



## *STAR FIELDS*

Newsletter of the  
Amateur Telescope Makers of Boston  
Including the Bond Astronomical Club  
Established in 1934  
In the Interest of Telescope Making & Using

Vol. 22, No. 7 July 2010

### **This Month's Meeting...**

**Thursday, July 8<sup>th</sup>, 2010 at 8:00 PM**

**Phillips Auditorium**

**Harvard-Smithsonian Center for Astrophysics**

Parking at the CfA is allowed for the duration of the meeting.



*Photo by Ross Barros-Smith*

### **Member Presentation & Swap Night**

This month's meeting will feature four members speaking on astronomy or telescope related topics. This is a good chance to see what your colleagues have been up to

Also, bring your no-longer-used old equipment and accessories to the mini-swap meet. If you're looking to buy, this is the time to look for some great deals!

Please join us for a pre-meeting dinner discussion at [Changsho](#), 1712 Mass Ave, Cambridge, MA at 6:00pm before the meeting.

### **President's Message...**

Just like many of you, I became interested in astronomy as a teenager. But in those days, long ago, there weren't many choices for telescopes, and those that were available were pretty

expensive. I found that out when I went to Criterion Optical Co. in Hartford with a very small budget for a telescope, and the nice person I talked with finally reached into a drawer and pulled out a slightly scratched small mirror and offered it to me cheap, along with a slightly defective focuser (no knob or rack, but it did have a small diagonal attached), and some miscellaneous small lenses and cardboard spacers for making an eyepiece. He also gave me some brief verbal instructions on how to put all this together into a Newtonian telescope. Next stop the hardware store to buy a piece of stove pipe, and I was in business after a little construction work. There were no astronomy books in our local library, but just sweeping the dark sky (back then it was dark) and picking out some interesting sights – even with no idea what they were or what they were called - was a thrill for a teenager.

It would be nice if I could tell you that I stayed with the hobby continuously from then up to now. But the truth is that other things- college, grad school and then the “real world”- soon intervened and demanded attention and my astronomy activities faded into the past.

Then for my birthday about ten years ago- out of the blue and with no warning- my wife and two boys decided to give me a telescope. Sometimes those close to you seem to know more about your latent interests than you do yourself. My surprise gift re-awakened my long-ago interest and love in astronomy and soon afterward I joined ATMOB.

This gift opened up completely new directions that I wouldn't have followed otherwise. I began learning about and looking at different types of celestial objects, got involved in light pollution abatement, participated in a number of club star parties which in turn led to becoming a volunteer astronomy teacher, and followed the “ATM” part of our club's name to build my second telescope.

To our newer members, here is what I (like you, a relative newcomer) learned: you don't need to be an expert to enjoy and participate in all of our club activities- my own astronomy knowledge and experience was almost non-existent when I joined. All you need is some enthusiasm and interest, and you will be accepted as a full participating member. All the ATMOB members I've interacted with over my nine years in the club have been extraordinarily generous with sharing their knowledge and helping to bring an aging teenager up to speed with modern astronomy. And our club has many genuine experts- in telescope making, observing, astrophotography, optical equipment maintenance and repair, and public outreach- just to name a few. Please don't feel shy about talking with them.

To all members, consider trying some new activity in our club that you haven't tried before. If you have been a casual observer, consider stepping it up a notch, or try coming to one of our star parties, or test drive telescopes recently installed at the clubhouse for member use. Along the way you will meet other members that maybe you didn't know very well, but who are interesting and helpful and may know a lot about something that is new to you. And this member interaction is really what our club is all about.

