The Focal Point

The Atlanta Astronomy Club
Established 1947
September 2015

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Editor: Tom Faber

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September General Meeting

Please join us for the next meeting of the Atlanta Astronomy Club, to be held on Saturday, September 12th at **3PM at the Fernbank Science Center**. Since Fernbank closes at 5PM on Saturdays we will now begin our meetings at 3PM. A short beginner's program will be presented at 2PM. Our featured speaker will be Chap Percival. Chap will present a talk about the solar eclipses and specifically the upcoming total solar eclipse that will span the United States in August 2017.

After the talk and elections, upcoming club events and programs will be announced by the club officers.

The Talk

A TOTAL solar eclipse is one of the grandest spectacles the heavens have to offer us. The last one visible anywhere in the lower forty eight states was in 1979. On August 21, 2017, millions will have the opportunity to observe this amazing phenomenon again—right from their own backyards.

Speaker Bio

Chap Percival is a lifelong educator with a passion for sharing his knowledge of astronomy. Born in Scranton, Pennsylvania, he holds a BA in mathematics and physics from Taylor University, an MAT in planetarium education from Michigan State University, and an MEd in instructional technology from the University of Virginia. He has been an astronomy educator since 1969 as a classroom teacher, club sponsor, and planetarium director, including teaching high school astronomy since 1995 at Pine View School in Osprey, Florida, one of the top schools in the nation. He has published newspaper articles, been

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The 2015 Peach State Star Gaze

Mark your calendars for the 2015 Peach State Star Gaze which is scheduled for Sunday October 11 through Sunday October 18 at the Deerlick Astronomy Village! Our keynote speaker will be Rod Mollise. "Uncle" Rod Mollise, is a Contributing Editor at Sky and Telescope magazine, and is familiar to amateur astronomers as the author of numerous books and magazine articles on every aspect of astronomy, amateur and professional.

Stay tuned to upcoming issues of the *Focal Point* and the AAC web sites for details on the talks, speakers, and other activities that will be held during the Star Gaze. And of course there will be lots of observing under some of the darkest skies in Georgia. The new moon occurs on Tuesday, October 13. Micki's Kitchen is also scheduled to return with meals, sandwiches, hot coffee and hot chocolate and other drinks, and her famous brownies! See you there!

The Deerlick Astronomy Village, located about 100 miles east of Atlanta and 50 miles west of Augusta, has some of the darkest skies in the state.

The AAC field at the DAV during the 2013 PSSG - Photo by Tom Faber.

August AAC General Meeting Report

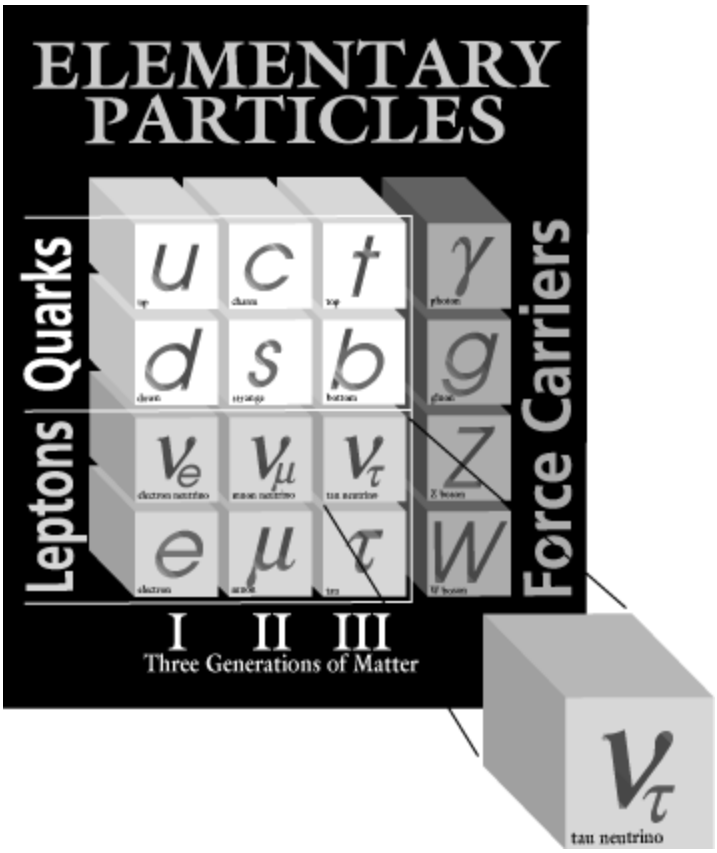
By Alan Coffelt, AAC Recording Secretary. Photos by Tom Faber.

