



WAS NEWS

Monthly Newsletter of the Worthing Astronomical Society
www.was.org.uk



Number 195

March 2006

ALMANAC

All times U.T. add one hour for B.S.T.

March / April LUNAR

Month	Date	Time	Rise	Set
March	6 th	20.16	08.56	01.52
	14 th	23.35	17.38	06.20
	22 nd	19.10	02.25	08.45
	29 th	10.15	05.44	18.53
April	5 th	12.01	09.21	02.48
	13 th	16.40	19.02	04.56
	21 st	03.28	02.44	10.20
	27 th	19.44	04.15	19.21

Month	Date	Time	Rise	Set
March	3 rd	19		
	5 th	13		
	7 th	01		
	8 th	19		
April	15 th	13		

April
Mars 4° S. of moon
Saturn at stationary point
Saturn 4° S. of moon
Mercury at greatest elongation W.28°
Jupiter 5° N. of moon

Minima of Algol
March 13th 03.42 16th 00.30 18th 21.18
April 2nd 05.24 5th 02.12 7th 23.06 25th 04.00

Lunar Occultation's

Times as at Old W.A.S. Observatory

Date	U.T.	S.A.O. No	Mag	Phase
March	h. m. s.			
16 th	22.43.25	139140	7.8	Reapp
17 th	02.40.31	139140	6.4	Reapp
18 th	01.09.52	158207	8.0	Reapp
19 th	02.18.33	158731	7.5	Reapp
20 th	02.44.50	183567	7.0	Reapp
20 th	02.44.52	183567	7.0	Reapp
31 st	20.32.55	93042	8.1	Diss
31 st	20.54.53	93052	7.5	Diss

Date	U.T.	S.A.O. No	Mag	Phase
April				
1 st	19.24.33	76005	9.2	Diss
1 st	20.20.12	76029	6.7	Diss
3 rd	20.22.48	77268	8.4	Diss
3 rd	20.30.09	77267	8.4	Diss
3 rd	21.23.49	77314	8.6	Diss
4 th	20.30.01	78483	8.0	Diss
4 th	20.37.56	78488	8.5	Diss
4 th	20.47.22	78480	7.6	Diss
4 th	20.50.37	78496	7.8	Diss
4 th	21.36.68	78524	5.0	Diss
4 th	23.19.55	78580	7.3	Diss
5 th	22.57.19	79495	8.2	Diss
6 th	19.37.54	80113	5.9	Diss
6 th	21.42.42.	80146	8.2	Diss
6 th	22.47.01	80173	8.4	Diss
6 th	23.57.56	80195	7.9	Diss
6 th	23.58.30	80196	7.7	Diss
8 th	21.02.13	98874	7.6	Diss
9 th	00.10.44	98914	7.9	Diss
9 th	20.36.34	99257	7.6	Diss
11 th	00.25.44	118891	7.9	Diss
12 th	00.03.17	038635	8.4	Diss
30 th	20.05.42	76998	6.9	Diss

The list above is a selection of about 23 % of the more easily observed evening events, there are lots more in the wee small hours for the insomniacs amongst us

Dave Wells

EARTH

Month	Date	Sunrise	Sunset
March	6 th	06.35	17.54
	14 th	06.17	18.03
	22 nd	05.59	18.16
	29 th	05.43	18.28
April	5 th	05.27	18.40
	13 th	05.09	18.53
	21 st	04.52	19.07
	27 th	04.40	19.17

PLANETS (As at March 22nd)

Planet	Constellation	Rises	Sets	Mag.
Mercury	Aquarius	05.22	16.37	+1.7
Unfavourable				
Venus	Aquarius	04.20	14.02	-4.4
Morning object in the south east				
Mars	Taurus	08.45	01.28	+1.1
Evening object in the south west				
Jupiter	Libra	22.24	07.49	-2.4
Morning object				
Saturn	Cancer	12.41	04.21	+0.1
Evening object in the south west				
Uranus	Aquarius	05.33	16.21	+5.9
Unfavourable				
Neptune	Capricornus	04.44	14.13	+8.0
Unfavourable				
Pluto	Serpens cauda	01.08	10.31	+13.9

Have you seen it yet?

