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Editor & Publisher:
Richard DeMidio

The NHAS Observer and Gamma Ray Bursts

Newsletter of the New Hampshire Astronomical Society

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Astro Labs have Started

President's Message

Well, at the risk of saying something that has probably been heard each and every year throughout the history of astronomy in New England, "Has the weather been terrible or what!" I don't know about you, but I've managed to get outside with my scope exactly once since the snow melted. I remember last year, Stellafane ended up sandwiched between the remnants of two hurricanes, so I suppose it can't get very much worse than that. Let's hope that the wet, humid, cloudy spring and early summer has managed to get all the bad weather out of the system; leaving us some decent weather for the rest of the season. Hey, I can dream… Anyway, at this month's meeting I'll do the second half of my talk on high-energy astrophysics for amateur astronomers. Last month was on Gamma Ray Bursts and if you missed it, the most awe-inspiring tidbit would have to be that a single Gamma Ray Burst puts out as much as 10^{18} times the output of the Sun in under a second. That's the same as 3 million H-bombs per second for 76 times the age of the universe – all in as little as 6 milliseconds! Needless to say, you don't want to be anywhere near one. This month we'll drop down to a slightly more sane energy scale and cover Polars, Magnetars, and Blazars. That's two types of stellar remnants and an active galactic nucleus, all of which have had tons of good science done by amateur astronomers.See you there!

✷ Matthew Marulla
NHAS President 2005

Public Observing Highlights

About 100 students and parents showed up at West Nottingham Elementary in Hudson on May 19th. After a slide show inside, the kids enjoyed views of Saturn, Jupiter, the moon, and other objects. It was a clear, cool night and the bugs were kept at bay. The skywatch was scheduled to end at 9:30 PM, but at 10:30 PM we were still there showing things to them.

✷ Ed Ting

Astrophoto of the Month

Herb Hubert took this wonderful shot of the Lagoon Nebula on May 27th, with an Orion ED80 and Canon Digital Rebel at prime focus. Photos are uploaded regularly on the NHAS Photo Comm site Yahoo group.

Photo by Herb Bubert

Astro Lab Sessions

Editor's Note: I am including Bob's original message to the group as an fyi for what these sessions are about.

We have been trying to hold the ASTRO 101 Lab for many months. I am writing this on Friday night (May 27th). The original hope was that we could have our lab session tonight. But, surprise, it is raining. And Saturdays forecast isn't much better. Our original intent was to have the lab session on a coffeehouse night at our dark sky site. However, these nights have been in conflict all spring with events that supersede the lab session. Important things like Astronomy Day, or Messier Marathon. The spring semester is fast coming to a close so we need to schedule this lab session as quickly as practical. So, let's look to the near future for possible options. The next opportunity appears to be the June 3rd coffeehouse. Because we want to do some observing, aligning and navigating we will need to have clear weather. Thus, if the coffee house is postponed we will also postpone our lab. An e-mailing will go out. Let's hope the weather is good on the third or we will be into summer with its long twilight trying to have this lab session. I am hoping there is still interest in this Lab session. It is open to all members, regardless of attendance of the Astro 101 classes. If you have a comment about this proposed session or would like to confirm you interest in attending then you are welcome to send me a note at : Membership.2005@nhastro.com

The first Astro 101 course lab session was held on Friday June 3rd. The weather wasn't great but many objects were visible, including Jupiter, Saturn, double stars and deep sky objects. Telescopes we set-up, tuned and evaluated. Practice was had at aligning, finding and tracking. The turn out was relatively small but there were plenty of instructors for each student. Thanks to all who attended and made the event a success. For those who missed it, come to nearly any coffeehouse event at YFOS as the atmosphere is always one of support, sharing and learning.

✷ Bob Sletten

Noteworthy News

Gamma Ray Bursts ..... Page 2

Gamma Ray Bursts

Last month, **Matt Marulla** provided his first briefing to the club related to his recent studies in the southwest sponsored by NASA. Everyone found the discussion fascinating and for me personally, I had trouble fathoming the shear numbers that describe the intensity of the burst. I hope everyone enjoys this fascinating article. Matt will be providing more topics at subsequent meetings. I am including a summary of the presentation here from my personal notes and Matt's presentation.

