



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. 16, No. 9 October 2004

This Month's Meeting...

Thursday, October 14th, 2004 at 8:00 PM

Phillips Auditorium
Harvard-Smithsonian Center for Astrophysics

Parking at CfA is allowed for duration of meeting

THIS MONTH'S SPEAKER will be Dr. James Elliot who will address the topic of observing occultations of Kuiper Belt Objects and how amateurs can help. Dr. Elliot is a Professor in the Department of Earth, Atmospheric, and Planetary Sciences and Department of Physics, MIT & Director of the MIT George R. Wallace, Jr. Astrophysical Observatory in Westford, MA. Located beyond the orbit of Neptune, the Kuiper belt consists of many thousands of detectable bodies known as Kuiper belt objects (KBOs). From observations of stellar occultations by KBOs we can measure accurate diameters, from which we can derive albedos and densities for those objects with known masses (the KBO binaries). With stellar occultation data we can also probe for close companions and possible tenuous atmospheres. A program is being initiated to predict and observe stellar occultations by KBOs. Part of this program will involve 10-14 inch telescopes (equipped with high-speed CCD cameras), for which there should be several observable events per year that occur somewhere on Earth. Extensive coverage of the occultation tracks will be important for these events, and this presents a good opportunity for collaboration with others also interested in observing these events.

Please join our speaker for a pre-meeting dinner at 5:45 PM (seating at 6:00 PM) at the Changsho Restaurant located at 1712 Mass Ave. in our fair city, Cambridge.

President's Message...

During the last year, ATMoB has enjoyed enviably close cooperation with two of the leading space research organizations in the world. It started with Lincoln Laboratories, who 'borrowed' the Knight Observatory for some preliminary work on the Mars Lasercom Demonstration, a plan to develop an optical communications link with a spacecraft orbiting Mars in order to facilitate much higher data rates than current RF technology permits. While this was taking place, this month's speaker, Dr. Jim Elliot of the nearby Wallace Astrophysical Observatory in Westford, found he was unable to accommodate a team from Draper Laboratory who needed a suitable place to conduct field tests of an Inertial Stellar Compass. Dr. Elliot suggested they give ATMoB a call, and for the last 6 months, the Knight Observatory has been the off and on host to Tye Brady, Sean Walker and their team. Indeed, as I write this, the ISC is taking pictures of the sky while slewing around on the team's Software Bisque Millennium mount, and exceeding the 2.5 degree/second slew detection design specification by almost 80%.

This level of cooperation is not unprecedented in our club's history. During WWII, several ATMoB members took part in the Harvard Project to perfect prisms used in spy cameras. In the early 1950's, ATMoB members Jim Gagan, Sam Gardiner, Eldridge Pickard and Chester Cook helped build a 16" Schuppman telescope for the US Air Force. The scope was tuned to H-Alpha and was used to observe solar prominences for the first time during the day. In 1955 we joined with the Astronomical League on the Sputnik Project, and many ATMoB members worked from the roof of Harvard College's Building D with a shop-made scope with a Jaegers Erfle Eyepiece and a 50mm binocular objective in an aluminum tube to try and determine what our cold-war enemy was up to. *

Once again we at ATMoB are being called upon to provide a service to the scientific community. Jim Elliot has spent much of the last several years researching asteroids in the Kuiper Belt, a region that many scientists think holds the key to information on the solar nebula from which Earth and the other planets formed. Jim will outline the importance of this region during his talk, and then call upon us to record several important occultations over the next year. I hope you can make it to Jim's talk, and maybe join us beforehand for dinner at the Changsho. He's a pretty interesting guy – he even showed Mike Hill and I how to make ice cream with liquid nitrogen earlier this year.

