, and get out to enjoy the beauty of the Nebraska night skies.

'Pale Blue Dot' Images Turn 25



These six narrow-angle color images were made from the first ever "portrait" of the solar system taken by Voyager 1 on Feb 14, 1990, which was more than 4 billion miles from Earth and about 32 degrees above the ecliptic. Left to right and top to bottom are Venus, Earth, Jupiter, and Saturn, Uranus, Neptune. Image credit: NASA/JPL-Caltech.

A New Way to View Titan: 'Despeckle' It

-- Radar images of Titan have always had a grainy appearance due to electronic noise.

-- A new tool suppresses the noise, resulting in clearer views than ever before.

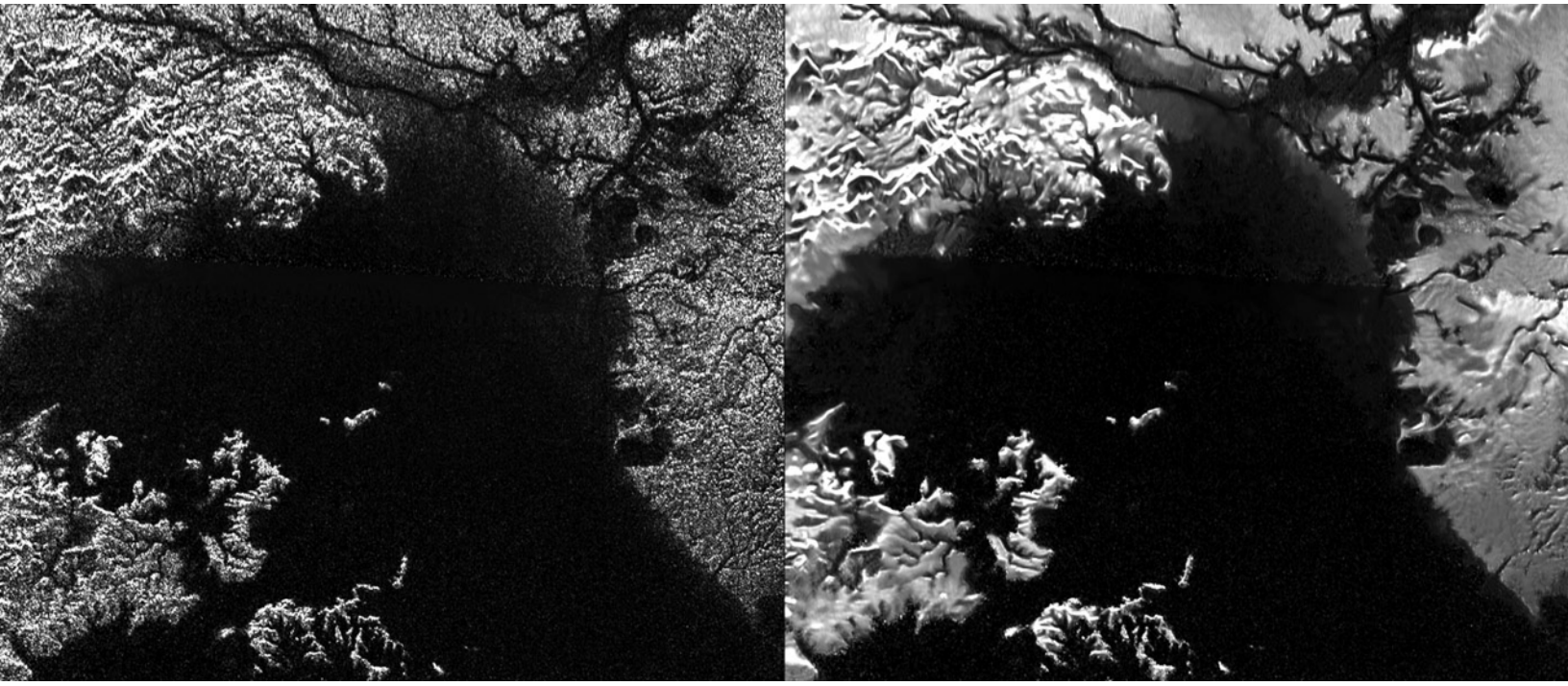
During 10 years of discovery, NASA's Cassini spacecraft has pulled back the smoggy veil that obscures the surface of Titan, Saturn's largest moon. Cassini's radar instrument has mapped almost half of the giant moon's surface; revealed vast, desert-like expanses of sand dunes; and plumbed the depths of expansive hydrocarbon seas. What could make that scientific bounty even more amazing? Well, what if the radar images could look even better?

Thanks to a recently developed technique for handling noise in Cassini's radar images, these views now have a whole new look. The technique, referred to by its developers as "despeckling," produces images of Titan's surface that are much clearer and easier to look at than the views to which scientists and the public have grown accustomed.

