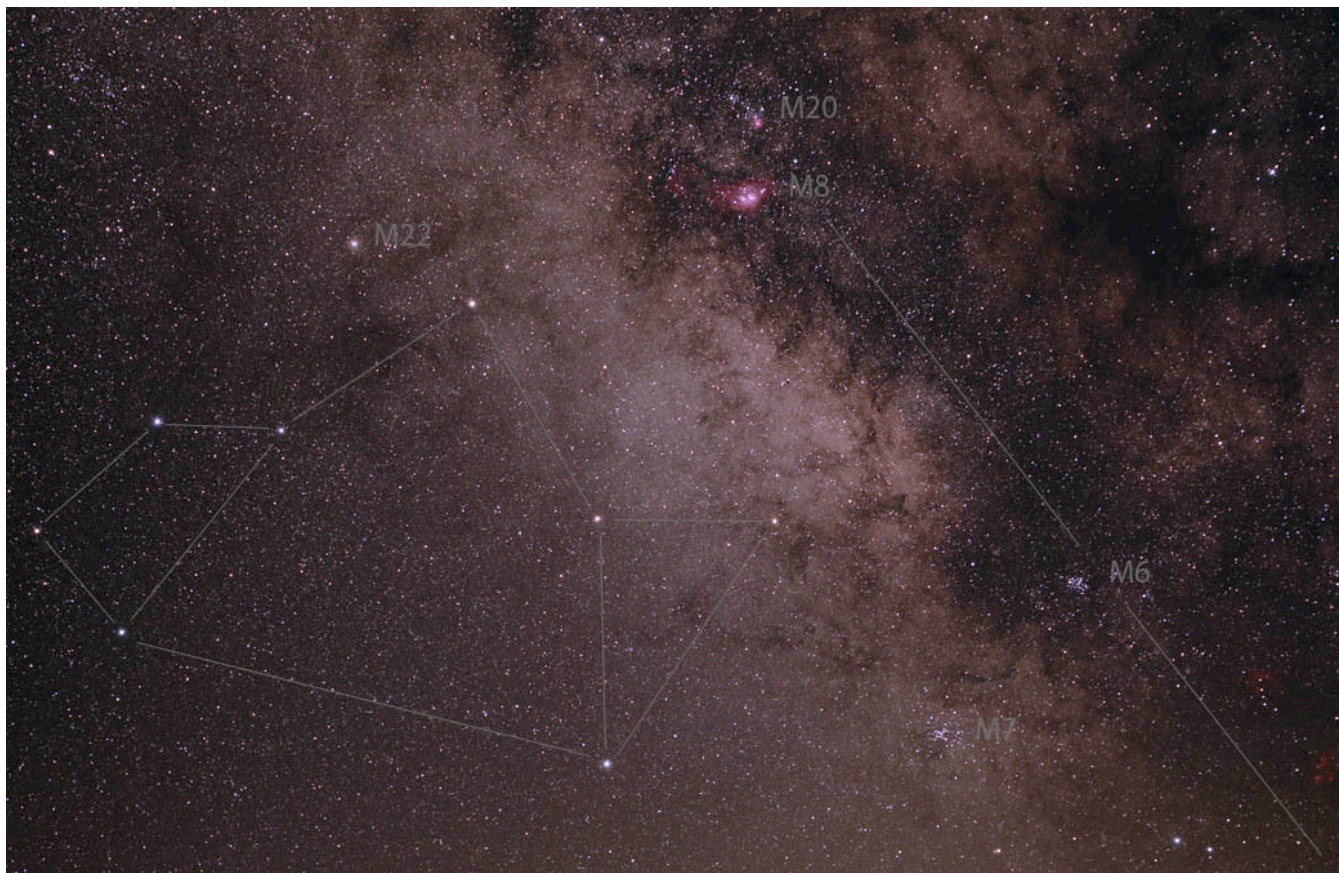


# Sky WAA tch



## ***The Teapot and Friends***

Rick Bria captured this image of the Constellation Sagittarius at the 2011 Stellafane Convention in Springfield Vermont from a spot near the entrance to the McGregor Observatory. He used a modified Canon T1i with a 15-85mm lens set at 44mm. The camera was mounted on an AstroTrac to counter the Earth's rotation.