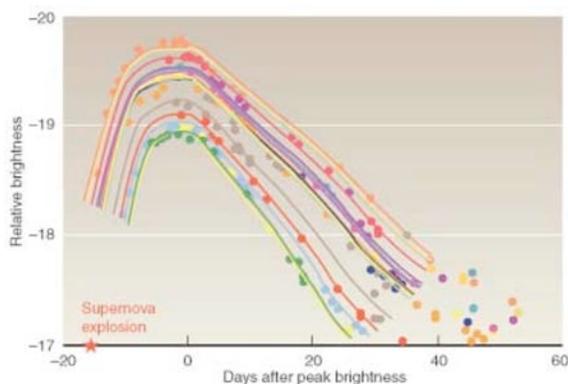
~ *Bernie Kosicki, President* ~

## June Meeting Minutes . . .



*Photo by Al Takeda*

The June meeting of the Amateur Telescope Makers of Boston featured Dr. Rosanne Di Stefano, astrophysicist at the Smithsonian Astrophysical Observatory and lecturer of Astronomy at Harvard University. Her discussion focused on Type Ia Supernovae and that, although we do not know what causes them, they are still very useful in our observations of the universe because they can provide accurate measurements of distance not because they are identical “standard candles”, but because there is a known relationship between the peak brightness and its rate of decline (see graph below).



Dr Di Stefano discussed several theories about how these supernovae come to be but no conclusions have yet been reached. She mentioned several historic Type Ia supernovae in historical context including those of 1006 which is possibly the brightest supernova seen from the earth, 1572 “Tycho’s Supernova,” and 1604 “Kepler’s Supernova,” the last Type Ia supernova in our galaxy and which pre-dated the telescope. It was also indicated that the rate of Type Ia supernovae within our galaxy is about 0.3 per century.

Circumstances point to the stars going Type Ia supernova to be hot white dwarves which reach a critical mass. This is because, in contrast to Type II supernovae which are known to be core collapses of stars in the 8.5 to 25 solar mass range at the end of their lives, are rich in hydrogen, display great diversity, occur in young star populations, destroy the progenitor star and leave neutron stars or black holes as remnants, Type Ia exhibit no hydrogen, are “standardizable” candles, occur in young and old star populations, we have not seen the progenitor star, nor have

we seen remnants. White dwarves are created when stars, late in their life, exhaust their fuel and expand, giving off their outer shells of gas and cool leaving behind a small dense cool star about the radius of Earth (5000-6000km) but with 60% of the sun’s mass. They consist of degenerate matter (reaction products including helium, carbon and oxygen) surrounded by a thin layer of normal gas (50km). Chandrasekhar calculated that resulting star cannot exceed 1.4 times the mass of the sun otherwise it would no longer be able to support its weight through electron degeneracy pressure and collapse to form a neutron star rather than explode as a supernova.

There are different theories for how a white dwarf could gain the necessary mass to reach the critical point at which it could ignite and explode, consuming itself. First, Dr. Di Stefano indicated that many stars are binaries. One possibility is that two orbiting white dwarves could merge, producing the critical mass required. This is the Double Degenerate Star scenario. Another, and possibly more likely scenario, is that a white dwarf is paired with a normal star which would donate matter at the appropriate rate to reach the critical mass. This is the Single Degenerate Theory.

One possible way to identify stars fitting the Single Degenerate Theory is by looking for supersoft x-ray sources. These sources have luminosities, temperatures and radii expected of hot white dwarves which seem to be the best candidates for Type Ia Supernovae. Some of these sources indicate a steady H-Burn. A theoretical statistical analysis indicates that this is a possibility. If this is the case, we may be able to find dozens of Type Ia progenitor stars and study them in detail.

Concerning amateur participation in supernovae research, Dr. Di Stefano indicated that amateurs can be very helpful in providing photometric measurements of supernovae when they are discovered in order to generate more accurate light curves to identify Type Ia Supernovae.

Dr. Di Stefano continued to briefly discuss microlensing, Mesolensing, transits and exo-planets. Detection of exo-planets events depends on wide-field monitoring, with variables being peak magnitude, duration and cadence of observation. There are several wide field projects in place, including Pan-STARRS, LSST, OGLE, MOA, KMTNet and Kepler. Most of these focus on exo-planet transits but may be able to detect lensing events as well.

Exo-planet detection can also be made through microlensing and mesolensing. Dr. Di Stefano explained that microlensing events are milliarcsecond in size, occur in time domain only, have low probability of events per lens, has no event prediction, and is difficult to follow up. Mesolensing, on the other hand, uses the larger Einstein ring, has astrometric effects, has a high probability per lens, has the possibility of event prediction, and follow up may be possible. MACHO LMC has detected mesolensing events. Short lensing events (planets, brown dwarves, hypervelocity objects) are being detected by OGLE and MOA and KMTNet is especially designed to be sensitive to them. Events are more easily detected when they are near us or near the lensed star.