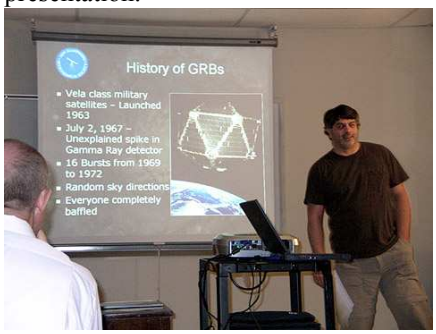
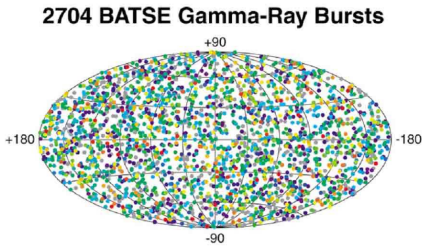


Photo by Chase McNiss

We learned that gamma rays have the smallest wavelength at approximately 10-12th on the order of the size of Atomic Nuclei. Gamma Rays cannot be focused. The main reason that they have not been studied much in the past is that all observing must be done outside the atmosphere. If you look at the history, the military used satellites to monitor nuclear detonations. They also noticed unusual readings from many of their satellites but were unable to correlate those to any known atomic tests. From 1969 to 1972, there were sixteen recording that could not be correlated to any atomic explosions. So, this had the whole community baffled on the cause. What complicated this even more was that the readings appeared to be coming from the sky in every direction. In 1991, the first breakthrough was made when the Compton Gamma Ray observatory was launched. This provided the best possible detection mechanism at the time. The project was very successful and we learned that the GRBs are very short lived, that they are very old, and very distant on the order of several billions of light years. For us, this is actually good thing because there energy output is so tremendous that we would not be reading this article if one were to go off near us. What scientists found is that when plotted, the areas of detection were consistent throughout the entire sky making these objects very common. As the following diagram illustrates, the GRBs are very consistent throughout the entire sky meaning that they are not associated with the Milky Way.



Scientists also discovered that GRBs have x-ray and optical detection afterglows, which if detected, can provide much insight to the origin and composition. Scientists also discovered that GRBs go through an evolution from burst, to x-ray, to optical afterglows as their wavelengths change. The idea was to construct a device that would be automatically able to detect and track this change. In April, 2005 the Swift (no acronym) Observatory went operational after a three-month intense checkout phase. This observatory can detect and process GRBs through the evolutionary cycle and implements a slewing technology. So, the sensors detect a burst, followed by a quick automatic positioning to look for both X-ray and optical afterglows. What we learned is that some GRBs do not have all the afterglow effects. Scientists have been able to determine from the afterglows the sizes and intensities of the bursts. We also know that they specific types of afterglows tell us about the type of GRB. It appears that some GRBs result from the birth of a black hole in the collapse of a massive star, and others from the merger of neutron stars or black holes in binary systems. Here is a picture of the Swift telescope. It contains three types of sensors for measuring the state of GRBs. The BAT (Burst Array Telescope) detects the burst while the XRT (X-Ray Telescope) looks for the X-Ray afterglow, and the Optical telescope for the any visual remnants. The scope is capable of slewing and positioning from twenty to seventy seconds depending on the location of the burst

Photo provided by Matt Marulla

In its first three months of operation, SWIFT detected 92 GRBs and is totally automated. When detections are made, the device sends all its information to ground stations. To make things even better, the scope has the ability to send triggers to thousands of users over the internet who have subscribed to be notified. Since time is of the essence and large scopes are not always available, the idea is to make GRBs quickly known to the astronomical community so that amateurs can quickly point an optical scope to the area of detection and look for evidence of visual afterglows. I think they took a page from the SETI playbook in utilizing the Internet and community to assist in the research. Matt made reference to a person in Arizona who has been studying some visual afterglows with a normal C8 telescope. For more information please visit the following web sites.

http://grb.sonoma.edu/ Real time updates on Gamma Ray Bursts with plots, images, http://gcn.gsfc.nasa.gov/ GRB Coordinate Network home page http://www.aavso.org/observing/programs/hen/ Sign up for GRB alerts – Submit observations! http://swift.gsfc.nasa.gov/docs/swift Swift home page.

✶ Article written by Rich DeMidio using Matthew Marulla's presentation

Deep Sky Object of the Month

Observer: Lew Gramer Your skills: Intermediate Date and UT of Observation: 1996-06-16, 06:00 UT Location: Bath, ME, USA (44N) Site classification: rural Limiting magnitude: 6.5 - low alt Seeing: 3 - medium Moon up: no Instrument: 7x35mm binos Magnification: 7x Filters used: none Object: M33 Category: Spiral galaxy Constellation: Tri Data: mag 5.7 size 73'x45' RA/DE: 01h33m +30o40m Description: Somewhat startling to suddenly hit on this object during a low-aperture binocular sweep! Quite pretty, with clear extension out to at least half a degree, with just a hint (in these skies) of dark regions and spiral structure. Worth a look in a wide-field instrument, the wider the better!

