The Spectrogram

Newsletter for the Society for Telescopy, Astronomy, and Radio

March 2005

Inside this Issue

S*T*A*R
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On the web at:
http://www.starastronomy.org

March's Meeting

The next meeting of S*T*A*R will be Thursday, March 3rd.

Our program will be "Astronomy and Astrology in Mesopotamia" by Dr. Ron Wallenfels who has studied this ancient culture extensively. Among other skills, he can read cuniform, the clay tablets used during this era to record observations, calculations and laws.

The meeting will begin promptly at 8:00pm at the King of Kings Lutheran Church, 250 Harmony Road, Middletown.

Thanks to Contributors!

Thanks to all this month's contributors to the *Spectrogram* (Steve Walters, Ernie Rossi, Steve Fedor, Daniel Handlin, Barlow Bob, Randy Walton, Greg Crinklaw). If you'd like to follow in their footsteps, **the deadline for the next edition of the *Spectrogram* is Friday April 1st**. Please email any contributions to gwarnes1@comcast.net.

Calendar

September 2, 2004
History of the Telescopes
Ernie Rossi

October 7, 2004
Constellation Myths
Dr Hank Bartol, Newark Academy

November 4, 2004
X-Raying the Hearts of Supernova Remnants
Jeremy Carlo, Columbia University

December 2, 2004
Eclipse!
Ken Legal

January 6, 2005
Business Meeting on Telescope Purchase

February 3, 2005
Imaging by the S*T*A*Rs

March 3, 2005
Astronomy & Astrology in Mesopotamia
Dr. Ron Wallenfels

April 7, 2005
Digital Universe
Carter Emmart, Rose Center

May 5, 2005
Cassini Mission to Saturn
George Lewycky

June 2, 2005
AGM

President's Corner

By Steve Walters

March is upon us. The weather will be improving as we move through the month, hopefully the last snow has fallen and spring is in the air! So it's time to get out observing and imaging! Spring is a great time for galaxies, get out there and look at a few! Also, the sun is around most days so try doing some solar projections to see the sunspots.

Already, Tim Tierney has started a thread on our discussion board about the club's Messier Marathon at Coyle Field on 3/12. I hope you'll get out and take a run at the Messier list even if you don't want to stay up all night. It's a fun event, there will be quite a few club members there and you can compare notes on how well you're doing and pick up some observing tips on how to move quickly through the list. Also, it's a good chance to try out other member's eyepieces if you're thinking of a new Nagler.

The 25" Obsession has had a few outings now and we are in the process of making various improvements. We're acquiring a ladder and ramps for use with it, Steve Fedor has generously built dew heaters and a controller for it (these are being installed now – Thanks Steve!) and we are considering other things to make it easy to use including digital setting circles, finders and weights. I hope we will have the 25" in full operation shortly but some improvements will take a few months to accomplish (like DSCs).

We have three good programs in a row lined up for March, April and May. In March, Dr. Ron Wallenfells will tell us about astronomy in Mesopotamia; in April, Carter Emmart from the Rose center in NYC will talk on "Digital Universe"; and in May, George Lewycky will tell us about the Cassini mission to Saturn. These should all prove interesting, please come to our meetings.

Clear Skies!

Steve…

February Meeting Minutes

By Steve Fedor

The Feb. 2005 meeting of S*T*A*R Astronomy was attended by 39 members and non-members. At 8:04pm president Steve Walters called the meeting to order. Steve began by discussing the night's agenda, which was primarily presentations by the Imaging SIG, and the upcoming programs which can be found elsewhere in the Spectrogram.

At 8:11 S*T*A*R member Dave Britz gave a fascinating talk on "Video Astronomy- The easy path to electronic imaging." Dave discussed the use of video camcorders and security cameras for imaging as well as the variables that affect image quality such as atmospheric turbulence, chromatic distortion and refraction. Dave also illustrated the differences between afocal and direct focus systems and mentioned he is an active participant in the video astronomy group on Yahoo.