Typically, Cassini's radar images have a characteristic grainy appearance. This "speckle noise" can make it difficult for scientists to interpret small-scale features or identify changes in images of the same area taken at different times. Despeckling uses an algorithm to modify the noise, resulting in clearer views that can be easier for researchers to interpret.

Antoine Lucas got the idea to apply this new technique while working with members of Cassini's radar team when he was a postdoctoral researcher at the California Institute of Technology in Pasadena.

"Noise in the images gave me headaches," said Lucas, who now works at the astrophysics division of France's nuclear



Presented here are side-by-side comparisons of a traditional Cassini Synthetic Aperture Radar (SAR) view and one made using a new technique for handling electronic noise that results in clearer views of Titan's surface. The technique, called despeckling, produces images that can be easier for researchers to interpret.

center (CEA). Knowing that mathematical models for handling the noise might be helpful, Lucas searched through research published by that community, which is somewhat disconnected from people working directly with scientific data. He found that a team near Paris was working on a "de-noising" algorithm, and he began working with them to adapt their model to the Cassini radar data. The collaboration resulted in some new and innovative analysis techniques.

"My headaches were gone, and more importantly, we were able to go further in our understanding of Titan's surface using the new technique," Lucas said.

As helpful as the tool has been, for now, it is being used selectively.

"This is an amazing technique, and Antoine has done a great job of showing that we can trust it not to put features into the images that aren't really there," said Randy Kirk, a Cassini radar team member from the U.S. Geologic Survey in Flagstaff, Arizona. Kirk said the radar team is going to have to prioritize which images are the most important to applying the technique. "It takes a lot of computation, and at the moment quite a bit of 'fine-tuning' to get the best results with each new image, so for now we'll likely be despeckling only the most important -- or most puzzling -- images," Kirk said.

Despeckling Cassini's radar images has a variety of scientific benefits. Lucas and colleagues have shown that they can produce 3-D maps, called digital elevation maps, of Titan's surface with greatly improved quality. With clearer views of river channels, lake shorelines and windswept dunes, researchers are also able to perform more precise analyses of processes shaping Titan's surface. And Lucas suspects that the speckle noise itself, when analyzed separately, may hold information about properties of the surface and subsurface.

"This new technique provides a fresh look at the data, which helps us better understand the original images," said Stephen Wall, deputy team lead of Cassini's radar team, which is based at NASA's Jet Propulsion Laboratory in Pasadena, California. "With this innovative new tool, we will look for details that help us to distinguish among the different processes that shape Titan's surface," he said.

Details about the new technique were published recently in the Journal of Geophysical Research: Planets.

The Cassini-Huygens mission is a cooperative project of NASA, ESA (European Space Agency) and the Italian Space Agency. NASA's Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the mission for NASA's Science Mission Directorate, Washington. JPL designed, developed and assembled the Cassini orbiter. The radar instrument was built by JPL and the Italian Space Agency, working with team members from the US and several European countries.

More information about Cassini:

http://www.nasa.gov/cassini

http://saturn.jpl.nasa.gov

250 Years of Planetary Detection in 60 Seconds

Nancy Atkinson, Universe Today

Early astronomers realized some of the "stars" in the sky were planets in our Solar System, and really, only then did we realize Earth is a planet too. Now, we're finding planets around other stars, and thanks to the Kepler Space Telescope, we're able to find planets that are even smaller than Earth.

This great new graphic of the history of planetary detection was put together by Hugh Osborn, a PhD student at the University of Warwick, who works with data from the WASP (Wide Angle Search for Planets) and NGTS (Next Generation Transit Survey) telescope surveys to discover exoplanets. It starts with the first real "discovery' of a planet — Uranus in 1781 by William and Caroline Herschel.

"The idea of this plot is to compare our own Solar System (with planets plotted in dark blue) against the newly-discovered extrasolar worlds," wrote Osborn on his website. "Think of this plot as a projection of all 1873 worlds onto our own solar system, with the Sun (and all other stars) at the far left. As you move out to the right, the orbital period of the planets increases, and correspondingly (thanks to Kepler's Third Law), so does the distance from the star. Moving upwards means the mass of the worlds increase, from Moon-sized at the base to 10,000 times that of Earth at the top (30 Jupiter Masses)."