✷ Lew Gramer

Home Made Solar Filter

I recently made a solar filter for my Orion "Short-tube 80". The actual filter material is from Baader Planetarium. It's available on-line from Astro-Physics for $36 plus shipping. What you get is a sheet of coated plastic in the European "A4" size, which is about the size of a standard sheet of paper (it's 7.9" x 11.4"). The package and the Astro-Physics Web site both have directions on making a holder out of cardboard and glue which will fit your telescope and hold the filter material using double-sided tape. I had followed those directions with the first filter I made from the film for a 4.25-inch Newtonian, but I had some ideas for improvements, as these directions result in a filter holder which while functional is rough-looking. While "cardboard and glue" may conjure up images of crude constructions of the sort kindergarteners might make, it's possible to create smooth surfaces with these materials. With a little care, you can wind up with something this is light, strong, stiff, waterproof and perfectly fitted to your telescope. The secret is in taking your time, particularly letting each application of glue dry completely. The filter fits on the objective end; I mount mine to the end of the dew shield, which let me remove the dew sheild for use as a mold. This meant that there was no danger that glue would drip on my objective lens!. I wrapped the end of the dew tube with plastic wrap and held the wrap on with a collar of two layers of masking tape. I did that because you need to make the mold for the filter ring bigger than the actual installation site so that there will be room for the interior treatment of the inside of the filter. It'll wind up quite snug, and three layers of tape would be fine as well. Then I carefully cut several one-inch wide strips from a sheet of cardboard. The kind you want has a fuzzy surface on both sides. Don't use corrugated cardboard or the smooth-finished sort, as it won't glue as well! I haven't found a source for this kind of cardboard. My supply was collected over several months from the backs of pads of paper. If you find a supplier, please let me know! It's important to cut the strips to size at each step, so measure carefully. Wind a layer of cardboard around the tube, cutting to fit. Cut another strip to go just on top of the first. Now use white glue (of the "Elmer's" sort) to glue them together on the form. If you're careful, you can do this without leaving glue on the outside surface of the outer layer, and can then use rubber bands to hold it in place while the glue dries. If not, a layer of waxed paper will keep the rubber bands from becoming glued to the cardboard. I used a generous layer of glue; it soaks into the cardboard and makes the bond stronger. Be sure to adjust the "outside" edges of the strips while the glue is still liquid. After this tube-ring has dried, take the two-layer ring off and put it on a sheet of cardboard and draw around it. Cut out that circle, and cut a hole in the middle of the circle to let the sunlight through. I left an edge of about three-quarters of an inch. Glue this flat ring to the flat edge of the two-layer tube ring, weighting it down with a book and using waxed paper to prevent gluing the book on. From here you can repeat the process. I added a layer of cardboard to the ring which was an inch and three-quarters inches wide. After it had dried, I cut the upper part of it into triangles which I could then fold down on the flat ring and glue in place to bond the flat ring to the tube ring. Another flat ring, sized to fit over the folded edge and a final layer on the tube ring overlapping that join point finished the first part of my filter holder. At this point I sanded the object to smooth it out and put several thin coats of glue over the entire surface in steps. I'd coat part of it, let it dry and then sand it with fine sandpaper. Then I'd do the same to another part. Finally I added a coat of glue without sanding it. Each coat was smoothed with my fingers while liquid, and I did my best to fill in cracks and holes with glue. The end result of these layers of glue is a hard, smooth surface which feels much like one of the lighter softwoods. Since the glue soaks in, it looks like the cardboard is the surface: there's no "shell" of glue. After a through drying over several days I painted the form with two coats of polyurethane for water resistance. When that had dried, I used this form as the mold for another of the same shape. I then used double-sided sticky tape to attach a circle of filter material to the inner form, and covered it with the outer one. The two fit together quite tightly, and I decided not to glue them together, so that I can replace the filter material should that become necessary. I then constructed a round box for the filter using the same techniques. The completed filter was the mold for the box, but I used more plastic wrap and tape to make sure it would fit loosely in the box. I now have a small, strong box which closely holds a solar filter which perfectly fits my telescope. It cost very little and looks good. I can recommend this construction method: almost all it takes is time!