At 8:40 Manalapan high school students Rathi and Erin gave a summary of the report they did on the Andromeda galaxy with assistance from Steve Walters. This was done for a ½ term science project. Their goals were to image the Andromeda galaxy as well as edit the image and attempt to define its chemical makeup. Although their success was varied, they certainly were grateful for the assistance that S*T*A*R, in particular Steve Walters, had given them.

At 9:00 Jordan Feder gave his "Object of the Month" presentation. This month's topic was comet Macholz. Jordan presented a sky chart showing the comet's present and future path including its relative brightness as it travels through the solar system. Jordan also included numerous, very high quality astrophotos (with due credit given to the astrophotographer) and spoke of the comet's structure.

At 9:14 vice-president Dennis OLeary reviewed the guidelines for using the club's 25 inch Obsession dob. He presented the request form for reserving the scope as well as a written version of usage guidelines. He urged all QO's to use caution and discretion with the general public while at viewing sessions. It was also noted that the host of any public star parties will be the primary insured and the host will be responsible to fill out a liability waiver. It was also noted that the ladders and ramps have been ordered.

The SIG's then gave their reports.

ATM – Gordon Waite began by mentioning that a new mirror had been started. At the 1/31 session Dave Nelson had first light with his 8 inch mirror that he ground on the ATM nights. Mike Lindner was able to obtain an incredible 30th wave 16 inch mirror. Congrats to Mike and Dave!

Imaging – Steve Walters reported there will an imaging SIG meeting on 2/17.

Beginner's – Nancy McGuire indicated she is working with new members and has a 6 inch reflector to loan but it needs a dob mount. She also inquired if the club would purchase a Telrad for it. Nancy also asked for eyepiece donations.

Observing. – Tim Tierney indicated that the first outing with the 25 inch dob would be held the upcoming weekend which was 2/5 at John H.'s house. Gavin Warnes indicated the 25 inch scope would be on display for the Turkey Swamp event in May as well as Earth Day in Manasquan in April. Mike Lindner asked if there were any plans for Astronomy Day. At this time there are no plans.

Announcements:

Randy Walton announced that A.S.T.R.A. would hold an event for Astronomy Day at the planetarium at Ocean County College on April 16th.

Larry Campbell announced he needs volunteers for a star party at the elementary school in Holmdel on Feb. 15th

The 50/50 was drawn.

The meeting was then adjourned and all took part in a group picture with the 25 inch dob. The activities then shifted to everyone enjoying coffee and the presentations and displays put on by the Imaging SIG. These were:

John Ambrose – Digital camera afocal equipment

Dave Britz – Video imaging

Charles Byrne ISS model, Lunar/ Planetary Society

Nick Lordi – Pseudo coloring of astro images

Steve Walters – display of his astrophotography

Gavin Warnes – Demonstration of Registax

No observing took place afterwards due to cloudy weather.

Solar Observing at NEAF

The Rockland Astronomy Club is hosting the second annual NEAF Solar Star Party at Rockland Community College in Suffern, NY, on April 16th & 17th. NEAF attendees are invited to observe the Sun through a variety of Hydrogen-alpha and sunspot solar filters. No star party entrance fee or registration required. Pictures from last years event plus fantastic solar images can be found at http://www.sungazer.net/field.html.

Ernie's Telescope Corner

By Ernie Rossi

Telescopes Across the Spectrum

Today, astronomers study light across the entire spectrum. Telescopes for non visible wavelengths require very different designs than conventional optical telescopes.

Infrared and Ultraviolet Telescopes

Light from much of the infrared and ultraviolet portions of the spectrum behaves enough like visible light to be recorded by the optical telescope, as long as it is equipped with appropriate detectors and mirror coatings. Of course the telescope must be in space in order to receive significant ultraviolet light.

Near the extreme wavelength end ultraviolet light (the shortest wavelengths of ultraviolet) behaves like X rays.

Extreme infrared light (the longest wavelengths of infrared) pose observing difficulties because ordinary telescopes are warm enough to emit significant amounts of long wavelength infrared light, and this telescope emission would interfere with any attempt to observe these wavelengths from the cosmos. One solution to this problem is to make the telescope so cold that it emits very little infrared radiation. NASA's Space infrared telescope Facility (SIRTF), launched in 2003, is cooled with liquid helium to just a few degrees above absolute zero.

