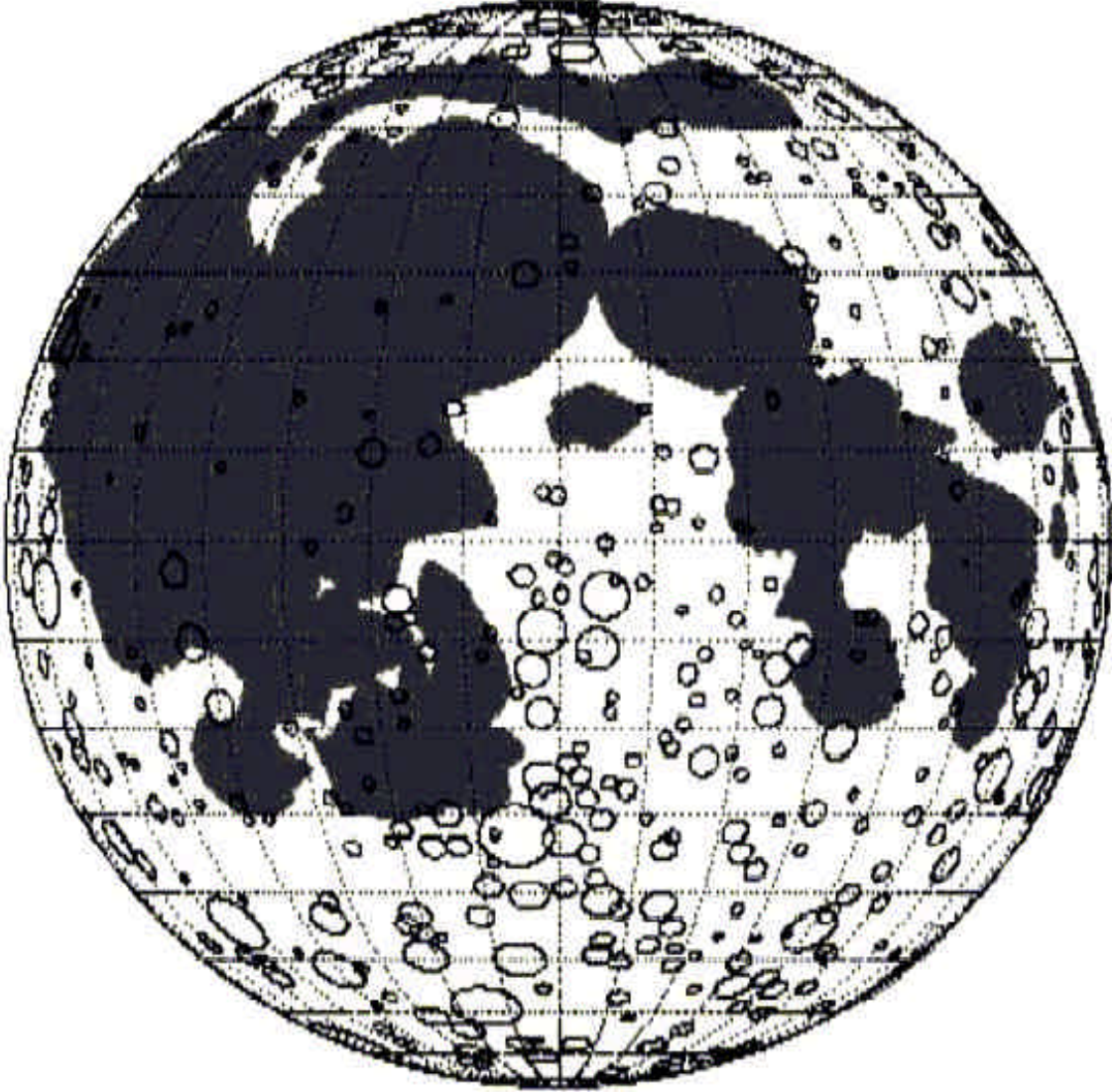


OBSERVATION FIELD GUIDE



FOR the TOTAL LUNAR ECLIPSE OF FEBRUARY 21th, 2008

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USE OF THIS OBSERVATION FIELD GUIDE

This Field Guide has been designed to follow all the phenomena expected to happen during the observation of the eclipse event. With this guide we try to present a variety of observation activities to those amateurs who answered our invitation to observe coordinately the Total Lunar Eclipse of February 21th, 2008. For this purpose, the guide puts forward all the practical information required to perform the activities proposed in the Manual for the Observation, available only in Spanish in <http://www.cielosur.com/eclipse-luna-febrero20y21-2008-guia-observacion.php>. Here, all the descriptive information has been scrapped in order to produce a handy operational resource.

With this idea in mind, all the information has been combined following the eclipse timeline. Thus, those observers interested in taking part in all the activities must follow all the timeline steps to cover sequentially all the observation events. In order to reference activities that are very different, some steps have been unified or mixed. Those observers interested only in some of the activities can follow the timeline skipping the steps that are not applicable. In order to discriminate the different activities, each step is referenced with their associated activity number.

A priori, this Field Guide is addressed to observers familiarized with the phenomena, with the astronomical equipment and its operation and with the associated problems. However, we believe that the Manual for the Observation can be used by everybody interested, as a help to understand in detail the contents of this Observation Field Guide.

Following, the content of the eight proposed activities is compiled together with the required table of data. The same order, table and figure numbers used in the Manual for the Observation has been maintained here.

The table XVI shows the whole timeline of the activities to be performed in a chronological way. Therefore, they are mixed. It can convince someone without experience, despite that the activities are not exceptionally difficult (apart from monitoring the Lunar Transient Phenomena), they involve certain degree of discipline and serious work during a extended time periode. As in other real time tasks, both aspects are present, high dynamic and stressed moments (partial eclipse phases) and quiet and relaxed moments (eclipse totality). It must be considered in order to don't miss anything previously intended.

ADDITIONAL NOTE ON TIMING: In all the steps of the activities, a blank rectangle has been introduced to write in the measured times. It is recommended to use a GPS as a time reference provider for the Universal Time. So, all the observers can be synchronised within one second. If a chronometer is used, please, verify that it is synchronised within one second with a GPS or your national broadcasted time signals.

It is quite difficult to record the time of an event during its telescopic observation. In order to deal with this inconvenient, it is recommended to use a voice recorder analogic or digital (PC, mobile, etc). Shortly before the event, a sound mark with the identification and the time of the event to come is recorded. In the exact moment of the event, another sound mark is recorded. Later, the interval between the two marks can be measured with an accuracy better than 1 second.

A chronometer with alarm is recommended also to have some device to warning that a specific observation moment is coming up.

PROPOSED ACTIVITIES

1st activity: Timing of the ocultation of Regulus.

NOTE: Only for SouthAmerica.

TABLE IX
REGULUS OCULTATION VISIBILITY FROM SOUTH AMERICA

City	Ocult. Regulus		Emers. Regulus	
	T. U.	Elev.	T. U.	Elev.
Asunción (Guatemala)	-	-	-	-
Asunción (Forguay)	22:22:15	0,3°	23:21:00	13°
Bogotá	-	-	-	-
Brasilia	22:13:45	9,6°	23:18:00	24°
Buenos Aires	22:43:30	1,5°	23:29:30	12°
Caracas	-	-	-	-
Kingston	-	-	-	-
La Habana	-	-	-	-
La Paz	22:09:30	-10°	23:05:00	12°
Lima	-	-	-	-
Managua	-	-	-	-
México	-	-	-	-
MonteVIDEO	22:46:15	4°	23:29:45	12°
Panamá	-	-	-	-
Puerto Príncipe	-	-	-	-
Quito	-	-	-	-
San José of Costa Rica	-	-	-	-
San Juan of Pto. Rico	-	-	-	-
San Salvador	-	-	-	-
Santiago of Chile	22:35:50	-9,5°	19:22:30	0,1°
Santo Domingo	-	-	-	-
Tegucigalpa	-	-	-	-

2nd activity: Lunar Parallax measurement.

TABLE X
LUNAR HEIGHT DURING THE LUNAR PARALAX MEASUREMENT

Asunción (Guatemala)	13,6°	La Paz	28,0°	San José Costa Rica	19,1°
Asunción (Forguay)	32,6°	Lima	21,4°	San Juan Puerto Rico	37,4°
Bogotá	28,3°	Managua	17,5°	San Salvador	14,8°
Brasilia	45,5	México	06,1°	Santiago	18,4°
Buenos Aires	26,7°	MonteVIDEO	27,6°	S. Domingo	33,8°
Caracas	36,3°	Panamá	23,6°	Tegucigalpa	16,8°
Kingston	27,1°	Puerto Príncipe	31,4°		
La Habana	22,1°	Quito	23,0°		

3rd activity: Video Sequence

4th activity: Timing of the Eclipse Contacts

TABLE IV
TIMING OF THE ECLIPSE CONTACTS

Contact	Universal Time
First Penumbra Contact	00:36:18
First Umbra Contact	01:43:00
Start of Totality	03:00:48
Eclipse Maximum	03:25:42
End of Totality	03:50:36
Last Umbra Contact	05:08:24
Lastst Penumbra Contact	06:15:18

TABLE XI
DANJON SCALE

Category	Lunar Aspect
0	Very Dark. Nearly invisible after the start of totality.
1	Presents a gray or brown colour with very few visible features.
2	Presents a red-brown colour, with the borders brigther than the center
3	Presents a brick red colour witha yellowish border.
4	Presents a brilliant orange colour with a possible bluish border.

5th activity: Timing the Lunar features immersion on the Earth Shadow

TABLE XII
IMMERSION AND EMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

Immersion	Name	Emersion	Name
01:48	Grimaldi	04:06	Grimaldi
01:49	Aristarchus	04:07	Billy
01:54	Kepler	04:07	Tycho
01:56	Billy	04:09	Campanus
02:00	PYTHEAS	04:19	Kepler
02:02	Copernicus	04:22	Aristarchus
02:03	Timocharis	04:27	Copernicus
02:05	Plato	04:30	Pytheas
02:11	Campanus	04:36	Timocharis
02:14	Aristoteles	04:42	Dionysius
02:15	Eudoxus	04:42	Manilius
02:16	Manilius	04:44	Plato
02:20	Menelaus	04:46	Menelaus
02:24	Dionysius	04:47	Goclenius
02:24	Plinius	04:49	Plinius
02:27	Tycho	04:51	Eudoxus
02:34	Proclus	04:52	Aristoteles
02:38	Taruntius	04:53	Langrenus
02:42	Goclenius	04:55	Taruntius
02:48	Langrenus	04:59	Proclus

6th activity: Timing of ocultation of stars by the Moon

TABLE XIII
OCULTATION OF STARS BY THE MOON

MADRID					BUENOS AIRES				
U.T.	Nº - Star	Mag	O/E	D	U.T.	Nº - Star	Mag	O/E	D
					01:59:30	1-GSC 840 185	8,6	O	1
					02:19:15	1-GSC 840 185	8,6	E	1
02:26:10	2-GSC 833 1091	10	O	1					
					03:00:30	3-GSC 840 963	10	E	1
					03:02:15	4-GSC 840 869	9,5	E	1
					03:08:30	5-GSC 840 944	10	E	1
03:27:10	2-GSC 833 1091	10	E	1					
03:30:30	6-GSC 837 442	9,9	O	1					
03:55:30	7-GSC 837 82	9,8	O	3					
04:12:45	8-GSC 837 606	9,4	O	3					
04:24:45	9-GSC 837 40	8,8	O	3					
04:32:50	6-GSC 837 442	9,9	E	1					
04:37:25	7-GSC 837 82	9,8	E	2					
04:50:30	8-GSC 837 606	9,4	E	3					
04:56:30	10-GSC 837 143	9,8	R	3					

7th activity: Timing of Lunar features Emersion from the Earth Shadow

See TABLE XII

8th activity: Monitoring of Lunar Transient Phenomena

TABLE XIV
LUNAR FORMATIONS ACTIVE DURING ECLIPSES

Lunar Formation	Date	TLP
Plato	10 DIC 1685	Soil Redening
	17 AGO 1970	Pulsation
Aristarchus	05 DIC 1881	White Spot over orange surface
	12 JUL 1889	Brightning surrounded by the penumbra
	23 MAY 1891	Brightening of circus and associated area
	27 DIC 1898	Brightening
	19 FEB 1905	Bright White Spot
	04 AGO 1906	Brightening
	07 OCT 1949	Brightening
	25 FEB 1964	Brightening
Tycho	04 OCT 1884	Bright White Spot lika 2nd mag. Star
	08 ENE 1898	Darkening of all the area
	15 AGO 1905	Brightening
	01 ABR 1912	Bright white spot affecting shape
	07 NOV 1919	Only visible the radiation crossing Longomontanus.
Proclus	03 JUL 1898	Redening
Dionysius	08 ENE 1917	Bright spot in the umbra inmersión
Grimaldi	25 JUN 1964	White trail in the western Limb

TABLE XV
ELGER SCALE OF ALBEDOS

Albedo	Toponym
0,0	Dark Shadows.
1,0	Darker Points of Grimaldi and Riccioli.
1,5	Interior of Boscovich, Billy and Zupus.
2,0	Soils of Endymion, Le Monier, Julius Caesar, Crüger and Fourier.
2,5	Interior of Azout, Vitruvius, Pitatus, Hippalus and Marius.
3,0	Interior of Taruntius, Plinius, Teophilus, Parrot, Flamsteed and Mercator.
3,5	Interior of Hansen, Archimedes and Mersenius.
4,0	Interior of Manilius, Ptolemaeus and Guericke.
4,5	Surface around Aristillus and Sinus Medii.
5,0	Walls of Arago, Lansberg, Bullialdus and surfaces surrounding Kepler and Aristarchus.
5,5	Walls of Picard, Timocharis and radiations of Copernicus.
6,0	Walls of Macrobius, Kant, Bessel, Mösting and Flamsteed.
6,5	Walls of Langrenus and Theaetetus
7,0	Soils of Theon, Ariadaeus, Bode B, Wichmann and Kepler.
7,5	Soils of Uckert, Hortensius and Euclides.
8,0	Walls of Godin, Bode and Copernicus.
8,5	Walls of Proclus, Bode A and Hipparchus C.
9,0	Soil of Censorinus, Dionysius, Mösting A and Mersenius B and C.
9,5	Interior of Aristarchus and La Pérouse.
10,0	Central Peak of Aristarchus.