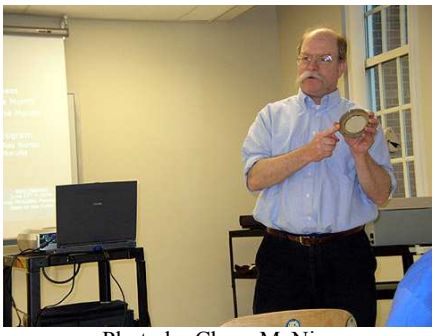


Photo by Chase McNiss

✷ John Bishop

The Bottom Line

Starting Balance: $3,854.41
Deposits: $281.35
A/P: $1231.91 (Insurance, Mosquito Magnet, T-Shirts, Porta Potty)
Net Balance: $2,903.85
Cash Balance on April 30: $2,903.85
Membership: 114
New members: 1
Joe Frazier Canaan , NH
Donations: 2 tanks of propane from Paul Winalski

✷ Barbara O'Connell

Looking Back at Last Month

Opening. Matt Marulla walked us through the various department reports and set the stage for the evening program on gamma bursts. **Scope of the Month.** A local professor at St. Anslems described a homemade scope that one of his students made.

Photo by Chase McNiss

Public Observing. Ed Ting reported that this has been the worst season for public observing he has ever seen. So far, we have like two skywatches. We got a check for $100.00 from Salem sky watch donation. There was one last night at West Nottingham in Hudson. Ed did a slide show inside and over 100 people attended to over 10:30pm. Ed has many copies of night sky magazine. If there some left after the meeting, he wants to get rid of them. *Editor's Note: Uncertain if all them were taken but if not, they will be at the next club meeting.* **Book of the Month, John Bishop** Turn left at Orion. The advantage is that it is fun to read as it is kind of chatty. The charts are outstanding including a constellation, finder, and eyepiece perspectives. Note that folks using reflecting telescopes might have invert the image. It also shows the nearby objects such as double stars. The maps are great for star hoping navigation. The pictures are also very realistic in their view of object as seen from a telescope. Finally, there is a rating scale to show how they appear from telescopes and binoculars complete Icons for various types of equipment. This is a very good book top get started.

Committees. Photo Club **Chase McNiss** reported that meetings have been occurring at the Nashua public library. Refer to club email for dates and locations. The group gets together to share as new images, ask questions about photography, and share techniques for processing. If you have some new equipment, please bring to show it off. Web: **Matthew Marulla** reported that the new website is still in progress and members can view it at www.nhastro.org Take a look and send matt comments. Matt requested a mail alias for webmaster be redirected to his address. ATMs: **Larry Lopez** reported that he was thinking to have a meeting based on demand from the club. Please contact him for any questions or requests. . Membership: **Bob Sletten** was unable to make the meeting so refer to the article on the first page for details.

YFOS. **Larry Lopez** reported that he needs volunteers to help with lawn mowing. The mosquito net is installed an operational. If you go there it might need to be emptied so please check. Some folks reported that the LED display on the machine was blinking red. We were uncertain on whether that means stable or not. An orange light means that machine is not lit. A green light means lit and operational (this is what we want). Chase pointed out that an entry should be made in the log book to indicate status and any service performed on the mosquito net. The instructions and replacement netting are in the cabinet. Larry asked if anyone knows about optimal placement of the device and is looking for domain knowledge from members. The main source is either woods to the North or gulley to the south to the swamp. Generally, the bugs go upwind to load up and use the wind to get back home. They are ingenious little creatures. Over the next few weeks, observations will help determine optimal placement so please log your findings when onsite.. **Other Topics**. **Matt Marulla** showed some recent pictures that he recently viewed on the web. The first one was taken by one of the Mars rovers depicting a panorama taken from the top of a hill that was being climbed for months.

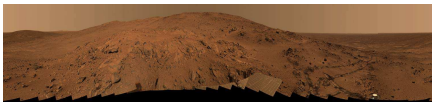


Photo provided by Matt Marulla

The rovers are now over thirteen months past expected lifespan which is astonishing. Scientists are pleased but also amazed on how well they have held up. Matt also showed another picture of M104 taken with the new Spitzer telescope.

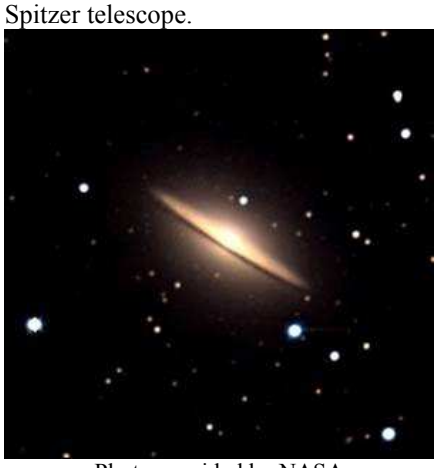


Photo provided by NASA

Finally, there was a picture new moon that Cassini recently discovered between the rings.