The use and development of these wide field monitoring instruments and modes will allow us to discover planets outside the “resonant” zone, lead to planet discoveries within the habitable zone, and learn about the outer regions of planetary systems, free-floating planets and hypervelocity objects. We will learn a lot about planets from these monitoring programs, and the science return could far exceed present expectations.

Again, Dr. Di Stefano reiterated that there is a need to develop a program for systematic amateur participation in observations for both transit and observations. Amateurs can enlist observers, take advantage of announced events, provide ongoing and follow up observations, and in the near future monitor high probability predicted events. Specifically, amateurs can add multi-wavelength observations, continued monitoring perhaps with higher resolution, more sensitive photometry, or higher frequency, astrometry, and finally more structure in light curves which can provide more information, in particular parallax and proper motion.

Following her presentation, Dr. Di Stefano took questions. One reference of interest may be the book “Historical Supernovae.”

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Steve Beckwith brought the business meeting to order at 9:10pm. He took the opportunity to mention that, as president, he had a lot of help from the club membership. Also, he was proud of the hard work, ongoing and new projects that the club has been a part of during his tenure as club president. It has been both a pleasure and trying, being president.

Mario MoTTA commented on Dark Sky Bill S1481 and indicated that the club needed to provide vocal support for a vote to override the committee chair to move the bill along. Information is available at [www.mass.gov/legis/comm/j37.htm](http://www.mass.gov/legis/comm/j37.htm). He also provided a token of appreciation to Steve for job well done as president.

Fred Ward gave a brief report on his eye surgery success and indicated that anyone wanting details could read the club “discuss” archive or contact him directly.

### Annual Meeting/Elections

The slate of Executive Board Candidates was provided. A comment was made that there were no additional nominations meeting the club by-laws requirements. A motion to vote to approve the slate as presented was made and seconded. The vote was held and overwhelmingly approved as follows:

President Bernie Kosicki  
Vice President Mike Hill  
Treasurer Nanette Benoit  
Secretary Bruce Tinkler  
Membership Tom McDonagh  
Member at Large Chuck Evans  
Member at Large Neil Fleming

Appointed by the President as Newsletter Editor is Ross Barros-Smith, a non-board position.



Members of the Executive Board (L-R): Nanette Benoit, Bruce Tinkler, Tom McDonagh, Bernie Kosicki, and Mike Hill

*Photo by Al Takeda*

Bernie Kosicki, the newly elected club President had a few words in the “Passing of the Gavel.” He recognized Steve for his work and dedication for the past two years as President of the club as well as co-chair of the Observing Committee. He indicated that Steve handled the problems and glitches of the club fairly. Also that Steve had done well training the VP to deal with the procedures of the club and finally succeed him. He closed by saying “Great job! Go back to observing!” In accepting the position of President of the club, Bernie said that it is humbling to take over a 76 year old club, especially as a new comer of only 7 or 8 years. Taking stock of the club as it stands:

- Observing Program – at the Westford Club House has unrivaled resources and facilities.
- The Telescope Makers Group – has a wonderful shop, available supplies and recognized experts available for all to take advantage of.
- The Public Outreach – under Virginia’s guidance reaches thousands of school children and adults through numerous star parties each year.
- Connects with professional astronomers through meetings which not only allow us to learn about current research but also provides us with opportunities to contribute to that research.

The club, according to Bernie, is successful because of its member volunteers.

Bernie would like to hear member ideas. He closed his comments by saying “This is your club. Try something different from what you have done before!”

Al Takeda provided the June Secretary’s Report. He also commented that it has been an honor and a pleasure to serve as club Secretary and newsletter editor for the past 4 years and wished to thank the membership. Bernie indicated that Al had had the hardest job on the board.

The Membership Report was given by Tom McDonagh. He indicated that there were no new members, and the membership stands at 330 members. He also mentioned that some members had already renewed. Renewal can be done over the net through the club website and payment made using PayPal. For those who choose not to renew electronically, he is happy to take

membership renewals in person with the membership form and cash or check. Tom also thanked the retiring board members and wished the best to Bernie and the new board members.