TABLE XVI
TIMELINE of EVENTS

U.T.	EVENT	O/E	HEMIS	FIGURE	TELESCOPE	CAMERA
22:43:30	Regulus	O	S	5	Whatever	DSLR
23:29:30	Regulus	E	S	6	Whatever	DSLR
00:36:18	First Contact	-	N-S	160-161	Medium Focal	DSLR
01:00:00	Parallax Measurement	-	N-S	7-8	Short Focal	DSLR
01:40:00	VIDEO Start	-	N-S	-	Medium Focal	DSLR
01:43:00	Second Contact	-	N-S	162-163	Medium Focal	DSLR
01:48:00	GRIMALDI	O	N-S	14-15	Large Aperture	DSLR
01:49:00	ARISTARCHUS	O	N-S	16-17	Large Aperture	DSLR
01:54:00	KEPLER	O	N-S	18-19	Large Aperture	DSLR
01:56:00	BILLY	O	N-S	20-21	Large Aperture	DSLR
01:59:30	GSC 840 185 (8,6)	O	S	52	Large Aperture	DSLR
02:00:00	PYTHEAS	O	N-S	22-23	Large Aperture	DSLR
02:02:00	COPERNICUS	O	N-S	24-25	Large Aperture	DSLR
02:03:00	TIMOCHARIS	O	N-S	26-27	Large Aperture	DSLR
02:05:00	PLATO	O	N-S	28-29	Large Aperture	DSLR
02:11:00	CAMPANUS	O	N-S	30-31	Large Aperture	DSLR
02:14:00	ARISTOTELES	O	N-S	32-33	Large Aperture	DSLR
02:15:00	EUDOXUS	O	N-S	34-35	Large Aperture	DSLR
02:16:00	MANILIUS	O	N-S	36-37	Large Aperture	DSLR
02:19:15	GSC 840 185 (8,6)	E	S	53	Large Aperture	DSLR
02:20:00	MENELAUS	O	N-S	38-39	Large Aperture	DSLR
02:24:00	DIONYSIUS-PLINIUS	O	N-S	40-41	Large Aperture	DSLR
02:26:10	GSC 833 1091 (10)	O	N	57	Large Aperture	DSLR
02:27:00	TYCHO	O	N-S	42-43	Large Aperture	DSLR
02:34:00	PROCLUS	O	N-S	44-45	Large Aperture	DSLR
02:38:00	TARUNTIUS	O	N-S	46-47	Large Aperture	DSLR
02:42:00	GOCLNIUS	O	N-S	48-49	Large Aperture	DSLR
02:48:00	LANGRENUS	O	N-S	50-51	Large Aperture	DSLR
03:00:30	GSC 840 963 (10)	E	S	54	Large Aperture	DSLR
03:00:48	Third Contact	-	N-S	164-165	Medium Focal	DSLR
03:02:15	GSC 840 869 (9,5)	E	S	55	Large Aperture	DSLR
03:08:30	GSC 840 944 (10)	E	S	56	Large Aperture	DSLR
03:10:00	LTP Monitoring	-	N-S	-	Large Aperture	Web
03:25:42	Eclipse Maximum	-	N-S	166-167	Medium Focal	DSLR

(to be continued)

TIMELINE of EVENTS

(continuation)

U.T	EVENT	O/E	HEM	FIGURE	TELESCOPE	CAMERA
03:25:42	Eclipse Maximum	-	N-S	166-167	Binoculars	DSLR
03:27:10	GSC 833 1091 (10)	E	N	58	Large Aperture	DSLR
03:30:30	GSC 837 442 (9,9)	O	N	59	Large Aperture	DSLR
03:50:36	Fourth Contact		N-S	168-169	Medium Focal	DSLR
03:55:30	GSC 837 82 (9,8)	O	N	60	Large Aperture	DSLR
04:06:00	GRIMALDI	E	N-S	66-67	Large Aperture	DSLR
04:07:00	BILLY-TYCHO	E	N-S	68-69	Large Aperture	DSLR
04:09:00	CAMPANUS	E	N-S	70-71	Large Aperture	DSLR
04:12:45	GSC 837 606 (9,4)	O	N	61	Large Aperture	DSLR
04:19:00	KEPLER	E	N-S	72-73	Large Aperture	DSLR
04:22:00	ARISTARCHUS	E	N-S	74-75	Large Aperture	DSLR
04:24:45	GSC 837 40 (9,8)	O	N	62	Large Aperture	DSLR
04:27:00	COPERNICUS	E	N-S	76-77	Large Aperture	DSLR
04:30:00	PYTHEAS	E	N-S	78-79	Large Aperture	DSLR
04:32:50	GSC 837 442 (9,9)	E	N	63	Large Aperture	DSLR
04:36:00	TIMOCHARIS	E	N-S	80-81	Large Aperture	DSLR
04:37:25	GSC 837 82 (9,8)	E	N	64	Large Aperture	DSLR
04:42:00	DIONYSIUS-MANILIUS	E	N-S	82-83	Large Aperture	DSLR
04:44:00	PLATO	E	N-S	84-85	Large Aperture	DSLR
04:46:00	MENELAUS	E	N-S	86-87	Large Aperture	DSLR
04:47:00	GOCLINIUS	E	N-S	88-89	Large Aperture	DSLR
04:49:00	PLINIUS	E	N-S	90-91	Large Aperture	DSLR
04:50:30	GSC 837 606 (9,4)	E	N	65	Large Aperture	DSLR
04:51:00	EUDOXUS	E	N-S	92-93	Large Aperture	DSLR
04:52:00	ARISTOTELES	E	N-S	94-95	Large Aperture	DSLR
04:53:00	LANGRENUS	E	N-S	96-97	Large Aperture	DSLR
04:55:00	TARUNTIUS	E	N-S	98-99	Large Aperture	DSLR
04:56:30	GSC 837 143 (9,8)	R	N	66	Large Aperture	DSLR
04:59:00	PROCLUS	E	N-S	100-101	Large Aperture	DSLR
05:08:24	Fifth Contact	-	N-S	170-171	Medium Focal	DSLR
05:10:00	LTP Monitoring	-	N-S	119	Large Aperture	Web
05:30:00	LTP Monitoring	-	N-S	119	Large Aperture	Web
06:15:18	Sixth Contact. Final.	-	N-S	172-173	Medium Focal	DSLR

TIMING OF THE REGULUS OCULTATION BY THE MOON

NOTE: Only for South America.

Proposed equipment:

Large Aperture Telescope Médium Focal Telescope DSLR Camera PC GPS Chronometer with alarm Voice Recorder
--

ESTIMATED TIME: 22:43:30

FIRST ACTIVITY STEP BY STEP

CONFIGURATION:

Large Aperture Telescope with short eyepiece (250x) and polarized filters

Medium Focal Length Telescope with a DSLR camera attached to the primary focus: Frame the whole Moon disk.

DSLR Camera controlled by a PC.

ACTIVITY:

BEFORE THE FIRST CONTACT WITH REGULUS:

22:30:00 Verify the focus of the camera. Mars and Sirius can be two good targets before the moonrise.

22:32:45 Moonrise in Buenos Aires.

22:40:00 Visual Observation of the star with the Large Aperture Telescope with high magnification. Move the Moon out of the field of view to avoid observer blindness. Once the moon is out, take off the polarizers.

22:42:00 Record activity mark in the voice recorder (if available). ("Immersion of Regulus").

Figure 5. (Zenith up).

22:43:30 During the contact of the star with the western limb of the Moon, shot a sequence of fast pictures with the camera attached to the medium focal telescope until the star is completely disappeared.

22:43:30 Record the time of the immersion. Record signal in the voice recorder (if available).

22:44:00 Set chronometer alarm at 23:28:00, two minutes before the Emersion of Regulus.

Interval until next step..... 43,5 minutes.

Simulation of the occultation of Regulus seen from Buenos Aires.

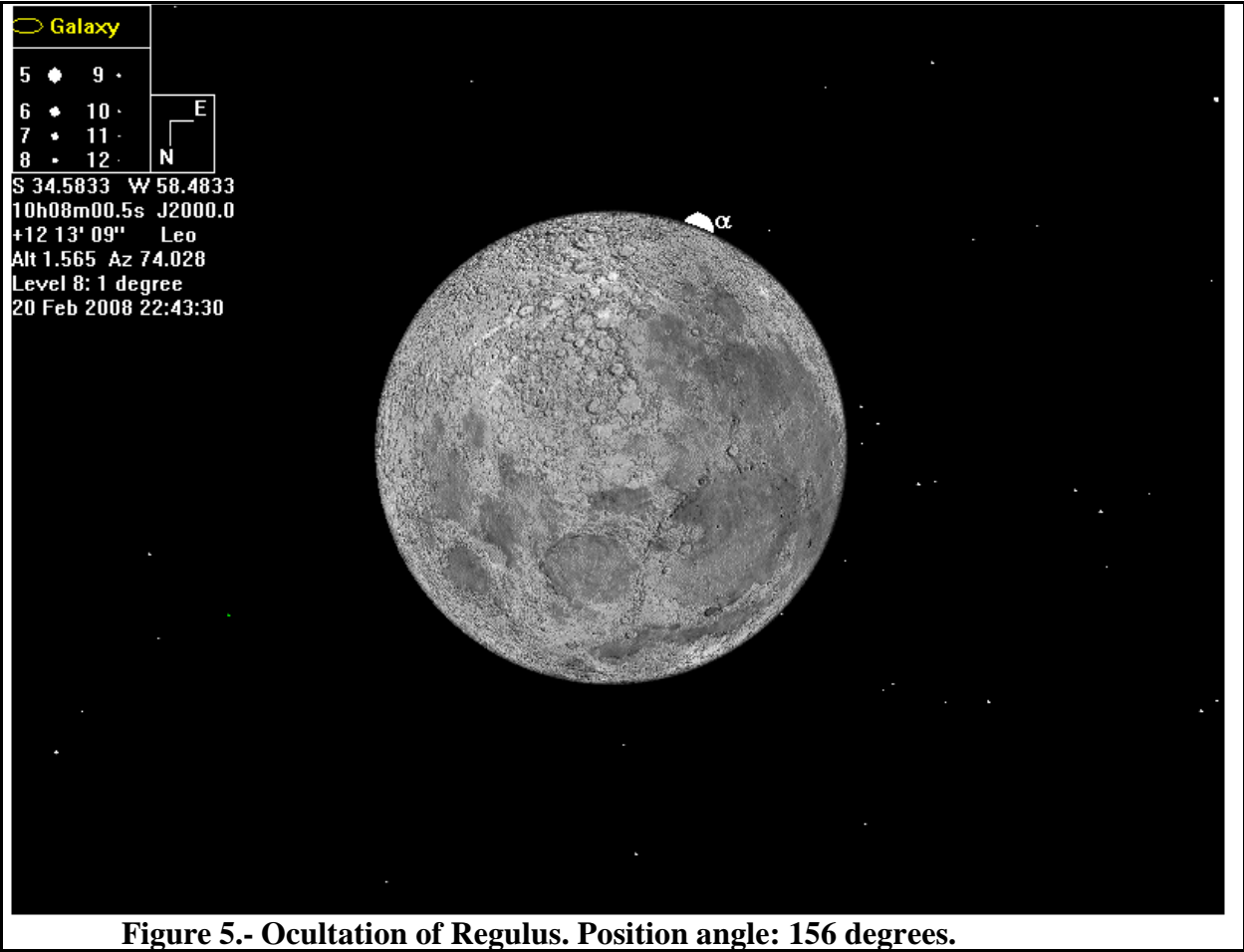


Figure 5.- Occultation of Regulus. Position angle: 156 degrees.

Measured Time	
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TIMING OF EMERSION OF REGULUS BEHIND THE MOON

ESTIMATED TIME: 23:29:30

FIRST ACTIVITY STEP BY STEP

Before the Emersion of REGULUS:

23:27:30 Once the alarm rings, start observation of the eastern limb the Moon.

Figure 6. (Zenith up).

23:28:00 Record activity mark in the voice recorder (if available). (“Emersion of Regulus”).

23:29:30 Upon the star becoming visible in the limb, shot a second sequence of pictures until the star is seforted of the limb.

23:29:30 Record the time of the immersion. Record signal in the voice recorder and stop it (if available).

23:30:00 Save the captured pictures in a specific PC folder properly labelled.

END OF THE ACTIVITY.

Interval until next step..... 120 minutes.

Simulation of the Emersion of Regulus seen from Buenos Aires.

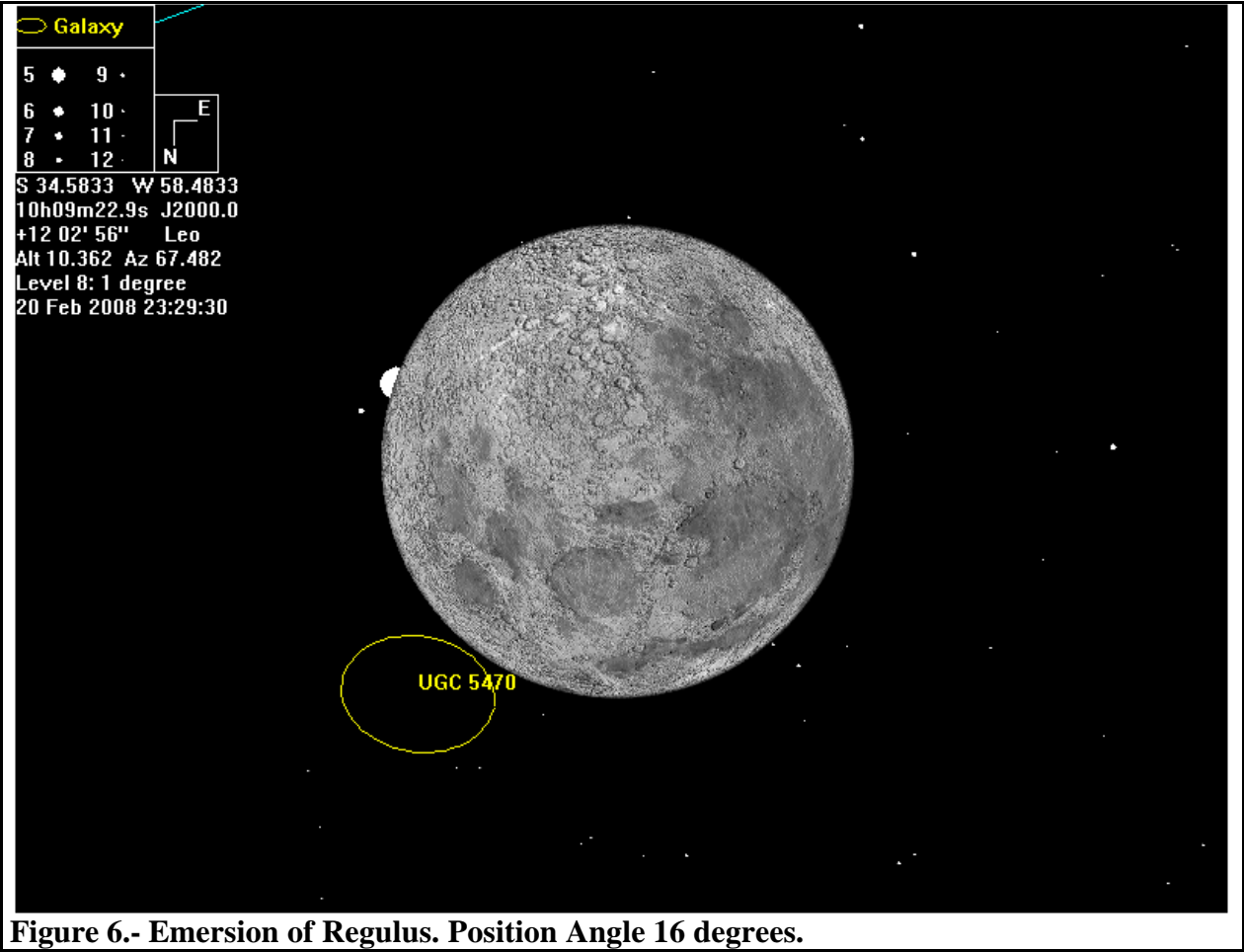


Figure 6.- Emersion of Regulus. Position Angle 16 degrees.

Measured Time	
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TIMING OF THE ECLIPSE CONTACTS

FIRST CONTACT WITH THE PENUMBRA

FOURTH ACTIVITY STEP BY STEP

No planned activity

Optionally:

00:36:00 Start the voice recorder (if available).

00:36:18 Capture a picture and record the time. Record the time and the identification of the event ("First Contact with the penumbra) in the voice recorder, if available.

00:36:30 Stop the voice recorder (if available).