PHENOMENA

Day	Hour	March
6 th	06	Mars 3° S. of moon
10 th	20	Saturn 4° S. of moon
12 th	03	Mercury in inferior conjunction
14 th	21	Penumbral lunar eclipse
19 th	11	Jupiter 5° N. of moon
25 th	07	Venus at greatest elongation W.47°
25 th	14	Mercury at stationary point
26 th	02	Venus 5° N. of moon
27 th	18	Mercury 2° N. of moon
29 th	10	Solar eclipse
29 th	13	Pluto at stationary point

Editors Note

A very chilly Good Morning to you....Junior WasNews Editor is teething at present so it's a big hello again to 4.00AM!

This of course affords me an excellent opportunity to finish the latest WAS News and stare at a crystal clear morning sky with just the hint of dawn, but at minus 3.0 degrees C that's as close as I'm getting!

I know, I know - what a weed....

Rob

Dates for your Diary

Eclipses

Alex Vincent

Penumbral lunar eclipse.

On the night of March 14/15 2006, there will be a total penumbral eclipse of the Moon. Eclipse begins at 21.21, mid eclipse is at 23.47 and eclipse ends at 02.13. All times are UT. Magnitude of the eclipse is 1.031. As this eclipse is totally eclipsed in the penumbra, there should be a good darkening on the Moon's southern limb.

One Saros earlier in 1988 this eclipse was given as a small umbral with a magnitude of only 0.003 according to Bao-lin Liu, but according to Meeus it was a total penumbral with a magnitude of 1.092. There is no much difference in the appearance of a very small umbral and a relatively large penumbral. Observations of the March 3 1988 eclipse however were inclusive in determining which type of eclipse it was.

Partial solar eclipse.

On March 29 2006 there will be a partial eclipse of the sun visible in Britain. The eclipse begins at about 09.45, mid eclipse is at 10.30 and eclipse ends at 11.22. Times are UT. From Worthing the eclipse will have a magnitude of about 0.300. It will be less the further north you are. Some WAS members are going to Libya and Turkey to see totality.

This eclipse is Saros 139 and on September 13 1699 it was an annular-total event, which was total in northern Scotland for a mere 20 seconds. On February 3 1916 this eclipse was a large partial from Britain and had sunset not intervened, Cardiff would have had totality. On July 16 2186 Saros 139 will produce a 7 min 29 sec totality in the mid Atlantic.

Secondary Minimum Of Ow Geminorum.

The long period eclipsing binary star "OW Geminorum" has a period of 3.4559 years (1258.63 days). At maximum it is of magnitude 8.2 and drops down to 10.0 at minimum. Its duration is 16 days. The primary star is almost totally eclipsed at minimum. Its last primary minimum was on June 12 2005 and its next occurs on November 24 2008.

The orbit of OW Gem is elongated and therefore secondary minima are to one side of the primary minima. The next secondary minimum is due on March 31 2006 +/- 6 days. The amplitude is much shallower, possibly only 0.1 magnitude, but it is possible that this star may have deep and shallow minima and that the latter could be as much as 0.5 magnitudes. Duration of secondary minima are 30 days and so observations should be made between March 16 and April 15 2006.

Reports

February Lecture Reviewed – Report by Peter Atkinson

Deep Space Photography From Wiltshire to Southern France

Philip Perkins

Philip began by outlining his agenda:

- Why Astrophotography?
- Equipment
- Prerequisites
- Image Medium
- Image Acquisition
- Image Processing & Display

1. His answer to the question Why Astrophotography? was given as "Making visible that which cannot otherwise be seen" – a reference to the fact that time lapse exposures can record objects which could not otherwise be seen by the human eye.
2. First Steps, using 35 mm film
 - Time exposure on a fixed tripod – showing firstly the Hale-Bopp comet over Stonehenge and secondly the five naked eye planets also over Stonehenge.