The Treasurer's Report was given by Nanette Benoit. She reported that the club spent less than budgeted and did not earn as much from dues and interest. However, the club has sufficient funds. Over the past year, many improvements have been made in our facilities from our spending. An official report will be issued, and an end of year report will be available in the club newsletter. Nanette specifically thanked Harvard and MIT for the use of the meeting room and club house, which is one area other clubs have significant expenses.

The Clubhouse Report was given by Steve Clougherty. He brought us up to date on the May work parties and announced the upcoming work party.

The Observing Report was provided by John Meher. He reported that the Friday evening video courses would continue with a course on Weather.

### Upcoming Events

Upcoming club events and star parties were announced by Bernie.

May 28 to Jul 16, 2010

Meteorology: An Introduction to the Wonders of Weather  
ATMoB Clubhouse

Jun 26, 2010

June Clubhouse Work Party # 7 ATMoB Clubhouse

Jul 8, 2010

Members' Night ATMoB Clubhouse

Jul 10, 2010

Star Party for Families of Military Service Men & Women  
Hanscom Air Force Base, Lexington

Jul 17, 2010

New Member Orientation Night ATMoB Clubhouse

Jul 24, 2010

July Clubhouse Work Party #8 ATMoB Clubhouse

June 19th, July

17th Astronomy Nights in Arlington Robins Farm Park

### Unfinished Business:

Paul Valleli updated the club concerning Tal's 10" donated scope. It has been dried, disassembled, and diagnosed with the participation of several club members. Several parts have been repaired or replaced. Hopefully, it should be up and running in July.

### New Business:

None

### Announcements:

Mario Motta announced that he has been appointed AAVSO 2<sup>nd</sup> Vice President.

Haldun Menali announced he would be on a ship in Tahiti/Cook Islands for the July 18<sup>th</sup> Solar Eclipse. He will share pictures in September.

~ *Bruce Tinkler, Secretary* ~

## Clubhouse Report . . .

Twenty ATMOB members were on hand to help with a variety of projects at the clubhouse on Saturday June 26. The weather cooperated but it was hot and humid.

The grass was mowed during the morning thanks to John Blomquist hauling his tractor to the site. John Maher used the power mower to finish mowing in the morning and afternoon. Eileen Myers raked the field with some help from other members. The observing field was trimmed and the condition of the property this season is very good.



*Photo by Al Takeda*

Scraping has begun on the north side of the clubhouse and this effort will continue throughout the Fall. This side will be stained once the prep work is finished. The third floor outside peak remains to be stained and this final area will be completed when ladders and staging are available.

Archiving of ATMOB materials was being discussed and implemented by Paul Valleli and Anna Hillier. Bruce Berger Mike Hill and Sergio are wiring the new tool shed in the workshop. Shelving and toolracks will be installed. The sheetrock, flooring and painting are complete.

Plans were discussed for upgrades to the 20" Shapley scope in the Ed Knight Observatory. The Dobsonian box mount will be rebuilt and the telescope structure will be strengthened in upcoming work sessions.

The clamshell observatory is in very good working order and will be available for member use this summer. Extended hand rails were installed by Dave Prowten to bridge the gap from the outside ladder to the inside step ladder. The Dall-Kirkham telescope mount was partially disassembled and the clutches and gears will be machined to provide a smoother tracking capability. We hope to have a slide show available for the July meeting to

show off the fine work that so many members have contributed to this project.

Lunch was prepared by the finest chefs in the area, thanks to Art Swedlow, Sai Valabhalla, Eric Johannsen and Eileen Myers.

A full list of participants will be included in the next Starfields (September) and an update on additional projects that are ongoing at the clubhouse will be included.