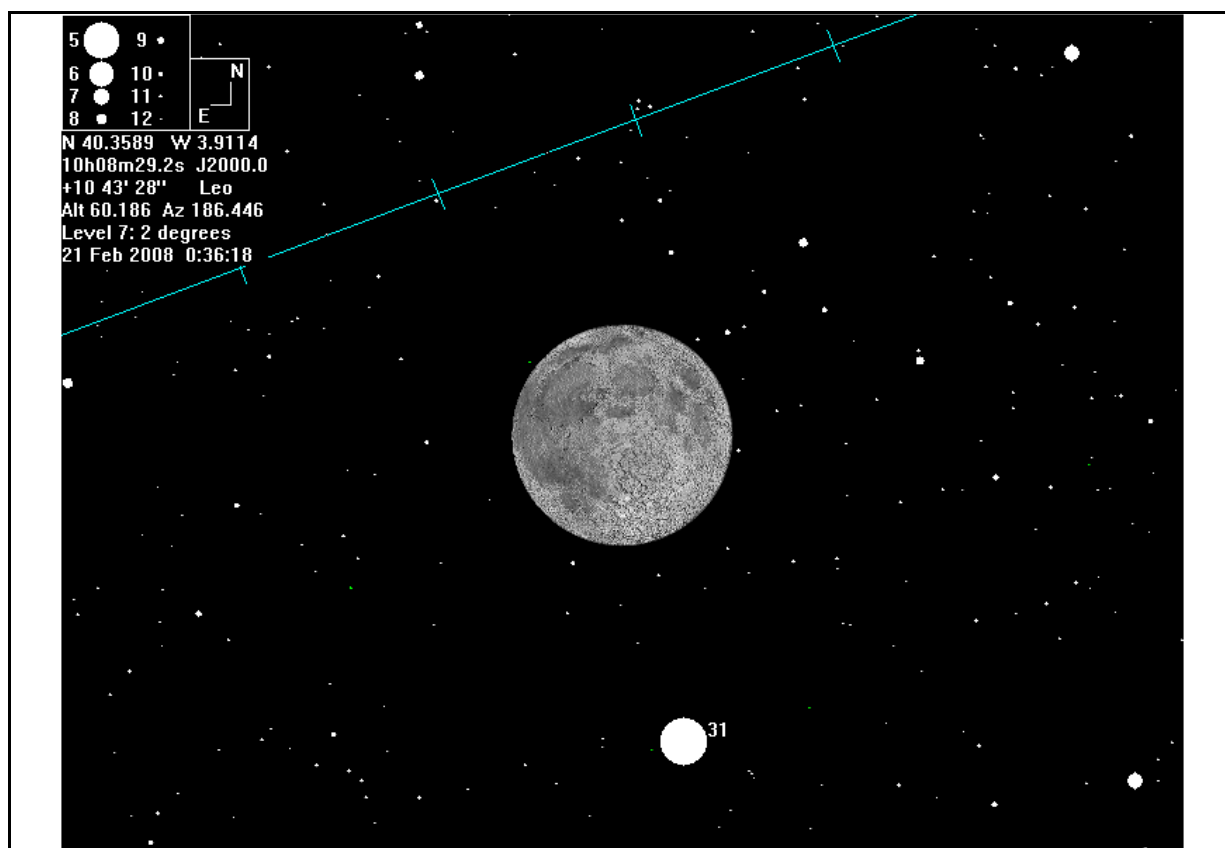


Figure 160.- First Contact with the penumbra from Madrid.

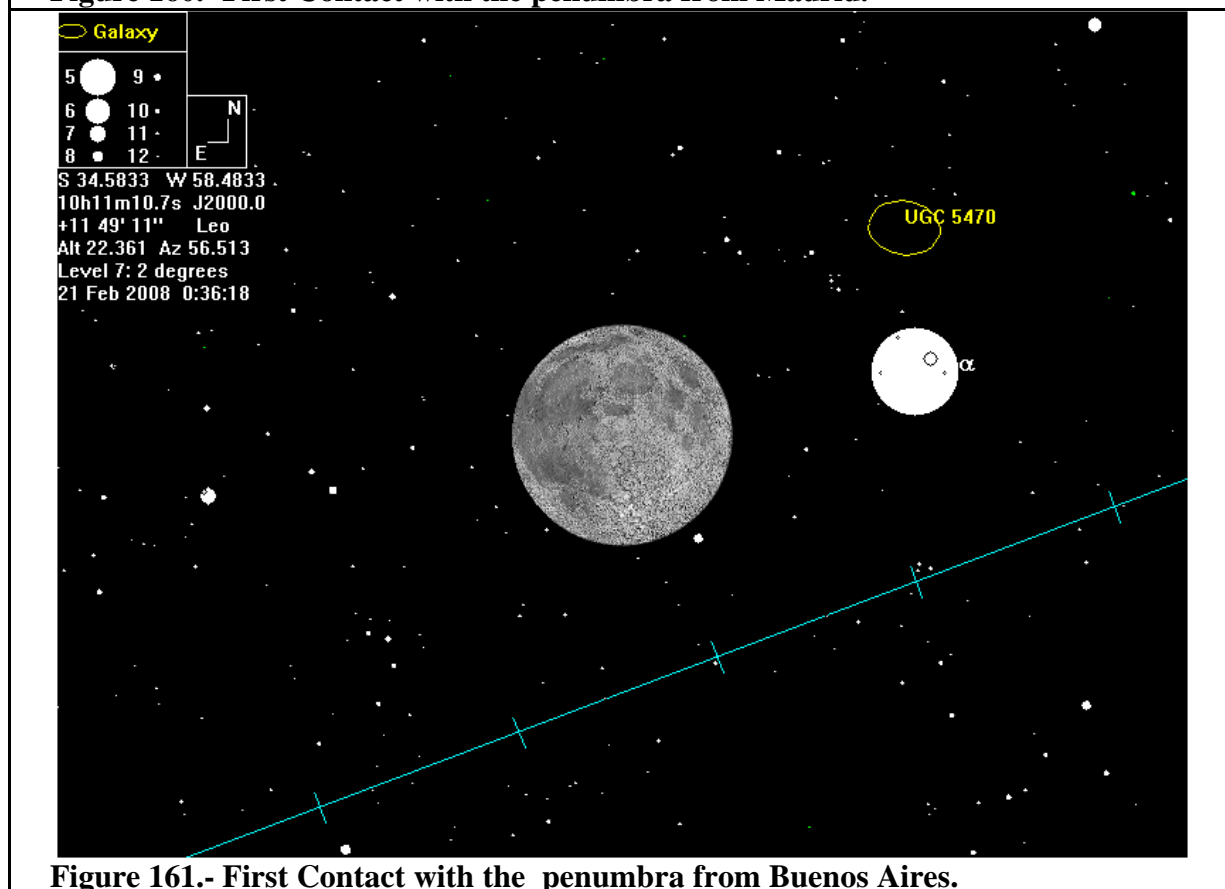


Figure 161.- First Contact with the penumbra from Buenos Aires.

MEASUREMENT OF THE LUNAR PARALAX

Proposed equipment:

Short Focal Telescope or Teleobjective
Medium Focal Telescope
DSLR Camera
PC
GPS
Chronometer with alarm
Voice Recorder

EXACT TIME: 01:00:00

SECOND ACTIVITY STEP BY STEP

CONFIGURATION:

Short Focal Telescope or Teleobjective, with the DSLR camera attached to the primary focus
Camera controlled from the PC.

GPS or Chronometer with Universal Time.

ACTIVITY:

Before the measurement.

00:30:00 If used, verify that the Chronometer is synchronized at one second accuracy with the GPS.

00:31:00 Set the chronometer alarm 10 seconds before the estimated time of measurement (00:59:50).

00:32:00 In the Short Focal Telescope (or Teleobjective): Frame the Moon and the stars Regulus (mag. 1,4) and 31 Leonis (mag. 4,4).

00:33:00 Verify focus and frame. Align the longer distance parallel to the longer size of the frame (portrait). Remove the test pictures.

Close to the event time.

00:55:00 Start the voice recorder (if available).

00:59:00 Verify the frame and check if a re-framing is required.

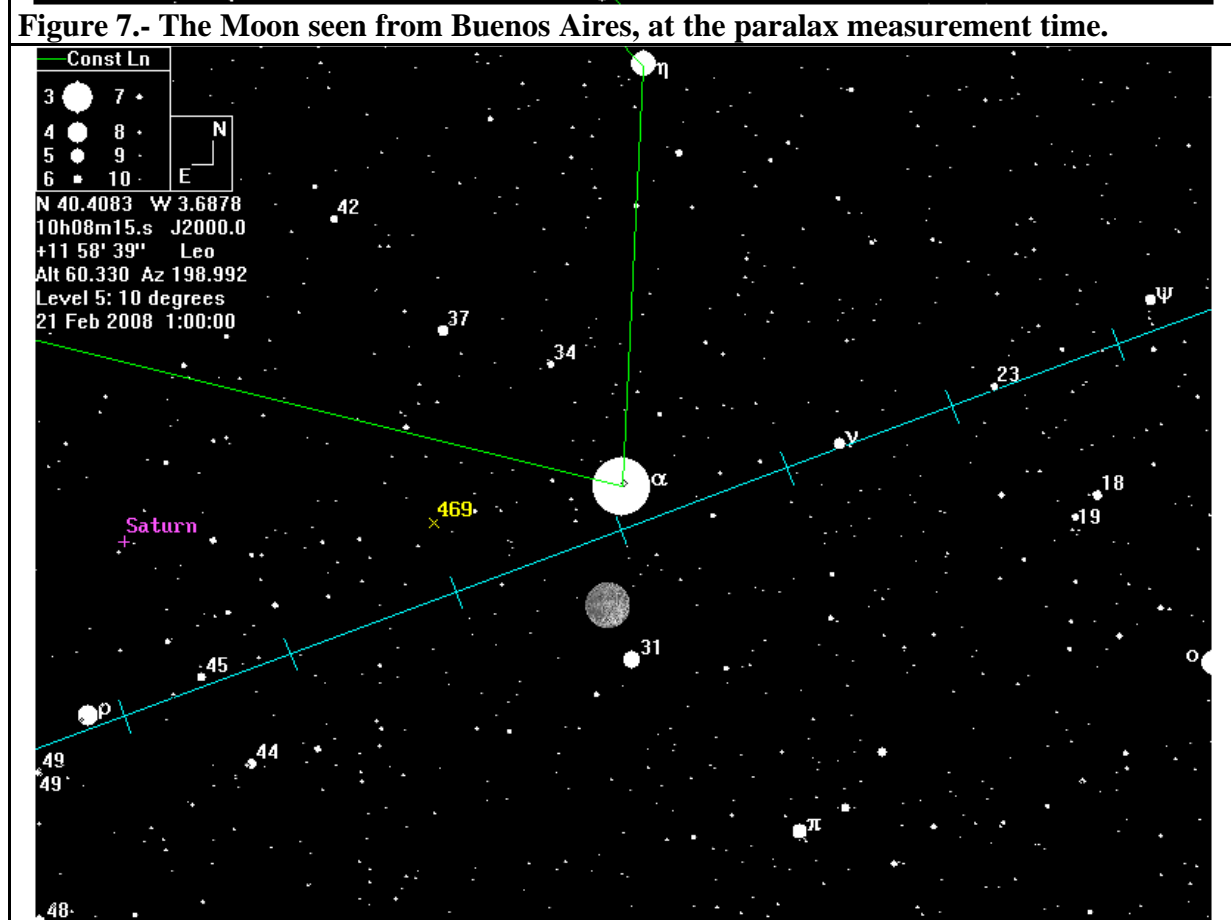
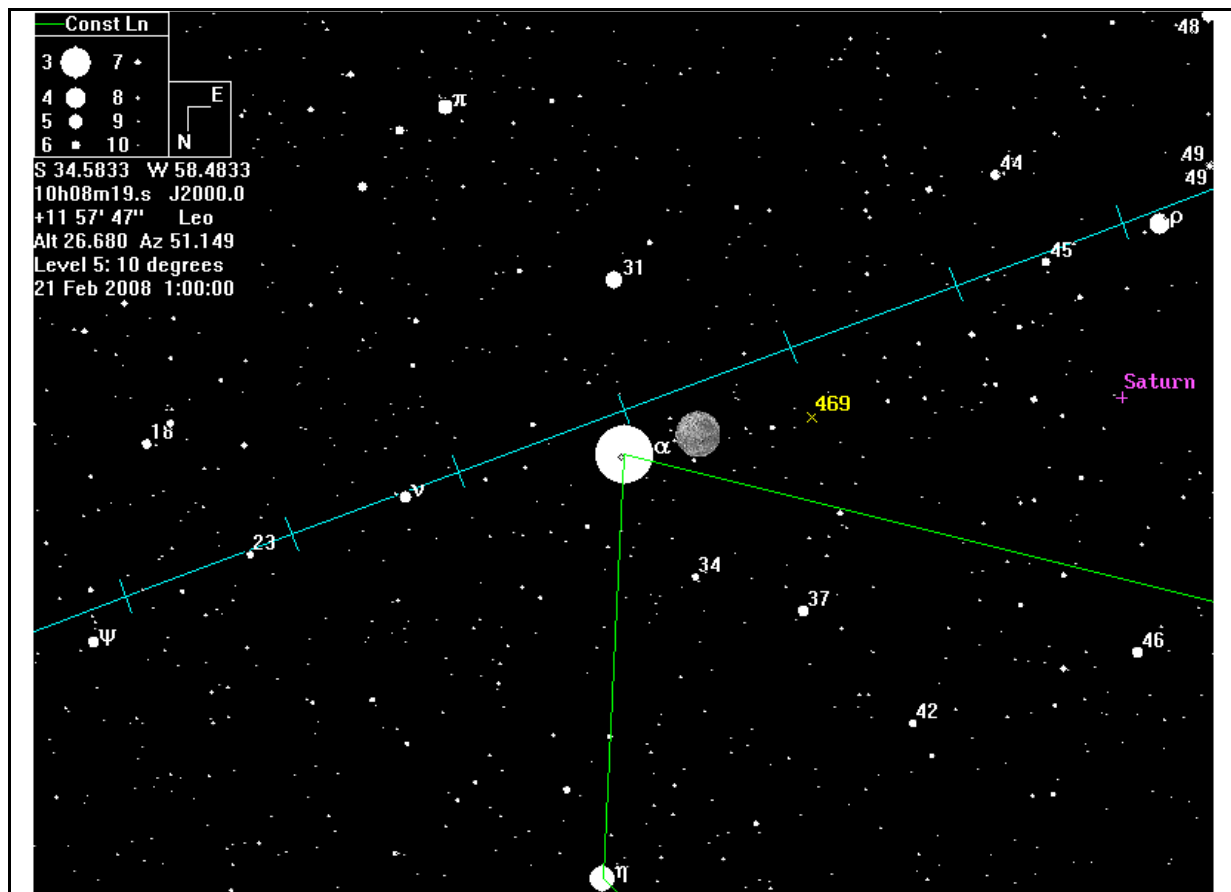
00:59:50 Upon the alarm ring, countdown ten seconds and shot the camera at the exact time.

01:00:00 Record the time of the shot in the voice recorder (if available) and stop it.

01:01:00 Save the picture in a separated folder of the PC. Set the chronometer alarm at 02:15:00.

END OF THE ACTIVITY.

Interval until next step..... 14 minutes.



INITIATION OF THE VIDEO SEQUENCE

Proposed equipment:

Medium Focal Telescope Short Focal Telescope One or two DSLR cameras GPS and/or Chronometer
--

EXACT TIME:	01:40:00
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THIRD ACTIVITY STEP BY STEP

CONFIGURATION:

Telescope of medium focal length with a DSLR camera attached to the primary focus
Telescope of Short focal length with a DSLR camera attached to the primary focus (for a second video sequence)

Both cameras controlled by a PC.

Chronometer with the Universal Time. Alarm at 01:43:00

PREVIOUS ACTIVITIES:

01:15:00 Once the alarm rings, focus the cameras by means of test exposures.

01:20:00 Adjust the exposure until the image is enough bright but without saturation. It is suggested to test 320 and 400 ASA.

Telescope of medium focal length

01:25:00 Frame the Moon and rotate the camera until the Moon rotation axis is parallel to the larger dimension of the frame. Put the Moon in the center of the field of view.
These two adjustments are very important.

Telescope of short focal length (or teleobjetivo mounted in an equatorial mount).

01:25:00 Frame the Moon and rotate the camera until the Moon rotation axis is parallel to the shorter dimension of the frame. Put the Moon in the center of the field of view.
These two adjustments are very important.

01:28:00 Remove the test exposures. Set the chronometer alarm at 01:39:00.

BEFORE THE CAPTURES:

01:30:00 Configure Control SW of the camera to shut with automatically with an INTERVAL of 20 seconds.

