



SUPARCO

SUPARCO - ASTRONOMY & ASTROPHYSICS

BULLETIN

Volume I, Issue I

January 2012

Pakistan Space Vision 2040, was approved by the Prime Minister of Pakistan which inter-alia included augmentation / strengthening of the Astronomy and Astrophysics programmes of SUPARCO.

SUPARCO's astronomy and astrophysics program is mainly focused on theoretical and observation research. For this an astronomical observatory is planned to be established. Research studies pertaining to deep space objects including galaxies, nebulae and variable stars are also being initiated. Search for earth like planets is a hot topic in astrophysics nowadays. It is planned to conduct research studies in this field also.

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Events of Month

Date	Time	Event/Direction
01-5 Jan	2:00 am to 5:30 am	Quadrantid Meteor Shower Direction: North East
13 Jan	23:00 to Early Morning	Astronomical Conjunctions 1. Mercury and Pluto 2. Venus and Neptune Direction: 1. Not visible 2. East

Our Sky

On a cloud free dark night, away from city lights, our sky appears to be full of stars. All that glitters in the sky are not stars. Among stars there are also some fuzzy, faint objects known as nebulae and galaxies.

Our ancestors, while observing the sky, thought that it is like a big dome in which stars are embedded. This dome completes one orbit around Earth in one day with Earth being at the center. These ideas were based on human observation and understanding without any logical proof for it. Today we know that all these ideas are nothing but assumptions of man in his quest to understand the universe around him. We know now that Earth is not at the center of the universe; it is not even the center of our solar system. Earth itself is a planet revolving around the Sun.

Our Sun is an average star of our galaxy and there are billions of other stars, some much bigger, others smaller, than the sun. We also see billions of other galaxies in the universe some of which are similar to our own galaxy. Many others have totally different shape and properties. These galaxies lie at a distance which would be billions of light years away from one another.

The picture of the sky based on old ideas is however useful in developing an understanding of the sky. When we look at the stars, we find ourself inside a big dome embeded with stars and other objects. This dome is called the Celestial Sphere. The word "Celestial" comes from the Latin word for heaven. Astronomers use the celestial sphere to locate stars and galaxies and to plot the tracks of the Sun, Moon, and planets throughout the year.

North pole star which is used for celestial navigation. Its angle of elevation can be used to determine latitude of any particular place on Earth. This star can easily be spotted in the north direction throughout the night.

SUPARCO is launching an Astronomy and Astrophysics Bulletin from Jan 2012 on monthly basis as it is the best tool to promote space understanding. Its objective is to create awareness among Professionals, Amateur Astronomers, Educators, Students and public at large about the progress made in this field through technological innovations. The bulletins would include news on latest developments, events and book reviews as well as work being carried out at SUPARCO in these all important fields.

Message from the Chairman SUPARCO

Winter (Northern Hemisphere)



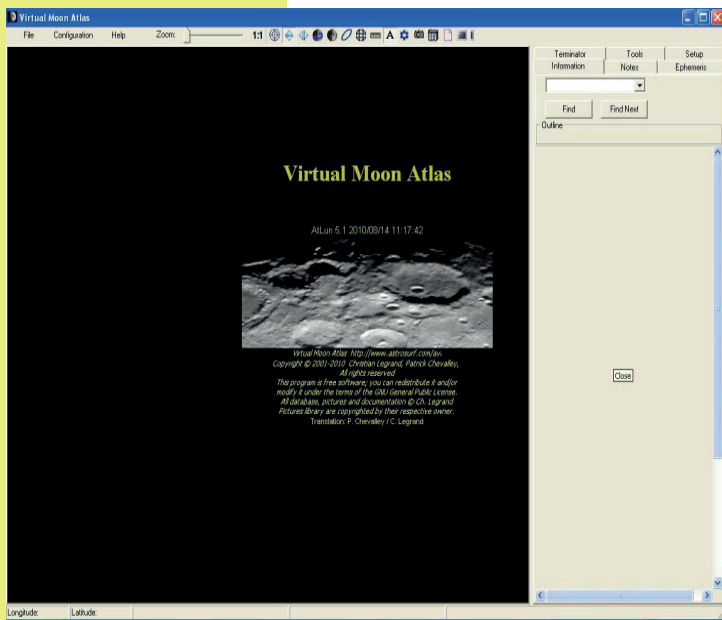
Credit : NASA

Virtual Moon Atlas

Copyright © 2001-2010 Christian Legrand, Patrick Chevalley

License as published by the Free Software Foundation

It has rightly been said that nowadays an astronomer works more on a PC than with typical equipment in an observatory. Working with telescopes is the start of a long and tedious journey for an astronomer which ultimately ends with a computer. Professional astronomical softwares are beyond the scope and reach of general public but some astronomical software are available on the internet and are easy to operate.

