Star Gazer News

Newsletter of the Delmarva Stargazers
www.delmarvastargazers.org

From the Prez...

Sorry, you missed our February meeting. All who attended were speechless with Don's antique digital setting circles using a Commodore 64 computer and optical encoders. Our main program for the evening was digital setting circles technology. I started the program with a short power point on converting celestial to horizon coordinates (azimuth and altitude). That conversion uses universal time, latitude and longitude of the observing site and right ascension (RA) and declination (DEC) of the object being observed. The calculations are relatively simple using the law of cosine and above parameters.

Don's Commodore 64 calculates azimuth and altitude and corrects for observers position by calculating the azimuth and altitude of two known stars in the observer' celestial view. Once the two known stars were found, Don would type in an object to be found and two rectangles, one vertical and one horizontal would show-up on the Commodore's screen. He would then move his DOB until the two rectangles overlapped. When rectangles formed a cross, Don's selected object would be in his eyepiece. But… to make it work,the digital encoders could not slip or wobble in either the azimuth or altitude bearings on the Dob and your fixed horizon or vertical position on the Dob had to be accurately fixed. Don's Commodore 64 could be used to find 400 hundred objects. During the meeting the Commodore was still functional.

I then presented my Orion Sky Wizard device which works on the exact same principle as Don's. Mine was a lot smaller and could located 4000 celestial objects. Still the encoders could not wobble in the bearings or the whole system would not work well. My "Level Me" position had to be accurate as with Don's. Don and I both chose the horizontal position "Level Me" position. Needless to say, Dons' Commodore 64 digital setting system was as operational as it was **eons ago**!

To finish the program Ryan Goodwin brought in this 10 inch Meade Schmidt-Cassegrain:"Go To Scope". During his presentation he put the scope in action and discussed the procedure that he uses to set up the scope. Ryan usually would set-up scope outside his house and then go in for a dinner or cup of coffee. In a few minutes he would to go the scope finalize the set-up and then start observing.

As the scope went through its set-up motions, Ryan discussed the AudioStar and options available to him. The AudioStar controls the telescope to find and track any of over 30,000 celestial objects automatically.

Thank you-- Don and Ryan for a great presentation.

Don also discussed Gravity Recovery and Interior Laboratory -- GRAIL -- mission to the moon. Mission of dual satellites is to understand the moon, its gravity and it's interior.

Chuck Jennings did the Flame nebula as the object of the month. Chuck explained that the Flame Nebula, designated as NGC 2024 and Sh2-277, is an emission nebula in the constellation Orion. It is about 900 to 1,500 light-years away. The bright star Alnitak, at the easternmost star in the Belt of

(see Prez on page 7)

Upcoming Events:

Meeting !	**Mar 6th**	**7 PM**	**Smyrna Church**
Observing !	**Mar 23rd**	**Dusk**	**Blackbird & Eq. Cntr & Mallard**
Mirror Making !	**Mar 23rd to 25th**		**Mallard Lodge**