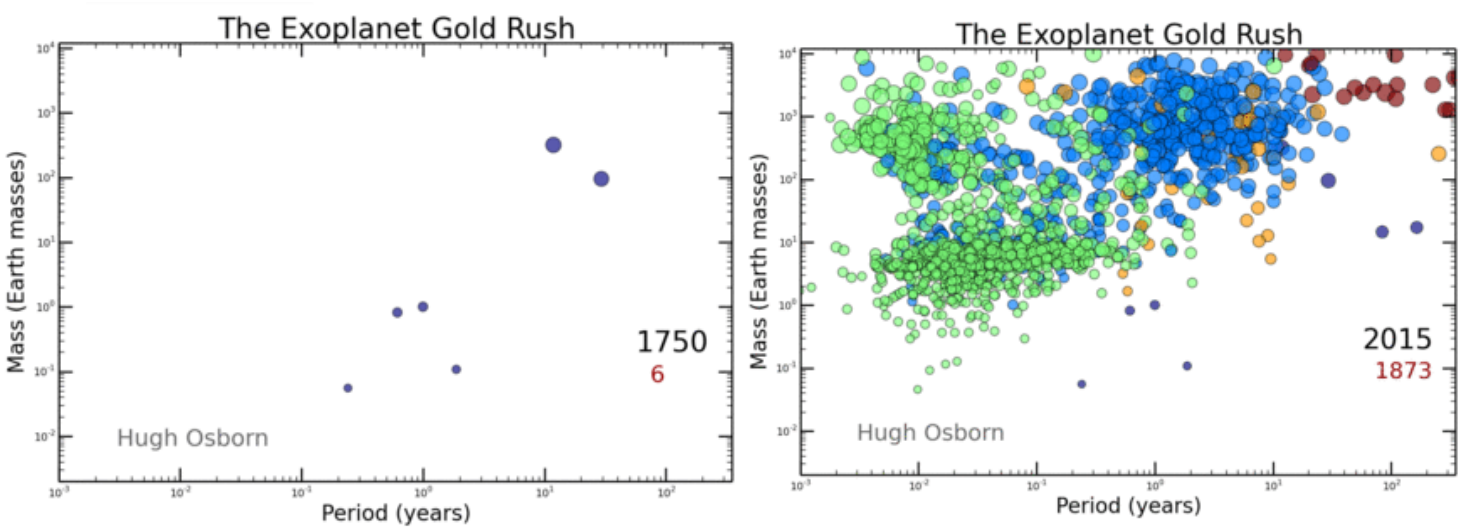
You'll notice a few "clusters" as time moves along. The circles in dark blue are the planets in our Solar System; light blue are planets found by radial velocity.

Then in maroon are planets found by direct imaging, followed by orange for microlensing and green for transits.

The first batch of exoplanets were the massive 'Hot Jupiters', which were the first exoplanets found "simply because they are easiest to find," using the radial velocity method. Then you'll see clusters found by the other methods ending with the big batch found by Kepler.

"This clustering shows that there are more Earth and super-Earth sized planets than any other," said Osborn. "Hopefully we can begin to probe below it's limit and into the Earth-like regime, where thousands more worlds should await!"

On reddit, Osborn also provided great, short explanations of the



An animated history of planetary detection, from 1750 to 2015. It shows the period (x-axis), mass (y-axis), radius (circle size) and detection method (color) of the 1800 plus planets now known. Credit and copyright: Hugh Osborn. Click here to view the animation.

various methods used to detect planets, which we'll include below:

Radial Velocity

Planets orbit thanks to gravitational attraction from their star's mass. But the mass of the planet also has an effect on the star – pulling it around in a tiny circle once every orbit. Astronomers can split the light from a star up into it's colours, which have an atomic barcode of absorption lines in. These lines shift position as the star moves – the light is effectively compressed to bluer colours when moving towards and pulled to redder colours when moving away.

So, by measuring this to-and-fro (radial) velocity, and finding periodic signals, astronomers can detect the tug of distant exoplanets.

Direct Imaging

This is easier to get your head around – point a big telescope at a star and directly image a planet around it. This only work for the biggest young planets as these are warmest, so glow brightest in the infra-red (like a red-hot piece of Iron). To find the planet in the glare of it's star, the starlight needs to be suppressed. This is done by either blocking it out with a starshade, or digitally combining the images in such a way to remove the central star, revealing new exoplanets.

Microlensing

Einstein's general theory of relativity shows that mass bends space time. This means that light can be bent by massive objects, and even act like a lens. Occasionally a star with a planetary system passes in front of a distant star. The light from the distant star is bent and lensed by both the star and the planet, giving two sharp increases in brightness over a few days – one for the star and one for the planet. The amount of lensing gives the mass of the planets, and the time between the events gives us the distance from their star. More info

Transits

When a planet crosses in front of it's star, it blocks out a small portion of sunlight depending on it's size. We only see the star as a single point, but we can infer the presence of a planet from the dip in light. When this repeats, we get a period. This is how we have found more than 1000 of the current crop of ~1800 exoplanets!