There's been a tremendous amount of activity at the clubhouse – new concrete telescope pads in the observing field, a new shed to house our maintenance equipment and flammables. This past Saturday I saw VP Virginia out there scraping the barn siding in preparation for a fresh coat of stain. I'm taking the next step to refurbish the 17-1/2" with a new mirror cell and spider to replace one that doesn't keep collimation. Mike Hill has finished the electronics room and is moving towards making the library resemble a real library. - Continued on page 5 -

September Meeting Minutes

Bruce Berger opened the 762nd meeting of the Amateur Telescope Makers of Boston with a short, comical, look at his experiences up at Stellafane this year. Some interesting times indeed. The speaker for the evening was Tye Brady from Draper Labs. Tye spoke to us about a very promising new technology project he is working on called the Inertial Stellar Compass (ISC) The development is part of NASA's New Millennium Program and once qualified early next year in space will be an option for spacecraft designers for the important task of satellite guidance, navigation and control. Whereas a traditional star tracker weighs 12 Kg, draws 33W and costs \$2 million dollars, the ISC weighs 3 Kg, draws 3.5W and only costs around \$650 thousand dollars. The ISC is composed of two parts; A simplified star tracker and a 3-axis mems gyro. It works by measuring the interstellar angles within groups of 3 stars and matching patterns with a stored catalogue of the 1500 brightest stars using specialized algorithms. Once an initial position has been determined the rate gyros keep track of spacecraft attitude. The gyros exhibit an inherent slow drift of positional accuracy that will be corrected with periodic updates from the star tracker every 5 minutes. The project is well along now having gone through a number of test phases. One of these, the system observatory testing was done up at our clubhouse over the last six months. This included star mapping, filter tuning, and pointing accuracy testing. Subsequent flight validation will take place early next year on an Air Force "Road Runner" mission to be launched on another new technology, Elon Musk's newly developed low cost Falcon rocket launcher.

The business meeting followed with the standard committee reports. Paul Cicchetti said that work was proceeding on the latest concrete work in the back barn and outside making up new observing pads. Charlie McDonald presented a short star party summary indicating that there had been 30 star parties last year. He also indicated that he would be resigning his post as star party coordinator so that he could concentrate on other public outreach activities including the creation of amateur astronomy videos. Virginia Renehan will be taking over his post. Virginia announced the next new member orientation night coming on November 6th. Eileen Myers announced the next New York City bus trip coming up on October 9th. Peter Bealo announced an upcoming star party in Plaistow N.H. on October 22nd. Lastly, Gary Walker informed us that the 20" telescope is coming along well and should be back up and running in about a month.

- *Michael Hill* -

Treasurer's Report...

As of September 26, 2004:

Checking account balance: \$7,289.56

Money market savings account balance: \$39,097.56

Revenues: \$2,743.17

Expenses: 362.24

Net Income: \$2,380.93

Fund Balances:

Land fund: \$3,067.61

Clubhouse fund: \$1,388.80

Donations:

Thanks to members for your generous donations to the club during September. These donations are an important part of keeping the club solvent.

General fund donations: \$578.90

Clubhouse fund donations: 39.55

Land fund donations: 25.00

- *Gary Jacobson, Treasurer*-

Membership Report...

This month we would like to extend a warm welcome to the following new members:

MARK MATHEWS, Lynnfield

JERRY SULLIVAN, Chelmsford

JOAN KADARAS, Littleton

KATHLEEN THOMAS, Melrose

ERIC MARTIN, Melrose

For questions please email membership@atmob.org or call 603-891-2702. Thank you! - *Shilpa Lawande*-

Clubhouse Committee Summer Report

Following the 20" Shapley reflector dedication, members have continued to utilize the clubhouse and participate in improving the clubhouse throughout the summer months.

- 98 members attended the 12 mirror grinding Thursday night sessions.
- 170 members signed in on the 20 nights the clubhouse was open for observing, including 13 Saturday nights. Weather was good on most nights.
- 74 'member days' were volunteered on 12 work party dates, culminating in the concrete pour on Sept. 11th.

The new shed was delivered on June 12th; framing for the foundation started on July 3rd; gravel was delivered on Sept 7th, excavation, framing, and rebar installation for 8 concrete pads was completed by Sept. 8th; and concrete poured, leveled, smoothed and finished on Sept. 11, 2004.