X-Ray and Gamma-Ray Telescopes

X rays have significant energy to penetrate many materials, including living tissue and ordinary mirrors. While this property makes X rays very useful to medical doctors, it gives astronomers headaches. Trying to focus X rays is somewhat like trying to focus a stream of bullets. If the bullets are fired directly at a metal sheet, they will puncture or damage the sheet. However, if the metal sheet is angled so that the bullets barely graze its surface, then it will slightly deflect the bullets. Specially designed mirrors can deflect X ray in much the same way. Such mirrors are called grazing incidence mirrors because X rays merely graze their surfaces as they deflect toward the focal plane. X ray telescopes, such as NASA's Chandra X-ray Observatory, generally consist of several nested grazing incidence mirrors.

Gamma rays can penetrate even grazing incidence mirrors and therefore cannot be focused in the traditional sense. Capturing such high energy light at all requires detectors so massive that the photons cannot simply pass through them. The largest Gamma-ray observatory to date was the 17 ton Compton Gamma Ray Observatory which was launched in 1991 and destroyed in a controlled crash to Earth in 2000.

Radio Telescopes and Interferometry

Radio telescopes use large metal dishes as mirrors to reflect radio waves. However, the long wavelengths of radio waves mean that very large telescopes are necessary to achieve reasonable angular resolution. The largest radio dish in the world, the Arecibo telescope, stretches 305 meters or around 1,000 feet) across a natural valley in Puerto Rico. Despite its large size, Arecibo's angular resolution is only about 1 arc minute at commonly observed radio wavelengths which is a few hundred times worse than the visible light resolution of the Hubble space telescope.

In the 1950's, radio astronomers developed an ingenious technique for improving the angular resolution of the radio telescopes. They learned to link two or more individual telescopes to achieve the angular resolution of much larger telescopes. This technique is often called interferometry because it works by taking advantage of the wave properties of light that cause interference. The procedure relies on precisely timing when radio waves reach each dish and on

super computers to analyze the resulting interference patterns.

One famous example of radio interferometry. the very large array (VLA) near Socorro, New Mexico, consists of 27 individual radio dishes that can be moved along railroad tracks laid down in shape of a Y. The light gathering capability of the VLA's 27 dishes is equaled to their combined area, equivalent to that of a single telescope of 130 meters across. The VLA's angular resolution, achieved by spacing the individual dishes as widely as possible, is equivalent to that of a single radio telescope with a diameter of almost 40 kilometers. Today, astronomers can achieve even higher angular resolution by linking radio telescopes around the world.

In principle, interferometry can improve angular resolution not only for radio waves, but for other forms of light. In practice interferometry becomes increasingly difficult for light with shorter wavelengths. Nevertheless, astronomers have begun to succeed at infrared and visible interferometry and are testing technologies for X ray interferometry. One reason why two Keck telescopes were built on Mauna Kea is so that they can be used for infrared and opticalinterferometry. The potential value of such interferometers is enormous. In the future, infrared interferometers may be able to obtain spectra from individual planets orbiting other stars, allowing spectroscopy that could determine the composition of their atmospheres and help determine weather they harbor life.

The future of astronomy in space

It will always be cheaper and easier to do astronomy from ground based observatories, but space is likely to play an ever increasing roll in astronomy. NASA is already at work on the James Webb space telescope which may launch as early as 2010. For the more distant future, many astronomers dream of an observatory on the far side of the moon. Because the moon has no atmosphere it offers all the advantages of telescopes in space while also offering the ease on operating on a solid surface.