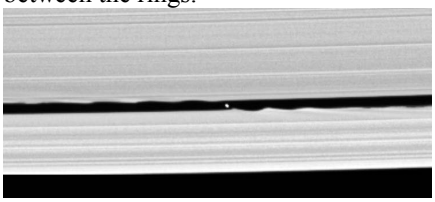


Photo provided by NASA

Rich DeMidio showed the certificate of appreciation sent from NASA space place and proposed that it be placed in YFOS warming hut.

Photo by Chase McNiss

Larry took the certificate since he was going to YFOS the next day. **John Bishop** showed his home made solar filter (refer to earlier article for the details). **Matt Marulla** brought in a

piece of trivia which was a Bauch and Lomb 4000. It has no optical coatings and is housed in a shiny tube with no black lining. It is an f/13 and he bought it for $5. He wants to use it for a guide scope but the threadings are not standard. Matt asked our resident expert machinist Joel Harris for assistance ☺

Photo by Chase McNiss

✷ Rich DeMidio

NASA Space Place

Editor's Note: This article may be found on web at http://spaceplace.nasa.gov/astro_clubs/

Moving a Mountain of a Dish

by Patrick L. Barry

Your first reaction: "That's impossible!"

How on earth could someone simply *pick up* one of NASA's giant Deep Space Network (DSN) antennas—a colossal steel dish 12 stories high and 112 feet across that weighs more than 800,000 pounds—move it about 80 yards, and delicately set it down again?

Yet that's exactly what NASA engineers recently did.

One of the DSN dishes near Madrid, Spain, needed to be moved to a new pad. And it had to be done gingerly; the dish is a sensitive scientific instrument full of delicate electronics. Banging it around would not do.

"It was a heck of a challenge," says Benjamin Saldua, the structural engineer at JPL who was in charge of the move. "But thanks to some very careful planning, we pulled it off without a problem!"

The Deep Space Network enables NASA to communicate with probes exploring the solar system. Because Earth is constantly rotating, a single antenna on the ground can communicate with a probe for only part of the day, when the probe is overhead. By placing large dishes at three locations around the planet—Madrid, California, and Australia—NASA can maintain contact with spacecraft around the clock.

To move the Madrid dish, NASA called in a company from the Netherlands named Mammoet, which specializes in moving massive objects. (Mammoet is the Dutch word for "mammoth.")

On a clear day (bad weather might blow the dish over!), they began to slowly lift the dish. Hydraulic jacks at all four corners gradually raised the entire dish to a height of about 4.5 feet. Then Mammoet engineers positioned specialized crawlers under each corner. Each crawler looks like a mix between a flatbed trailer and a centipede: a flat, load-bearing surface supported by 24 wheels on 12 independently rotating axes, giving each crawler a maximum load of 194 tons!

One engineer took the master joystick and steered the whole package in its slow crawl to the new pad, never exceeding the glacial speed of 3 feet per minute. The four crawlers automatically stayed aligned with each other, and their independently suspended wheels compensated for unevenness in the ground.

Placement on the new pad had to be perfect, and the alignment was tested with a laser. To position the dish, believe it or not, Mammoet engineers simply followed a length of string tied to the pad's center pivot where the dish was gently lowered.

It worked. So much for "impossible."

Find out more about the DSN at http://deepspace.jpl.nasa.gov/dsn/ . Kids can learn about the amazing DSN antennas and make their own "Super Sound Cone" at The Space Place, http://spaceplace.nasa.gov/en/kids/tmodact.shtml.

Caption:
Giant Deep Space Network antenna in Madrid is moved using four 12-axle, 24-wheel crawlers.

Note to editors:

This image may be found at http://spaceplace.nasa.gov/astro_clubs/dsn_madrid_move.jpg .

DEADLINE July 2005 Issue: 5 PM July 11
E-mail articles to the Editor.
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2005 Officers
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Polars, Magnetars, and Blazars, 6/17, Planetarium

NHAS Upcoming Events

Event	Date	Time	Location
June Business Meeting	June 17th	7:30 pm	Planetarium Concord NH
CMP Skywatch	July 1	7:30 pm	Planetarium Concord, NH
Coffee House	July 8	Dusk	YFOS
July Business Meeting	July 15	7:30 pm	St. Anslem's
CMP Skywatch	Aug 5	7:30 pm	Planetarium Concord, NH