3. Tracked Wide Field
 - Time exposure using simple camera on equatorial mount Illustrated by slides of the Southern Milky Way, IC1805 in Cassiopeia and NGC 7000 the North American Nebula in Cygnus.
4. Film Processing - Development
 - What is needed to process such images?
 - Changing bag
 - C-41 development kit
 - Film scanner

Here the method used by Philip to develop film in the field was illustrated
5. Prerequisites for Deep Space - the platform
 - Focus on essentials - avoid gadgets
 - A Solid Equatorial Mount of high quality
 - The needs of astrophotography are much more demanding than visual work
 - German Equatorial Mounts are considered best for astrophotography.
 - Fork mounts can work well, but check the quality
 - forget field de-rotators
 - Why Polar Align?
 - The mount has to accurately emulate the motion of the earth, otherwise the image will suffer from field rotation
 - Polar Alignment Essentials
 - Polar alignment is purely a process of making two physical adjustments: azimuth and altitude, to align the mount's RA axis with the earth's polar axis
 - Nothing else matters - avoid confusion of iterative methods and hand controller interaction
 - Polar Alignment Methods
 - Iterative Method
 - Prevalent on modern mounts with Goto capability
 - Limited accuracy- dependent on pointing accuracy of the mount and orthogonality of the telescope optics with the mount
 - Can be quicker and apparently easier for the new user
 - Described for the LX200 here: <http://www.astrocruise.com/polarold.htm>
 - Drift Method
 - Highly accurate - the drift method determines intrinsic alignment accuracy of the RA Axis
6. Prerequisites for Deep Space - the optics
 - Photographic speed
 - The range of f/5 - f/8 works well for refractors and reflectors
 - Optics much slower than this require overly long exposure times
 - Optics much faster than this should be treated with respect
 - difficult to manufacture
 - off-axis aberrations
 - vignetting
 - focus very critical
 - Stability of Focus
 - Dew avoidance
 - Optics should be kept at or very slightly above ambient
 - Location
 - Transparency / Seeing / Dark Skies
 - Expose as near to the zenith as possible
7. Jetstream has a direct effect on seeing conditions.
 - Current forecast is at http://maps.wunderground.com/data/640x480/2xeu_jt.gif
 - Medium range forecast is at: http://weather.unisys.com/mrf/9panel/mrf_300_9panel_eur.html
8. Deep Space - camera at prime focus
 - Nikon F2
 - Meade 10" LX200
 - Lumicon GEG
 - Tracked by ST-4

Illustration: The Trifid Nebula M20
9. High Resolution Wide Field
 - Medium format photography on high quality refractor and mount
 - Astro-Physics 900 GTO mount
 - Astro-Physics 155 EDF with 4" focuser and field flattener
 - Pentax 67

Illustrations: M31 the Andromeda Nebula
M8 the Lagoon Nebula
M20 the Trifid Nebula
the Horsehead nebula

10. High Resolution CCD Imaging
- 12.5" f/9 Ritchey-Chretien
 - SBIG ST-8E CCD camera
- Illustrations included:
M101 Spiral Galaxy
The Helix Nebula
11. CCD Imaging : selection including
- Jupiter and Saturn
 - Mars
 - Lunar craters
 - Transit of Venus
 - Many excellent pictures of nebulae and galaxies

This was an absorbing presentation with many spectacular photographs and was very well received.

Philip's Website is at www.astrocruise.com

Notices

Changes To The Constitution

Due to the re-location of the Society's observatory, the following change needs to be made to the constitution:

5.4 Observatory

There shall be an Observatory sub committee appointed by the Executive Committee responsible for: -

- 5.4.1 Maintenance of the observatory telescope.
- 5.4.2 Supervising and instructing members in the use of the observatory telescope.
- 5.4.3 Preparing a timetable for any programme of work submitted by members.
- 5.4.4 Maintaining an Observatory log.
- 5.4.5 The Committee will make an annual allocation of money to the Observatory Fund to be spent at the discretion of the Observatory sub committee.
- 5.4.6 Carry out an annual Health and Safety inspection and prepare a report for the Committee.