Name	**Launch Year**	**Special Features**
Hubble Space Telescope	1990	Optical, infrared and ultraviolet
Far ultraviolet spectrographic explorer	1999	Ultraviolet Spectroscopy
Chandra X-ray Observatory	1999	X-ray imaging and Spectroscopy
X-ray multi mirror mission	1999	X-ray Spectroscopy
High Energy Transient Explorer	2000	Study of Gamma Ray Burst
Wilkinson Microwave Anisotropy Probe	2001	Study of Cosmic Microwave Background
International Gamma Ray Astrophysics Lab	2002	Gamma-Ray Imaging, Spectroscopy & Timing
Space Infrared Telescope Facility	2003	Infrared Observations of the Cosos
Swift	2003	Study of Gamma-Ray Burst
Kepler	2006	Transit Search for Extrasolar Earth Size Planets
Space Interferometry Mission	2009	First Mission For Optical Interferometry in Space
James Webb Space Telescope	2010	Follow on to the Hubble Space Telescope
Terrestrial Planet Finder	2014	Search for Earth Like Planets Around Other Stars

Past, Present & Future Space Telescopes

Review: Personal Solar Telescope

By Daniel Handlin

Early last year, Coronado rolled out the P.S.T., the Personal Solar Telescope, a complete H-alpha observing package including a 40mm f/10 refractor and a 12.5 mm eyepiece. Many club members expressed interest in the PST, but did not know whether it was worth purchasing. The goal of this review is to provide enough information for these members to make a decision on whether to purchase the PST.

After talking with the few people who had actually seen a PST, I decided to purchase the PST on the theory that, at best, I'd get a pretty good full-disk H-alpha view of the Sun-if only at a fairly low magnification – and at worst, it would be like a reddened white-light image that showed prominences. The PST arrived promptly from B&H Photo and Video in New York City, a day ahead of schedule. I

highly recommend them as vendors. While some other vendors I had contacted, such as Anacortes and Astronomics, had 30 day waiting lists, B&H had one in stock and shipped it immediately (presumably because fewer astronomers shop there than at places like those mentioned above).

The PST was *exceedingly* well packaged and built. It felt and looked extraordinarily sturdy. It was immediately obvious what the reviewer for the January issue of Astronomy magazine meant by an "impression of optical quality". The PST is the best-constructed optical instrument that I have ever seen in its size range. The 12.5 mm Kellner it came with had fairly good eye relief for its size compared with some Plossls that I've seen, but as I am far less experienced with eyepieces than most members of the club, I can't offer a good assessment of its quality and shall discuss it no further. My PST came with a plastic clip-on cap for the objective. From reading other reviews online, there appears to be a fairly significant variation in what the PSTs are packaged with; some come with CEMAX eyepieces optimized for H-alpha viewing instead of the Kellner; some have metal screws for the eyepiece instead of plastic (mine was plastic), and some have metal screw-on caps for the objective rather than the clip-on cap. However, the clip-on cap and the plastic mounting screw seemed sturdy enough for me. The only problem I had was that the packaging for the PST is very tight, so that when I take the PST out the objective lens cap can get caught in the foam and sometimes comes off. But this was not a major problem. The PST screwed right on to my photographic tripod with a ¼-20 mounting screw, as advertised. The PST has two holes in close proximity to each other to facilitate precise mounting on a tripod.

The plastic screw that secures the eyepiece again felt sturdy. The focusing knob and tuner were very well constructed. The tuner is surprisingly difficult to turn, but Coronado says on their website that the instrument is delivered properly tuned and that the best views are obtained within a 1-2 degree turn of this position, so this is perhaps not surprising.

The next few days after receiving the PST were, of course, cloudy (as all amateur astronomers know, clouds form in proportion to the square of the aperture times the focal length cubed of any new telescope). Finally, a clear day arrived. I brought out the PST and inserted the 12.5 mm eyepiece. This is one of the best features of the PST; I just take it out of its case, screw it onto the tripod, and drop in an eyepiece, and I have an H-alpha scope all ready to go.

The first thing I noted about the PST in use was that the "Sol Ranger" finder was very easy to use. You just point the PST at the Sun and a bright light appears in a small window on top of the PST. You move that light into the center of the window, and the Sun is centered in the eyepiece. Finding the Sun was never a problem in the PST. When I looked through the eyepiece for the first time, all I saw was a fuzzy orange glow. After focusing it and tuning the image properly, a lot of details popped out. I had read that H-alpha observing requires the observer to "train" his or her eye; this was incredibly true. I found it amazing how, as I scanned the solar disk more carefully, new details would pop out each time. I managed to sight several different kinds of prominences, including one loop prominence that wrapped around the solar limb and was also visible as a filament above the solar atmosphere. Soon after spotting that filament – my first chromosphere detail other than sunspot group 720 - the sun disappeared behind the trees.