A Short Introduction to Astronomical Sketching

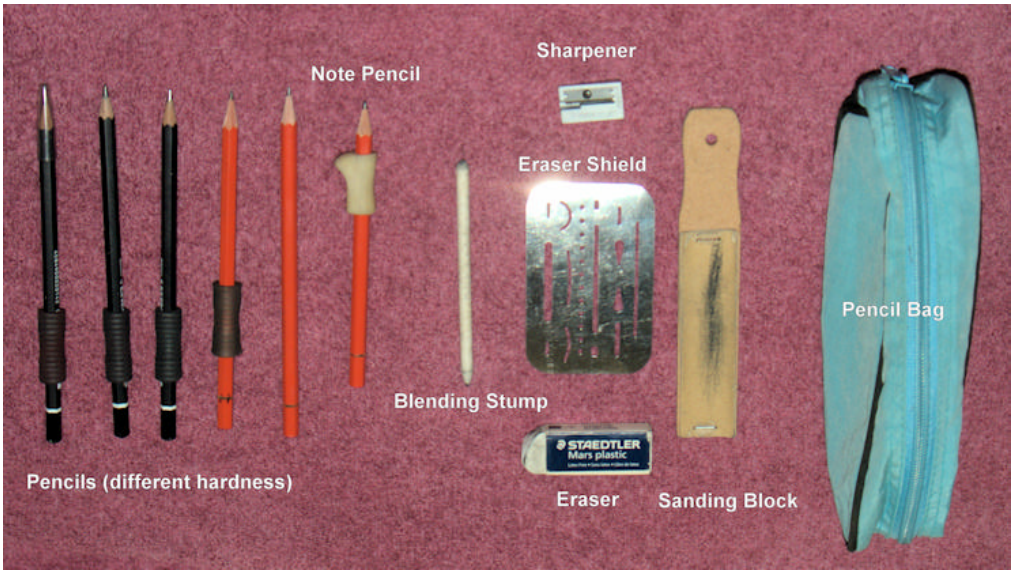
Michael Lecuyer

I am no artist, though I can at sketch at the telescope. It gets me beyond the quick look so I know if what I saw is right, wrong or imaginary. Sketching needs a longer look, teasing out subtle detail, carefully noting extents, shapes, looking for relationships between parts, unexpected entanglements, dark areas making object much more interesting than a treasure hunt does.

In the late 1970's, using my home made 6" telescope, I was able to capture details on Mars – it turns out the 6" f/8 mirror is pretty good as measured at a Mirror Making Seminar, so good that three drawings of the red planet have survived from the last attempt at sketching. Now I'm more diligent with the difficult objects where a hard find is rewarded with a simple sketch to be enjoyed the next day comparing it to an image in the DSS catalog with matching star positions.

Sky and Telescope gave a brief review of a book "Astronomical Sketching – A Step-by-Step Introduction" in Patrick Moore's 'Practical Astronomy Series' written by several contributors each bringing their particular talents and tips for sketching the moon, comets, the sun, planets, star clusters, nebula and galaxies, suggesting exercises and methods for each subject as an excellent introduction to several sketching techniques from charcoal, colored chalk, pencils and colored pencils. It truly is a step-by-step introduction quickly bringing the sketcher out in all of us assuming we know nothing about sketching and gives you the confidence to try it. More experienced sketchers will be tempted to try another medium.

The tools are simple for pencil sketching: pencils with a range of hardness from rich black to very hard gray, an eraser, eraser shield, sand paper block, and blending stump. Harder pencils for dim stars, softer pencils for the darkest areas. The blending stump, in spite of its unlovely name, the best tool in sketching extended objects, the galaxies and nebula, by controlled spreading of graphite. The source of the graphite can be a 'well' created with a soft pencil scribbling a circular area on paper or extending a central mark building up a bright core of a galaxy. The sandpaper block forms the shape of the pencil either sharpening to make dim stars sharp or dulling the point quickly creating the well or building bolder stars.



Hard pencils range from H to 4H and beyond with softer darker pencils ranging from B to 8B needing adjusting with the sanding block and sharpener. Harder pencils keep their points longer keeping dim stars small. The great range seems nice indoors until we're working in the cold under dim red lights with pencils rolling off the table making the elaborate tools of the artist our enemies. I've slimmed down to HB, B, and 4B, the eraser, sanding block and stump with most of them kept in the pencil bag. All that's on the table are my writing pencil logging observations, once a HB now a B for better contrast, and my eraser. When the sketch begins the HB comes out to draws stars and, 4B makes wells.

A small plug concerning pencils – Republic Palomino pencils feel the smoothest therefore unlikely to tear damp paper. Unfortunately their range is only from 2H to 2B and so I've augmented them with Lyra 4B and 6B for good wells and larger (brighter) stars. The common Faber Castell art pencils are rough and scratchy compared to Palominos

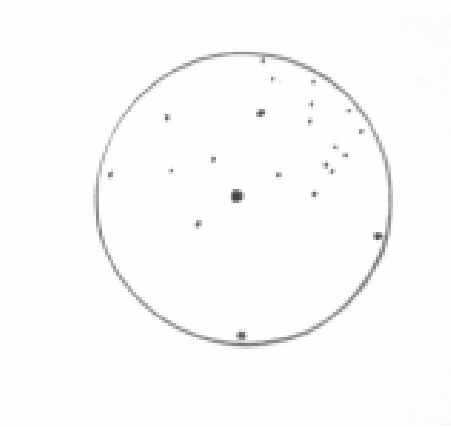
(See Sketching on page 3)