Also the following underlined text requires deletion from the constitution:

7.5 Paragraph 2. Delete "and the observatory Curator."

Further amendments below also need to be made to remove any ambiguity and the following changes have been suggested – the alterations have been underlined.

4.1.4 Student membership for full time students.

7.2 The Meetings Secretary

7.3 The Business Secretary

11.3 maintained by the Membership Secretary.

The above changes will require voting on at the next (April 2006) monthly meeting and were announced at the 8th March meeting as required under Section 15 of the constitution.

Observatory

Graham Boots

Our Observatory is now operational at the new site, which is at Windlesham House School 7 miles north of Worthing in the parish of Washington, just off the A24.

The operation of the Observatory at the new site will be very different from when it was at the old Goring site. In exchange for a dark site and much improved night sky observing conditions we will now be sharing the Observatory with the school and working to form a partnership, encouraging the pupils in the science of astronomy.

Members wishing to use the observatory will be taken and shown the site and given training on how to use the facility in daylight that should take about one hour. Then further training will be giving on a clear evening. All then being well a key will be given. A sheet entitled 'Observatory and Telescope Guidance Information' will be given. Please telephone me on 01903 505346 so training sessions can be mutually arranged. Members wishing to use the Observatory will need transport, as public transport is not easily available to the new site. The toilet facility is in the cricket pavilion that is about five minutes walk away and there is an entry code.

Any members wishing to use the observatory will be given an Observatory card that shows their name, allocated number and car registration. These cards must be shown when asked for by school staff and can be left on display (like a paid for parking ticket) in the car to save being bothered if busy in the observatory.

The school will hold a list of member's Observatory cards details.

Articles

Recording your observations – Part 3

Ed Sampson

Webcams

Because the Observatory occupies a site on school grounds it is necessary for checks to be carried out by the Criminal Records Bureau upon all members on site who maybe in direct contact with pupils or children from any other source. Members not in contact will not be checked but they must still carry their current Observatory card with them at all times when on site.

Members will need to let me know their car registration, dates they intend to visit the Observatory along with approximate times of arriving and leaving so I can inform the Bursary before hand. Please also let me know the names of all members of the society in the observing group. Members observing groups will be limited to six members and a maximum of three vehicles. There is sufficient parking at the Observatory site for this number of vehicles. Because of these restrictions it will not be possible to invite visitors to the Observatory.

A curator no longer manages the Observatory. Instead a sub committee manages it. At present the committee consists of Graham Darlington, Peter Atkinson, Brian Halls and myself. For 35 years from 1969 to 2004 I organized various observing events but I am no longer wishing to arrange these activities and no replacement person or team has come forward. I am aware that for whatever reason some members will not be able to operate the telescope and observatory by them selves. I can only hope that sometime in the future this situation will change.

I am deeply grateful to those who took part in the relocation of our Observatory who names I list below.

Graham Darlington and his son Lawrence
Keith Peters and his son James
Peter Atkinson
Jan Young
Brian Halls
Dave Storey
Colin Knappitt
Eileen Boots

I also take this opportunity of thanking Windlesham House School for not only providing the site but also the direct involvement of the staff in connection with the building work, planning, insurance and the preparation of the legal documents.

The last two news letters have covered a simplistic nature of observation recording
Its time to step up the pace a bit with the next logical progression,

What do you need?

A telescope with the ability to track in the right ascension axis
A web cam
A laptop or PC

How does it work?

This principle only works on solar system objects.
A webcam has a small chip, this works much the same way as a high powered eyepiece.

The theory is simple, Record a mini movie of your target and then convert that movie into a single picture. You can break this down into 2 stages.