As I used the PST more over the next few days, I learned that tuning the image was the key to seeing the H-alpha details. There is a **very** narrow range where the PST is properly tuned; if it the tuner is more than 5 or 10 degrees away from this point, the chromosphere detail disappears completely. But within this range, a whole lot of interesting things were visible. Through the PST, I saw prominences, filaments, plage, active regions, and the fringe of spicules around the solar limb (the 40 mm aperture doesn't provide enough resolution to see individual spicules). I was very happy with the detail the PST provided. My PST has a slight ghost to the left of the main image, but it was not a major annoyance. I found that I used the Kellner that came with the scope most often of my eyepieces, at 32x; I also found that by shielding the eyepiece from the solar glare with my hand I could see far more detail. The Kellner does not have a rubber eyeguard so this became very important with this eyepiece.

One of the interesting things I got to see through the PST was an airliner transiting the solar disk. As I looked at some filaments in the center of the solar disk, an aircraft zoomed across the Sun, taking about a quarter of a second (this is also how I confirmed that the PST inverts the solar image; the aircraft was upside-down). Overall, as a newcomer to H-alpha observing I was very happy with the quality of the image and with the detail that I could see on the Sun.

The PST has provided a wonderful opportunity for me to view the Sun in H-alpha that I would not otherwise have had. In H-alpha, the Sun presents a new face every day (even every hour). I am very satisfied with my purchase, and I have a feeling I may end up using the PST much more than my night-time telescope, primarily because it's much more convenient to set up. As the review in *Astronomy* says, the PST "encourages frequent viewing" and is a great way to affordably and conveniently enjoy the Sun in H-alpha.

So I give my highest recommendation for the PST. I suggest that if you purchase one, that you buy it from B&H (which, as of the time of this writing, has some in stock). If you would like to "try before you buy", I'd be more than willing to let you have a look through mine; send me an e-mail at Daniel_handlin@hths.mcvsd.org and we can arrange something, preferably on a Sunday afternoon. I'd also be interested in seeing how the PST performs "double-stacked", with a SolarMax 40 screwed on the front; if you have a SolarMax 40, please send me an e-mail and we can arrange something as well. My PST has opened up the daytime to astronomical viewing that I find every bit as varied and

interesting as the night. If you get a PST, whether you're a newcomer to H-alpha or an experienced observer looking for a more portable setup, I guarantee yours will too.

Messier Objects - March

By Greg Cantrell (reproduced from a prior edition)

M65 & 66 (NGC3623 & 3627) – These round, bright galaxies in Leo share the field of view with edge on galaxy NGC3628, and make a wonderful view at low powers.

M95, 96 & 105 (NGC3351, 3368 & 3379) – This small cluster of galaxies is found in Leo. Look for NGC2284 & 3389 in the field of view with M105.

M40 (Winnecke 4) – Two stars, magnitudes 9.0 & 9.3, found in Ursa Major.

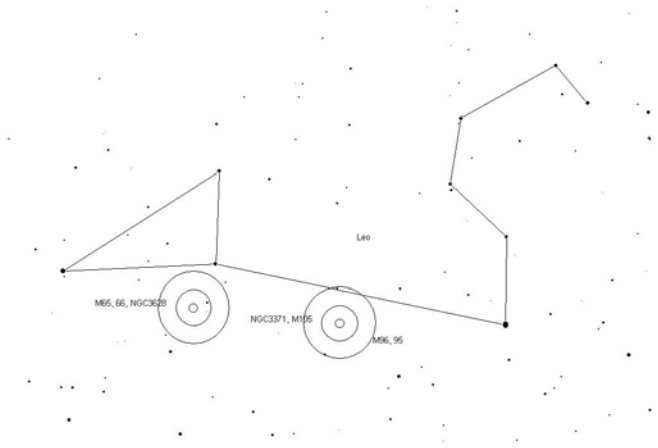
M81 & 82 (NGC3031 & 3034) – M81, a bright spiral galaxy, and M82, seen nearly edge on, make up one of the finest views in the night sky. Find this wonderful pair in Ursa Major.