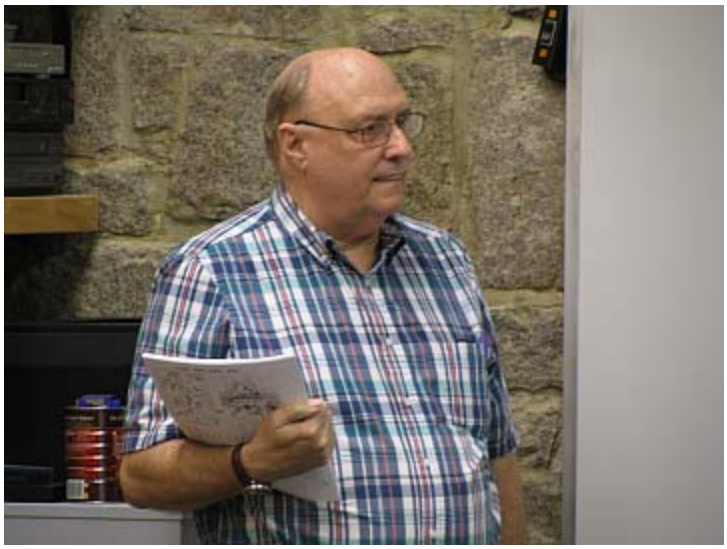
This month's general meeting was on Saturday, August 8th starting at 3PM at the Fernbank Science Center. There were 53 members and guests present for the meeting.

Our speaker was Vince Teeter, a retired computer engineer and amateur enthusiast in physics and astronomy. As a volunteer, Vince has served as a docent and an educator at the Pisgah Astronomy Research Institute, www.pari.edu, near Brevard NC. He is also a volunteer lab assistant at the Tellus Science Museum. Normally when we talk about astronomy we look at very large objects and very long distances, but the universe also includes particles that are on the smallest of scales. Vince's interest in what makes up the universe led him to read *The God Particle* by Nobel prize-winning physicist Leon Lederman, and took off from there. His talk was on the Standard Model of physics with a concentration on the elementary particles that are of interest to astronomers. Many of the particles that are studied in places like CERN only exist for an extremely short time when they are produced, and astronomers are more interested in those particles that are stable and travel great distances (so they can be detected here on earth).

Vince began the talk by describing the basic vocabulary of particle physics including all the different types of particles and their counterparts, antiparticles, along with their characteristics. There are about 100 of them and as the number has grown it has been suggested it is really a particle "zoo". Particles are grouped into three types: bosons, leptons, and quarks. Vince explained that particles are characterized by how long they exist, their mass, charge, state (or spin), and forces that may be involved (i.e. strong and weak nuclear forces). Next, Vince broke the groups down and described the different particles in each type, how they are combined to make all the elements and essentially everything. He shared interesting facts along the way, and pretty soon, terms were flying left and right- gluon, muon, baryon, up, top, down, charm, strange, and so on. During the last part of the talk, Vince related all this to astronomical phenomena, like the processes involved in star formation and stellar nucleosynthesis.

After the talk, there were club announcements about upcoming events and an invitation to join the club for guests who are interested. For future speaker programs and upcoming club event details and observing programs, see the club calendar or visit the club's Facebook page at https://www.facebook.com/AtlantaAstronomy .





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interviewed on radio, and volunteered with the National Park Service as a sky interpreter. He's also given an astronomy talk at the Grand Canyon Star Party and led groups to view five different total solar eclipses.

Future Meetings

The AAC meetings are now on the second Saturday of each month, still at the Fernbank Science Center and at 3PM. The next couple of meeting dates are: September 12 and November 14. There will be no AAC meeting in October due to the Peach State Star Gaze.

Upcoming DSO Dates and Locations

These are the dates for the next few AAC Dark Sky Observing events. All of these events are scheduled at Grier's Field at the Deerlick Astronomy Village unless noted: Sept 19, No October DSO due to the PSSG, Nov 14, Dec 19. The locations and dates of the DSOs may change - check the AAC web page for updates.

The Next Charlie Elliott Meeting

"Experience the Universe at Charlie Elliott"

Our regular meeting schedule resumes in September. Join us for a potluck dinner meeting and stargazing on Saturday, Sept. 19th.

The next regular meeting of the Charlie Elliott Chapter will be held on September 19, with a potluck supper and general elections. The potluck meeting will be held at 5:30 PM at the Campbell Aquatic Building on Murder Creek Church Road. A food sign-up sheet will be posted after Labor Day.

At sunset we will head over to Jon Wood Astronomy Field (33.468865, -83.735319) for a night of observing (weather permitting). All are welcome! Bring your scopes, binos, or just bring yourself – we enjoy sharing the night sky with our guests!