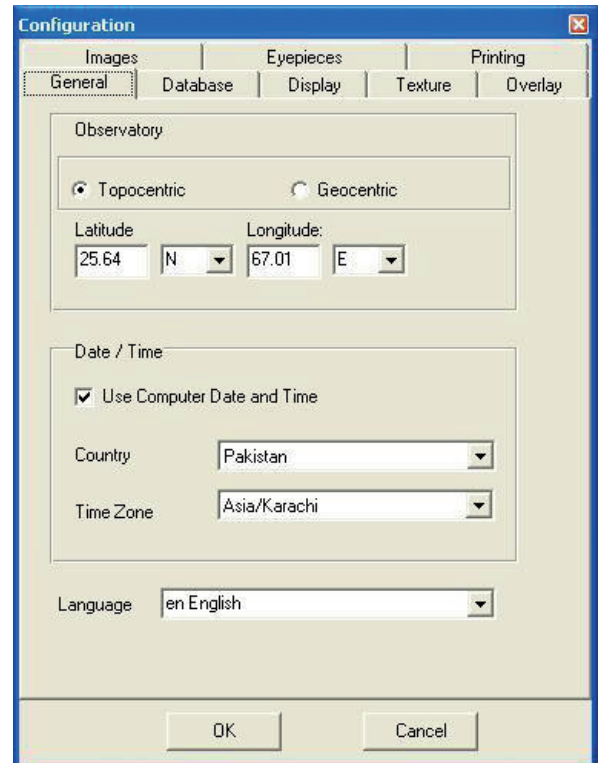


One such software is “Virtual Moon Atlas” developed by Christian Legrand and Patrick Chevalley. It is a free software and it could also be redistributed or modified under the terms of the GNU General Public.

This software can be downloaded from the link http://www.astrosurf.com/avl/UK_index.html. To run the full VMA Pro Version 3.0 (Oct 25th 2005), the requirements are 2 Ghz Processor with 512 MB RAM and Opel GL 64 MB video RAM card. It operates on Mac with Virtual PC and on Linux with Wine and Windows.

S.No.	City	Latitude (N)	Longitude (E)
1	Karachi	24.866	67.01
2	Islamabad	33.716	73.076
3	Lahore	31.56	74.766
4	Quetta	30.21	67.0199
5	Peshawar	34.01	71.933

The first thing after downloading the software is to configure it according to one's location on Earth. Enter the coordinates and time zone for Karachi as shown in the figure below, for the software to work properly. Any error in putting this information would result in the appearance of the moon incorrectly at your computer screen. For convenience, previous table gives the coordinates of main cities of Pakistan.



Some buttons are also given in taskbar. Try what happens when each of these buttons is pressed. There is one important tab given on the right side of the software screen named “Ephemeris”. Different phases of the moon can be studied by adjusting time and date in this tab. By pressing “now” it will show the phase of the moon according to the time running on the computer.

How would the moon be in the sky after one week, or may be after one month or a few hours later can thus be examined. Similarly we can also monitor the shape of the moon by entering the time and date from previous months.

There is an option given in “File” menu to save the picture you have worked on. This option enables us to go outside in the field and try to look for the details of the real moon by comparing it with the printout of the generated picture of the moon for that particular observing session.