Notes Rick: When we look toward the direction of Sagittarius we are looking toward the CENTER of our Milky Way Galaxy. Naturally we would expect a lot of 'Stuff' to be in that direction, and Sagittarius doesn't disappoint. Near the top is M20 the Trifid Nebula and M8 the Lagoon Nebula. To the left is the globular star cluster M22. The two open (galactic) star clusters M6 and M7 are in the lower right of the image. The long lines running from M8 through M6 and down to the right represent the plane of the Milky Way Galaxy. It extends well beyond the boundaries of this image both down to the right and up to the left. Of course these and other objects in the area are best seen at higher magnification in a telescope, but I also like this wide angle view because it reminds me we are on a planet circling a star in the outskirts of a spiral galaxy.

# Events for September 2011

## WAA Lectures

**“Member Presentations Night”**  
**Friday September 9<sup>th</sup>, 7:30pm**  
**Miller Lecture Hall, Pace University**  
**Pleasantville, NY**

WAA members will showcase their astrophotos, equipment and other insights. Let us know if you have something to show or tell. Please email the club with a brief idea of what you will be presenting. Free and open to the public. [Directions](#) and [Map](#).

## Upcoming Lectures

**Miller Lecture Hall, Pace University**  
**Pleasantville, NY**

On October 14<sup>th</sup>, Dr. Reuben Kier will be the presenter. Dr. Kier has contributed photos to, and written for, *Sky and Telescope*. He is the author of *The 100 Best Astrophotography Targets* and lectures frequently on astrophotography.

## Starway to Heaven

**Saturday September 3<sup>rd</sup>, 8:00pm**  
**Meadow Picnic Area, Ward Pound**  
**Ridge Reservation, Cross River**

This is our scheduled Starway to Heaven observing date for September, weather permitting. Free and open to the public. The scheduled rain/cloud date is September 24<sup>th</sup>. Participants and guests should read our [General Observing Guidelines](#) and [Directions](#).

## New Members. . .

Ron Posmentier - Croton-on-Hudson

## Renewing Members. . .

Joe Geller - Hartdale  
 Lydia Maria Petrosino - Bronxville  
 Anthony Monaco - Bronx  
 David Fox - Scarsdale  
 Bill Newell - Mount Vernon

## WAA APPAREL

Charlie Gibson will be bringing WAA apparel for sale at the September meeting. Items include:

- Hats, \$10 (khaki)
- Tee Shirts, \$13 (navy, royal blue, white, with blue trim around collar and arm cuffs).



## CONGRATS FRANCIS

Long-time WAA'er Francis J. O'Reilly received first place in the over 12-inch optical competition at Stellafane for his 12.5 inch f/7 Newtonian telescope. He looks forward to bringing it to a Starway to Heaven observing session in the near future. For more photos see: [Stellafane site](#).

Credit: The Springfield Telescope Makers, Inc.

Westchester Amateur Astronomers, Inc., a 501(c)(3) organization, is open to people of all ages with the desire to learn more about astronomy. The Mailing address is: P.O. Box 44, Valhalla, New York 10595. Phone: 1-877-456-5778. Observing at Ward Pound Ridge Reservation, Routes 35 and 121 South, Cross River. Annual membership is \$25 per family, and includes discounts on *Sky & Telescope* and *Astronomy* magazine subscriptions. Officers: President: Doug Baum; Senior Vice President: Larry Faltz; Vice President Public Relations: David Parmet; Vice President Educational Programs: Pat Mahon; Treasurer: Rob Baker; Secretary/Vice President Membership: Paul Alimena; Vice President Field Events: Bob Kelly; Newsletter: Tom Boustead.