September 19th is also "International Observe the Moon Night"! We will have nice views of the moon as it approaches 1st quarter. The moon sets at 11:38 PM, but be sure to arrive before 10 PM, which is when the Elliott Trail gate locks to new entry.

Summer Update Report and Upcoming Elections

The summer has zipped by at Charlie Elliott! We have enjoyed stargazing, photography, and outreach events on Jon Wood Astronomy Field. We have made a lot of new friends along the way! We've made good progress with our plans for the coming year and have put together a strong slate of officer candidates for the elections in September. For details on the proposed slate of officers and the open chapter positions, please see the Officers page. If you have an interest in assisting the chapter, have any nominations or suggestions for committee positions, or if you have any questions, please send an email to director@ceastronomy.org. A copy of our summer report to the Chapter and the AAC Board is available here.

The handouts from our "Summer Under the Stars" sessions are available for download on our Past Events page. Monthly sky maps are available from skymaps.com.

September 19 (potluck), October 10 (note date change!), November 14, December 12

The Night Sky Network (NSN)

As a member of the Atlanta Astronomy Club, you have a free membership in NASA's Night Sky Network (NSN). The Night Sky Network was started in 2004 and is a nationwide coalition of more than 400 amateur astronomy clubs that was developed and is operated for NASA by the Astronomical Society of the Pacific.

It functions to educate the public about NASA missions through local astronomy clubs by providing the clubs with information and outreach materials about NASA activities. Only members of registered astronomy clubs can become members of the NSN.

On a more practical level, the NSN provides the AAC with a website on which the AAC can maintain a club roster of members, maintain a calendar of events and send out e-mails to our members about Club activities. (In these days of anti-spam filters on most e-mail programs, this has been an invaluable resource for keeping members informed.)

When you are enrolled on the NSN you receive an e-mail from them on behalf of the AAC, with your User ID and your password. You can then go in and edit your membership information. If, for example, you do not wish to receive e-mails about upcoming events, you can check the box requesting no e-mails; or you can delete your e-mail address if you do not want ANY e-mails sent to you from the NSN.

If you do this, or make other changes (such as updating your contact information), PLEASE either forward a note to me at Treasurer@AtlantaAstronomy.org, or make a note in the "Notes on Membership" box, as I may think the change was an oversight when you were registered and not a deliberate choice on your part and I would re-enter the information.

Daniel Herron, Mark Banks and Sharon Carruthers are the AAC's NSN coordinators. If you have a problem or question, contact us for help.

Sharon Carruthers, Treasurer@AtlantaAstronomy.org

The Astronomical League

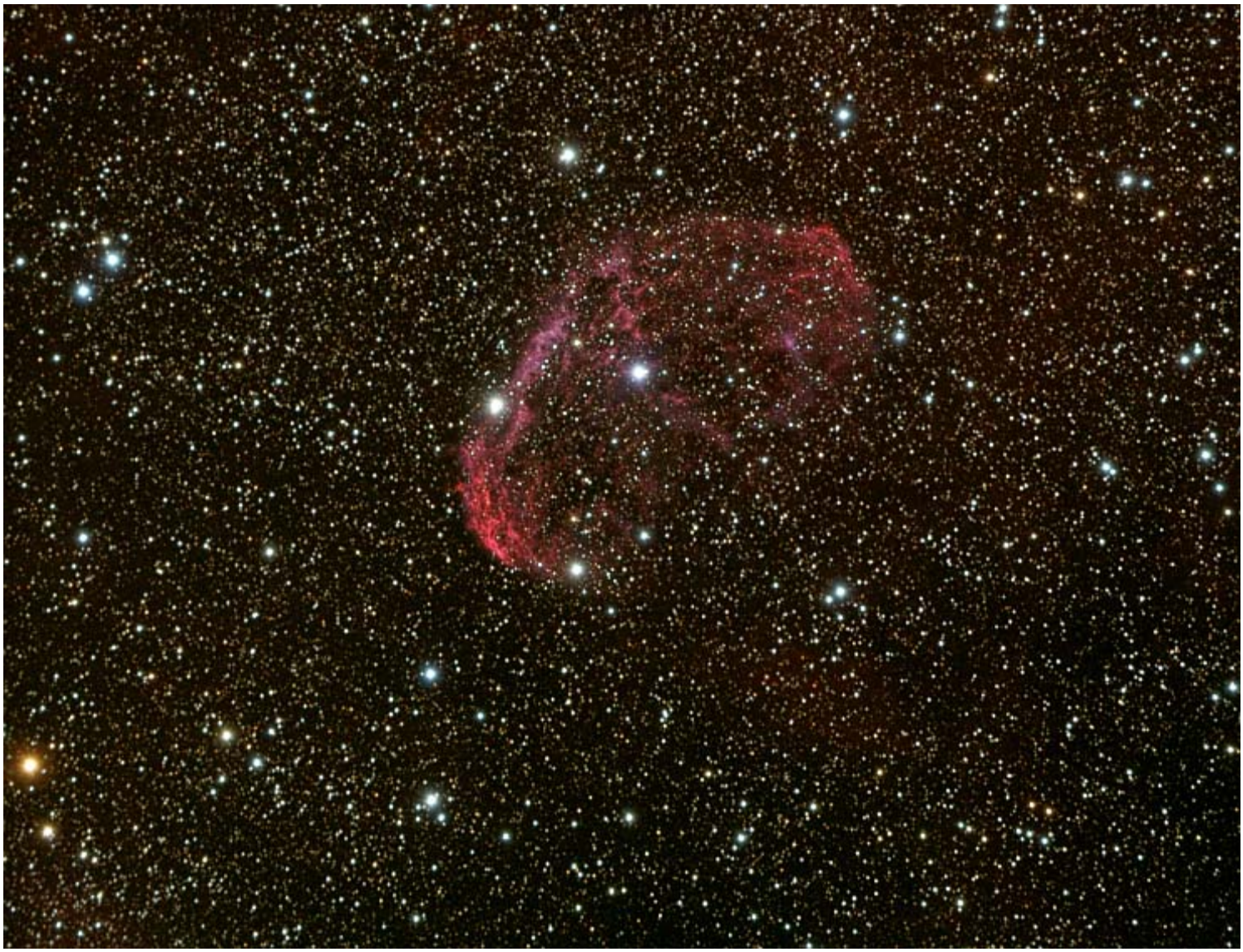
As a member of the **Atlanta Astronomy Club** you are automatically also a member of the **Astronomical League**, a nation wide affiliation of astronomy clubs. Membership in the AL provides a number of benefits for you. They include:

* You will receive *The Reflector*, the AL's quarterly newsletter.

* You can use the Book Service, through which you can buy astronomy-related books at a 10% discount.

* You can participate in the Astronomical League's Observing Clubs. The Observing Clubs offer encouragement and certificates of accomplishment for demonstrating observing skills with a variety of instruments and objects. These include the Messier Club, Binocular Messier Club, the Herschel 400 Club, the Deep Sky Binocular Club, and many others.

To learn more about the Astronomical League and its benefits for you, visit http://www.astroleague.org



From the President's Desk

We have a lot of activities going on and we need you!!!

*The annual Makers Faire will be October 3rd & 4th located at Decatur High School this year. At last year's event they had nearly 30K visitors! This year maybe even more. We need volunteers to come out and talk to people about telescopes and astronomy. In particular we need several solar scopes so the lines won't be too long to take a look. We also need to show people how a telescope is made so they can make a DIY project out of it. Please contact Jamie Anderson for more info at: jamiea@bellsouth.net. He will be coordinating all the volunteers for this event.

*The 22nd annual Peach State Star Gaze (PSSG) will be October 11th thru 18th. You can come for a day or the whole week. There will be all kinds of astronomy talks, exhibits, vendors and great observing. As usual, Micki's kitchen will be on hand to provide hot meals for all. Just register on line and join us!!! Please note there will not be an October meeting at Fernbank. Most of us will be at the PSSG.

* Several major stargaze events are coming up. The East Cobb Park on Friday, Sept. 18th and Morgan Falls on Friday, Oct. 23rd. Both of these events usually draw a big crowd so please help if you can. This is also the time of year we get a lot of requests from schools. Please check the club calendar and volunteer when an event is in your area.

Mark Banks, AAC President

NGC 6888 Image by Alan Coffelt

The image above was made by AAC Recording Secretary Alan Coffelt at the Deerlick Astronomy Village on the night of August 14. Alan made this LRGB image using the Orion EON130 telescope and the QHY23 camera, and took fourteen 12 minute subs to produce the image.