Web Review

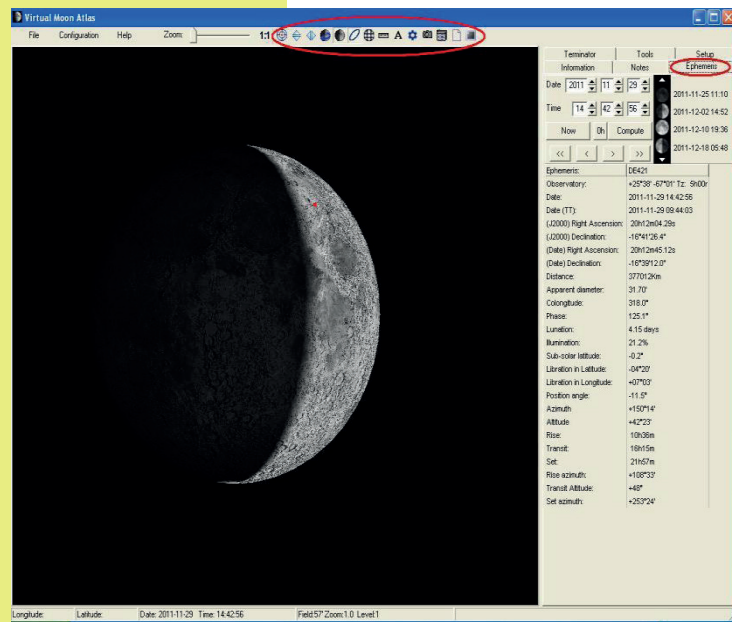
<http://www.exploremarsnow.org>

Tremendous progress has been made during the last several years in investigating possible life and life sustaining conditions in our solar system. Mars has always been the focal point and the first object ever considered for this particular research.

www.exploremarsnow.org is a website which lets one know about Martian conditions and futuristic approaches regarding human landing on the Mars.

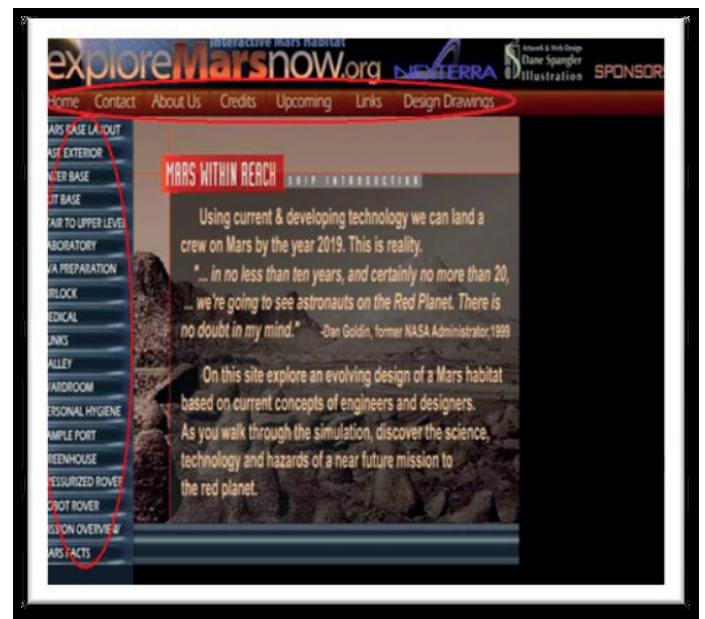


The pictures above show a comparison of a phase of the moon in which one (left) is a real picture taken with the help of a telescope whereas the other one (right) is generated by using this software by entering the time and date at which the picture was taken. Pictures of the moon generated in this way can be very useful during real time observation of the moon.

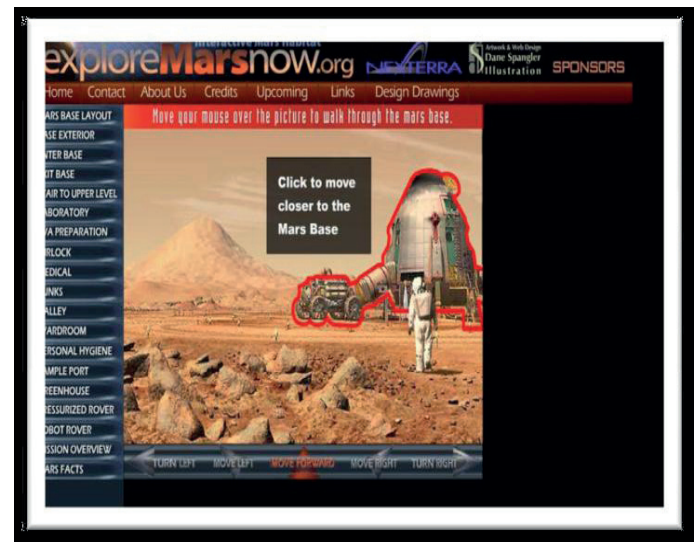


One of the most important aspects of this software which could be an important one for us is to know when a new moon will occur. We can create the conditions to see when the conjunction will occur and after how many hours it will be possible for us to look for the new moon in the sky.