## Articles and Photos

### **An Astronomy Vacation in Arizona: Part 4: The Smithsonian Trip Day 2** by Larry Faltz

Since we had returned rather late from Kitt Peak the previous night, the formal day 2 program (4/29/11) didn't start until 11 am and we had time to join some of our fellow attendees at a leisurely outdoor breakfast by the Arizona Inn's pool. Once things got started, David Aguilar discussed the work of the IAU Minor Planet Center at the Harvard-Smithsonian Center for Astrophysics (CfA), where he is Director of the Office of Public Affairs. One of the many research components of CfA, the MPC tracks solar system objects, particularly Near Earth Asteroids. David's focus inevitably turned to the question of whether Pluto was a planet. He described in great detail the controversies and maneuverings at the famous International Astronomical Union meeting in Prague in 2006, where a small group of planetary dynamicists managed to pass a resolution (after most of the attendees had departed) establishing a new definition of "planet", casting Pluto out of the club and demoting it to the somewhat contradictory classification of "dwarf planet". David showed a remarkable animation that plotted the orbits of all of the bodies being tracked by the Center, and he made it clear that Earth itself has not fulfilled one of the primary requirements for the definition of a planet, the "clearing" of its orbit. Check out some of the animations at <http://www.minorplanetcenter.net/iau/Animations/Animations.html>. David also intimated that a famous astrophysicist who had long been opposed to Pluto's inclusion in the family of true planets was wavering and may soon publicly recant.

Following this fascinating lecture, the group boarded a tour bus for lunch at a Mexican restaurant and then we headed to the Fred Lawrence Whipple Observatory (FLWO) on Mt. Hopkins, 43 miles south of Tucson. FLWO is the largest field installation of the Smithsonian Institution Astrophysical Observatory (SAO) outside of Cambridge, Massachusetts [the SAO

and the Harvard College Observatory jointly operate the CfA]. FLWO hosts a number of instruments, including a 10 meter optical gamma ray telescope, the automated MEarth array, the four 12-meter gamma ray telescopes of the Veritas array and its crown jewel, the 6.5-meter MMT, which originally stood for "Multi-Mirror Telescope" when it saw first light with six 1.8-meter mirrors. Now it's just "MMT".



Visitor's Center at the Fred Lawrence Whipple Observatory, with the Veritas array (photo FLWO)

At the Visitor's Center we could see the four giant Veritas (Very Energetic Radiation Imaging Telescope Array System) scopes, each made from 350 hexagonal mirrors and looking more like radio dishes than optical instruments. They record blue Cerenkov radiation generated when high-energy gamma rays strike molecules in the upper atmosphere. Rather than images, these telescopes provide data that maps the location, energy and flux of gamma ray sources both within and outside the Milky Way. These are some of the most energetic objects in the universe.

We boarded a smaller bus for the 12-mile trip to the top of Mt. Hopkins. Dan Brocious, trip co-host and Director of Public Affairs at FLWO, regaled us with a continuous stream of interesting information about the observatory, the flora and fauna of the mountain, light pollution issues and even the mining history of the area as we travelled for 45 minutes up the steep and twisty dirt road.



The MMT on Mt. Hopkins high above the Visitor's Center, with two all-sky cameras in the foreground

Most of the instruments at FLWO are on a ridge half a mile southeast and 800 feet below the MMT. We had a close-up look at the original 10-meter Whipple gamma ray telescope (on which the Veritas scopes are based) and photographed ourselves from a balcony near the scope's focus, a surprisingly difficult task if you don't want to merely end up with a photo of your camera with your head behind it.



In the focus of the 10-meter gamma ray scope



The 10-meter Whipple gamma ray telescope

As we walked along the ridge, Dan described the scopes, their research programs and how they were operated. The 1.3-meter Peters Automated Infrared Imaging Telescope (PAIRITEL) was responsible for the northern half of 2MASS (2 Micron All Sky Survey), which mapped the night sky at infrared wavelengths, resulting in the discovery of brown dwarfs.