More About NGC 6888

From: https://en.wikipedia.org/wiki/Crescent_Nebula

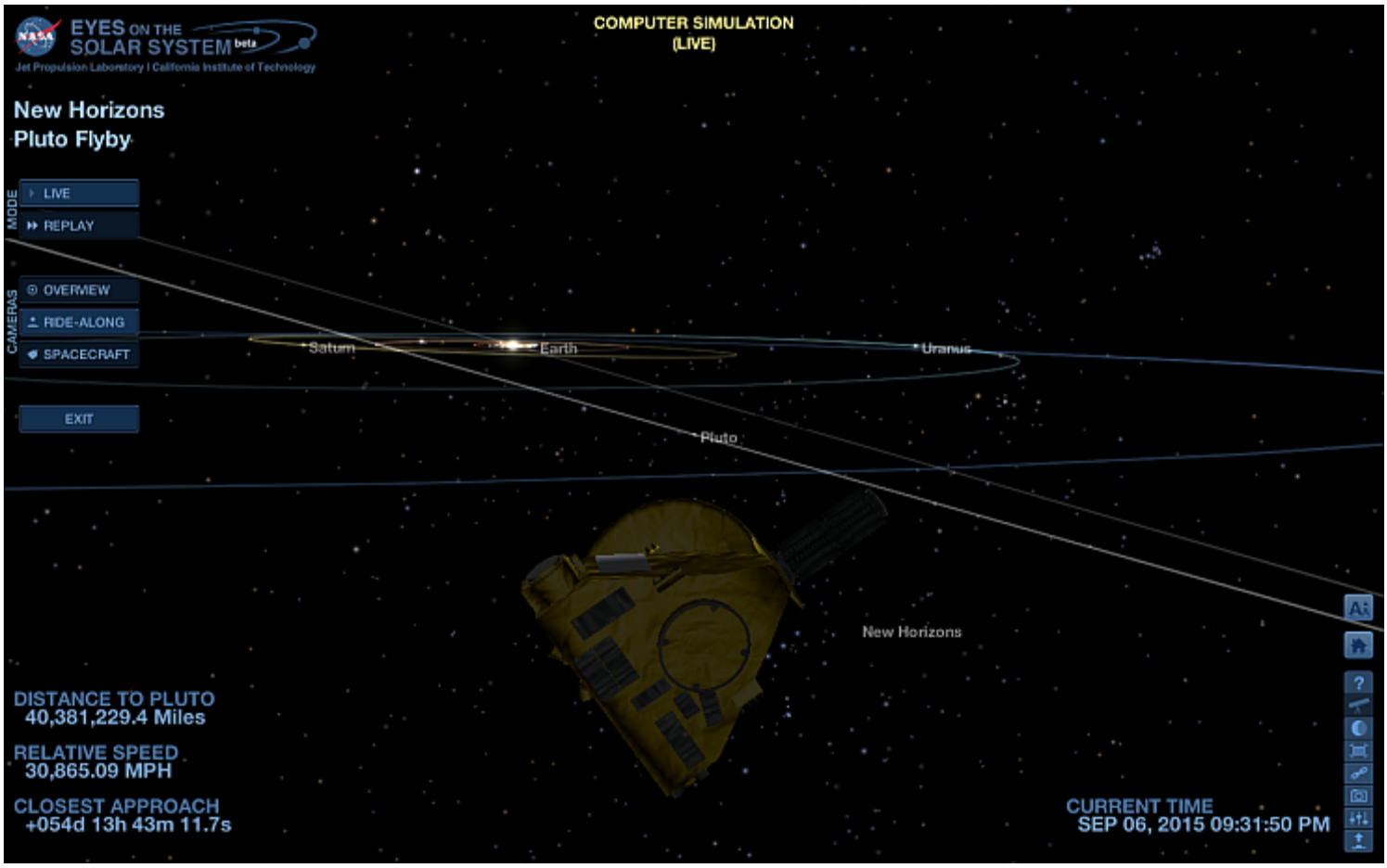
The Crescent Nebula (also known as NGC 6888, Caldwell 27, Sharpless 105) is an emission nebula in the constellation Cygnus, about 5000 light-years away. It was discovered by Friedrich Wilhelm Herschel in 1792. It is formed by the fast stellar wind from the Wolf-Rayet star WR 136 (HD 192163) colliding with and energizing the slower moving wind ejected by the star when it became a red giant around 250,000 to 400,000 years ago. The result of the collision is a shell and two shock waves, one moving outward and one moving inward. The inward moving shock wave heats the stellar wind to X-ray-emitting temperatures. It is a rather faint object located about 2 degrees SW of Sadr. For most telescopes it requires a UHC or OIII filter to see. Under favorable circumstances a telescope as small as 8 cm (with filter) can see its nebulosity. Larger telescopes (20 cm or more) reveal the crescent or a Euro sign shape which makes some to call it the "Euro sign nebula".

Where is New Horizons Now?

Below is an image of a computer simulation of what New Horizons is currently doing. It is in spin mode and still sending back lower data-rate information collected by the energetic particle, solar wind and space dust instruments in real-time. But as of September 5 New Horizons will start to download the full image (and other data) set collected during its encounter with the Pluto system in July.