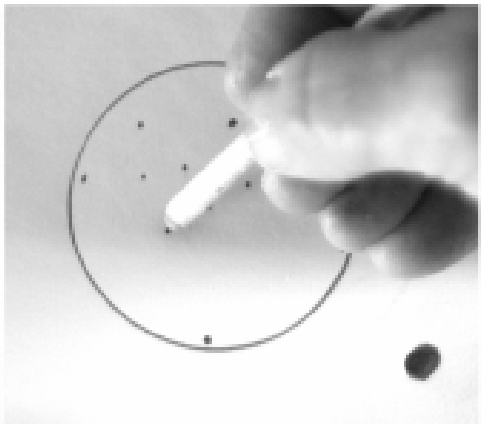
(Sketching from page 2)
and Lyra's.

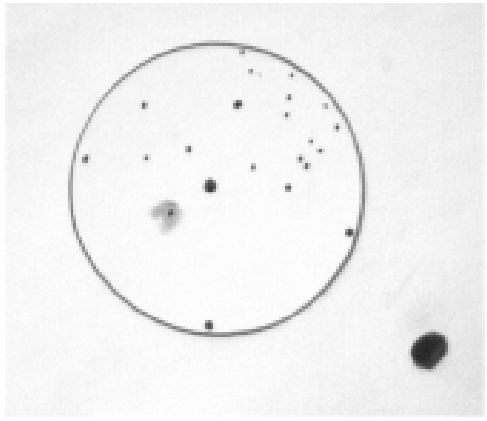
Once the sketch is created at the eyepiece it can be redrawn with better tools if we want a good finished product when the paper is dry. Graphics software can also be used to finalize the drawing and create a negative image representing the eyepiece view. Mis-positioned stars can be removed (marked with a short light line through them) perhaps with the help of the eraser shield or more easily fixed in a digital image.

There are many topics and tips covered in the book and on the web dealing with writing and erasing wet paper - think 'Rite in the Rain' pads, creating round stars, working with complex nebula and so on.

The easiest way to begin is to start with the star field around the object, even an open cluster, and work our way around marking the brightest stars and the working in some dimmer ones. This, even in the case of an open cluster, give us the the accurate posi-







tional framework for the galaxy, nebula, or even the cluster itself either open or globular. It helps to choose a star for the center of the drawing to keep the the other field stars in their relative positions. The final move is to draw the object itself positioned in the star field. It's OK to draw stars outside your field of view to keep proportions right if the field lacks good positioning or stars necessary to compare to pictures for comparison or identification.

It's good to start with a simple objects, lets say a small galaxy or M29 (the Cooling Tower), before trying M 11 (with its thousands of stars) or the Great Orion Nebula's fine detail. Taking it to extremes Sue French, who writes the column “Deep Sky Wonders” for Sky and Telescope, gave a presentation at a club meeting which included a sketch that took three nights to complete.

An alternative that's intriguing is the use of a PDA or tablet for sketching, eliminating all the messy tools and paper, is described in another Practical Astronomy book 'Astronomical Cybersketching' which covers hardware from cell phones to tablets and laptops. The book referred to outdated hardware when it was released but the basic sketching techniques scattered through the book remain valid. 'Astronomical Cybersketching' is not as accessible as “Astronomical Sketching” with the tips hidden among discussions of truly ancient hardware (like core memory and the original boxy Mac) but may be worth borrowing to find ways to draw Saturn and it's rings or turn your rough photos of the moon into quality drawings with additional detail at the eyepiece.

My conclusion – this is a lot easier than photography and captures what you see, not what the camera sees. The tools are cheaper and faster, no dark frames, flat frames, stacking and getting it just right in the photo editor. It's done it a few minutes, not hours with a better understanding of the deep sky.