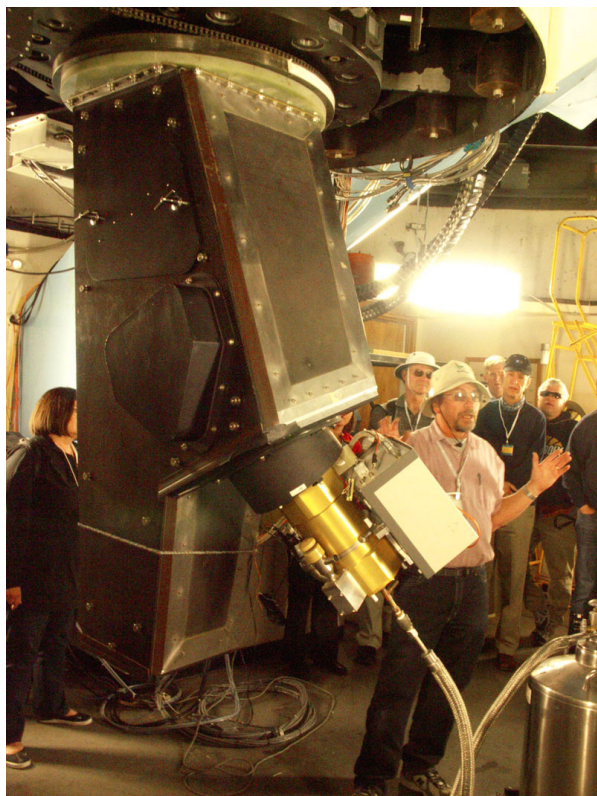


Dan Brocius outside the PAIRITEL

A 1.2-meter scope next door was used to generate the star catalog for the Kepler space telescope.



We were taken inside the dome of the 1.5-meter Tillinghast reflector, sporting the liquid nitrogen-cooled FAST spectroscope. The Tillinghast is used almost exclusively for spectroscopy. Even though it produces modern data, the scope has a charming retro look, due to its yoke mount and 3-foot diameter etched polar setting circle at the bottom of the yoke. Even its computer control is retro, running under DOS.



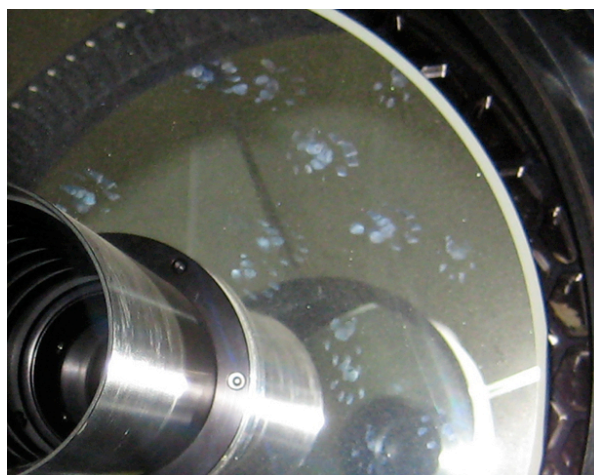
Dan Brocius and the FAST spectroscope

Next stop was the MEarth array, eight 16-inch RC Optical telescopes on Paramounts fitted with Apogee cameras, all off-the-shelf equipment. MEarth searches for exoplanets around class M stars. The project was the brainchild of a Harvard graduate student. It is housed in a former satellite tracking station, a rather spacious building with an apartment and kitchen, except that no one stays there because MEarth is operated completely by remote control. When the roof rolls itself off each clear night, the MEarth scopes automatically monitor 2,000 stars, taking multiple readings of

each one to generate light curves. The data is processed by computers back in Cambridge. Dan pointed out paw prints of ring-tailed cats on the RC mirrors. Unattended...unavoidable!