One of my first webcam attempts 1st may 04 10" Newtonian and toucam

Stage 1 Capturing

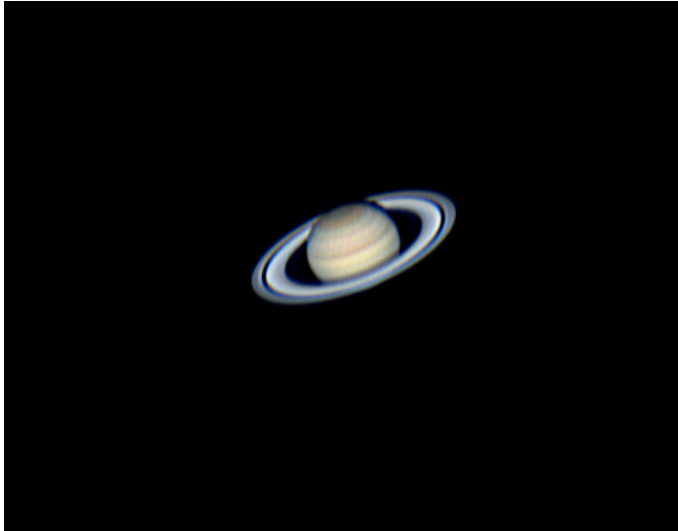
This involves Plugging in the webcam into the eyepiece holder, Focus the target, and then adjust the brightness levels until the target appears natural on the pc monitor. Next use your capture software to record an image (in frames) 500 to a 1000 frames are more than sufficient. That's it your PC will now have an AVI movie file stored on it.

Stage 2 processing

Fear not this is not as complex as it sounds. All you need to do is get some software that will convert your frames to a single image. Two free programmes that are popular are K3CCD tools (early versions) and Registax. The latter Registax is the more popular.

All you need to do with Registax is set all the check boxes to automatic and the work is done for you. There is only the simple task of tweaking the sharpness until you are happy.

Then save the image to your PC.



Saturn captured Feb 05 8'' LX90 and Toucam pro 2

Is there a more simplistic method?

Yes there is, the chaps at Meade have produced a Multi tasking imager called a LPI.

You still need a PC but instead of capturing a movie the LPI captures and processes the image while you watch. Just press the stop button when you are happy with the result. Personally I swear by this method for detailed lunar photography.



Craters and Mountain ranges on the moon Aug04 LPI and 8''SCT

an inexpensive step (around £30-90 if you shop around) but ultimately the best way ever to record our neighbors in the solar system. Just don't forget to label the time and date the image was captured.

If you require any further advice or would like to hear a highly detailed lecture on the subject just contact me on Starman01@btinternet.com I am always pleased to receive your images in any format based on any of the articles I have written.

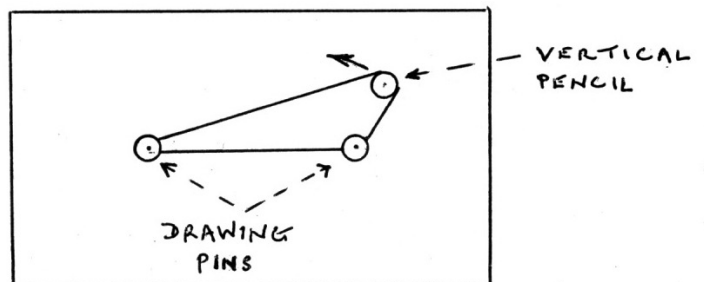
Elliptical Orbits

Colin Knappitt

Just about every body in the Universe seems to rotate or revolve (orbit another body) or do both. Up to the time of Johannes Kepler, revolution of heavenly bodies had to depict celestial perfection by taking place in exactly circular orbits. Unfortunately, this did not fit the observations; so Kepler came to postulate his three laws of planetary motion, the first of which says that planets orbit the Sun in elliptical paths with the Sun at one focus of the ellipse.