Your 2011-2012 Officers

Office	Officer	Phone	email
President	Lyle Jones	302-736-9842	worm1647@comcast.net
President-elect	Chuck Jennings		
Secretary	Michael Lecuyer	302-284-3734	mjl@interpacis.org
Treasurer	Kathy Sheldon	302-422-4695	memomsheldon@comcast.net
Past President	Jerry Truitt	410-885-3327	Truittjs@Atlanticbb.net

Exoplanets

An extrasolar planet, or exoplanet, is a planet outside the Solar System. A total of 729 such planets have been identified as of January 28, 2012. It is now known that a substantial fraction of stars have planets, including perhaps half of all Sun-like stars. In a 2012 study, each star of the 100 billion or so in our Milky Way Galaxy is estimated to host "on average ... at least 1.6 planets." Accordingly, at least 160 billion star-bound planets may exist in the Milky Way Galaxy alone. Unbound free-floating planetary-mass bodies in the Milky Way may number in the trillions with 100,000 objects larger than Pluto for every main-sequence star.

For centuries, many philosophers and scientists supposed that extrasolar planets existed. But there was no way of knowing how common they were or how similar they might be to the planets of our Solar System. Various detection claims made starting in the nineteenth century were all eventually rejected by astronomers. The first confirmed detection came in 1992, with the discovery of several terrestrial-mass planets orbiting the pulsar PSR B1257+12. The first confirmed detection of an exoplanet orbiting a main-sequence star was made in 1995, when a giant planet was found in a four-day orbit around the nearby star 51 Pegasi.

Most known exoplanets are giant planets believed to resemble Jupiter or Neptune. That reflects a sampling bias, since massive planets are easier to observe. Some relatively lightweight exoplanets, only a few times more massive than Earth (now known by the term Super-Earth), are known as well; statistical studies now indicate that they actually outnumber giant planets while recent discoveries have included Earth-sized and smaller planets and a handful that appear to exhibit other Earth-like properties. There also exist planetary-mass objects that orbit brown dwarfs, and there exist others that "float free" in space not bound to any star, however the term "planet" isn't always applied to these objects.

In the sixteenth century the Italian philosopher Giordano Bruno, an early supporter of the Copernican theory that the Earth and other planets orbit the Sun, put forward the view that the fixed stars are similar to the Sun and are likewise accompanied by planets. He was burned at the stake by the Roman Inquisition in 1600.

In the eighteenth century the same possibility was mentioned by Isaac Newton in the "General Scholium" that concludes his Principia. Making a comparison to the Sun's planets, he wrote "And if the fixed stars are the centers of similar systems, they will all be constructed according to a similar design and subject to the dominion of One."

Planets are extremely faint light sources compared to their parent stars. At visible wavelengths, they usually have less than a millionth of their parent star's brightness. It is difficult to detect such a faint light source, and furthermore the parent star causes a glare that tends to wash it out. It is necessary to block the light from the parent star in order to reduce the glare, while leaving the light from the planet detectable; doing so is a major technical challenge.

All exoplanets that have been directly imaged are both large (more massive than Jupiter) and widely separated from their parent star. Most of them are also very hot, so that they emit intense infrared radiation; the images have then been made at infrared rather than visible wavelengths, to reduce the problem of glare from the parent star. An exception is the exoplanet Fomalhaut b, observed at visible wavelengths by the Hubble Space Telescope. That planet was found to be surprisingly bright in visible light, possibly because it is surrounded by a large disk of reflective material that may be a satellite system in the process of formation.

Detection Methods

Though direct imaging may become more important in the future, the vast majority of known extrasolar planets have only been detected through indirect methods. The following are the indirect methods that have proven useful:

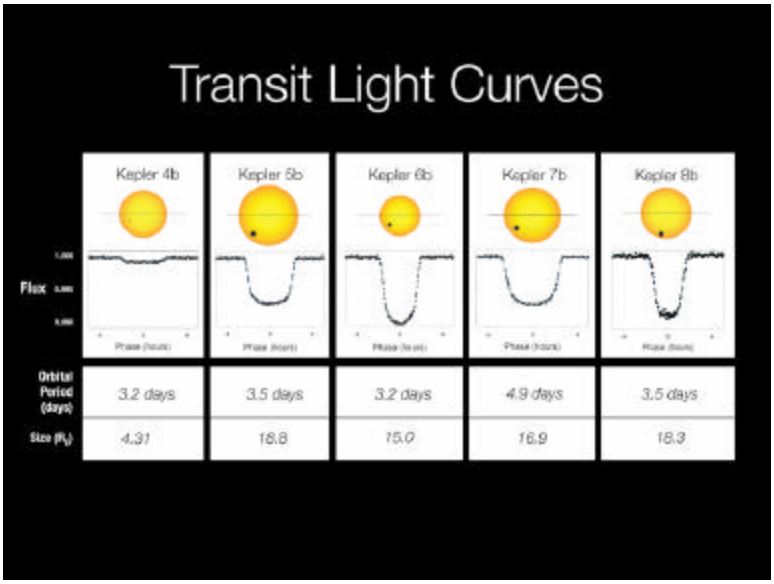
Radial velocity or Doppler method

As a planet orbits a star, the star also moves in its own small orbit around the system's center of mass. Variations in the star's radial velocity – that is, the speed with which it moves towards or away from Earth – can be detected from displacements in the star's spectral lines due to the Doppler effect. Extremely small radial-velocity variations can be observed, of 1 m/s or even somewhat less.[41] This has been by far the

(See Exoplanets on page 5)

(Exoplanets *from page 4)*

most productive method of discovering exoplanets. It has the advantage of being applicable to stars with a wide range of characteristics. One of its disadvantages is that it cannot determine a planet's true mass, but can only set a lower limit on that mass.



Transit method

If a planet crosses (or transits) in front of its parent star's disk, then the observed brightness of the star drops by a small amount. The amount by which the star dims depends on its size and on the size of the planet, among other factors. This has been the second most productive method of detection, though it suffers from a substantial rate of false positives and confirmation from another method is usually considered necessary. The transit method reveals the radius of a planet, and it has the benefit that it sometimes allows a planet's atmosphere to be investigated through spectroscopy.

Transit Timing Variation (TTV)

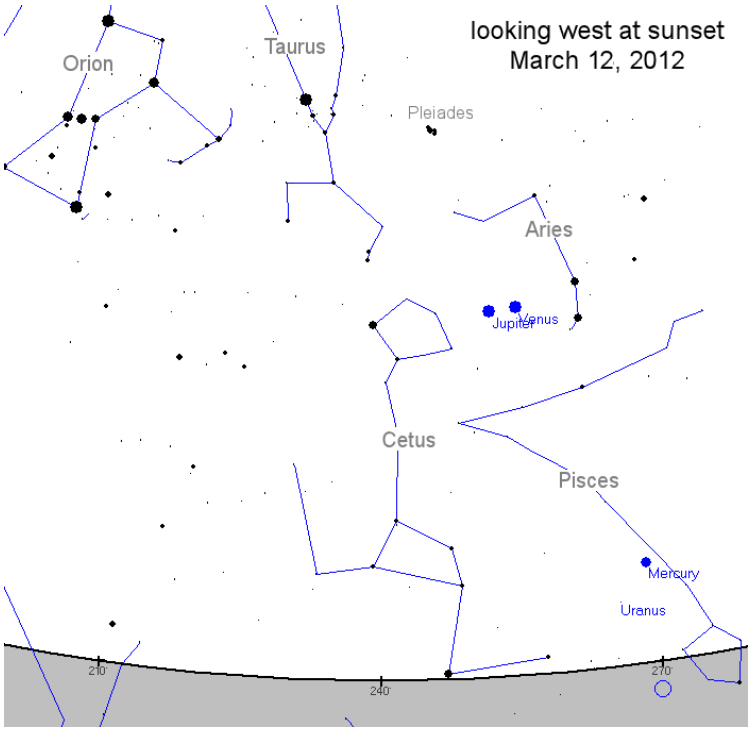
When multiple planets are present, each one slightly perturbs the others' orbits. Small variations in the times of transit for one planet can thus indicate the presence of another planet, which itself may or may not transit. For example, variations in the transits of the planet WASP-3b suggest the existence of a second planet in the system, the non-transiting WASP-3c.[42] If multiple transiting planets exist in one system, then this method can be used to confirm their existence.[43] In another form of the method, timing the eclipses in an eclipsing binary star can reveal an outer planet that orbits both stars; as of November 2011, five planets have been found in that way.