The MEarth array (photo Dan Brocius)



Disrespectful visitors to a MEarth mirror

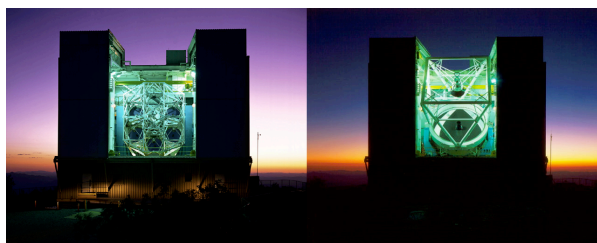
We re-boarded the bus and drove another 2.5 miles up to a dormitory building that houses MMT operating staff and astronomers, and then we transferred to SUVs for the last few hundred yards of the very steep (but now paved) road that leads to the large MMT building. We were rewarded with a panoramic view of the other FLWO telescopes, 800 feet below us. In the opposite direction, looking towards Mexico, we could see a large forest fire raging about 25 miles away. Fortunately, the smoke was heading away from us.





The view southeast from the MMT

The MMT was the second large alt-az research telescope to be built, following the innovative construction of a giant alt-az in Russia. The original design used six 1.8-meter mirrors, yielding an effective aperture of 4.5 meters. The third largest telescope in the world when it was dedicated in 1979, it was upgraded with a Roger Angel spun 6.5-meter mirror, f/1.5, which saw first light in 2000. The building had to be enlarged about one meter to accept the new telescope.



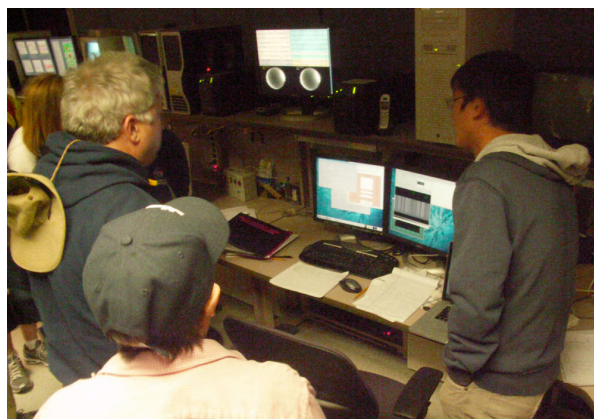
The MMT in its original (left) and current configuration (Photo FLWO)

We had the run of the building for over an hour, with Dan and a scope technician describing the various components, including the adaptive optics system, three different secondaries and a variety of imaging and spectroscopic equipment. The telescope was slewed in altitude from vertical to about 30° and back, making relatively little noise in the process. Like in other research scopes, the cooling system made the bulk of the racket.

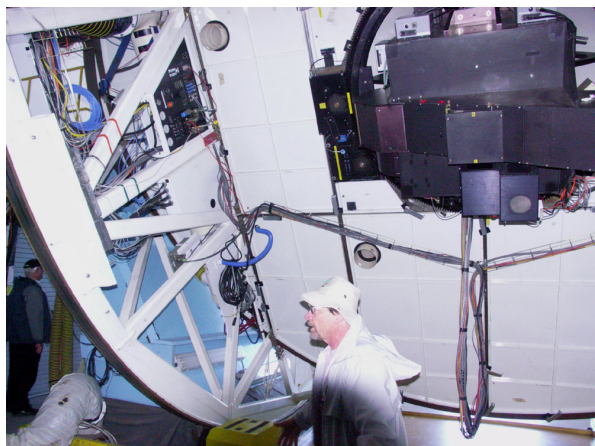


Elyse in front of the 6.5-meter MMT primary

In the rather cramped telescope control room we talked with the technicians and a U of A astronomy graduate student as they set up for the evening's observing run. There were many computer screens displaying scope control programming, image and spectroscopy data, weather conditions and even mirror temperatures.