The images will be downloaded in 2 passes. The first pass will use lossy compression which will have some compression artifacts but will return the image set faster. NH will then re-send the images using lossless compression, which will take longer but will not have compression artifacts. The full download of images and other data collected during the encounter will take over a year, since at New Horizons' distance (over 3 billion miles) it can transmit data at only 1-2 kilobits/second with its 12 watt radio tranmitters.

New Horizons is currently (as of September 6) 54 days and about 40.4 million miles past Pluto and departing at close to 31,000 mph. Note in the simulator image the belt of Orion is visible just to the right of the space-craft, the "V" of the Hyades in Taurus is visible to the lower right of the position of Uranus, and the Pleiades is visible to the upper right of the Hyades.



New Horizons Spacecraft begins Intensive Data Downlink Phase

September 4, 2015

If you liked the first historic images of Pluto from NASA's New Horizons spacecraft, you'll love what's to come.

Seven weeks after New Horizons sped past the Pluto system to study Pluto and its moons – previously unexplored worlds – the mission team will begin intensive downlinking of the tens of gigabits of data the spacecraft collected and stored on its digital recorders. The process moves into high gear on Saturday, Sept. 5, with the entire downlink taking about one year to complete.

"This is what we came for – these images, spectra and other data types that are going to help us understand the origin and the evolution of the Pluto system for the first time," said New Horizons Principal Investigator Alan Stern, of the Southwest Research Institute (SwRI) in Boulder, Colorado. "And what's coming is not just the remaining 95 percent of the data that's still aboard the spacecraft – it's the best datasets, the highest-resolution images and spectra, the most important atmospheric datasets, and more. It's a treasure trove."

Even moving at light speed, the radio signals from New Horizons containing data need more than 4 ½ hours to cover the 3 billion miles to reach Earth.

As a flyby mission, New Horizons was designed to gather as much information as it could, as quickly as it could, as it sped past Pluto and its family of moons – then store its wealth of data to its digital recorders for later transmission to Earth. Since late July, New Horizons has only been sending back lower data-rate information collected by the energetic particle, solar wind and space dust instruments. The pace picks up considerably on Sept. 5 as it resumes sending flyby images and other data.

During the data downlink phase, the spacecraft transmits science and operations data to NASA's Deep Space Network (DSN) of antenna stations, which also provide services to other missions, like Voyager. The spacecraft's distance from Earth slows communication rates, especially compared to rates offered by today's high-speed Internet providers. With New Horizons past Pluto, the typical downlink rate is approximately 1-4 kilobits per second, depending on how the data is sent and which DSN antenna is receiving it.

"The New Horizons mission has required patience for many years, but from the small amount of data we saw around the Pluto flyby, we know the results to come will be well worth the wait," said Hal Weaver, New Horizons project scientist from the Johns Hopkins University Applied Physics Laboratory (APL) in Laurel, Maryland.

The team also plans to continue posting new, unprocessed pictures from the Long Range Reconnaissance Imager (LORRI) on the New Horizons project website each Friday. The images are available here; the next LORRI set is scheduled for posting on Sept. 11.

New Horizons is part of NASA's New Frontiers Program, managed by the agency's Marshall Space Flight Center in Huntsville, Alabama. APL designed, built, and operates the New Horizons spacecraft and manages the mission for NASA's Science Mission Directorate. SwRI leads the science mission, payload operations, and encounter science planning.

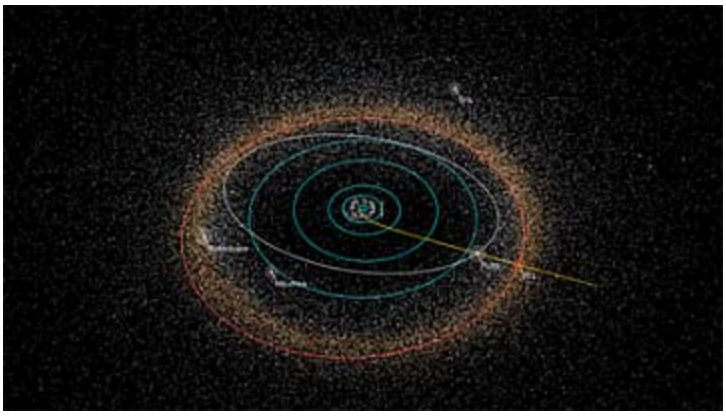


Image above right: Path of NASA's New Horizons spacecraft toward its next potential target, the Kuiper Belt object 2014 MU69, nicknamed "PT1" (for "Potential Target 1") by the New Horizons team. Although NASA has selected 2014 MU69 as the target, as part of its normal review process the agency will conduct a detailed assessment before officially approving the mission extension to conduct additional science. (Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute/Alex Parker)

New Horizons Team Selects Potential Kuiper Belt Flyby Target

August 28, 2015

NASA has selected the potential next destination for the New Horizons mission to visit after its historic July 14 flyby of the Pluto system. The destination is a small Kuiper Belt object (KBO) known as 2014 MU69 that orbits nearly a billion miles beyond Pluto.