Gravitational microlensing

Microlensing occurs when the gravitational field of a star acts like a lens, magnifying the light of a distant background star. Planets orbiting the lensing star can cause detectable anomalies in the magnification as it varies over time. This method has resulted in only 13 detections as of June 2011, but it has the advantage of being especially sensitive to planets at large separations from their parent stars.

The Solar System in February

Mercury is just above the western horizon on the 1st. It is just below **Jupiter** and **Venus**. **Venus** and **Jupiter** rendezvous on the 12th, making a nice set of bright objects in the western sky after sunset. **Mars** is at opposition, so now is a good time for a look-see—send me your sketches and photos for a future issue of your newsletter. **Uranus** and **Neptune** are too close to **Sol** to observe. **Saturn** rises 4 hours after sunset in the beginning of March and rises 1 hour after sunset by the end of the month. On the 24th, **Pleiades**, **Venus**, **Jupiter**, and **Luna** make a crooked line in the western sky after sunset. The **Spring Equinox** occurs on March 20th at 1:14AM EDT.



The Hidden Power of Sea Salt, Revealed

By Dauna Coulter

Last year, when NASA launched the Aquarius/SAC-D satellite carrying the first sensor for measuring sea salt from space, scientists expected the measurements to have unparalleled sensitivity. Yet the fine details it's revealing about ocean saltiness are surprising even the Aquarius team.

"We have just four months of data, but we're already seeing very rich detail in surface salinity patterns," says principal investigator Gary Lagerloef of Earth & Space Research in Seattle. "We're finding that Aquarius can monitor even small scale changes such as specific river outflow and its influence on the ocean."

Using one of the most sensitive microwave radiometers ever built, Aquarius can sense as little as 0.2 parts salt to 1,000 parts water. That's about like a dash of salt in a gallon jug of water.

"You wouldn't even taste it," says Lagerloef. "Yet Aquarius can detect that amount from 408 miles above the Earth. And it's working even better than expected."

Salinity is critical because it changes the density of surface seawater, and density controls the ocean currents that move heat around our planet. A good example is the Gulf Stream, which carries heat to higher latitudes and moderates the climate.

"When variations in density divert ocean currents, weather patterns like temperature and rainfall are affected. In turn, precipitation and evaporation, and fresh water from river outflow and melt ice determine salinity. It's an intricately connected cycle."

The atmosphere is the ocean’s partner. The freshwater exchange between the atmosphere and the ocean dominates the global water cycle. Seventy-eight percent of global rainfall occurs over the ocean, and 85 percent of global evaporation is from the ocean. An accurate picture of the ocean's salinity will help scientists better understand the profound ocean/atmosphere coupling that determines climate variability.

"Ocean salinity has been changing,” says Lagerloef. “Decades of data from ships and buoys tell us so. Some ocean regions are seeing an increase in salinity, which means more fresh water is being lost through evaporation. Other areas are getting more rainfall and therefore lower salinity. We don't know why. We just know something fundamental is going on in the water cycle."

With Aquarius's comprehensive look at global salinity, scientists will have more clues to put it all together. Aquarius has collected as many sea surface salinity measurements in the first few months as the entire 125-year historical record from ships and buoys.

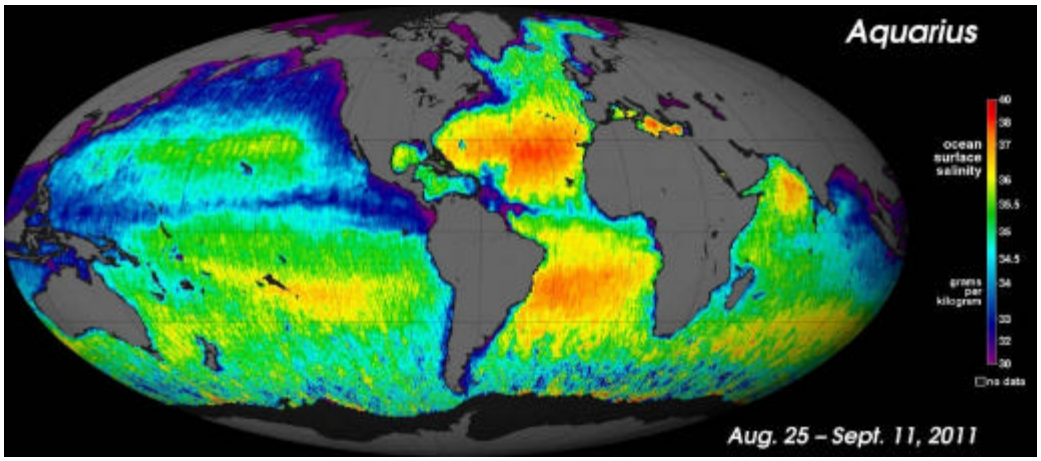
"By this time next year, we'll have met two of our goals: a new global map of annual average salinity and a better understanding of the seasonal cycles that determine climate."