For Canon Eos:

- 5-1) Open the Remote Shutter in the control SW
- 5-2) Open the Tools Menu
- 5-3) In the emerging window select:
 - Delay Adjustment..... 00 min 00 seg
 - Tom. p. interv. c. Temp. 00 min 20 seg
 - Captures800

(to be continued)

(continuation)

MEDIUM ANGULAR VIDEO:

01:40:00 Start the photographic sequence with the medium angular camera, as synchronised as possible (a minute before the alarm has been activated). This sequence must not be interrupted despite any error or perturbation.

LARGE ANGULAR VIDEO:

01:40:00 Start the photographic sequence with the large angular camera, as synchronised as possible (a minute before the alarm has been activated). This sequence must not be interrupted despite any error or perturbation.

01:42:00 Adjust gradually the exposures in the two cameras, try to obtain bright pictures without saturation.

EVENTUAL END of the ACTIVITY.

NOTE: The end of this ACTIVITY will be at 05:10:00.



VIDEO Frame with the Medium Angular



VIDEO Frame with Large Angular

Interval until next step..... 0 minutes.

TIMING OF THE ECLIPSE CONTACTS

FIRST CONTACT WITH THE UMBRA

Proposed Equipment.

Large Aperture Telescope; Telescope of focal media; Binoculars; Chronometer with alarm GPS and/or Chronometer and Voice recorder.

ESTIMATED TIME:

01:43:00

FOURTH ACTIVITY STEP BY STEP

CONFIGURATION

Large Aperture Telescope with DSLR Camera with shutter cable.
Auxiliar telescope with a medium power eyepiece (200x).
Binoculars of 8x50.

ACTIVITY

This ACTIVITY starts immediately after the initiation of the video sequence.
Put the shutter cable of the camera in mode CONTINUOUS;
Point the Telescopes to the eastern limb of the Moon;

01:42:00 Start the voice recorder and record and indentification of the event ("FIRST CONTACT with the umbra") and the time.

01:42:45 Start the continuous capture while it is monitored the eastern limb of the Moon;

01:43:00 Once the umbra is visible, record a time mark, stop the photographic sequence and stop the voice recorder.

01:44:00 Set the chronometer alarm at 01:47:00.

NOTE: From now, the chronomenter must be used only or the timing Ocultation of Craters and stars activities.

EVENTUAL END of the ACTIVITY.

NOTE: This activity continues at 02:59:00.

Measured Time	
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Interval until next step..... 4 minutes.

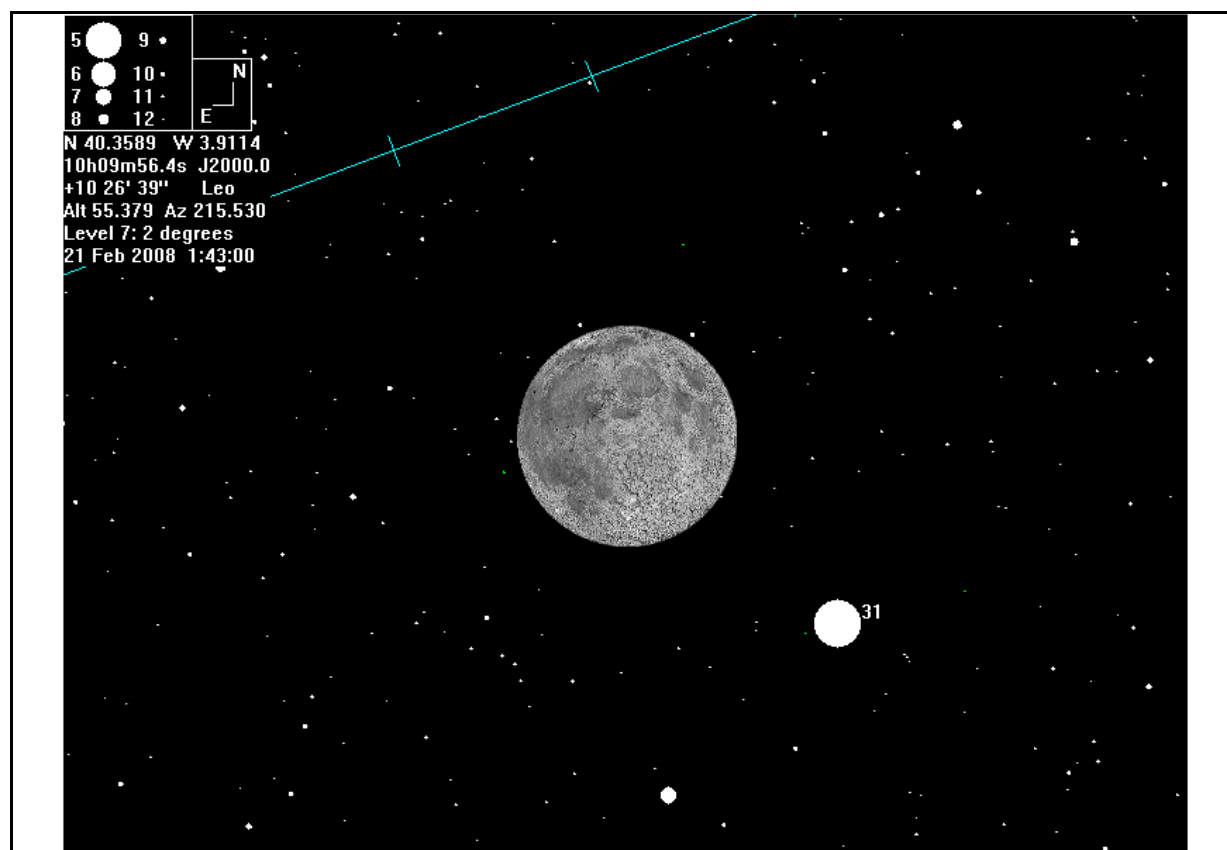


Figure 162.- FIRST CONTACT with the umbra from Madrid – altitud 55,4°.

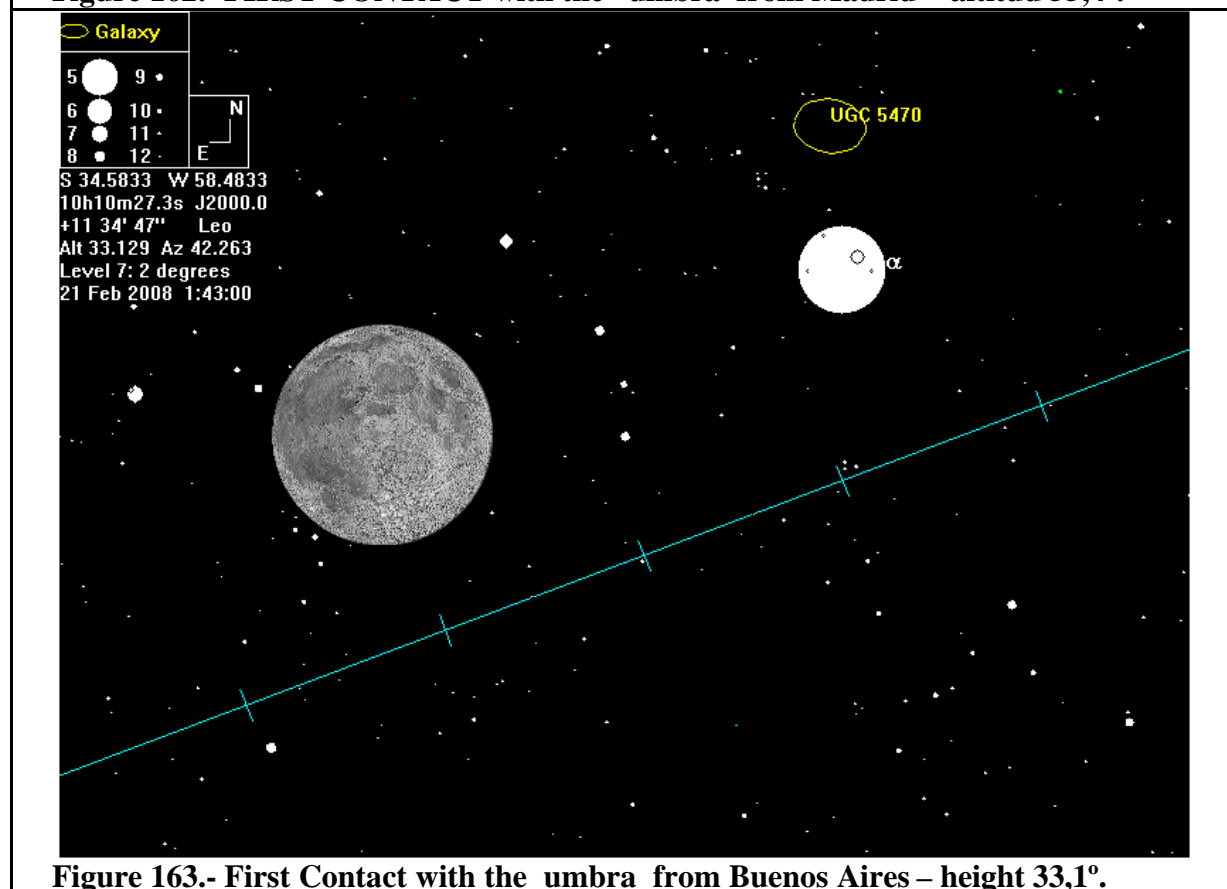


Figure 163.- First Contact with the umbra from Buenos Aires – height 33,1°.

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

GRIMALDI

Category	Diameter	Depth
Cuenca	430 Km	2000 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 01:48:00

FIFTH ACTIVITY STEP BY STEP

CONFIGURATION

Large Aperture Telescope with a low magnificationcon (100x) and polarizers.
Chronometer with alarm.
Optional picture if an aditional telescope and a camera are available.

ACTIVITY

01:47:00 Once the alarm rings, monitor the Grimaldi basin (see figures 14 and 15). Start the voice recorder (if available) and record the time.

01:48:00 Timing of the arrival of the umbra to the two borders and calculation of the average. At the ocultation of the basin record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
---------------	--

Interval until next step..... 0 minutes.

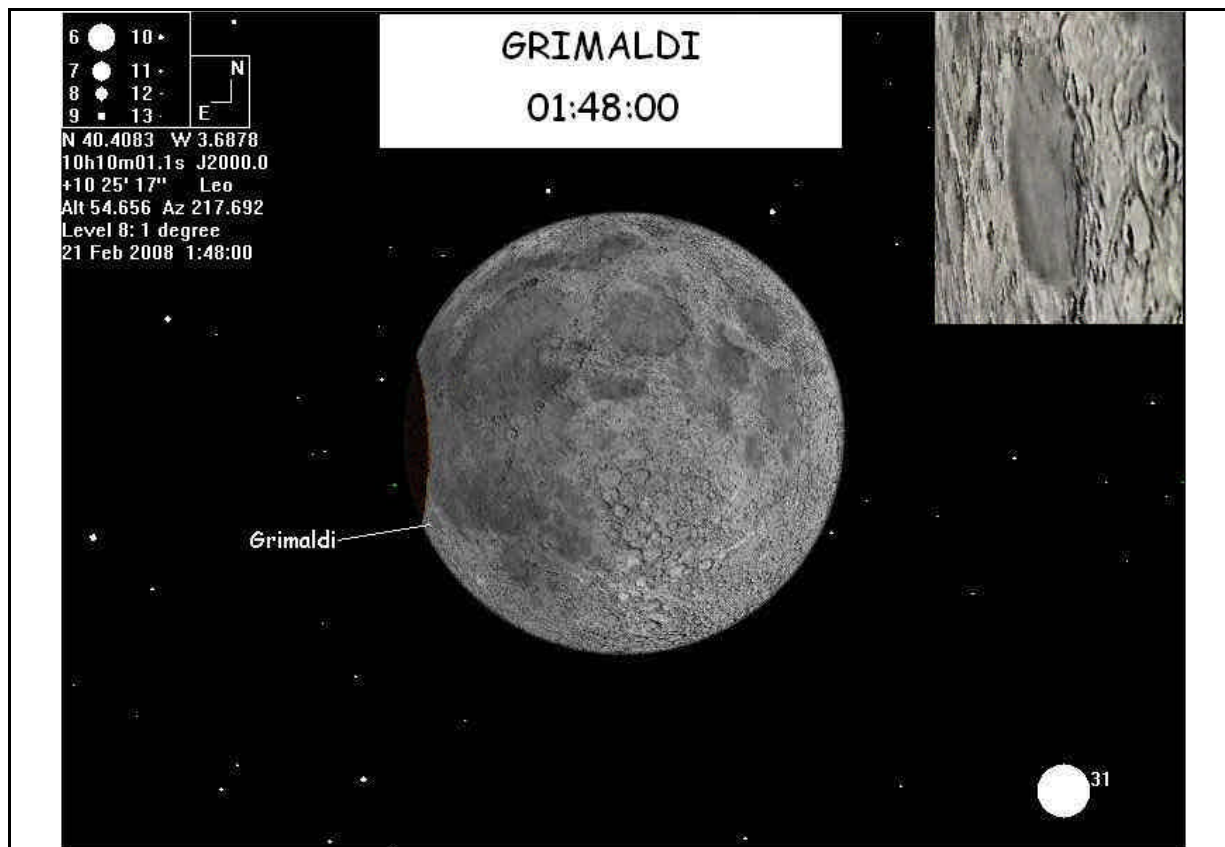


Figure 14.- Ocultation of Grimaldi seen from the North Hemisphere (01:48:00).



Figure 15.- Ocultation of Grimaldi seen from the South Hemisphere (01:48:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

ARISTARCHUS

Category	Diameter	Depth
Crater	40 Km	3000 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 01:49:00

FIFTH ACTIVITY STEP BY STEP

01:48:00 Monitor Aristarchus Crater (see figures 16y 17).

01:49:00 At the ocultation of the crater, record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

01:50:00 Set the chronometer alarm at 01:53:00
--

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).
--

Measured Time	
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Interval until next step.....3 minutes.

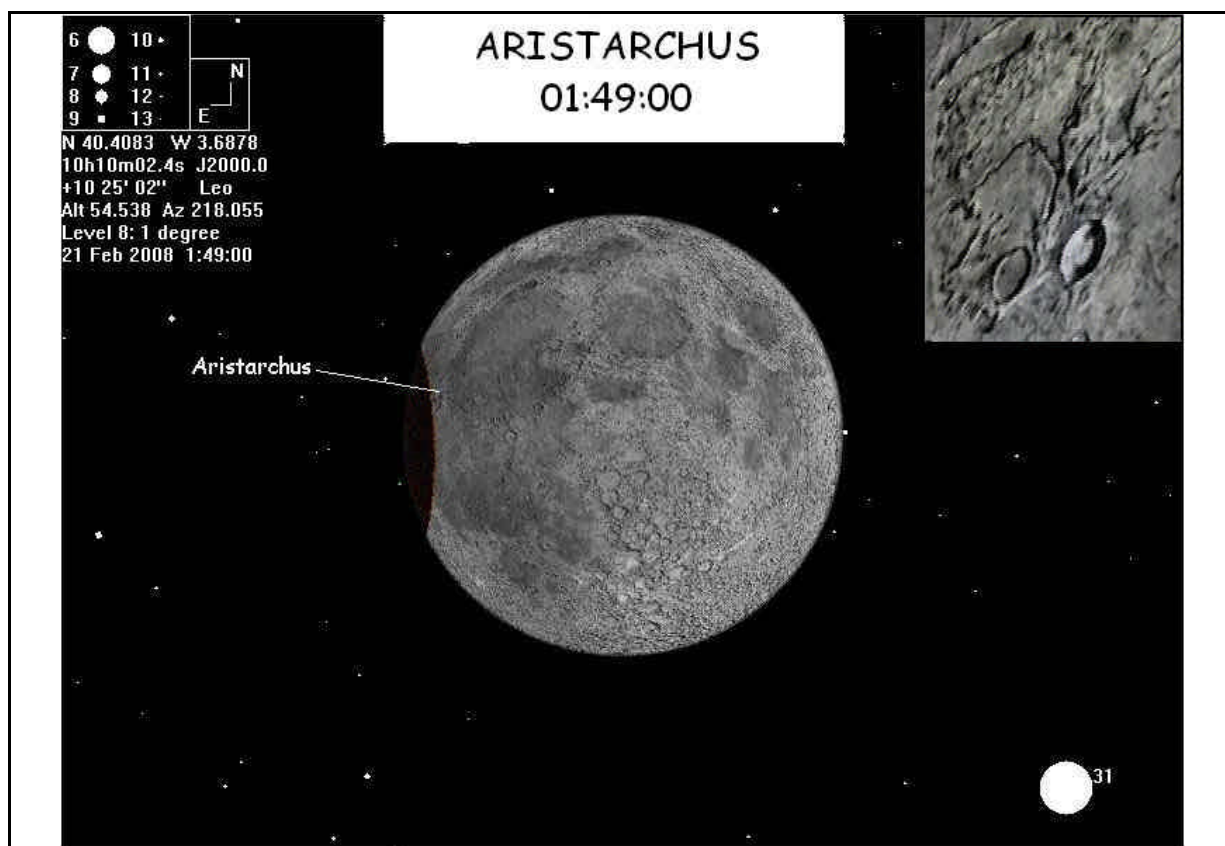


Figure 16.- Ocultation of Aristarchus seen from the North Hemisphere (01:49:00).