Tree topping, weed cutting, grass mowing and trimming continued (supplementing our landlord's appreciated efforts). Both mosquito magnets have been up and running with good results. The installation of 3- 5x5 ft observing pads, 1-10x13 ft shed foundation, 2- barn ramps and near barn floor, and 1-observatory ramp pad have been completed.

Hats off to these members for their volunteered days of work: Blomquist (7), Cicchetti (6), Clougherty (2), Gerhardt (9), Levin (2), Maerz (5), Reed (9), Renehan (4), Swedlow (5), Vallabha (4). A big thanks to Bill and Ned Toomy, Swezey, Siegrist, Schiesser, Simunovic, Prowten, Panaswich, Koolish, Knight, Johansson, Hill, Hillier, Goedecke, Feldkhun, Evans, V. Cicchetti, Berger, Mock, and Myers. **-Paul Cicchetti and John Reed-**

Next Work Party - Saturday Sept. 25th at 10AM.

Concrete framing will be removed and stored. Work on far barn front door, replacing barn and house clapboards damaged or missing, scraping old paint and preparing surface of the barn rear will all begin, with white stain application next. MIT has asked that we give this high priority. The house roof project awaits completion of Dave Prowten's efforts at Stellafane. Roof work is expected to begin in mid-October.

Clubhouse Saturday Schedule

October 9	Steve Clougherty	Steve Mock
October 16	Ed Budreau	Henry Hopkinson
October 23	Shilpa Lawande	Nitin Sonawane
October 30	Rick Burrier	Gary Walker
November 6	Brian Maerz	John Reed
November 13	Rich Nugent	John Small

Concrete Pour Party

The weather may not have cooperated for evening observing on Saturday, September 11, 2004, but the daylight hours were perfect for pouring concrete! And while there were only three volunteers who had signed up to help as of Thursday night, Saturday's work turnout was a testament to the club's volunteer spirit - 20 volunteer members, many with tools in hand, signed the clubhouse log-in sheet. No doubt several forgot to do so.

The concrete truck arrived some 30 minutes earlier than planned, but folks rallied to make last minute preparations in a display of real teamwork. For those who felt like taking a break from shoveling, washing off tools, or using the concrete floats and edging tools, there were several scopes set up for solar observing. All in all, 3 observing pads, 1- shed pad, barn floor and 2 entry pads, and a pad at the observatory ramp were cast. One member who showed up at the clubhouse later that evening jokingly commented that he, "didn't know we had so many Portuguese and Italian masons in the club - their work was pretty darn near perfect!"

Materials estimates by the clubhouse directors John Reed and Paul Cicchetti were 'spot on'. There was just a bit of concrete to spare, and that was used for a small pad for the mosquito magnet. As for leftover gravel, it was spread out on the road around the clubhouse to accommodate potholes and divets. After the work was completed, Sai Vallabha and Art Swedlow served up plenty of salad and John Reed's special Baily Hill spaghetti sauce over whole-wheat pasta. It looked like enough to feed an army - and that's who showed up - there were no leftovers anywhere.

Kudos to all those who helped out including, Paul Cicchetti, Chuck Evans, Bruce Gerhard, Karl Godecke, Eric Johansson, Dick Koolish, Brian Maerz, Steve Mock, Eileen Myers, John Panaswich, Dave Prowten, John Reed, V. Renehan, John Schiesser, Dave Siegrist, Sergio Simunovic, Art Swedlow, Larry Swezey, Bill & Ned Toomy, Sai Vallabha.

Special thanks go to Paul Cicchetti, John Reed, John Blomquist and Bruce Gerhard for all their efforts on this job (including Wednesday's efforts leveling gravel - in the rain - in readiness for Saturday), purchasing materials, building forms, organizing, phone calls, and on..... Your hard work is truly appreciated.