This remote KBO was one of two identified as potential destinations and the one recommended to NASA by the New Horizons team. Although NASA has selected 2014 MU69 as the target, as part of its normal review process the agency will conduct a detailed assessment before officially approving the mission extension to conduct additional science.

"Even as the New Horizon's spacecraft speeds away from Pluto out into the Kuiper Belt, and the data from the exciting encounter with this new world is being streamed back to Earth, we are looking outward to the next destination for this intrepid explorer," said John Grunsfeld, astronaut and chief of the NASA Science Mission Directorate at the agency headquarters in Washington. "While discussions whether to approve this extended mission will take place in the larger context of the planetary science portfolio, we expect it to be much less expensive than the prime mission while still providing new and exciting science."

Like all NASA missions that have finished their main objective but seek to do more exploration, the New Horizons team must write a proposal to the agency to fund a KBO mission. That proposal – due in 2016 – will be evaluated by an independent team of experts before NASA can decide about the go-ahead.

Early target selection was important; the team needs to direct New Horizons toward the object this year in order to perform any extended mission with healthy fuel margins. New Horizons will perform a series of four maneuvers in late October and early November to set its course toward 2014 MU69 – nicknamed "PT1" (for "Potential Target 1") – which it expects to reach on January 1, 2019. Any delays from those dates would cost precious fuel and add mission risk.

"2014 MU69 is a great choice because it is just the kind of ancient KBO, formed where it orbits now, that the Decadal Survey desired us to fly by," said New Horizons Principal Investigator Alan Stern, of the Southwest Research Institute (SwRI) in Boulder, Colorado. "Moreover, this KBO costs less fuel to reach [than other candidate targets], leaving more fuel for the flyby, for ancillary science, and greater fuel reserves to protect against the unforeseen."

New Horizons was originally designed to fly beyond the Pluto system and explore additional Kuiper Belt objects. The spacecraft carries extra hydrazine fuel for a KBO flyby; its communications system is designed to work from far beyond Pluto; its power system is designed to operate for many more years; and its scientific instruments were designed to operate

in light levels much lower than it will experience during the 2014 MU69 flyby.

The 2003 National Academy of Sciences' Planetary Decadal Survey ("New Frontiers in the Solar System") strongly recommended that the first mission to the Kuiper Belt include flybys of Pluto and small KBOs, in order to sample the diversity of objects in that previously unexplored region of the solar system. The identification of PT1, which is in a completely different class of KBO than Pluto, potentially allows New Horizons to satisfy those goals.

But finding a suitable KBO flyby target was no easy task. Starting a search in 2011 using some of the largest ground-based telescopes on Earth, the New Horizons team found several dozen KBOs, but none were reachable within the fuel supply aboard the spacecraft.

The powerful Hubble Space Telescope came to the rescue in summer 2014, discovering five objects, since narrowed to two, within New Horizons' flight path. Scientists estimate that PT1 is just under 30 miles (about 45 kilometers) across; that's more than 10 times larger and 1,000 times more massive than typical comets, like the one the Rosetta mission is now orbiting, but only about 0.5 to 1 percent of the size (and about 1/10,000th the mass) of Pluto. As such, PT1 is thought to be like the building blocks of Kuiper Belt planets such as Pluto.

Unlike asteroids, KBOs have been heated only slightly by the Sun, and are thought to represent a well preserved, deep-freeze sample of what the outer solar system was like following its birth 4.6 billion years ago.

"There's so much that we can learn from close-up spacecraft observations that we'll never learn from Earth, as the Pluto flyby demonstrated so spectacularly," said New Horizons science team member John Spencer, also of SwRI. "The detailed images and other data that New Horizons could obtain from a KBO flyby will revolutionize our understanding of the Kuiper Belt and KBOs." The New Horizons spacecraft – currently 3 billion miles [4.9 billion kilometers] from Earth – is just starting to transmit the bulk of the images and other data, stored on its digital recorders, from its historic July encounter with the Pluto system. The spacecraft is healthy and operating normally.

New Horizons is part of NASA's New Frontiers Program, managed by the agency's Marshall Space Flight Center in Huntsville, Ala. The Johns Hopkins University Applied Physics Laboratory in Laurel, Md., designed, built, and operates the New Horizons spacecraft and manages the mission for NASA's Science Mission Directorate. SwRI leads the science mission, payload operations, and encounter science planning.