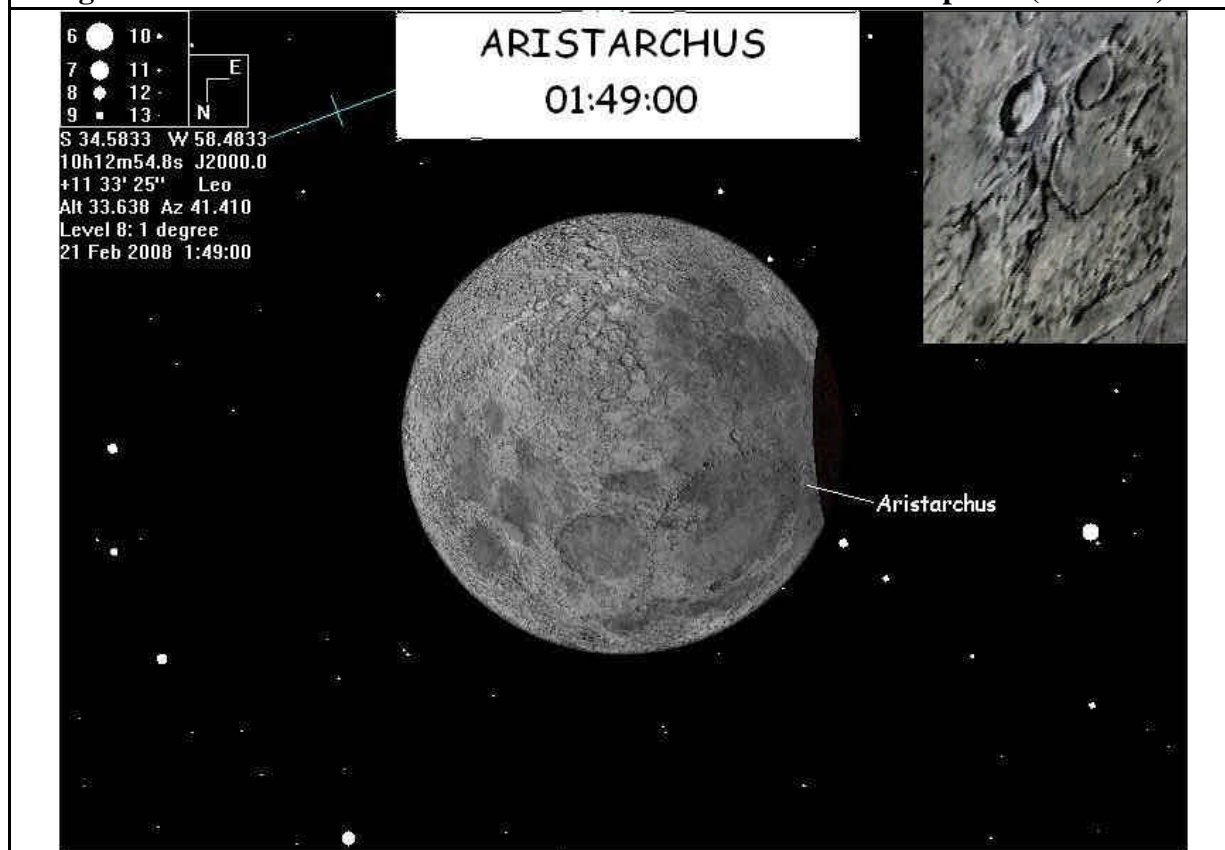


Figure 17.- Ocultation of Aristarchus seen from the South Hemisphere (01:49:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

KEPLER

Category	Diameter	Depth
Crater	32 Km	2570 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 01:54:00

FIFTH ACTIVITY STEP BY STEP

01:53:00 Once the alarm rings, monitor the Crater Kepler (see figures 18 and 19).

01:54:00 At the ocultation of the crater, record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).
--

Measured Time	
---------------	--

Interval until next step..... 1 minute.

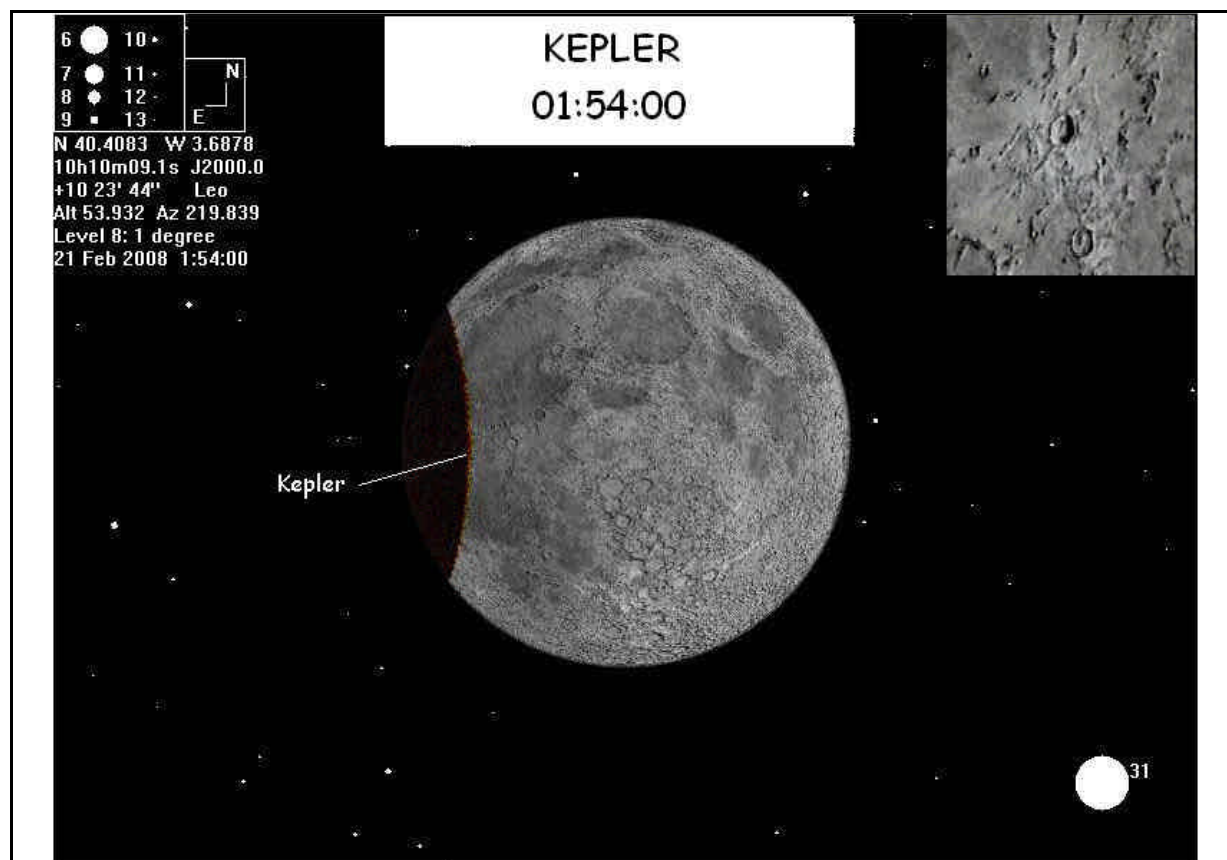


Figure 18.- Ocultation of Kepler seen from the North Hemisphere (01:54:00).

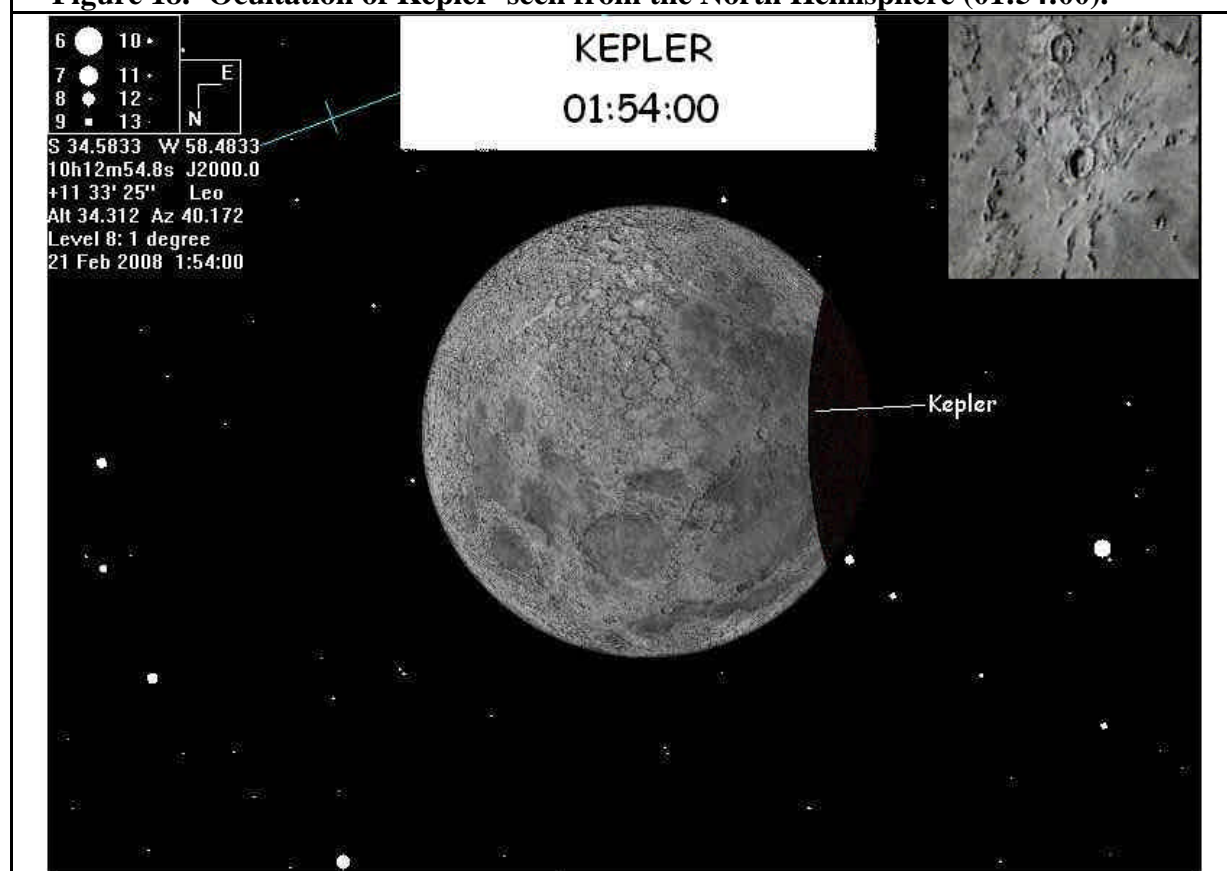


Figure 19.- Ocultation of Kepler seen from the South Hemisphere (01:54:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

BILLY

Category	Diameter	Depth
Crater	46 Km	1210 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 01:56:00

FIFTH ACTIVITY STEP BY STEP

01:55:00 Monitor Crater Billy (see figures 20 and 21).
--

01:56:00 At the ocultation of the crater, record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).
--

Measured Time	
---------------	--

Interval until next step..... 2 minutes for the South Hemisphere.
3 minutes for the North Hemisphere.

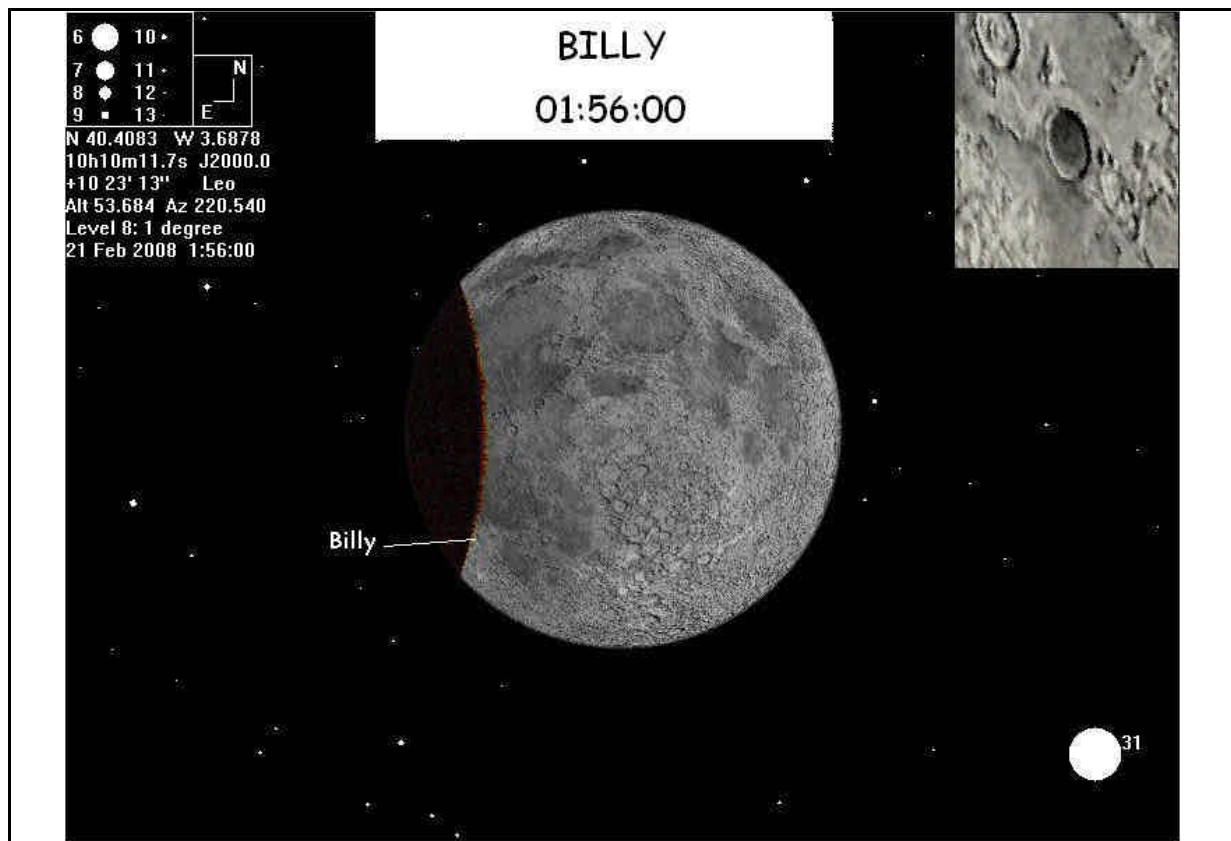


Figure 20.- Immersion of Billy seen from the North Hemisphere (01:56:00).