Thanks to Hugh Osborn for sharing his expertise with Universe Today!

Jason Noelle (right) helping setup a scope at our annual "How to Use Your Telescope" event.

The Heavyweight Champion of the Cosmos

Dr. Ethan Siegel

As crazy as it once seemed, we once assumed that the Earth was the largest thing in all the universe. 2,500 years ago, the Greek philosopher Anaxagoras was ridiculed for suggesting that the Sun might be even larger than the Peloponnesus peninsula, about 16% of modern-day Greece. Today, we know that planets are dwarfed by stars, which themselves are bound together by the billions or even trillions into galaxies.

But gravitationally bound structures extend far beyond galaxies, which themselves can bind together into massive clusters across the cosmos. While dark energy may be driving most galaxy clusters apart from one another, preventing our local group from falling into the Virgo Cluster, for example, on occasion, huge galaxy clusters can merge, forming the largest gravitationally bound structures in the universe.

Image credit: NASA, ESA, J. Jee (UC Davis), J. Hughes (Rutgers U.), F. Menanteau (Rutgers U. and UIUC), C. Sifon (Leiden Observatory), R. Mandelbum (Carnegie Mellon U.), L. Barrientos (Universidad Catolica de Chile), and K. Ng (UC Davis). X-rays are shown in pink from Chandra; the overall matter density is shown in blue, from lensing derived from the Hubble space telescope. 10 billion light-years distant, El Gordo is the most massive galaxy cluster ever found.

Take the "El Gordo" galaxy cluster, catalogued as ACT-CL J0102-4915. It's the largest known galaxy cluster in the distant universe. A galaxy like the Milky Way might contain a few hundred billion stars and up to just over a trillion (10^{12}) solar masses worth of matter, the El Gordo cluster has an estimated mass of 3×10^{15} solar masses, or 3,000 times as much as our own galaxy! The way we've figured this out is fascinating. By seeing how the shapes of background galaxies are distorted into more elliptical-than-average shapes along a particular set of axes, we can reconstruct how much mass is present in the cluster: a phenomenon known as weak gravitational lensing.

That reconstruction is shown in blue, but doesn't match up with where the X-rays are, which are shown in pink! This is because, when galaxy clusters collide, the neutral gas inside heats up to emit X-rays, but the individual galaxies (mostly) and dark matter (completely) pass through one another, resulting in a displacement of the cluster's mass from its center. This has been observed before in objects like the Bullet Cluster, but El Gordo is much younger and farther away. At 10 billion light-years distant, the light reaching us now was emitted more than 7 billion years ago, when the universe was less than half its present age.

It's a good thing, too, because about 6 billion years ago, the universe began accelerating, meaning that El Gordo just might be the largest cosmic heavyweight of all. There's still more universe left to explore, but for right now, this is the heavyweight champion of the distant universe!

Learn more about "El Gordo" here: http://www.nasa.gov/press/2014/april/nasa-hubble-team-finds-monster-el-gordo-galaxy-cluster-bigger-than-thought/

El Gordo is certainly huge, but what about really tiny galaxies? Kids can learn about satellite galaxies at NASA's Space Place http://spaceplace.nasa.gov/satellite-galaxies/.

From the Archives: March, 1975

Observing Report

After a long, five-month, absence our observing chairman returns once more to the public eye.

On March 7th John Bruce, Lee Thomas, Walter Baumann and myself journeyed to Hickman for an observing session. Fairly clear skies and low temperatures greeted our expedition, the first since last November. After setting up we began looking around at old and new objects of the late winter skies, Saturn, in central Gemini and retrograding, was excellent in John's six-inch. Steadiness was good so surface detail and ring divisions could be seem very clearly. Transparency however, was not very good. Deep sky objects were rather murky and undefined. I switched Bertha to M-108 and M-97 in Ursa Major and got fairly decent views of them. The Owl Nebula was a circular patch of 12th magnitude some three minutes across that appears much brighter than its stated magnitude. At times one of its two eyes was visible to us. M-108 was a thin edge-on galaxy of 11th magnitude that had a dark lane running down its eight minute by one minute length.

We also looked at M-46, a beautiful open cluster in Puppis. Right on its north edge is the very tiny planetary nebula, NGC-2438. This object would be a good test in club members telescopes, for it can be hard to find if one does not know where to look. Also the Rosette Nebula in Monoceros was viewed. Not nearly as impressive as its photographs since very little nebulosity was visible, this object was never the less worth looking at. Visible in a finder scope, the large star cluster is 8 full degrees across and about seventh magnitude.

As April approaches so does the realm of galaxies in Virgo. At the meeting I will discuss how to observe these galaxies, many of which are messier objects and easy to locate.

Brian Rugg

Observing Chairman