Stay tuned for the salty results. Read more about the Aquarius mission at aquarius.nasa.gov.

Other NASA oceanography missions are Jason-1 (studying ocean surface topography), Jason-2 (follow-on to Jason-1), Jason-3 (follow-on to Jason-2, planned for launch in 2014), and Seawinds on the QuikSCAT satellite (measures wind speeds over the entire ocean). The GRACE mission (Gravity Recovery and Climate Experiment), among its other gravitational field studies, monitors fresh water supplies underground. All these missions, including Aquarius, are sponsors of a fun and educational ocean game for kids called “Go with the Flow” at spaceplace.nasa.gov/ocean-currents.

(See Salt on page 7)

(Salt from page 6)



Aquarius produced this map of global ocean salinity. It is a composite of the first two and a half weeks of data. Yellow and red represent areas of higher salinity, with blues and purples indicating areas of lower salinity.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

(Prez from page 1)

Orion, shines energetic ultraviolet light into the Flame and this knocks electrons away from the great clouds of hydrogen gas that reside there. Much of the glow results when the electrons and ionized hydrogen recombine. Additional dark gas and dust lies in front of the bright part of the nebula and this is what causes the dark network that appears in the center of the glowing gas. The Flame Nebula is part of the Orion Molecular Cloud Complex, a star-forming region that includes the famous Horsehead Nebula.

Over the 2011 Christmas Holiday I found "12 Must-See Sky watching Events in 2012" by Joe Rao at SPACE.com. I thought that I would list those 12 celestial events before too much of 2012 had passed by. Go to the web site for more information on these twelve events. We will schedule some Club outings during the events.

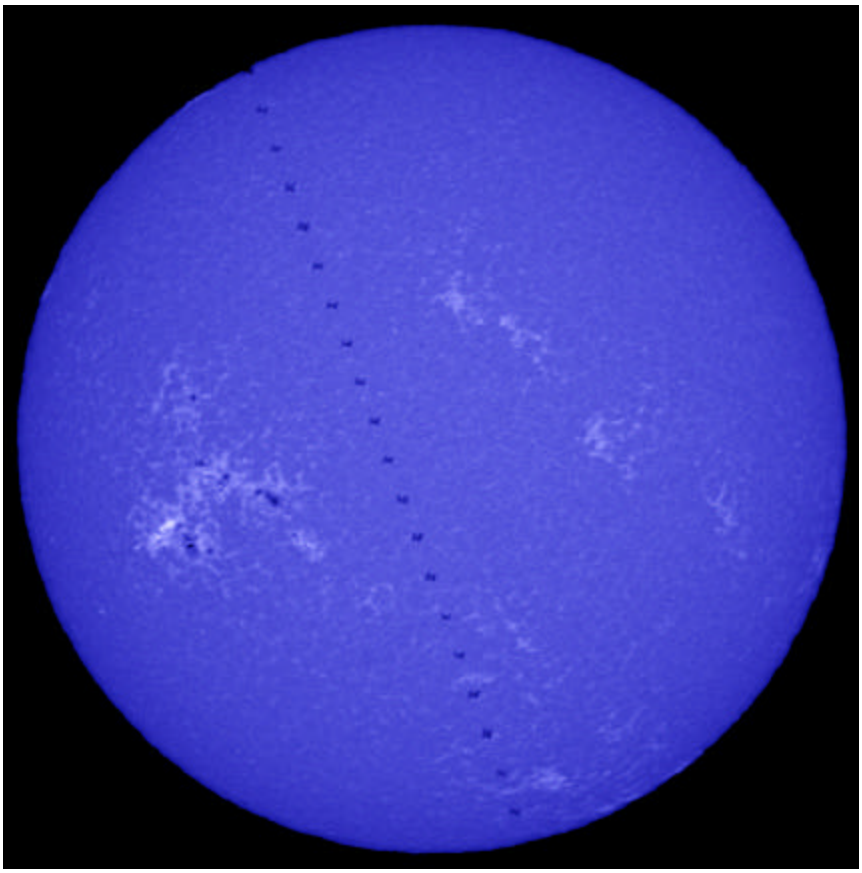
Jan. 4	**Quadrantis meteor shower peaks.**
Feb 20-Mar 12	**Best time to observe Mercury after sunset.**
March 3	**Mars arrives at opposition**
March 13	**Brilliant double planet (Venus and Jupiter)**
May 5	**The biggest full moon of 2012.**
May 20	**Annular eclipse of the sun**
June 4	**Partial eclipse of the moon.**
June 5	**Rare Transit of Venus across the sun**
Aug. 12	**Perseid meteor shower**
Nov. 13	**Total eclipse of the sun (Tracks cuts through Australia).**
Dec. 13-1	**Geminid meteor shower,**
Dec. 25	**Christmas evening and Jupiter.**