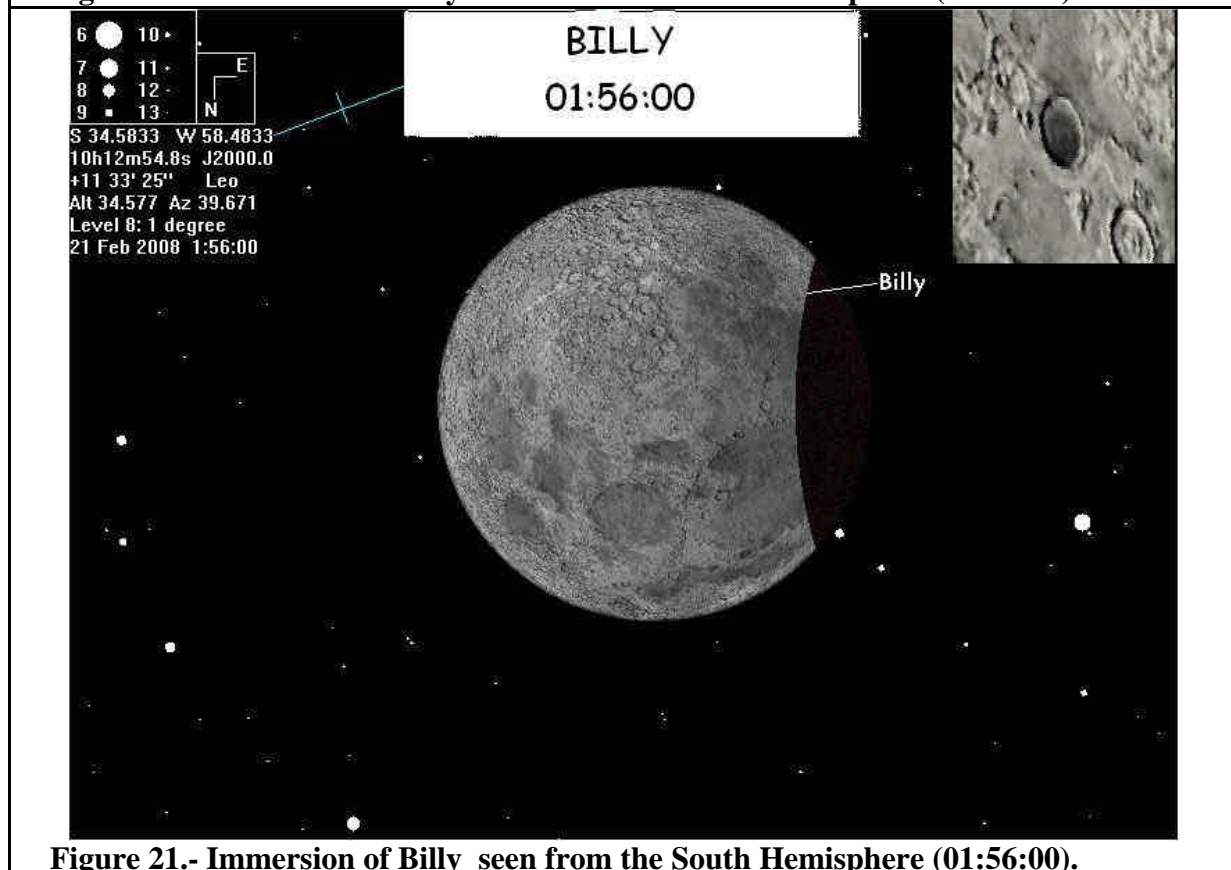


Figure 21.- Immersion of Billy seen from the South Hemisphere (01:56:00).

TIMING OF THE OCULTATION OF STARS BY THE MOON
FROM BUENOS AIRES

GSC 840 185

M_v = 8,6

Proposed Equipment.

Large Aperture Telescope;
Medium Focal Telescope (if available)
DSLR Camera (if the auxiliar telescope is available)
GPS and/or Chronometer and Voice recorder.

ESTIMATED TIME: 01:59:30

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

from Buenos Aires (from other sites, see note).

Large Aperture Telescope with a medium power magnification (200x) without polarizers.

Chronometer with alarm

Optional picture if additional telescope and camera are available.

ACTIVITY

IN BUENOS AIRES:

ATTENTION: the Ocultation of Crater Pytheas will be produced immediatelly after the end of this activity.

01:59:00 Monitor the star GSC 840 185 in the North of the Moon (see figure 52). Record time. If a camera and a telescope is available, capture test exposures to estimate the shutter velocity required to image. Saturate the Moon if necessary. Otehr tesscopes are taken good pictures.

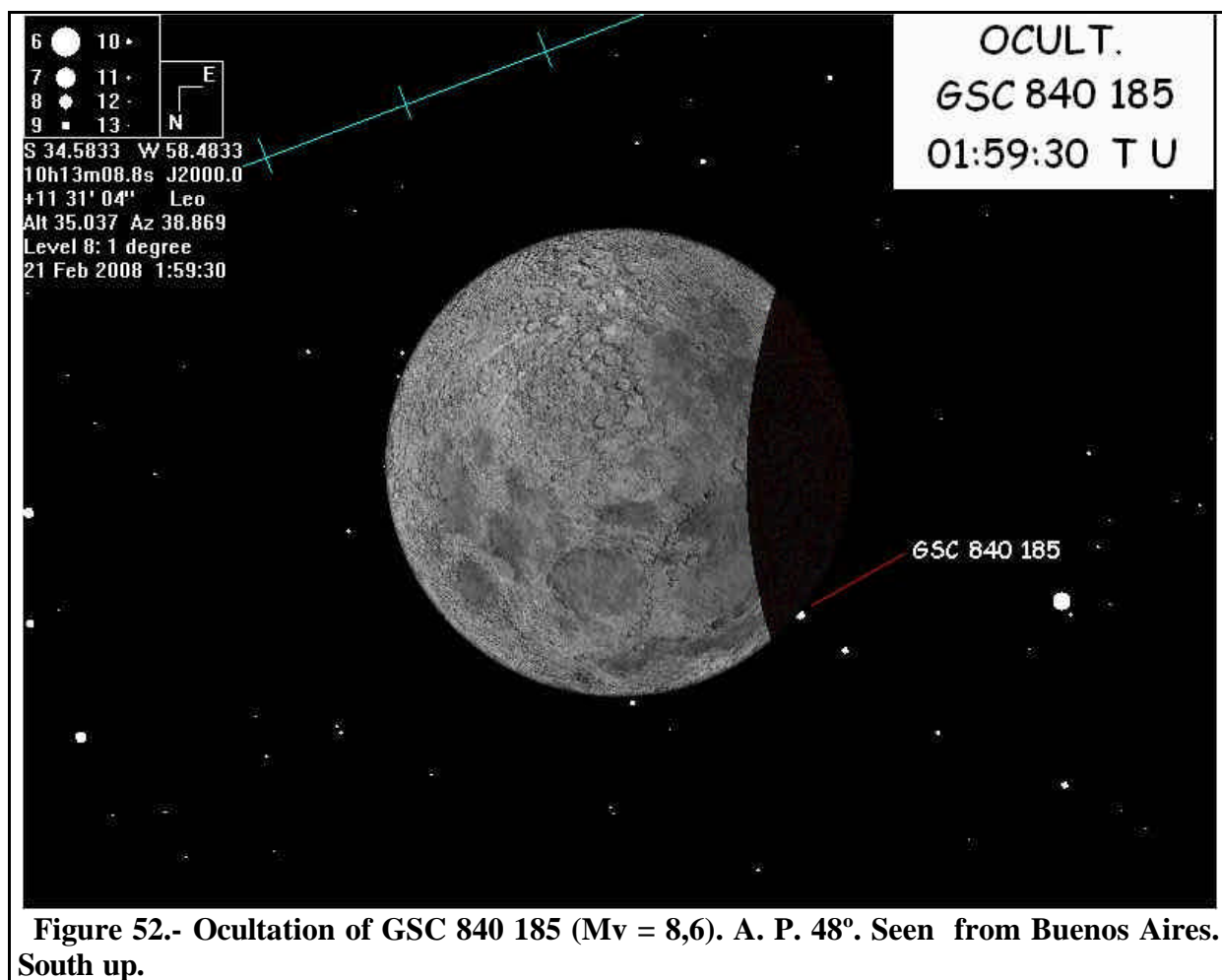
01:59:30 Take a fast sequence of pictures during the contact and ocultation of the star with the limb of the Moon.

01:59:45 At the star ocultation, record the identifying the event ("Ocultation star 1").

01:59:45 ATENTION: Immediate Ocultation of Crater Pytheas!.

EVENTUAL END of the ACTIVITY FROM BUENOS AIRES.

Interval until next step..... 0 minutes.



Measured Time	
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NOTE: In order to know if the ocultation is visible from other Southamerica sites and the time, it is necessary to perform a new simulation.

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

PYTHEAS

Category	Diameter	Depth
Crater	20 Km	2530 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:00:00

FIFTH ACTIVITY STEP BY STEP

01:59:50 Monitor Crater Pytheas (figures 22 and 23).

02:00:00 At the occultation of the crater, record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
---------------	--

Interval until next step..... 1 minute.

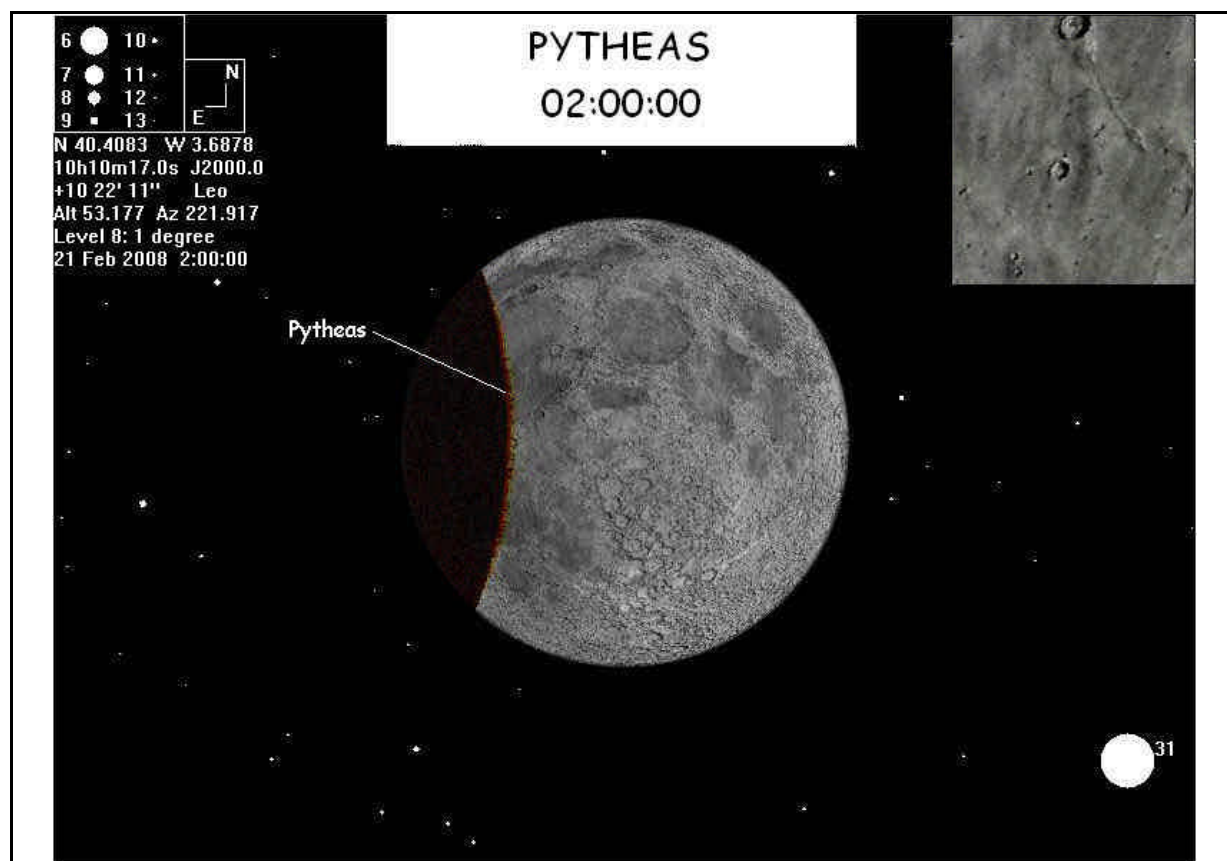


Figure 22.- Ocultation of Pytheas seen from the North Hemisphere (02:00:00).

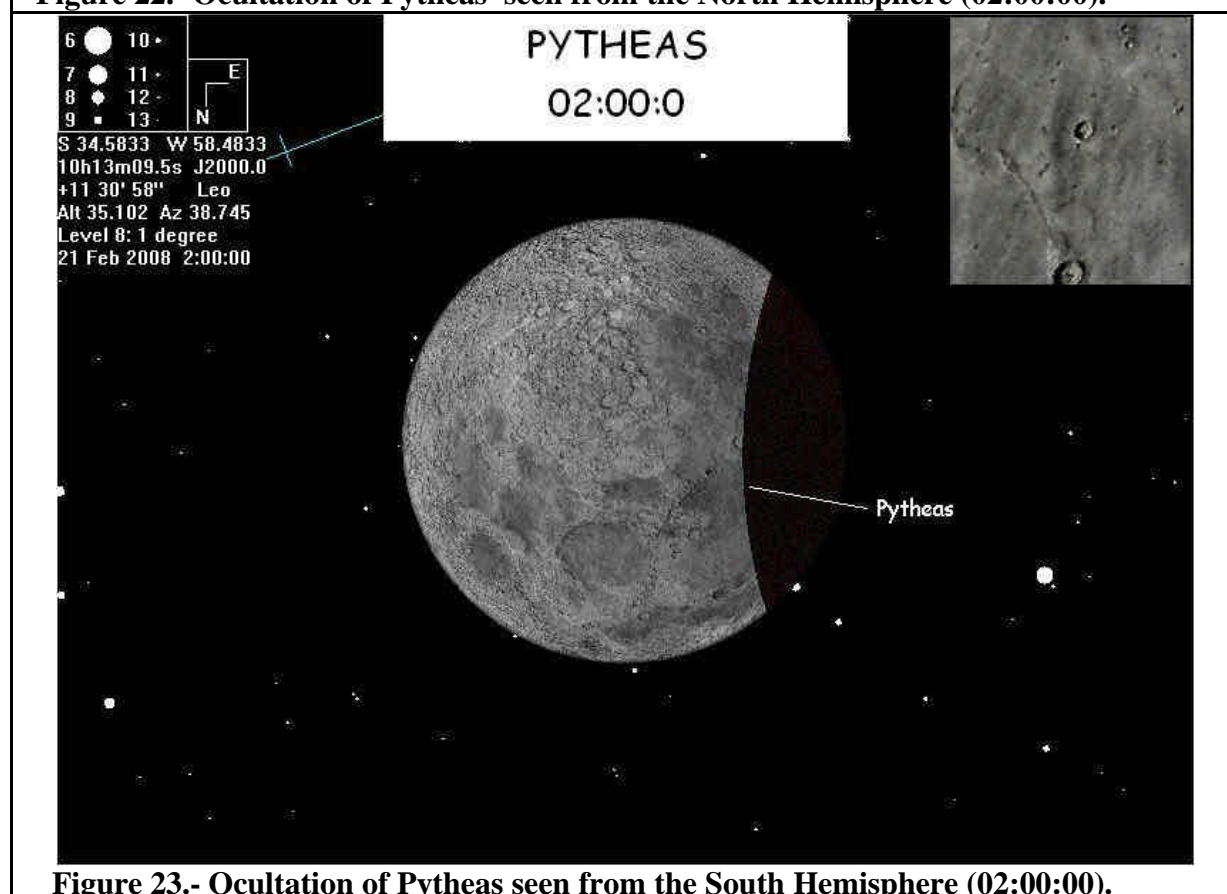


Figure 23.- Ocultation of Pytheas seen from the South Hemisphere (02:00:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

COPERNICUS

Category	Diameter	Depth
Impact Ring	93 Km	3760 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:02:00

FIFTH ACTIVITY STEP BY STEP

02:01:00 Monitor Impact Ring Copernicus (figures 24 and 25).