This software is particularly good for educators and young students who want to know more about moon. Using this software will certainly enhance our understanding of moon.



On the left side there are buttons that give a complete overview of the futuristic space ship. At the upper side some other links may also be found that tell about the latest updates included on the website. From "Design Drawings" link you can download these interactive features on your own computer.

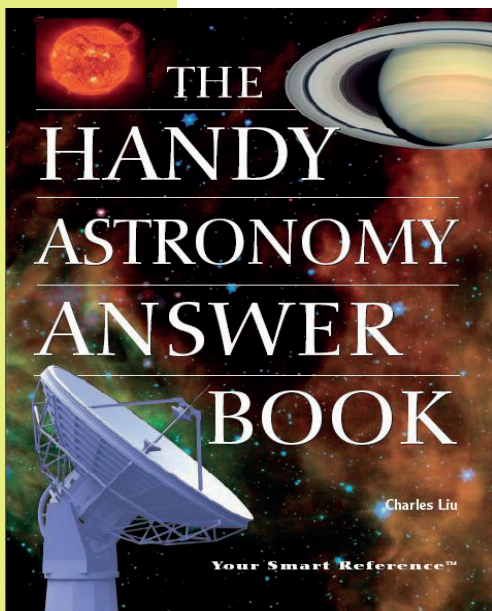


Book Review

"The Handy Astronomy book" written by Charles Lieu could be a good reference guide for those who want to know about the intriguing phenomenon of Astronomy. This book is written in a question and answer format and covers almost all aspect Astronomy and Astrophysics which we really want to know. It could be very useful resource book for teachers of Astronomy and Astrophysics.

This book starts with the fundamentals of Astronomy which are always very handy to know. Starting with the things humans have ever studied, the Universe itself, it provides very valuable information and facts about our Universe. Moving forward, it tells us about the galaxies, stars, solar system and about the Earth and its moon. The last few chapters cover information about human space program that has been running for over the last 50 years and how the recent past has advanced our understanding of the Universe and led us to the current state of knowledge. The book then explains about the current Astronomical advancements. The journey then starts again taking us back to the place where we find ourselves exploring our solar system to search for another terrestrial place to live in.

This book can be easily accessed on World Wide Web. Try searching by the name of the book and its author on Google.

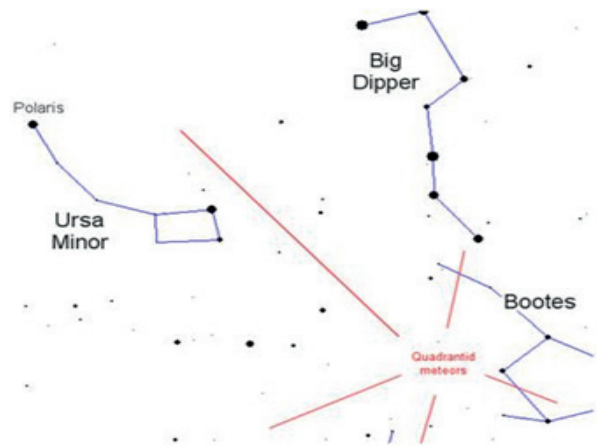


Sky this Month

The beginning of the year 2012 promises brilliant astronomical events in the sky. The month of January starts with a meteor shower, then the full moon, followed by two different planetary conjunctions, the new moon and finally the month will end up with an asteroid observation. All these events can be viewed without optical aid.

January 04, 2012 - Quadrantid

Quadrantid meteor shower, with the rate of 40 meteors per hour, would be visible from 1-5 January. The highest rate of meteors per hour took place in 1932 (80/ hour). The best time for observation is after midnight. Meteors radiate from the constellation Bootes, close to the North Star.

**January 09, 2012 - Full Moon**

Earth will be between the Sun and Moon, and therefore, the Moon will be fully illuminated as seen from Earth. This phase takes place from 07:30 UTC.

January 13, 2012

Mercury conjunct Pluto, both in Capricorn and Venus conjunct Neptune, both in the constellation of Aquarius.