It looks like we won't have the restroom and showers for our spring star gaze. But, it is still moving forward. We have our Mirror Making XII event from March 22 to 25 and still need some help for the event. The online registration should be up and running for the Spring Star Gaze at Tuckahoe State Park Equestrian Center from April 19 through 22 (Earth Day). Billie Westergard will do a presentation "Free Energy" and Jerry Truitt is doing then object of the month.

Paul Gray, a past member of Stargazers, who resides in Nova Scotia will be here for the week of March 6-10. He wanted to present at our March meeting a talk that he and his daughter Kathryn, who discovered a super nova, put together about their last summer's trip to Starmus(www.starmus.com). From Paul's email the trip was an amazing adventure for them. Work conflicts will not allow them to make our meeting. Consequently, there may be an evening event for them around March 7th to 9th. There will be an announcement through our yahoo groups and Facebook about the event presentation.

Astrophotos

by Members and Friends



On Jan 19th, it turned out that not only was it clear in the morning, but the ISS was scheduled to pass overhead. I drove to a spot outside of Oriskany Falls NY and setup my camera on Barlow Bobs' 70mm CaK scope. As predicted, at 11:48:38am the ISS passed overhead and I got some pictures of it. The picture combines the 20 frames that had the ISS in them. The detail isn't that great. The sun was only at 26 degrees, ISS was 500+ miles away, and a front was coming in (lots of wind both on the ground and high in the air). Even so, I was pretty pleased to get anything. The entire transit lasted about 1.5 seconds.

Charles A. Higgins—Mohawk Valley Asronomy Club—Central New York

Scope—70mm Coronado CaK solar telescope

Camera—The Imaging Source DMK 41AU02.AS Monochrome USB astronomy camera without IR cut filter.

Delmarva Stargazers Hosts

Twelvth Annual Mid-Atlantic Mirror Making Seminar

Delmarva Star Gazers will host the 12th Mid-Atlantic Mirror Making Seminar Friday March 23 through Sunday March 25, 2012, at Mallard Lodge, Smyrna, DE. Mirror makers and other attendees should check into the Lodge before 11:00 AM Friday. Activities begin at Noon, March 23, 2012.

The purpose of the Seminar is to introduce proven successful mirror making techniques and practices to those wishing to make their own mirrors. Special emphasis will be placed on successfully figuring the mirror.

Members who would like to help with this event are welcome.

How to Join the Delmarva Stargazers: Anyone with an interest in any aspect of astronomy is welcome
NAME_____New_____Renewal_____
ADDRESS_____
CITY, STATE & ZIP_____
E-MAIL ADDRESS (If any)_____
Do you need the newsletter snail mailed to you (Y/N)?_____
Please attach a check for $15 made payable to Delmarva Stargazers and mail to Kathy Sheldon, 20985 Fleatown Rd, Lincoln, DE 19960. Call club President Lyle Jones at 302-736-9842 for more information.