Everybody knows how to draw a circle using a pair of compasses but I guess that rather fewer know how to draw an ellipse in a simple way. All you need are two drawing pins stuck into a sheet of paper secured to a board. A loop of thread or thin string encircles the drawing pins and is held taut by a vertical pencil. With care and a bit of practice, you can circumscribe the pins to create a pleasing ellipse.

Drawing an Ellipse



The pin positions are the foci of the ellipse. When close together, the ellipse is pretty circular (low eccentricity) when far apart, the ellipse becomes long and thin (highly eccentric).

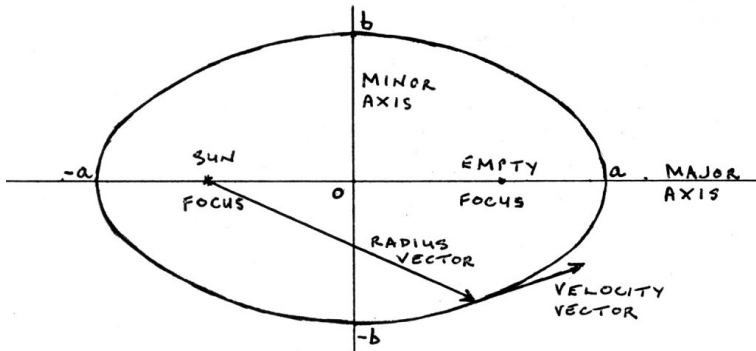
Any line through the centre of the ellipse is an axis but two axes are of particular importance: the longest possible axis or major axis and the shortest possible or minor axis. Half the major axis, the semi—major axis

has length a and the semi-minor axis has length b . If you know a and b , you can easily work out the eccentricity, e , of the ellipse - a measure of how much it deviates from being perfectly circular

$$e = \frac{\sqrt{a^2 - b^2}}{a}$$

If $b = a$, $e = 0$ and we have a circle. If $b = 0$, $e = 1$ and the ellipse becomes a straight line

A Very Eccentric Ellipse



Venus's orbit is the most nearly circular for Solar System planets ($e = 0.007$) while that of Pluto is the most eccentric ($e = 0.246$). Even so, Pluto's orbit would not obviously be non-circular to the eye. To look clearly elliptical, e probably needs to be at least 0.4, making b about 92% of a .

Orbital calculations for circular orbits are not too taxing, utilizing, as they do, Newton's law of gravity and the formula for centripetal force. Calculations on elliptical orbits are more challenging because the velocity vector is usually not perpendicular to the radius vector and both vary continuously in size as well as in direction. (Interestingly, while an ellipse has a simple area formula, πab , an exact formula for its circumference is not simple.)

The eccentricity of the Earth's orbit ($e = 0.017$) brings us about three million miles (4.8 million km) closer to the Sun in January than in July. During southern summers and northern winters, the Earth receives about 7% more solar radiation than in the opposite seasons and southern summers tend to be a bit hotter in consequence. Perihelion or closest approach to the Sun occurs around 3rd January and aphelion around 4th July. At these dates the Earth will be at opposite ends of the orbit's major axis but these times do not coincide with the dates of axial tilt towards the Sun at the solstices

Finally, why should bodies revolve in oval rather than perfectly circular orbits? Well, even if an orbit managed

to be exactly circular initially, collisions or gravitational interactions with third bodies (perturbations) are able to add energy to the orbiter, allowing it to "stray" further from its primary, stretching the circle into an ellipse. To get a feel for the size of perturbation forces on the Earth, Jupiter at opposition pulls on our planet with about 2×10^{18} newtons or the weight of about two hundred thousand cubic kilometres of water. If you find that worrying, let me reassure by saying that this force is "only" about one ten-thousandth part of the total weight of Earth's water and about one ten-thousandth part of the Sun's gravitational force holding the Earth in its orbit!