January 23, 2012 - New Moon

Moon will be between Earth and Sun and will not be visible from Earth. This phase occurs at 07:39 UTC.

January 24, 2011

Moon will be lying in the constellation Aquarius as the new moon and the Venus will appear close to each other giving a fantastic view in the sky.

Sky this Month

January 31, 2012 - 433 Eros asteroid

It is a Near-Earth Asteroid (NEA), discovered in 1898. It was the first asteroid that was orbited by a probe in 2000. Such objects have orbits that may remain unchanged for a few hundred million years before the orbit is disturbed by gravitational interactions. It is a potential impactor which may produce a crater larger than the Chicxulub crater on Earth that is believed to be responsible for the extinction of the dinosaurs

Planets Observation

Venus will be in the Western sky. With an apparent brightness of -3.85 Venus can easily be distinguished in the direction two-third of south and close to West as brilliantly white object against the background of night sky.

Those having telescopes could have a chance to observe planet Neptune as well. Neptune has apparent brightness 7.95 which makes it harder to observe. Uranus having brightness 5.83 much less than Neptune can also be seen high up in the sky after sunset.

With brightness -2.56 Jupiter will be very prominent in the night sky and will be easily observable in Eastern direction. Jupiter has several moons but four of those are easily visible with aid of a small telescope. These moons include Io, Europa, Callisto and Ganymede. Ganymede is the largest of all of the moons of the solar system, even bigger than planet Mercury.

The apparent brightness of Mars makes it quite a bright object in the sky. It has grown increasingly prominent during December as its brightness increased four times.

Saturn stands well above the south Eastern horizon after late night at the start of the month. The ringed planet shines at apparent brightness 1.2 among the background stars of Virgo and fairly close to the brightest star of the constellation, Spica.

The innermost planet, Mercury stands with the Sun and would remain invisible for the whole month.

January 14, 2012

The waning gibbous moon comes close to planet Mars in Eastern sky at late night.

