The chart above shows the night sky as it appears on 15th February at 21:00 (9 o'clock) in the evening Greenwich Mean Time (GMT). As the Earth orbits the Sun and we look out into space each night the stars will appear to have moved across the sky by a small amount. Every month Earth moves one twelfth of its circuit around the Sun, this amounts to 30 degrees each month. There are about 30 days in each month so each night the stars appear to move about 1 degree. The sky will therefore appear the same as shown on the chart above at 10 o'clock GMT at the beginning of the month and at 8 o'clock GMT at the end of the month. The stars also appear to move 15° (360° divided by 24) each hour from east to west, due to the Earth rotating once every 24 hours.

The centre of the chart will be the position in the sky directly overhead, called the Zenith. First we need to find some familiar objects so we can get our bearings. The Pole Star Polaris can be easily found by first finding the familiar shape of the Great Bear ‘Ursa Major’ that is also sometimes called the Plough or even the Big Dipper by the Americans. Ursa Major is visible throughout the year from Britain and is always quite easy to find. This month it is high in the
north east. Look for the distinctive saucepan shape, four stars forming the bowl and three stars forming the handle. Follow an imaginary line, up from the two stars in the bowl further from the handle. These will point the way to Polaris which will be to the north of overhead at about 50º above the northern horizon. Polaris is the only moderately bright star in a fairly empty patch of sky. When you have found Polaris turn completely around and you will be facing south. To use this chart, position yourself looking south and hold the chart above your eyes.

Planets observable in the night sky: Uranus and Jupiter.

EXPLORING THE NIGHT SKY THIS MONTH

The night sky looking south on 15th February

The chart above shows the night sky looking south at about 21:00 on 15th February. West is to the right and east to the left. The point in the sky directly overhead is known as the Zenith or Nadir and is shown on the chart at the upper centre of the chart. The curved brown line across the sky is the Ecliptic or Zodiac. This is the imaginary line along which the Sun, Moon and planets appear to move across the sky. The constellations through which the ecliptic passes are known as the constellations of the ‘Zodiac’.

Constellations through which the ecliptic passes are (west to east): Pisces (the Fishes) Aries (the Ram), Taurus (the Bull), Gemini (the Twins), Cancer (the Crab) and Leo (the Lion) rising over the eastern horizon.

The Milky Way can be seen reaching up from the bottom of the chart and passing through Puppis (on the southern horizon), Orion, Taurus Auriga and Cassiopeia. This is the galaxy in which we live and our Sun is just one of the 200 billion stars that reside in this large spiral galaxy.

The beautiful constellation of Orion is dominating the southern sky at this time of the year. Orion (with a little imagination) does look like the hunter after who it is named. The most obvious feature is the line of three stars that make up Orion’s belt. Below his belt we can see two bright stars called Saiph and Rigel that define the bottom of his ‘skirt like’ tunic. Above the belt are two stars Betelgeuse and Bellatrix that denote the position of his shoulders. Above and between his shoulders is a little group of stars that mark out the head. From his right shoulder (Bellatrix) he holds out a shield. From his left shoulder (Betelgeuse) a club is held above his head. In mythology Orion the hunter has two hunting dogs and his representation in the sky also has two dogs. By following the line of his belt down to the south east the bright star Sirius in the
constellation of Canis Major (the Large Dog). Following an imaginary line through Bellatrix and Betelgeuse to the east the star Procyon in the constellation of Canis Minor (the Little Dog) can be found.

Above Orion’s head is Taurus with the bright red star Aldebaran located at the centre of a cross shape of stars that defines Taurus. Up to the right is the beautiful Open Cluster M45 known as the Pleiades or the Seven Sisters. The cluster looks like a fuzzy patch of light at first glance with the ‘naked eye’ but after a good hard look, up to seven stars can be made out.

To the east (left) of Taurus is Gemini with the stars Pollux and Castor as the Twins. At the end of the line of stars leading from Castor is a lovely Open Cluster M35. It can be seen using binoculars as a small ‘fuzzy’ patch but a telescope will show it as a ball of stars.

There are another three open clusters known as M36, M37 and M38 in the neighbouring constellation of Auriga that appear to be almost in a line with M35.

To the east (left) of Taurus is the rather faint constellation of Cancer (the Crab). The faint upside down ‘Y’ shape of the recognised shape is quite difficult to make out especially in a light polluted sky. However it is worth searching out just to see the lovely open cluster M44 also called Praesepe or the Beehive Cluster. It is best seen using binoculars and does resemble an old traditional straw beehive with a swarm of bees around it.

To the east (left) of Cancer is the magnificent constellation of Leo the Lion. It is one of few constellations that do look a bit like what they are supposed to represent. The gas giant planet Jupiter is located in Leo this month.