~ *Clubhouse Committee Directors* ~  
~ *John Reed, Steve Clougherty and Dave Prowten* ~

#### Clubhouse Saturday Schedule

July 10	Art Swedlow	Sai Vallabha
July 17	Dave Siegrist	Bill Toomey
July 24	Blomquist + Jacobson + McDonagh: <b>WORKPARTY #8</b>	
July 31	John Maher	Rich Nugent
August 7	<b>CLOSED - STELLAFANE</b>	
August 14	John Hopkins	Eileen Myers
August 21	Bruce Berger	Mike Hill
August 28	Paul Cicchetti	John Reed

### Thoreau on Astronomy . . .

Friday. 4 a.m. To Cliffs. No dew; no dewey cobwebs. The sky looks mist-like, not clear blue. An aurora fading into general saffron color. At length the redness travels over, partly from east to west, before sunrise, and there is little color in the east. The birds all unite to make the morning quire; sing rather faintly, not prolonging their strains.

The crickets appear to have received a reinforcement during the sultry night. There is no name for the evening red corresponding to aurora. It is the blushing foam about the prow of the sun's boat, and at eve the same in its wake.

Journal, 9 July 1852

~ *Submitted by Tom Calderwood* ~

### Membership Report . . .

Membership as of June 29th, 2010 is 333 members.

The slow month of May is past and we can now celebrate the addition of three new members to our ranks. Please take the time to welcome Judith Tavano, George Sisler and Bernice Buresh to ATMob!

It is quite easy to renew your membership online using PAYPAL. No formal membership or setup fee is required to pay through PAYPAL. See the renewal page on the [atmob.org](http://atmob.org) website for details.

I have ATMOb name cards available for distribution. Do you need a new name tag? Please drop me a line and I will make one up for you. Are you having trouble with your *Astronomy* or *Sky &*

*Telescope* magazine subscription? Please feel free to contact me via email. I'll do my best to sort out any problems.

The Amateur Telescope Makers of Boston, Inc. is a 501(c)3 organization. Donations are gladly accepted and are tax deductible to the extent allowed by law. Please consider making a tax-deductible contribution to the club when planning for 2010.

[membership@atmob.org](mailto:membership@atmob.org)

~ *Tom McDonagh – Membership Secretary* ~

### Passing Along Another Torch . . .

For the last four years, when receiving your copy of Starfields on time and full of useful coverage of the goings on in ATMob and beyond, you had Al Takeda in whom to invest your thanks. Now that Bruce Tinkler takes over the core duties of the secretary's position and I assume responsibility for the newsletter, it is inevitable that we reflect upon the magnitude of this transition. This is a change that goes beyond simple formatting preferences and idiosyncrasies in grammar; like more than a handful of other members, Al's slavery of love is the only voice of the club I've known since joining.

Even this month, if by some non-negligible miracle your copy of Starfields has arrived reasonably on time and of passable mediocrity, you still have Al to thank. His investment of time and guidance (perhaps we could even call it "personal intervention" on one sleep deprived afternoon) have been the best foundation for building a smooth transition. So, while we've now done this a few times, I hope you will all join me again in thanking and applauding Al for his past and continuing service to our club.



Al leaves the position of Club Secretary after four years  
*Photo by Ross Barros-Smith*

On a more self centered note, I'd like to extend thanks to all of you who either spoke with me in person or emailed me you're your congratulations. It has always been understood to me that ATMob is one of those rarest of communities in which its participants get back just a little bit more than they had put in.

Your offers of written contributions, photographs, and less tangible support have only reinforced this feeling. It hasn't gone unappreciated.

Now that move forward, we ought to seize this opportunity to improve upon excellence. For the immediate future, the newsletter will carry on in much the same form we are all familiar with. A personal short term goal of mine is "don't screw up" More seriously, it is important to note that Starfields is the principle instrument for communicating within the club and the only one that reaches our entire membership. It is also an ongoing record of our activities to satisfy any future interest in the history of this organization.

With these considerations in mind, I hope to begin a conversation with all of you on building a better newsletter. Some questions that come to mind include: What do you enjoy seeing or find important? Is there any sort of content you wish were carried? How do you experience the newsletter? Do you prefer to read it on a screen or print it out for later use?