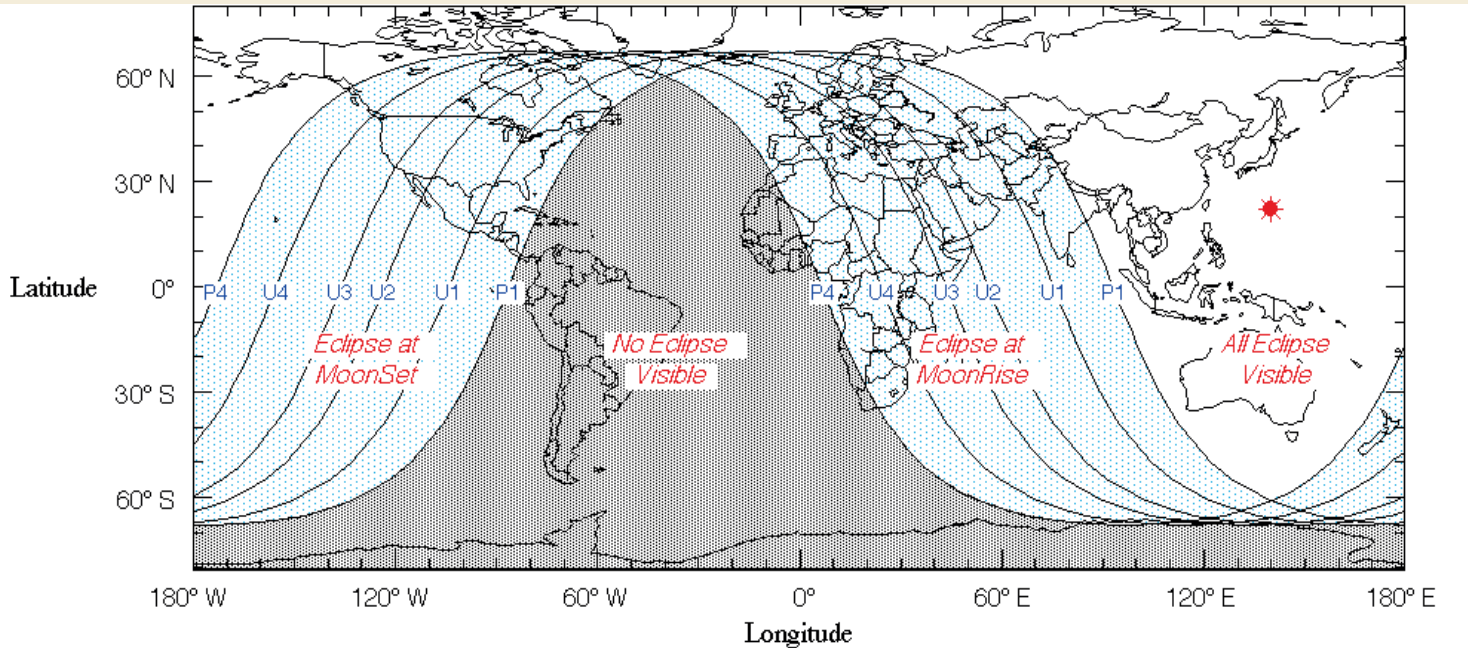


On 26th day of the month we would have new moon close to planet Venus. Looking somewhat high in the same direction one catches glimpses of another planet, Jupiter. This view will be visible in the southwestern sky. On 28th the moon will be in the middle of the two planets. On the 30th, moon in its first quarter will be near planet Jupiter in the sky.



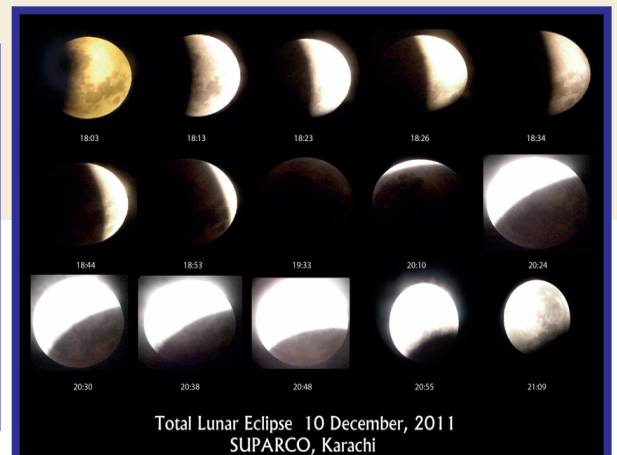
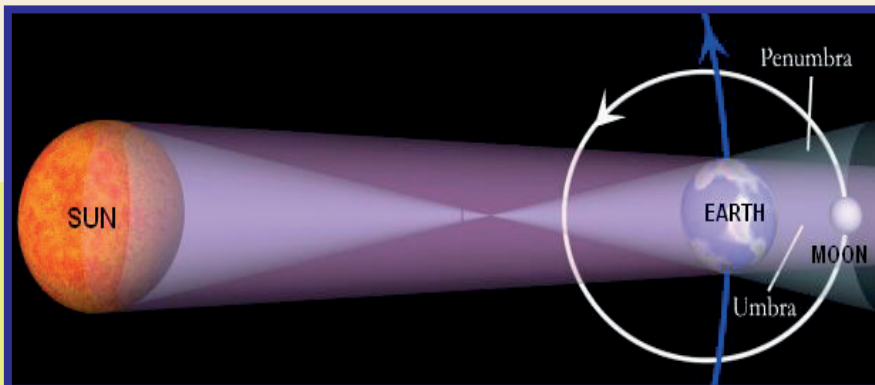
Total Lunar Eclipse

A total lunar eclipse took place on December 10th, 2011. It was the second of two total lunar eclipses which took place in 2011. The eclipse was visible from South-West Africa - Madagascar, the Middle East, Central Asia - Pakistan, India, Sri Lanka, Eastern China, Bangladesh, Western Myanmar, Western Thailand, Malaysia, Singapore, Western Indonesia, Antarctica, and Western edge of Australia. Eclipse at Moonrise was visible from South America from the tip of Chile, Eastern Argentina, and Eastern Brazil while the eclipse at Moon set was visible from central Thailand, Central Cambodia, South-West Vietnam, and Mid West Australia. Western Europe saw the moon rise totally eclipsed and covering a portion of the ninth-magnitude global cluster NGC 6401, Southern Africa and Australia saw the moon slip past the cluster untouched.



Source: NASA

SUPARCO observed the total lunar eclipse on 10th December 2011. The telescope used for the observation was Meade LX200 8" with 40mm and 32 mm eyepieces.



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