The planet Uranus is moving towards the western horizon but will still be observable briefly from after sunset until about 21:00, see the night sky chart above.

The planets Venus, Saturn, Mars and Jupiter in the morning before sunrise

For those early rising observers most of the planets can be found in the southern sky before sunrise. Mercury is very close to the Sun and will be very difficult to see. It is actually just over the south eastern horizon on the chart above. Neptune is in conjunction with the Sun and is not observable.
Leo is quite distinctive with the ‘sickle’ shaped pattern of stars looking much like the head of the lion that Leo represents. In fact the traditional ‘stick figure’ shape of Leo as shown on the chart above does look rather like the lion’s body or the Sphinx in Egypt. The ‘sickle’ is also described as looking like a backwards question mark (?). Leo does look unexpectedly large in the sky and may be a little difficult to find for the first time but once found it is easy to recognise and find again.

All the stars of the ‘sickle’ are quite bright but the bottom (most southerly) is noticeably brighter. This star is referred to as α (Alpha) Leonis and by its proper name Regulus.
Regulus is a large blue/white star approximately 160 times brighter than our Sun and lying at a distance of 69 light years. When viewed through a small telescope a smaller companion star can be seen close by making Regulus a double star. Regulus sits virtually on the ecliptic line (the brown line shown on the chart above). This is the imaginary line along which the Sun, Moon and planets appear to move across the sky. Leo is therefore one of the twelve constellations of the Zodiac. Every eighteen years Regulus is ‘occulted’ by the Moon every month for a period of eighteen months. An occultation occurs when the Moon passes in front of the star so the star disappears behind the Moon. The last series of occultations occurred around 2007 and the next series will be around 2024. The Moon does however pass close to Regulus every month. This month it will pass below on the 21st / 22nd.

The star Algieba, located above Regulus on the ‘Sickle’, is a very nice double star about 75 light years from us. The two stars orbit each other around their common centre of gravity every 620 years and have magnitudes of +2.2 and +3.5 which give them a combined magnitude of +1.98.

Spring time is regarded as the season of galaxies and Leo is on the edge of a large group of galaxies. The main group is located in the neighbouring constellations of Virgo and Coma Berenices to the east (left) of Leo. However Leo does have five bright galaxies of its own, these are known as: M65, M66, M95, M96 and NGC 3628. They are marked in yellow on the chart above.

The galaxies on the previous chart are shown in more detail below. A 100mm to 150mm aperture telescope and a dark sky will be required to see the faint ‘misty’ outline of these galaxies. There is a third galaxy close to M65 and M66 called NGC3628 these three are known as the Leo Triplet.

Messier 65 (also known as NGC 3623) is a spiral galaxy. It is about 35 million light-years away in the constellation Leo. We see it slightly tilted away from us. It was also discovered by Charles Messier in 1780.

M65 showing a dust lane in the Spiral Arms. M66 showing the Spiral Arms at the end of a bar
Messier 66 (also known as NGC 3627) is a barred spiral galaxy. It is about 36 million light-years away in the constellation Leo. M66 has an apparent magnitude of 8.9. It was discovered by Charles Messier in 1780. M66 is about 95 thousand light-years across with striking dust lanes and bright star clusters along sweeping spiral arms.

There is another beautiful pair of galaxies located below Leo these are M95 and M96 and further to the west (right) of M65 and M66.

Galaxies M96 and M95 in Leo

Messier 95 (also known as M95 or NGC 3351) is a barred spiral galaxy. It is about 38 million light-years away in the constellation Leo.

Messier 96 (also known as M96 or NGC 3368) is a spiral galaxy. It is about 31 million light-years away in the constellation Leo. M95 and M96 were discovered by Pierre Méchain in 1781 and catalogued by Charles Messier four days later.
The planets and Comet Catalina looking to the south during February at 06:00

The chart above shows the locations of the planets at sunrise on 15th February at about 07:00 in the morning. The sky has been darkened to show the planets.

**MERCURY** is too close to the Sun will and is not visible in the brightening sky in the south east.

**VENUS** is moving eastwards towards the Sun which is just over the south eastern horizon on the chart above. Venus will rise over the eastern horizon at about 06:00 which is about an hour before the Sun. It is moving closer towards the Sun and into superior conjunction (on the far side of the Sun) on 6th June. Venus is therefore appearing to get smaller as it moves further away and around behind the Sun. However it will appear rounder as more of the sunlit side becomes visible to us. As a consequence Venus will remain at about the same brightness, around magnitude -4.