In the control room of the MMT



Dan Brocius under a spectroscope on the MMT

We drove back down the dirt road to the Visitor's Center, arriving just after sunset. During the ride, flames from the Mexican border fire were plainly visible on distant hillsides. After an excellent dinner, the group went to observe in clear dark skies (SQM 21.36) using two 8-inch f/6 Orion Intelliscope dobs and a 20" f/5 Obsession truss-tube dob. David Aguilar asked me to assist with the night's teaching and targeting, which was particularly easy with the Intelliscope, an instrument I had not used before. Setup was intuitively obvious: when you turn it on, the hand control tells you to point it straight up. Then you aim at two stars and you are done! The hand control shows you which direction to push the scope to find your object in altitude and azimuth, an indicator counting down to zero in both axes to show you that you've arrived. The Leo Triplet was my first target, all 3 galaxies looking sharp and detailed in the generous low-power field. M81 and M82 made a lovely pair. In the 20", Omega Centauri was unbelievable, a gigantic, field-filling mass of stars, like a cotton ball stuffed into the eyepiece. I found many tiny

galaxies in Leo and Virgo with the 20", and with each of the scopes we looked at a variety of other objects, among them Saturn, M3, M13, M92 and Centaurus A, with its dust lane plainly visible with the 8" scope and a dramatic sight in the 20".

Although I could have stayed for many hours, we only had one bus to get us back to Tucson, so about 10:45 pm we called it quits and rolled the scopes back into the Visitor's Center. We had to find our way out to the coach in the dark so as not to disturb the unshielded Veritas scopes, which were in full operation.



Nogales Fire from Mt. Hopkins

We arrived back at the Arizona Inn around midnight and with the next day's long trip to the Large Binocular Telescope commencing at 8:30 am, we forced ourselves to sleep, visions of Omega Centauri and Centaurus A in the 20" hard to banish from consciousness.

Photos by the author except where noted. Read parts [1](#), [2](#) and [3](#) in previous SkyWAArch newsletters.

### Members Classified

As a service to members, the WAA newsletter will publish advertisements for equipment sales and other astronomy-related purposes. Ads will only be accepted from WAA members and must relate to amateur astronomy. Please keep to 100 words, include contact info and provide by the 20th of the month for inclusion in the next issue. The newsletter is subject to space limits; so ads may be held to subsequent issues. The WAA may refuse an ad at its sole discretion. In particular, price information will not be accepted. Members and parties use this classified service at their own risk. The Westchester Amateur Astronomers (WAA) and its officers accept no responsibility for the contents of any ad or for any related transaction.

Send classified ad requests to: [Newsletter](#).



# Almanac

**For September 2011 by Bob Kelly**

The change of seasons brings a rush of cooler nights with less mosquitoes and a rapid increase in precious darkness for our observers. But you'll have to wait until late in the evening for a bright planet to appear. But the later evening time is an opportunity to hop through our solar system.

Eager early evening observers with a wide-open western window can search for Saturn, deep in the depths of the western sky, setting before the end of twilight. A telescope will show the difference between Saturn and its neighbor, Spica, both at magnitude +1. Venus slides sideways through the western twilight this month. You can look for Venus two degrees below Saturn on the 28<sup>th</sup> and 29<sup>th</sup>, but at only 12 degrees from the Sun you'll have to know where to look in the bright twilight less than a half hour after sunset.

Jupiter, at magnitude minus 2.7, bursts into the evening sky after 10pm, heralding the start of the solar system object parade, when you can pick up three planets and two asteroids in the southern reaches of the sky. Even in a small telescope, Jupiter has atmospheric belts, dancing moons, the largest apparent size of any planet in our September skies – what more could you want from a planet? (Ok, no rings – but you can't have everything!)

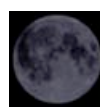
Uranus, Neptune, the dwarf planet Ceres and the minor planet Vesta are hanging out low in the southern skies, most easily visible after 10pm. Uranus is closest to Earth for the year on the 25<sup>th</sup> at magnitude 5.7 and 3.7 arc seconds wide. In a telescope, it's a tiny bluish dot in Pisces. Can you see it without optical aid, among all the other 5<sup>th</sup> and 6<sup>th</sup> magnitude objects out there?