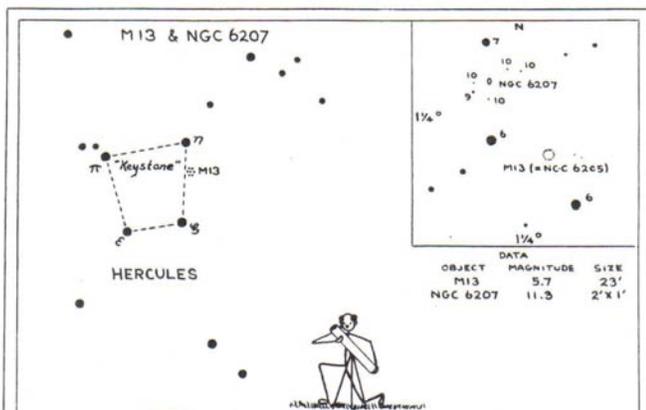
Please feel free to get in touch with your thoughts, recommendations, or related threats either by email ([newsletter@atmob.org](mailto:newsletter@atmob.org)) or approaching me in person.

This your club and your newsletter. What shall we do with it?

~ **Ross Barros-Smith** – Newsletter Editor ~

## Sky Object of the Month . . .

### JULY 2010 – NGC 6207



Unless you're a rank beginner, you've no doubt marveled at the spectacular stellar swarm that is M13. Taking on the appearance of a spoonful of sparkling sugar dropped on a sheet of black velvet, the great globular cluster in Hercules is one of the night sky's most dazzling sights.

Most backyard astronomers are so entranced by M13, that they fail to notice a small, faint oval patch of light a half degree to the northeast. This is the 11th magnitude galaxy NGC 6207. Years ago, I was just able to glimpse this 2' by 1' smudge in a 3-inch f/10 reflector. Most of the time, NGC 6207 will require a 4 to 6 inch scope, or larger.

M13 and NGC 6207 may appear close together, but they're light years apart – literally! While M13 is a "mere" 23 thousand light years away, the light from NGC 6207 comes from a distance of 46 MILLION light years – two thousand times more distant!

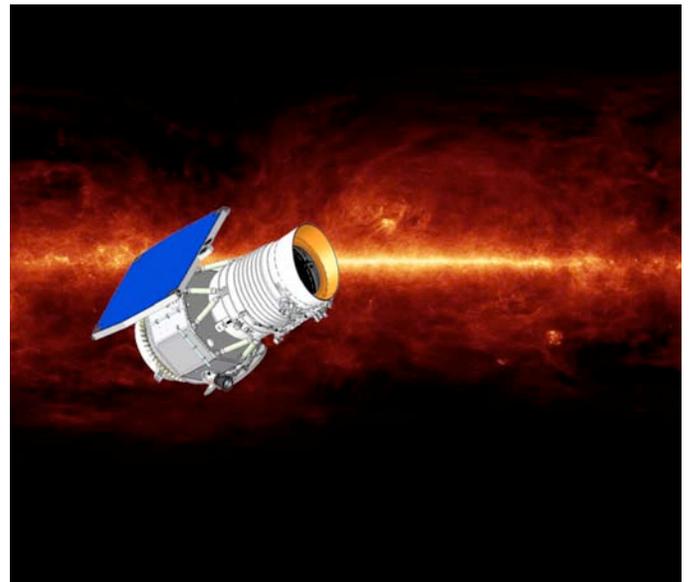


1° field M13 and NGC 6207 (3-inch f/10 reflector at 30X)

Your comments on this column are welcome. E-mail me at [gchapple@hotmail.com](mailto:gchapple@hotmail.com).

~ Glenn Chaple ~

## WISE Update . . .



Concept drawing by NASA/JPL

NASA's Explorer mission WISE (Wide-field Infrared Survey Explorer) was launched successfully on December 14, 2009, and has completed nearly 95% of its first scan of the sky. Even though it's designated a survey mission, as an infrared instrument, its job is to seek out the "old, cold and dusty" objects in our solar system and our own Milky Way galaxy.

High up on the list of “cold” objects are asteroids, PHAs (potentially hazardous asteroids) and NEOs (near-Earth objects), and amateur astronomers can play an important part in helping WISE scientists find and confirm locations of PHAs and NEOs. All that’s needed is a telescope with a digital camera, a dark area to observe from, and a computer with an internet connection to look at images and report discoveries.