**MARS** rises in the south east at about 01:00 and will set over the western horizon at around 10:00. To the early rising observer Mars will be visible above the south eastern horizon from 02:00 until the Sun begins to rise. It will just about be observable in the south in the constellation of Virgo and will appear as a fairly bright reddish (more correctly orange) star. Mars is currently on the other side of the Sun from us and is therefore still a long way from Earth. It therefore looks very small at just 7.5 arc-seconds in diameter. A pair of binoculars will show Mars as distinctly orange looking extended (fuzzy) star like object.

A small telescope (100mm refractor or a 150mm reflector) using a high magnification eyepiece will reveal the small orange coloured disc. Some dark markings may be seen and even the white polar ice cap.

**Jupiter** has four large moons that can be seen using a good pair of 10x50 binoculars or a small telescope. The moons were first reported by Galileo Galilei in 1610 and are referred to as the Galilean Satellites (or moons) in his honour.

**Io** is the closest of the Galilean moons to Jupiter. It orbits 421,000 km from Jupiter and takes just 1.77 Earth days to circle the planet. Io is the second smallest 3,630 km in diameter which is a little larger than our Moon (3,476 km).

**Europa** is the smallest of Jupiter’s moons and is a little smaller than Io and our Moon at 3,138 km in diameter. It orbits Jupiter every 3.55 Earth days on an orbit of 670,900 km.

**Ganymede** is the largest moon in our Solar System with a diameter of 5,262 km. It orbits Jupiter at 1,070,000 km from the planet and takes 7.16 days.
Callisto is 4,800 km in diameter and takes 16.69 days to orbit Jupiter a distance of 1,880,000 km.

A composite image of Jupiter and its moons

The four Galilean moons can easily be seen using a modest telescope (90mm aperture). The two inner moons called Io and Europa appear to move quite quickly especially when they are positioned close to the planet.

SATURN rises at about 03:00 in the south east which is about four hours or so before the Sun. Saturn is now observable before sunrise but quite low in the south to south east. Its position being low in the sky will reduce the clarity of the view due the murk and turbulence close to the horizon. See the chart on the previous page.

Computer image of Saturn and its moons on 15th Feb

Saturn’s rings can be seen quite well using a 150mm reflector or a 100mm refracting telescope and a magnification of 150x or even 200x if conditions permit. Moon Titan is fairly easy to see along with 2 or 3 others.

URANUS rises in the east in the constellation of Pisces at about 08:50 and will be observable in the south west from about 17:00 until about 19:00 when it will be getting lower and close to the western horizon. Uranus will require a medium sized telescope to see as a blue disc. A 150mm reflector or a 100mm refractor and using a high magnification.

It will be best to wait until the sky is completely dark so the time for observing the planet will be limited. It will be best seen while it still a reasonable height above the horizon and positioned away from dirty turbulent air. Uranus will be just 3.4 arc-seconds in diameter so this why it will require a high magnification to see as a disc.

NEPTUNE will not be observable this month it will be lost in the evening twilight close to the western horizon.

THE SUN
The Sun rises at 07:30 at the beginning of the month and at 07:00 by the end of the month. It will be setting at 16:50 at the beginning and 17:35 by the end of the month. Sunspots and other activity on the Sun can be followed live and day to day by visiting the SOHO website at: http://sohowww.nascom.nasa.gov/.

**THE MOON PHASES IN FEBRUARY**

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Last Quarter will be on 1\textsuperscript{st} February  
New Moon will be on the 8\textsuperscript{th} February  
First Quarter will be on 15\textsuperscript{th} February  
Full Moon will be on 22\textsuperscript{nd} February
COMET C/2013 UQ4 CATALINA

A fairly bright comet known as: 2013 US10 (Catalina) climbed up from the south eastern horizon through December and could be seen in the early mornings before sunrise. It passed close to the bright red giant star Arcturus in the constellation of Boötes and went on to pass Ursa Minor and Polaris (the Pole Star) during January.

The comet passed perihelion (closest to the Sun) on 15th November and is now moving away from the Sun. By the end of December Catalina was at its closest to Earth (136 million kilometres). When it was closest to Arcturus it was at its easiest to find but once it was found it was easier to locate again. It carried on getting closer to Earth until 17th January when it was just 108 million kilometres from us. It then began its journey out to the outer reaches of the Solar System and has started to become fainter. Comet 2013 US10 (Catalina) is not visible to the naked eye but should be easy to find using a pair of 9 x 50 binoculars. The head of the comet (the Coma) is expected to be about half the diameter of the full moon possibly with a short faint tail that should be observable until the end of February.

![Chart showing the path of Comet 2013 US10 (Catalina) through February 2016](chart.png)

On the chart above the path of Catalina is marked in red with time markers showing the date and time. The dates start at 31st January and then marked from 5th February and all the marked times are 21:00 (9 o’clock in the evening). The comet will be moving towards the south from Ursa Minor through Camelopardalis and then on towards Perseus so it will be moving in a direction from the pole star towards directly overhead.