Messier Objects - Continued

Janet Young

The Messier Objects are so called because they were a list of fuzzy objects in the night sky compiled by Charles Messier (1730-1817) a French comet hunter. While hunting for comets he kept finding these faint and fuzzy objects, so decided to compile a catalogue of them to avoid them being mistaken for comets. He listed them as M or Messier followed by a number. Charles Messier did discover several comets, but it is for the Messier catalogue he is best remembered.

M41

Constellation: Canis Major

RA 06h 44m

Dec -20.42

Distance: 2,400 light years

Type: Galactic Cluster

NGC 2287

A bright Galactic Cluster observed by John Flamsteed before Messier catalogued it. Lies very close to Sirius.

M42

Constellation: Orion

RA 05h 32m

Dec -05.25

Distance: 1,000 light years

Type: Planetary Nebula

NGC 1976

One of the most famous planetary nebulas in the sky. Known as the Sword Handle of Orion, this nebula is the birthplace for young stars. Contains the famous collection of stars known as the Trapezium which are a group of young stars. The Orion Nebula is one of the youngest nebulas in the sky.

M43
Constellation: Orion
RA 05h 33m
Dec -05.18
Distance: 1000 light years
Type: Planetary Nebula
NGC 1982

Satellite nebula to M42.

M44
Constellation: Cancer
RA 08h 37m
Dec +19.52
Distance: 500 light years
Type: Galactic Cluster
NGC 2632

The Praesepe Star Cluster, probably better known as the Beehive Cluster. Is an open star cluster and is one of the clusters closest to the Earth. Small binoculars can resolve the stars easily in this cluster.

WAS Ad

Sussex Astronomy Centre

For all your astronomy needs
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Large range of accessories, software, books etc
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Telephone 01903-247317
Email worthingastronomy@tiscali.co.uk
Web Site. www.sussex-astronomy-centre.co.uk
Ask for Paul Farmer (Club Member)

WAS News News

Telescopes 'worthless' by 2050

Paul Rincon - BBC News science reporter

Ground-based astronomy could be impossible in 40 years because of pollution from aircraft exhaust trails and climate change, an expert says.

Aircraft condensation trails - known as contrails - can dissipate, becoming indistinguishable from other clouds.

If trends in cheap air travel continue, says Professor Gerry Gilmore, the era of ground astronomy may come to an end much earlier than most had predicted.

Aircraft along with climate change will contribute to increased cloud cover.

The timescale is based on extrapolating air traffic growth figures. The BBC has learned that the calculations were made as part of preparations for an upcoming observatory project called the Extremely Large Telescope (ELT).

The ELT is intended to probe planets around nearby stars and look for extremely faint objects in the Universe.

Vision impaired

"It is already clear that the lifetime of large ground-based telescopes is finite and is set by global warming," Professor Gilmore, from Cambridge's Institute of Astronomy, told reporters recently in London.

"There are two factors. Climate change is increasing the amount of cloud cover globally. The second factor is cheap air travel.

"You get these contrails from the jets. The rate at which they're expanding in terms of their fractional cover of the stratosphere is so large that if predictions are right, in 40 years it won't be worth having telescopes on Earth anymore - it's that soon.

"You either give up your cheap trips to Majorca, or you give up astronomy. You can't do both."

Climate change is also expected to increase the amount of water vapour in the atmosphere through evaporation, contributing to overall cloudiness. The increase in cloud cover would affect both optical and infrared astronomy, which would have to be carried out from space.

Radio astronomy would continue to be ground-based.

Identical appearance

Contrails often present little more than a transient nuisance to astronomers; but when certain weather conditions prevail, they can break to look like natural clouds.

Holger Pederson, an astronomer at the Nils Bohr Institute in Copenhagen, Denmark, who has studied contrails, explained: "You can recognise the jet contrails when they are young. So you can stop your observation and then restart as soon as the contrail has passed the field of view of the telescope.

Worse is when the contrails last for hours. Then they degrade into something you can hardly distinguish from natural cirrus clouds."

Dr Hermann Mannstein, of the German Aerospace Centre (DLR), agreed astronomy would become more difficult, but said there was an upper limit on the contrail problem.