02:02:00 Timing the arrival of the umbra to both borders and calculate the average time. At the occultation of the impact ring record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
---------------	--

Interval until next step..... 0 minutes.

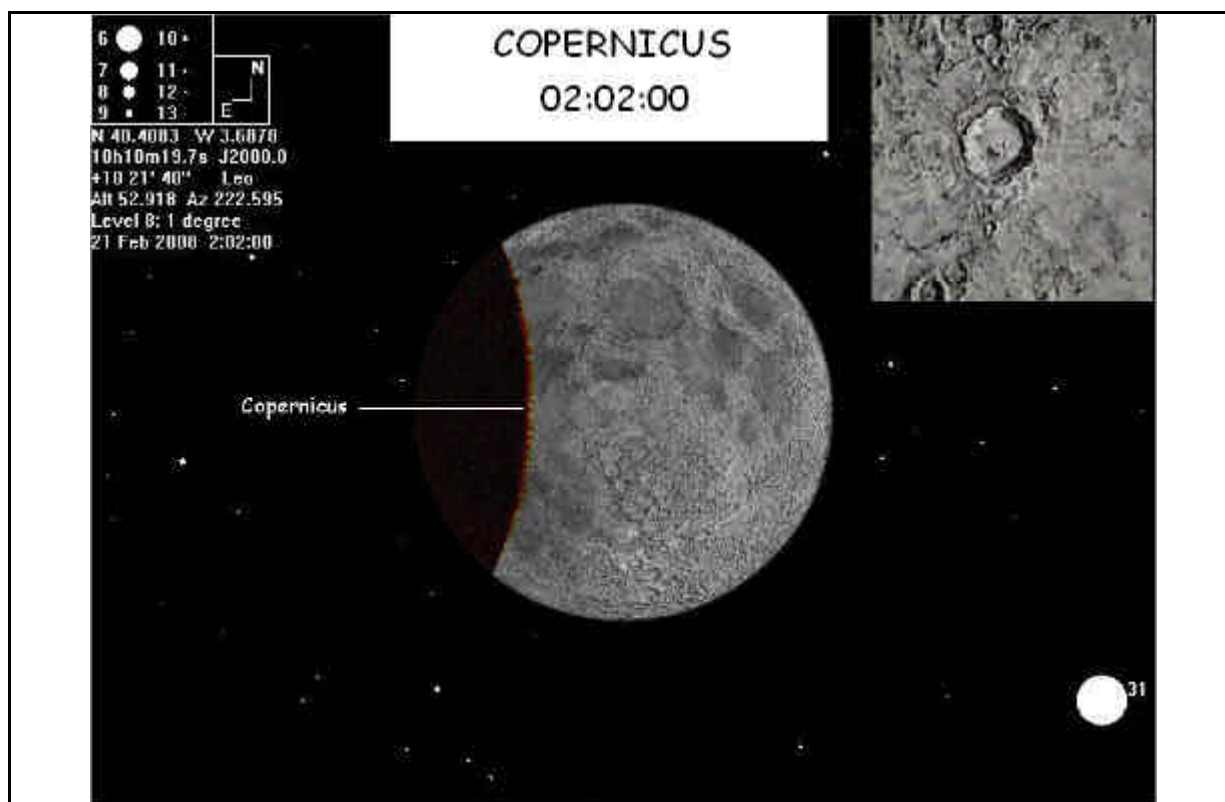


Figure 24.- Ocultation of Copernicus seen from the North Hemisphere (02:02:00).

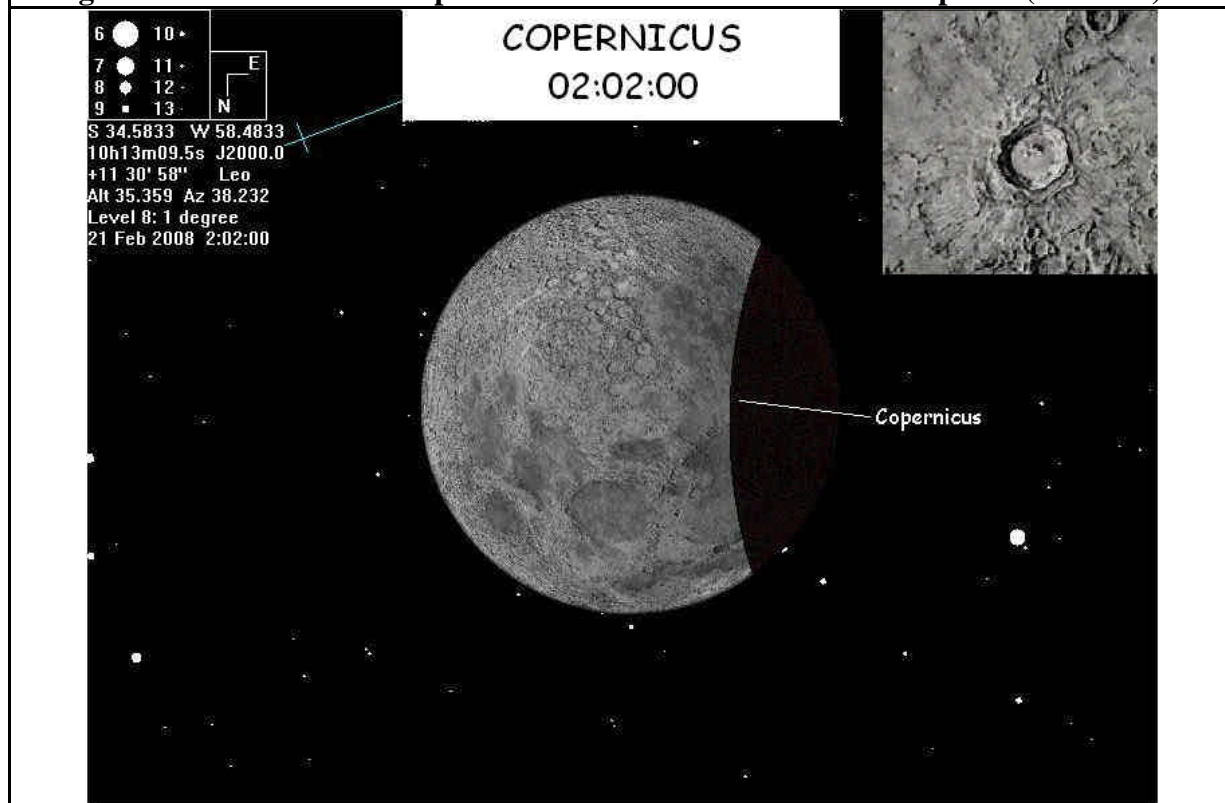


Figure 25.- Ocultation of Copernicus seen from the South Hemisphere (02:02:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

TIMOCHARIS

Category	Diameter	Depth
Crater	34 Km	2750 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:03:00

FIFTH ACTIVITY STEP BY STEP

02:02:30 Monitor Crater Timocharis (figures 26 and 27).

02:03:00 At the occultation of the crater, record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
---------------	--

Interval until next step..... 1 minute.

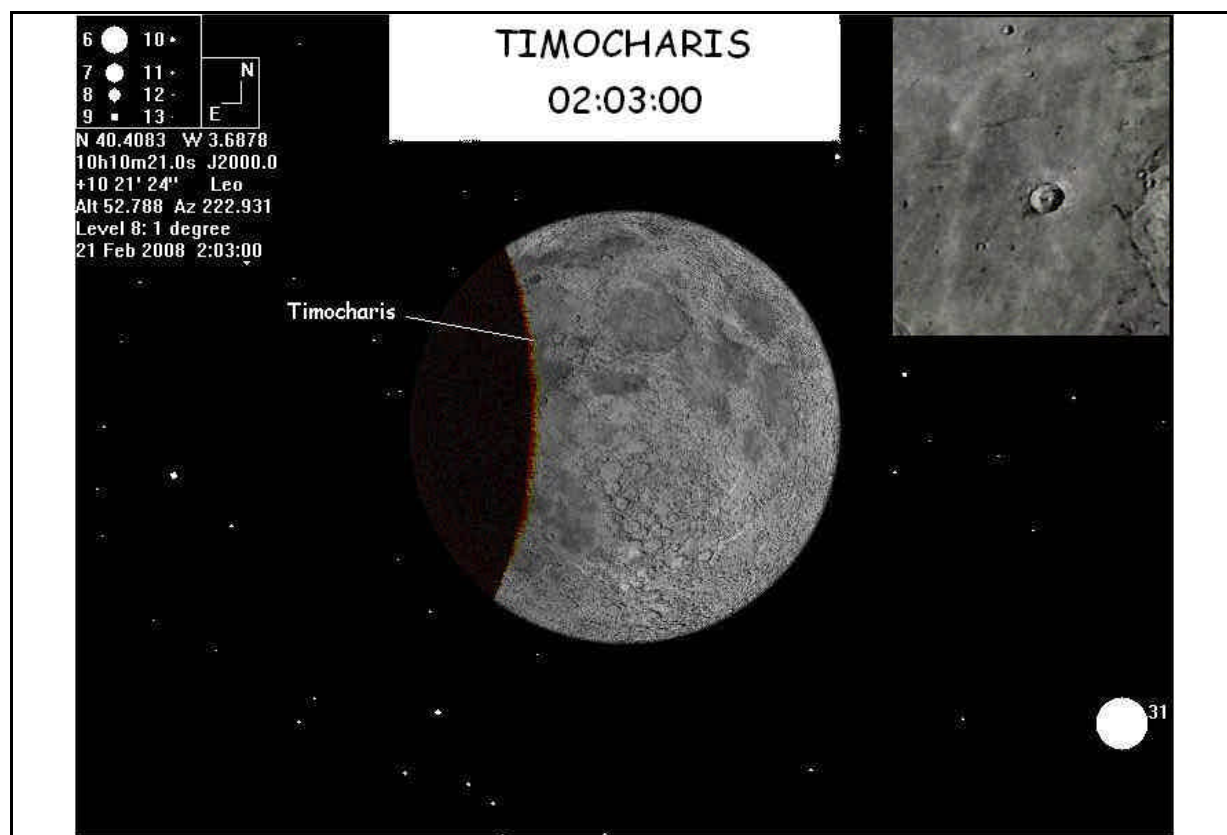


Figure 26.- Ocultation of Timocharis seen from the North Hemisphere (02:03:00).

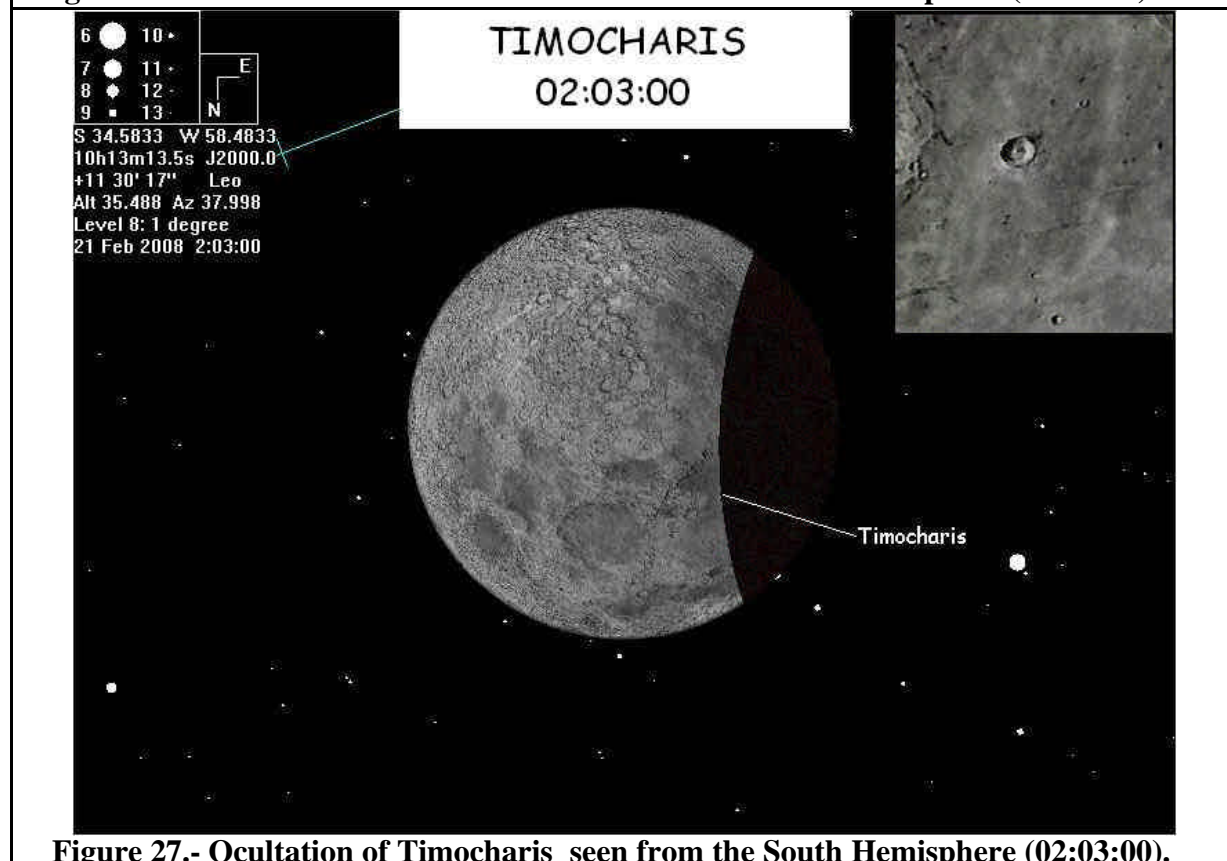


Figure 27.- Ocultation of Timocharis seen from the South Hemisphere (02:03:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

PLATO

Category	Diameter	Depth
Llanura amurallada	101 Km	1000 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:05:00

FIFTH ACTIVITY STEP BY STEP

02:04:00 Vigilar the Plato walled basin (figures 28 and 29). 02:05:00 Timing the arrival of the umbra to both borders and calculate the average time. At the ocultation of the basin record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available. 02:06:00 Set the chronometer alarm at 02:10:00. Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).
--

Measured Time	
---------------	--

Interval until next step..... 4 minutes.