WISE orbits the Earth over the day-night terminator and so is always looking up and out. Because of its orbital path, WISE will only observe each asteroid a few times and without more observations within two weeks, all of the new NEOs and PHAs WISE finds will be lost. Well, they won’t really be LOST, they’re still up there somewhere but because they’re SMALL and orbiting the Sun same as the rest of us, if the scientists don’t have enough observations to accurately determine and plot the orbits, they will lose sight of the new NEOs and PHAs.

Here’s how we can help the WISE team. All you need to do is look up WISE NEOs on the Minor Planet Center’s NEO confirmation page (<http://www.cfa.harvard.edu/iau/NEO/ToConfirm.html>), download their predicted positions and errors, and start observing them. You’ll also find an estimate of each object’s visual magnitude, and how long an exposure time you will need. From the measured position of the object on the sky (astrometry) and the report of each observer’s location and time of observation, scientists can determine the object’s orbit.

There are many ways of determining an asteroid’s position. One popular program to use is Astrometrica (<http://www.astrometrica.at>). Additionally, the Minor Planet Center (MPC) has published an online guide to doing astrometry that can answer many of the technical questions you might have while getting ready or taking your observations. (<http://www.cfa.harvard.edu/iau/info/Astrometry.html>).

If you submit observations of an asteroid while it is still on the MPC’s NEO page then your name will be listed on the Minor Planet Electronic Circular that describes the discovery circumstances. How cool is that!!

~ *Nanette P. Benoit* ~

## Space Shuttle Schedule Revised and Pushed into 2011...

Of particularly special interest to those of us who have been hoping to witness a shuttle launch in person before the program is concluded, NASA has announced they have modified the schedule for the last two scheduled launches.

STS-133, which will utilize Space Shuttle Discovery to deliver a refurbished multipurpose module to the International Space Station, has been moved from its mid-September slot to an anticipated launch date of November 1 later this year.

This change displaces STS-134’s earliest launch opportunity with Space Shuttle Endeavor, also in November. It is instead expected to fly on February 26, 2011, delivering a spectroscopy experiment to the ISS.

The possibility of rolling out Space Shuttle Atlantis for one last go as STS-135 is currently still in political hands and would require congressional approval. Such a mission would likely deliver supplies and an additional module to the ISS sometime between June and August of 2011.

Launch dates are always subject to change and quite tenuous several months out. The most current information on NASA’s vehicles is always available online at <http://www.nasa.gov/missions/highlights/schedule.html>.

~ *Ross Barros-Smith* ~



*Image by NASA*

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**August Star Fields DEADLINE**  
**Noon, Sunday, July 25<sup>th</sup>**

**Email articles to the newsletter editor at**  
**[newsletter@atmob.org](mailto:newsletter@atmob.org)**

**Articles from members are always welcome.**

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**POSTMASTER NOTE: First Class Postage**

Amateur Telescope Makers of Boston, Inc.  
c/o Tom McDonagh, Membership Secretary  
48 Mohawk Drive  
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Virginia Renehan [starparty@atmob.org](mailto:starparty@atmob.org)

**How to Find Us...**

**Web Page [www.atmob.org](http://www.atmob.org)**

**MEETINGS:** Held the second Thursday of each month (September to July) at 8:00PM in the Phillips Auditorium, Harvard-Smithsonian Center for Astrophysics, 60 Garden St., Cambridge MA. For INCLEMENT WEATHER CANCELLATION listen to WBZ (1030 AM)

**CLUBHOUSE: Latitude 42° 36.5' N Longitude 71° 29.8' W**

The Tom Britton Clubhouse is open every Saturday from 7 p.m. to late evening. It is the white farmhouse on the grounds of MIT's Haystack Observatory in Westford, MA. Take Rt. 3 North from Rt. 128 or Rt. 495 to Exit 33 and proceed West on Rt. 40 for five miles. Turn right at the MIT Lincoln Lab, Haystack Observatory at the Groton town line. Proceed to the farmhouse on left side of the road. Clubhouse attendance varies with the weather. It is wise to call in advance: (978) 692-8708.

**Heads Up For The Month . . .**

*To calculate Daylight Savings Time (DST) from Universal Time (UT) subtract 4 from UT.*

July 4 Last Quarter Moon  
July 11 New Moon  
July 18 First Quarter Moon  
July 25 Full Moon