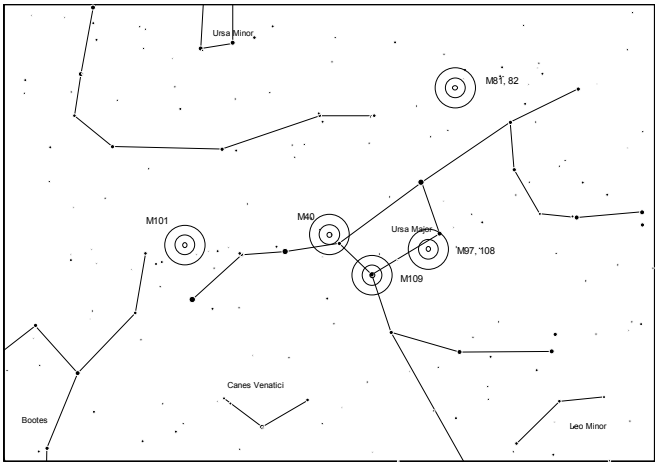
M97 (NGC3587) – Known as the Owl Nebula, this 11 magnitude planetary nebula in Ursa Major is a fine sight under dark skies.

M101 (NGC5457) – This large, magnitude 7.9, spiral galaxy in Ursa Major is seen face on, and can be a challenging object under anything but ideal sky conditions.

M108 (NGC3556) – This magnitude 10 edge on galaxy appears as a thin streak that brightens towards its center. A difficult object to locate in Ursa Major unless sky conditions are very good.

M109 (NGC3992) – A magnitude 9.8 spiral galaxy in Ursa Major that looks like a small oval patch of light.





Moon Phases

Feb 8 Feb 16 Feb 24 Mar 3

Mar 10 Mar 17 Mar 25 Apr 2

Are you a S*T*A*R Member?

S*T*A*R is a member of United Astronomy Clubs of New Jersey (UACNJ) and the International Dark Sky Association (IDA). Meetings are the first Thursday of each month, except July and August, at 8:00 PM at the King of Kings Lutheran Church, 250 Harmony Rd. in Middletown . Meeting generally consist of lectures and discussion by members or guest speakers on a variety of interesting astronomical topics.

Memberships: ( )Individual....$25
( ) Family...$35 ( ) Institutional $25

Name_____

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Make checks payable to: STAR Astronomy Society, Inc. and mail to P.O. Box 863, Red Bank, NJ 07701

A Different Angle on Climate Change

By Patrick L. Barry

Look toward the horizon in almost any major city, and you'll clearly see the gray-brown layer of smog and air pollution. Yet when you look straight up, the sky can appear perfectly blue; you might think there's no smog at all!

The smog is overhead as well, but it's much harder to see. Why is there such a difference?

It comes down to viewing angles: A vertical line straight up through the atmosphere crosses much less air than a line angled toward the horizon. Less air means less smog, so the sky overhead looks blue. On the other hand, when you look toward the horizon, you're looking through a lot more air. The smog is easier to see.

A one-of-a-kind sensor aboard NASA's Terra satellite capitalizes on this angle effect to get a better view of how clouds and air pollutants scatter and absorb sunlight. By doing so, this sensor—called the Multi-angle Imaging SpectroRadiometer (MISR for short)—is helping scientists fill in a major piece of the climate change puzzle.