Neptune, further out in our Solar System, is at magnitude 7.9 and 2.3 arc seconds wide in Aquarius. Then, you can hop over to the largest asteroid, number 1, and recently knighted as a dwarf planet, Ceres comes to opposition with the Earth on the 16<sup>th</sup> in Cetus at magnitude 7.6. Asteroid number 4 - Vesta - is brighter than Ceres, even one month past opposition in Capricornus at magnitude 6½. Since it's smaller than Ceres, it's been relegated to the ranks of the 'minor' planets, but at least it has a companion for the upcoming year – the Dawn spacecraft, taking some fantastic photos of this highly-ranked, but lowly-classified world.

The pre-dawn skies have the best view of Jupiter, while Mars shyly moves out from the morning twilight, starting the month as a garnet belt buckle for the lower twin of Gemini. Of course, with some imagination, one could envision Mars as the heart of Pollux, but it would be a shame to leave Castor heartless. But by the end of the month, Mars is transplanted to Cancer the Crab where it gets into the Beehive cluster starting on September 30<sup>th</sup>.



Sep 4



Sep 12



Sep 20



Sep 27

Mercury reaches maximum elongation from the Sun in the morning sky on the 3<sup>rd</sup>. It brightens up from zero magnitude and grows to over 7 arc seconds wide before diving back to the horizon after mid-month. Mercury points out fainter Regulus on the 9<sup>th</sup>.

The Moon points the way to Mars on the morning of the 23<sup>rd</sup>, makes a very close pass by the middle star in the front of the Scorpion on the 3<sup>rd</sup>, makes Jupiter even easier to find in morning twilight on the 15<sup>th</sup> and 16<sup>th</sup>. On the 20<sup>th</sup>, the last quarter Moon is 71½ degrees in altitude in the morning sky. While that is still about 20 degrees from zenith, it appears like it is overhead, at least clearing our tree-walled backyards.

The new moon lines up with the Sun every month, but this month lunar perigee occurs within 14 hours of new moon on the 27<sup>th</sup> and is the third closest perigee of the year. This leads to higher than normal tides, which makes it a particularly bad time if an hurricane makes landfall. After the new moon, Rosh Hashanah begins the Jewish new year of 5772 on the 28<sup>th</sup>.

Equal daylight and night-dark occurs on the 27<sup>th</sup>, several days after the equinox occurs on the 23<sup>rd</sup>, since the Earth's atmosphere bends sunlight over the horizon so we can see the sun when it is within a few degrees below the horizon. The Opportunity rover on Mars observes the Martian equinox on the 13<sup>th</sup>, a good time for its solar cells to make power at the rover's location just south of the Martian equator.

Sunrise time passes through the 6 o'clock hour in September. From now through the end of Daylight time in early November, the progressively later sunrise makes the morning sky more accessible to those who want to do some astronomy before the day gets started, without losing much sleep.

For those who like to see moving objects in the sky, satellites are visible in the evening and morning twilight. The International Space Station, with six souls aboard, is as bright as magnitude minus 3½ as it moves across the evening skies through the 5<sup>th</sup> and the morning skies starting on the 17<sup>th</sup>. The US Air Force spaceplane, the X-37B, may pass directly overhead during the evenings of the 10<sup>th</sup> and 11<sup>th</sup>, as bright as 2<sup>nd</sup> magnitude. Have you ever seen the Hubble Space Telescope? It's a 3<sup>rd</sup> magnitude dot that doesn't get higher than 15 degrees above our local horizon. Favorable passes are predicted for evenings of the 4<sup>th</sup> through the 9<sup>th</sup> through Sagittarius and Scorpius.

See Bob Kelly at <http://bkellysky.wordpress.com/>