Contrails form where the air is highly saturated with ice particles, but will not form if the air is too dry.

"You don't clog the whole sky. You have a certain proportion of the sky, in time and space, that can be affected," he said.

Restriction zones

But Professor Gilmore countered: "There are places where you get relatively fewer clouds - that's where we put our telescopes - but there is nowhere on Earth that you don't get clouds and aeroplanes.

"Already, around the major observatories, there are local laws to prevent aeroplanes flying within quite large distances," he told the BBC News website.

Professor Gilmore said sites where observatories are located, such as the Canary Islands, Hawaii and South America, are also attractive holiday destinations, and likely centres for future air traffic growth.

He added that the projections did not factor in the effects of global warming, which are likely to exacerbate the problem.

Mr Pederson said too few satellites built up image data on how contrails evolved over time.

"We may underestimate the amount of contrail-derived cirrus clouds," he said.

"We know from satellite imagery that clusters of contrails can last for two days. If carried by the upper jet stream through the troposphere, they can travel hundreds of kilometres."

There are several concepts under consideration for the European ELT, but the preferred design seems to be converging on a telescope that is some 30-60m in diameter.

A location has not been decided; but, despite the difficulties of access, Antarctica may become an option. The icy region has relatively clear skies, with a climate that is somewhat separate from other continents, and, crucially, is free from overflying commercial jets.

Hubble's largest galaxy portrait showcases Pinwheel

Hubble European Space Agency news release



This new Hubble image reveals the gigantic Pinwheel Galaxy, one of the best known examples of "grand design spirals," and its supergiant star-forming regions in unprecedented detail. The image is the largest and most detailed photo of a spiral galaxy ever released. Credit: European Space Agency & NASA [Download larger image version here](#)

Giant galaxies weren't assembled in a day. Neither was this Hubble Space Telescope image of the face-on spiral galaxy Messier 101 (the Pinwheel Galaxy). The image is the largest and most detailed photo of a spiral galaxy ever released from Hubble. The galaxy's portrait is actually composed from 51 individual Hubble exposures, in addition to elements from images from ground-based photos. The final composite image measures a whopping 16,000 by 12,000 pixels.

The Hubble observations that went into assembling this image composite were retrieved from the Hubble archive and were originally acquired for a range of Hubble projects: determining the expansion rate of the universe; studying the formation of star clusters in giant starbirth regions; finding the stars responsible for intense X-ray emission and discovering blue supergiant stars. As an example of the many treasures hiding in this immense image, a group led by K.D. Kuntz (Johns Hopkins University and NASA) recently catalogued nearly 3000 previously undetected star clusters in it.

The giant spiral disk of stars, dust and gas is 170,000 light-years across or nearly twice the diameter of our Milky Way. The galaxy is estimated to contain at least one trillion stars. Approximately 100 billion of these stars alone might be like our Sun in terms of temperature and lifetime. Hubble's high resolution reveals millions of the galaxy's individual stars in this image.

Diary

8th March	Orbital Oddities - Strange Goings-on with 3 or more bodies - James Fradgley
12th April	Members Contributions
10th May	Our Vital Moon - Robin Gorman
14th June	Peculiar Stars & Lick Observatory Visit in California - Dr Mike Dworetzky F.R.A.S., University College London
12th July	Venus Express - Andrew Coates
13th September	Sir Arthur Stanley Eddington -Mark Hurn
11th October	AGM & Members Contributions
8th November	Campaign for Dark Skies – Update - Bob Mizon
13th December	TBA

All Meetings (**bold**) are held on the second Wednesday of every month unless otherwise stated, at Heene Church Rooms, Worthing at 7.30 p.m. Meetings include the latest astronomical work, reports and, photographs by members. For further information find us on the Internet at www.was.org.uk or email: chairman@was.org.uk

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Note to Contributors

Contributions & Correspondence for the **April** issue of WAS NEWS should be with the Editor by **April 1st**. All material for inclusion should be sent to the Editor.

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