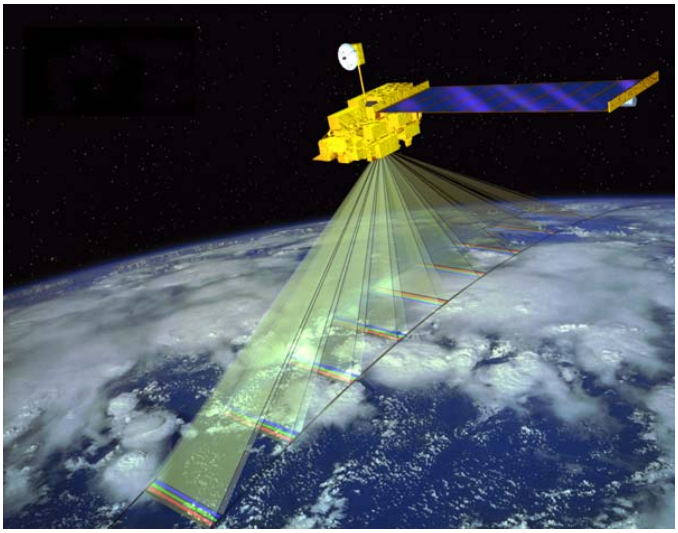
Most satellite instruments look only straight down at the Earth. Layers of airborne particles (called aerosols) and smog are harder to see with this vertical view, and clouds often appear only as two-dimensional sheets of white. Clouds and aerosols both can reflect incoming sunlight back out to space, thus cooling the planet. But they can also absorb sunlight and trap heat rising from below, thus helping warm the planet.

What is the net effect? MISR helps scientists figure this out by looking at the atmosphere at several angles—nine to be exact. Its nine cameras fan out across a range of angles from steeply looking forward (70.5 degrees from vertical), to straight down, to the same steep angle backwards. As the Terra satellite passes over a region, the cameras successively view the region at nine different angles.

From these data, scientists can construct a three-dimensional picture of the cloud cover, revealing much more about cloud dynamics than a flat image alone. They can also see light bouncing off aerosol pollution from nine different directions, thus getting a fuller picture of how aerosols scatter sunlight. And they can even spot thin layers of heat-trapping air pollutants that might go unnoticed by other satellites.

All this information comes just from looking at the atmosphere from a different angle.

For more information, see http://www-misr.jpl.nasa.gov . Kids can learn about MISR, see MISR images, and do an online MISR crossword at http://spaceplace.nasa.gov/en/kids/misr_xword/misr_xword2.shtml .



Caption:
The MISR instrument on the Terra satellite views the atmosphere and Earth's surface from nine different angles.
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In the Eyepiece

If you are not worn out by all of March's Messier objects, here is a list of more objects for this month. This is reproduced from www.skyhound.com with the kind permission of its creator and author of SkyTools Greg Crinklaw.

Object(s)	Class	Con	RA	Dec	Mag
M 81 & M 82	Galaxies	Ursa Major	09h55m34.1s	+69°03'59"	7.8
NGC 3511	Galaxy	Crater	11h03m23.7s	-23°05'11"	11.5
Spindle	Galaxy	Sextans	10h05m14.1s	-07°43'07"	10.1
Ghost of Jupiter/Eye	Planetary Nebula	Hydra	10h24m46.1s	-18°38'32"	8.6
NGC 2903	Galaxy	Leo	09h32m09.7s	+21°30'03"	9.6
M 95	Galaxy	Leo	10h44m00.0s	+11°41'57"	10.5
M 96	Galaxy	Leo	10h46m48.1s	+11°48'54"	10.1
The Leo I Dwarf	Galaxy	Leo	10h08m30.6s	+12°18'07"	11.2
Markarian 421	Galaxy	Ursa Major	11h04m27.4s	+38°12'34"	14.8
NGC 3395	Galaxy	Leo Minor	10h49m52.4s	+32°58'35"	12.4
NGC 2818/A	Planetary Nebula in Open Cluster	Pyxis	09h16m01.5s	-36°36'37"	13.0
PHL 1811	Quasar	Cap	21h55m01.6s	-09°22'24"	13.8?
Focus On the Twin Quasar	Quasar	Ursa Major	10h01m20.8s	+55°53'54"	17.0
Hickson 44	Galaxy Group	Leo	10h18m00.4s	+21°48'44"	10.0
Abell 33	Planetary Nebula	Hydra	09h39m09.2s	-02°48'35"	13.4

2005 EVENTS

Compiled by Barlow Bob of the Rockland Astronomy Club. This list can be found on the web at http://www.asnh.org/calendar/bobsannual.html

FEBRUARY 7 – 12 **WINTER STAR PARTY**
FLORIDA KEYS, FLORIDA
http://www.scas.org/

APRIL 8 - 10 **DELMARVA STAR PARTY**
TUCKAHOE STATE PARK, MARYLAND
http://www.delmarvastargazers.org