- Virginia Renehan-

New Member Orientation

Don't forget...the next new member orientation, including a tour of the clubhouse, observatories and telescopes, will take place on Saturday, November 6th at 6:30 pm. All new members are cordially invited to attend. Observing will follow, weather permitting. If any of our veteran members would like to help out during the orientation with a special presentation or demonstration, please contact us with your ideas. Or if you just want to stop by and introduce yourself, feel free. For all those that plan to attend please contact: Shilpa Lawande at (603) 891-2702 or Virginia Renehan at (978) 283-0862. Refreshments will be served. Hope to see you there! **- Virginia Renehan-**

Solar Projection Telescope

By Tom Lumenello, lumen.tal@verizon.net

I started making solar projection telescopes about 25 years ago when I felt compelled to show our daughters what the Sun looked like. At the time I had easy access to a variety of optical components and materials so that each time there was a desire to look at the Sun I would choose from whatever lenses were available and assemble a projection telescope. Each telescope was always different from the previous one, and was held together with duct tape. Recently, combining my interests in woodworking and astronomy I formalized the concept into a more permanent telescope. The completed Solar Projection Telescope was awarded third place in the Special Awards category at the 2004 Stellafane Annual Convention.

The main design criterion for the telescope was that the instrument would produce a solar image that would be large enough to be viewed simultaneously by a small group of observers. Other factors were that the supporting structure would be made of wood, the instrument would be small, lightweight and easy to store, and it would include a digital camera to record solar images.

The Solar Projection Telescope consists of an objective lens that produces a 2.8 mm diameter image of the Sun that is then magnified by a second lens to project a 132 mm diameter solar image onto a reflectance viewing screen. The objective lens is a 51 mm aperture 300 mm focal length achromatic doublet from Edmund Industrial Optics, while the magnifying lens is a Xenoplan 1.7/17 mm lens from Schneider Optics. The Xenoplan lens consists of 4 air-spaced elements with a rotating bezel to focus the projected image onto the screen. The screen is a 9 inch square by ½ inch thick piece of Gatorfoam Board; a rigid polystyrene foam core laminated between two face veneers of resin impregnated wood fiber. The viewing surface is matte and very smooth. The lenses and screen are mounted and aligned on a 4-foot wooden "optical bench" which in turn is mounted on a tripod with an adjustable gear-head to provide telescope azimuth and altitude aiming. The telescope is 48" in length and weighs 9 pounds,

An interesting feature is the combined finder and heat shield. The finder is a 7" diameter .06" thick aluminum disk with a .25" center hole located at the focal point of the objective lens between the objective and magnifying lenses. The center hole, or finder, is aligned with the lenses and screen so that when the Sun's image is positioned within the finder it is also seen projected onto the screen. The center hole is sized so that when the Sun's image falls within the finder no vignetting occurs to the projected image, while when it is outside the finder no thermal damage occurs to either the magnifying lens or nearby wooden parts of the telescope.

A fabric sleeve, created by my wife Carolyn, encloses the optical path to reduce the impact of ambient light on image

contrast. The length of the sleeve can be adjusted to accommodate different lighting conditions and number of viewers. To record solar images the sleeve fully encloses the optical path to eliminate ambient light from striking the screen. The digital camera used to acquire images is attached to a wood panel near the magnifying lens and views the screen at near normal incidence. A wedge in the camera mount, and an adjustment screw in the panel allow the camera to be aimed at the center of the screen, and to be removed and replaced with no change in alignment. Camera operation is with automatic exposure control, no flash, maximum optical zoom, and a 10 second time delay to eliminate effects of telescope vibration.

The telescope has been a lot of fun to use. The large solar images never cease to excite first time viewers, and the openness and size of the viewing screen provide for a comfortable setting for 6 to 8 simultaneous viewers. The images are bright with good contrast and display fine sun spot detail and faculae. With no filters in the optical system image color is bright white. Viewing time between tripod adjustments is over 1½ minutes in duration as the solar image moves across the screen. Digital images have been of good quality and fun to share.



Tom and Carolyn with his Solar Projection Telescope

Upcoming Star Parties

Below is a condensed list of upcoming star parties. A full pdf version has been included with the email version of star fields. If you only get the hardcopy of the newsletter then call one of the contacts for further information if there is a star party of interest to you.

Club Star Party Coordinator

Virginia Renehan 978-283-0862 starparty@atmob.org

October

Oct 22nd Friday (Rain date: Monday Oct 25th)

Annual Pollard Elementary School star party.

Goudreault's Farm, Plaistow NH, near Haverhill.