The **Atlanta Astronomy Club, Inc**., one of the South's largest and oldest astronomical society, meets at **3:00 P.M.** on the 2nd Saturday of each month at the Fernbank Scince Center in Decatur, or occasionally at other locations or times. Membership fees are **$30** for a family or single person membership. College Students membership fee is **$15**. These fees are for a one year membership.

Magazine subscriptions to ***Sky & Telescope*** or ***Astronomy*** can be purchased through the club for a reduced rate. The fees are **$33** for Sky & Telescope and **$34** for Astronomy. Renewal forms will be sent to you by the magazines. Send the renewal form along with your check to the Atlanta Astronomy Club treasurer.

The Club address: Atlanta Astronomy Club, Inc., P.O. Box 76155, Atlanta, GA 30358-1155. AAC Web Page: **http://www.AtlantaAstronomy.org.** Send suggestions, comments, or ideas about the website to webmaster@AtlantaAstronomy.org. Also send information on upcoming observing events, meetings, and other events to the webmaster.

Atlanta Astronomy Club Online

While this newsletter is the official information source for the Atlanta Astronomy Club, it is only up to date the day it is posted. So if you want more up to date information, go to our club's website. The website contains pictures, directions, membership applications, events updates and other information. http://www.atlantaastronomy.org You can also follow the AAC on Facebook by joining the AAC group, and on Twitter at http://twitter.com/atlastro.

AAC Officers and Contacts

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PSSG Co-Chair: Open

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Light Tresspass: Ken Edwards, Contact info TBA

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The Focal Point

Newsletter of The Atlanta Astronomy Club, Inc.

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Tom Faber
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We're here to help! Here's how how to reach us:

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Atlanta, GA 30358-1155
www.atlantaastronomy.org
On Twitter at http://twitter.com/atlastro

FIRST CLASS

www.beetagg.com

Calendar by Tom Faber (Times EDT/EST unless noted)

AAC Events are listed in BOLD

Sept 5th, Saturday: Moon Last Quarter.

Sept 10th, Thursday: Crescent moon near Saturn.

Sept 12th, Saturday: **AAC Meeting at Fernbank Science Center 3:00PM.**

Sept 13th, Sunday: New Moon.

Sept 19th, Saturday: **CEA Meeting and Potluck Dinner 5:30 PM at the Campbell Aquatic Building on Murder Creek Church Road**

Sept 21st, Monday: Moon First Quarter.

Sept 23rd, Wednesday: Equinox - Autumn Begins at 4:21AM.

Sept 25th, Friday: Mars near Regulus between Venus and Jupiter.

Sept 27th, Sunday: Full Moon. Total Lunar Eclipse: Penumbra first visible ~8:40PM, Partial begins 9:07PM, Total begins 10:11PM, Mid-Eclipse 10:48PM, Total ends 11:23PM, Partial ends 12:27AM, Penumbra last visible ~12:55AM.

Oct 3rd, Saturday: Venus, Regulus, Mars, & Jupiter in a near line in morning sky.

Oct 4th, Sunday: Moon Last Quarter.

Oct 8th-9th, Thursday-Friday: Draconids Meteor Shower.

Oct 9th, Friday: Moon near Mars between Venus & Jupiter.

Oct 10th, Saturday: **CEA Meeting in the Campbell Building (Note Date Change).**

Oct 11th, Sunday: Peach State Star Gaze Begins 12:00PM. Moon near Mercury, Venus near Regulus, Mars near Jupiter in morning sky.

Oct 12th, Monday: New Moon.

Oct 17th, Saturday: Mars & Jupiter less than 0.5° apart.

Oct 18th, Sunday: Peach State Star Gaze Ends 12:00PM.

Oct 20th, Tuesday: Moon First Quarter.

Oct 27th, Tuesday: Full Moon.

Nov 3rd, Tuesday: Moon Last Quarter.

For more event listings see the calendar at www.atlantaastronomy.org

Atlanta Astronomy Club Listserv

Subscribe to the Atlanta Astronomy Club Mailing List: The name of the list is: AstroAtlanta. The address for messages is: AstroAtlanta@yahoogroups.com . To add a subscription, send a message to: AstroAtlanta-subscribe@yahoogroups.com .

Focal Point Deadline and Submission Information

Please send articles, pictures, and drawings in electronic format on anything astronomy, space, or sky related to Tom Faber at focalpoint@atlantaastronomy.org. Please send images separate from articles, not embedded in them. Articles are preferred as plain text files but Word documents or PDFs are okay. You can submit articles anytime up to the deadline. **The deadline for October is Saturday, September 26. Submissions after the deadline will go in the following issue**.