APRIL 16 - 17 **NEAF**
NEAF SOLAR STAR PARTY
SUFFERN, NEW YORK
http://www.rocklandastronomy.com/neaf/
http://www.sungazer.net/field.html

JUNE 3 -5	**JERSEY STARQUEST STAR PARTY** **HOPE, NEW JERSY** **http://www.princetonastronomy.org**
JUNE 2 – 6	**CHERRY SPRINGS STAR PARTY** **CHERRY SPRINGS PARK, PA** **http://www.cherryspings.org**
JUNE 11	**STARCONN** **WESLEYAN UNIVERSITY, MIDDLETOWN, CT** **http://www.asgh.org/**
JULY 8 – 9	**ROCHESTAR FEST** **ROCHESTER, NY** **http://www.rochesterastronomy.com**
JULY 6 - 10	**MASON DIXON STAR PARTY** **SHREVEPORT AIRPORT / FOOTLIGHT RANCH** **YORK COUNTY, PA** **http://www.masondixonstarparty.org/**
JULY 6 – 10	**GREEN BANK STAR QUEST** **GREEN BANK, WEST VIRGINIA** **http://www.caacwv.org/gbstarquest.htm**
JULY 29 – AUG 7	**ROCKLAND SUMMER STAR PARTY** **SAVOY, MASSACHUSETTES** **http://www.rocklandastronomy.com/**
AUGUST 5 – 6	**STELLAFANE** **SPRINGFIELD, VT** **http://www.stellafane.com**
AUGUST 26 – 28	**THE CONJUNCTION** **NORTHFIELD, MA** **http://www.philharrington.net/astroconjunction/**
SEPT 9 -11	**BLACK FOREST STAR PARTY** **CHERRY SPRINGS STATE PARK, PENNSYVANIA** **http://www.bfsp.org/starparty/index.cfm**
SEPT 9 -11	**CONNECTICUT STAR PARTY** **MARLBOROUGH, CONNECTICUT** **http://www.asnh.org/**
SEPT 2 - 4	**ARUNAH HILL DAYS** **CUMMINGTON, MA** **http://www.arunah.org/calendar.htm**
SEPT 28 – OCT 2	**DELMARVA NO-FRILLS STARPARTY** **TUCKAHOE STATE PARK, MARYLAND** **http://www.delmarvastargazers.org/archive/n0frills2005/index.html**
OCT 1	**NOVAC STAR GAZE**

	MANASSAS, VA **http://ww.novac.com/gaze/**
OCT 7 - 8	**ASTRO ASSEMBLY** **SKYSCRAPERS, INC** **AMATEUR ASTRONOMICAL SOCIETY OF RHODE ISLAND** **http://www.theskyscrapers.org/**
NOV 1 – 8	**MID ATLANTIC STAR PARTY** **ROBBINS, NC** **http://www.masp.org/**

March Celestial Events

By Randy Walton

Day	Date	Time (LMT)	Event
Tue	1	03:50	Mars Rises
		04:15	Saturn Sets
		06:20	Venus Rises
		17:52	Sunset
		19:00	Mercury Sets
		20:40	Jupiter Rises
		23:52	Moon Rise
Thu	3	06:00	Moon Occults Antares
		10:15	Moon Set
		12:36	Last Quarter Moon
Thu	10	04:10	New Moon
		06:41	Moon Rise
Sat	12	03:30	Saturn Sets
		03:40	Mars Rises
		06:15	Venus Rises
		18:04	Sunset
		19:40	Mercury Sets, best view in 2005
		19:55	Jupiter Rises
		20:56	Moon Set
Thu	17	10:12	Moon Rise
		14:19	First Quarter Moon
		18:09	Sunset
Sun	20	07:33	Spring Equinox
Thu	24	02:40	Saturn Sets
		03:25	Mars Rises
		05:57	Sunrise
		17:13	Moon Rise
		18:16	Sunset
		19:00	Mercury Sets
		19:02	Jupiter Rises
Fri	25	15:58	Full Moon
		18:17	Moon Rise, Sunset
Mon	28	18:20	Sunset
			Zodiacal Light in W after evening twilight for two weeks