Coordinator: Peter Bealo (603) 382-7039

PBEALO@COMCAST.NET

Oct 27th Wednesday

Parker Middle School, Chelmsford

School Coordinator: Joan Kadaras (978) 760-0546,

jkadaras@rcn.com

Coordinator : Jack Drobot (978) 692-8093

Oct 16th and Oct 27th (Sat and Wed respectively)

Oak Ridge Observatory , Harvard, MA.

Contact: Ruth A Bazinet @ Office of Public Affairs,

Harvard-Smithsonian Center for Astrophysics - (617) 496-

7461 or Fax (617) 495-7016

Astronomy Day at Nashua High School

To celebrate the opening of the new planetarium at the Nashua NH High School South we are planning on holding a special Astronomy Day Celebration on Saturday October 22nd from 8:00 to 12:00 in the morning. There will be four technical sessions and a chance to see the new planetarium. If you wish to attend please call Edward Hendry at 603-966-1014.

Presidents Message Continued:

John Reed, Paul Cicchetti, John Blomquist, Bruce Gerhard and others are out there on weekends and during the week helping to make the clubhouse a better facility for us all. Think about it. When was the last time you lent a hand over at the clubhouse? Why not give John Reed or Paul Cicchetti a call to ask them how you can help?

I've lined up some very interesting speakers for the next few months thanks to the help of ATMob members. As a pre-holiday treat, Ed Ting, noted author of many articles for Sky & Tel and webmaster of www.scopereviews.com, gives us his talk on "The Best and The Worst: A serious (and not so serious) look at equipment available today for the amateur astronomer." So if you think you're in line for a holiday present from someone special, and want to drop them a few hints on what to get and what to stay away from, be sure to bring them to the December meeting. Clear skies and best regards. - *Bruce Berger, President* -

Black Forest Star Party

Gary Jacobson & I attended the Black Forest Star Party near Coudersport, PA this year and found it to be a wonderful experience. Limiting magnitude was 6.5; So many stars that it was easy to get lost up there. The Milky Way stretched from horizon to horizon with no visible light pollution. Weather was pleasant but very dewey on Friday night, less so Saturday. Fog rolled in a precluded viewing after about 3am Saturday and 1am Sunday. My Kendrick dew system was able to keep up quite nicely for my finders and eyepieces, though the 2 unprotected mirrors on my 8" newt fogged up without running the tube fans.

Camping is rustic, much like at Stellafane and Arunah Hill although it is a very large and flat area with people setting up their scopes right at their tent or camper. There was a food truck with reasonably priced meals and snacks open 24 hours a day. There is some power on the field, though with a crowd of 450 they asked us to limit direct AC power usage to light appliances and battery charging. No camper hookups but there are real bathrooms, plus portable units added for the star party. The park itself is geared toward the astronomer, with very strict lighting control. Saturday night was open to the public. The National Public Observatory runs a Stars-N-Parks program there each new moon weekend from April through October from sunset until 11pm.

Maybe we can get a few more to join Gary & me next year. It is an 8 to 9 hour drive from here. If we get enough folks together to charter a plane, there is a grass strip airport right across the street. (No planes came or went during the weekend while we were there.)
-*Bruce Berger*-

November *Star Fields* deadline
Saturday, October 30th

Email articles to Mike Hill
at noatak@aol.com

POSTMASTER NOTE: First Class Postage Mailed October 8, 2004

Amateur Telescope Makers of Boston, Inc.
c/o Shilpa Lawande, Membership Secretary
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FIRST CLASS

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How to Find Us...

Web Page 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 Eastern Daylight Time (EDT) from Universal Time (UT) subtract 4 from UT.

October 6 Last Quarter Moon
October 9 Asteroid Vesta (Mag 6.6) 1° south of 97 Aquarii
October 13 New Moon
October 20 First Quarter Moon
October 21 Orionid meteor shower
October 25 Venus, Jupiter and Mars line up in Pre-dawn sky
October 27 Full Moon **** Total Lunar Eclipse ****
October 31 Daylight savings time ends (Winter's here . . .)