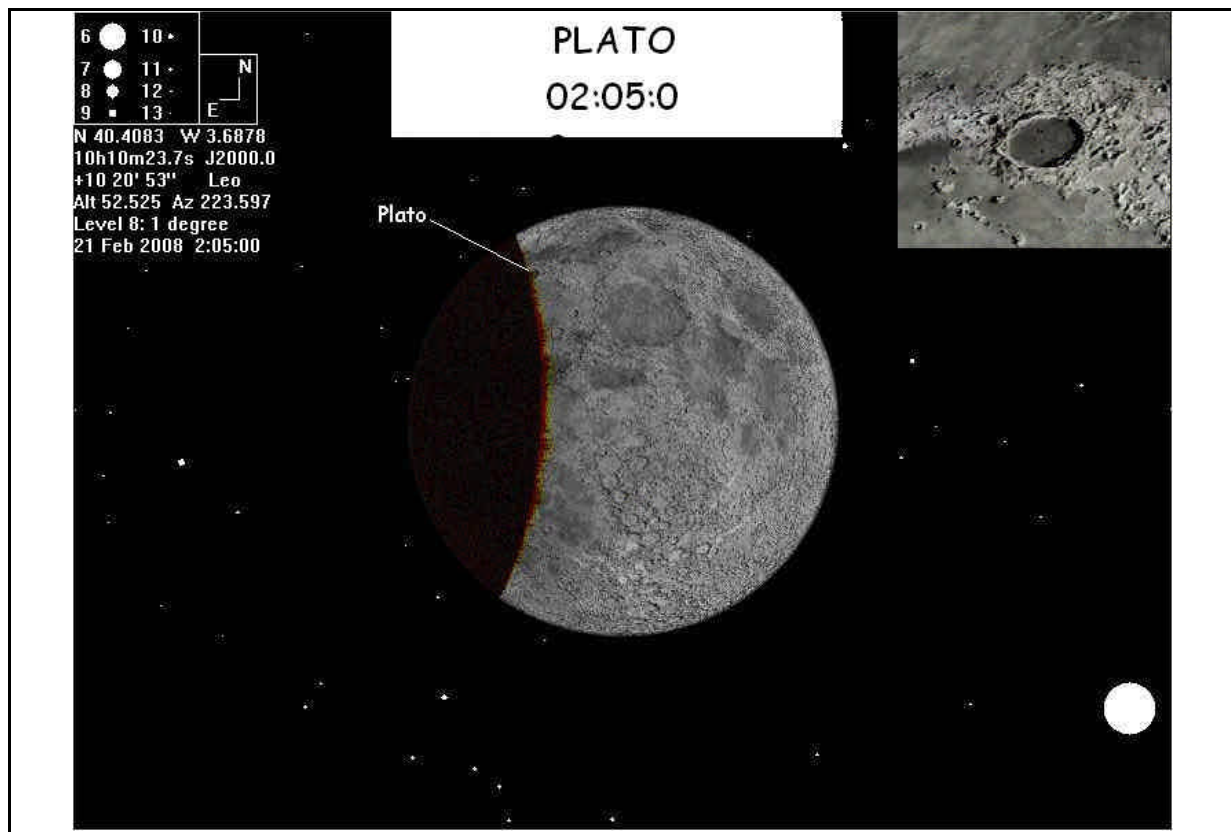


Figure 28.- Ocultation of Plato seen from the North Hemisphere (02:05:00).

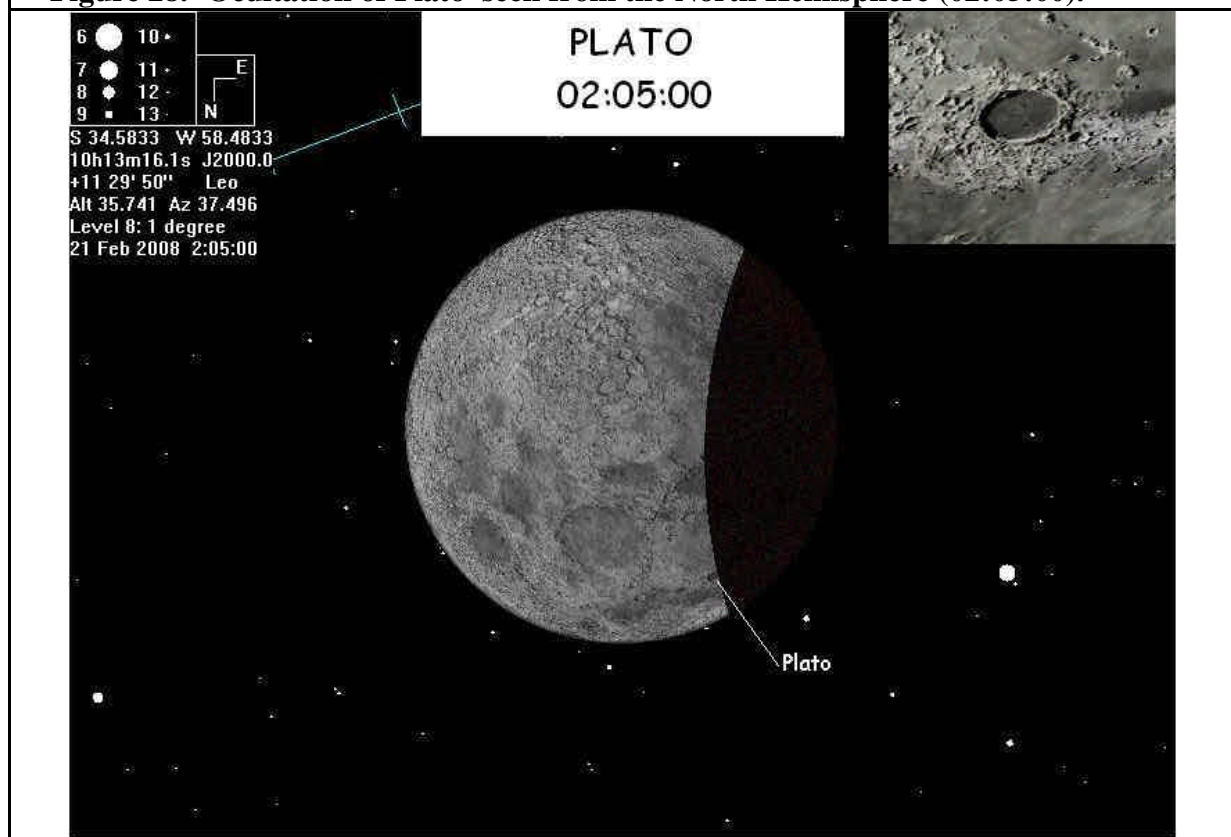


Figure 29.- Ocultation of Plato seen from the South Hemisphere (02:05:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

CAMPANUS

Category	Diameter	Depth
Crater	48 Km	2080 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:11:00

FIFTH ACTIVITY STEP BY STEP

02:10:00 Once the alarm rings, monitor the Crater Campanus (figures 30 and 31).

02:11:00 At the ocultation of the crater, record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
---------------	--

Interval until next step..... 2 minutes.

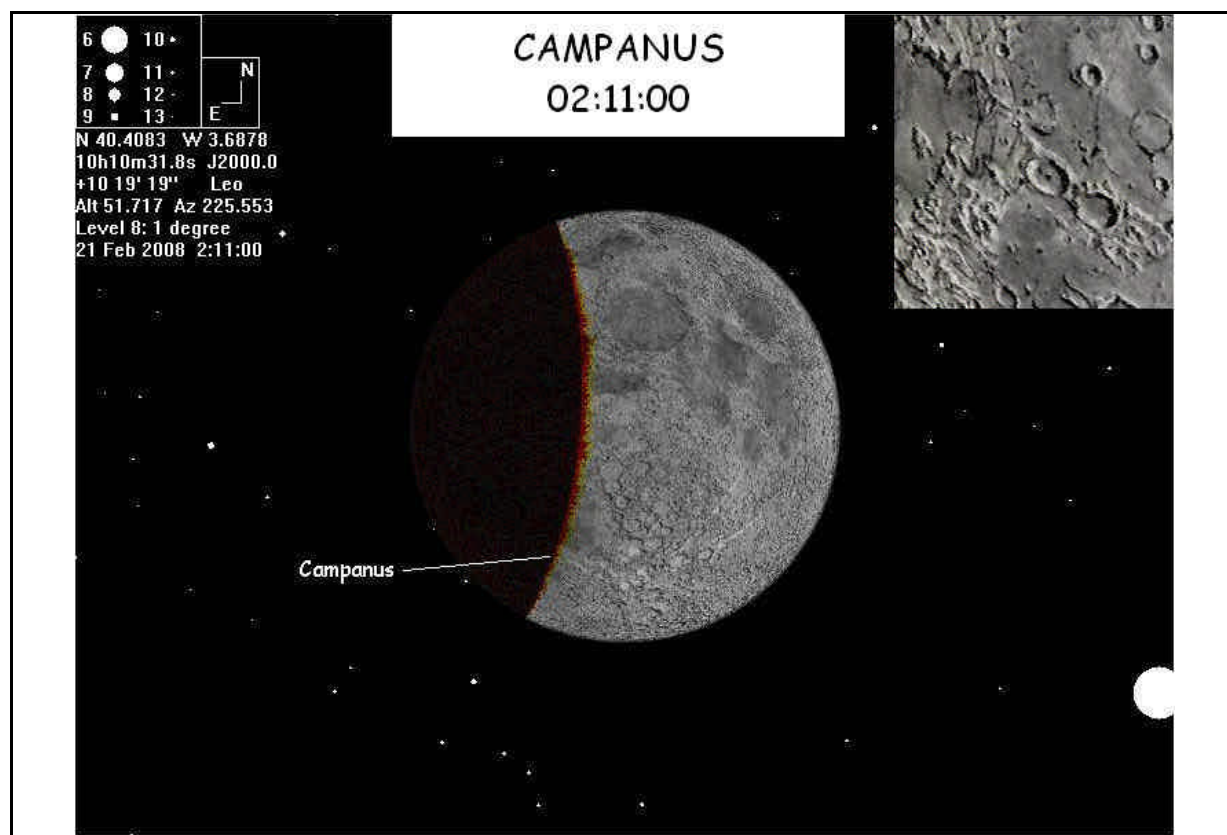


Figure 30.- Ocultation of Campanus seen from the North Hemisphere (02:11:00).

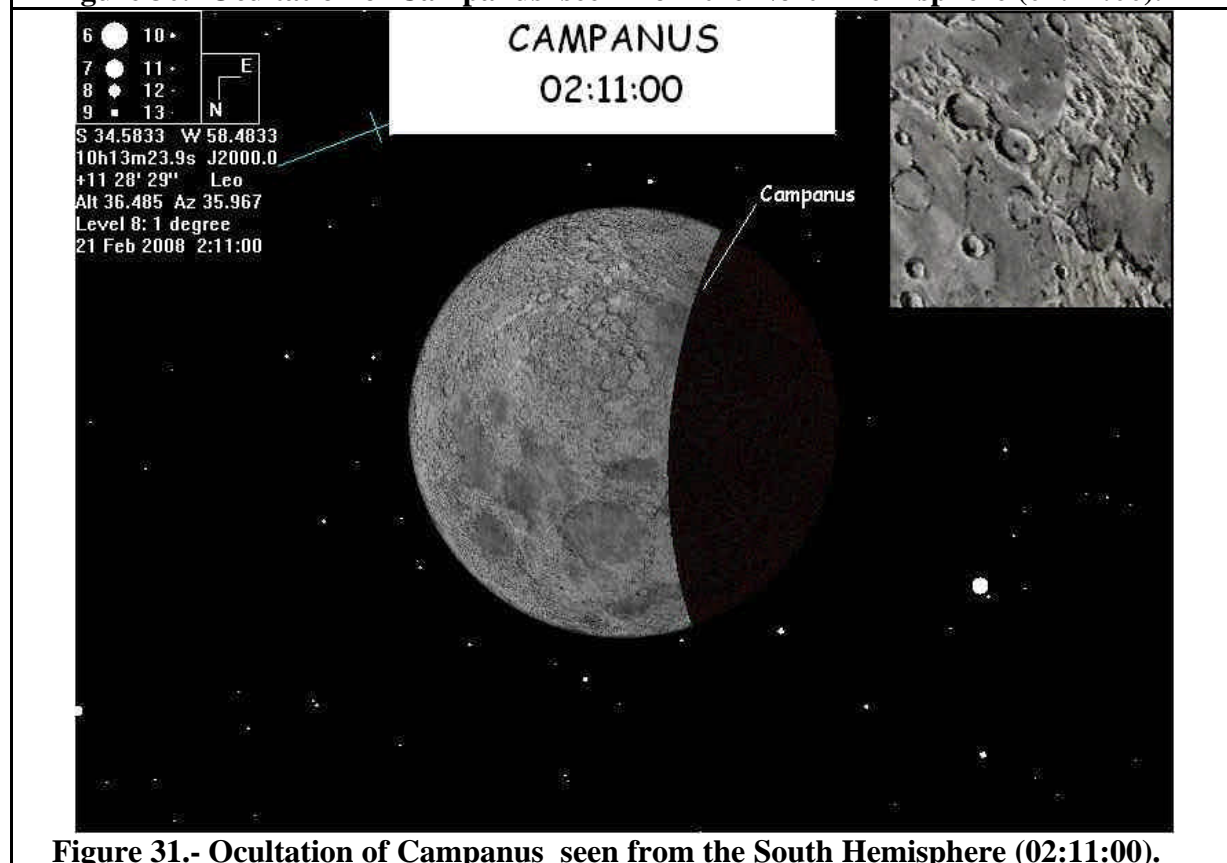


Figure 31.- Ocultation of Campanus seen from the South Hemisphere (02:11:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

ARISTOTELES

Category	Diameter	Depth
Circus	87 Km	3700 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:14:00

FIFTH ACTIVITY STEP BY STEP

02:13:00 Once the alarm rings, monitor the Circus Aristoteles (figures 32 and 33).

02:14:00 Timing the arrival of the umbra to both borders and calculate the average time. At the ocultation of the circus record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
---------------	--

Interval until next step..... 0 minutes.

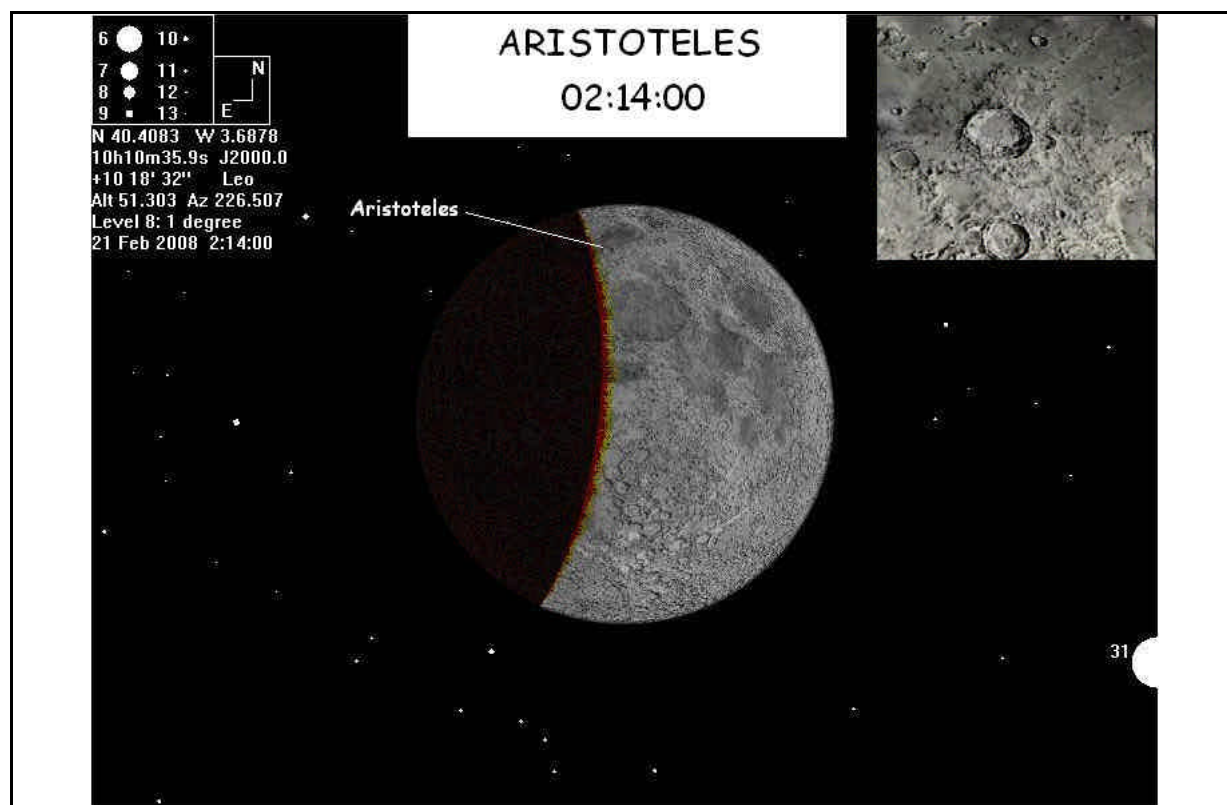


Figure 32.- Ocultation of Aristoteles seen from the North Hemisphere (02:14:00).

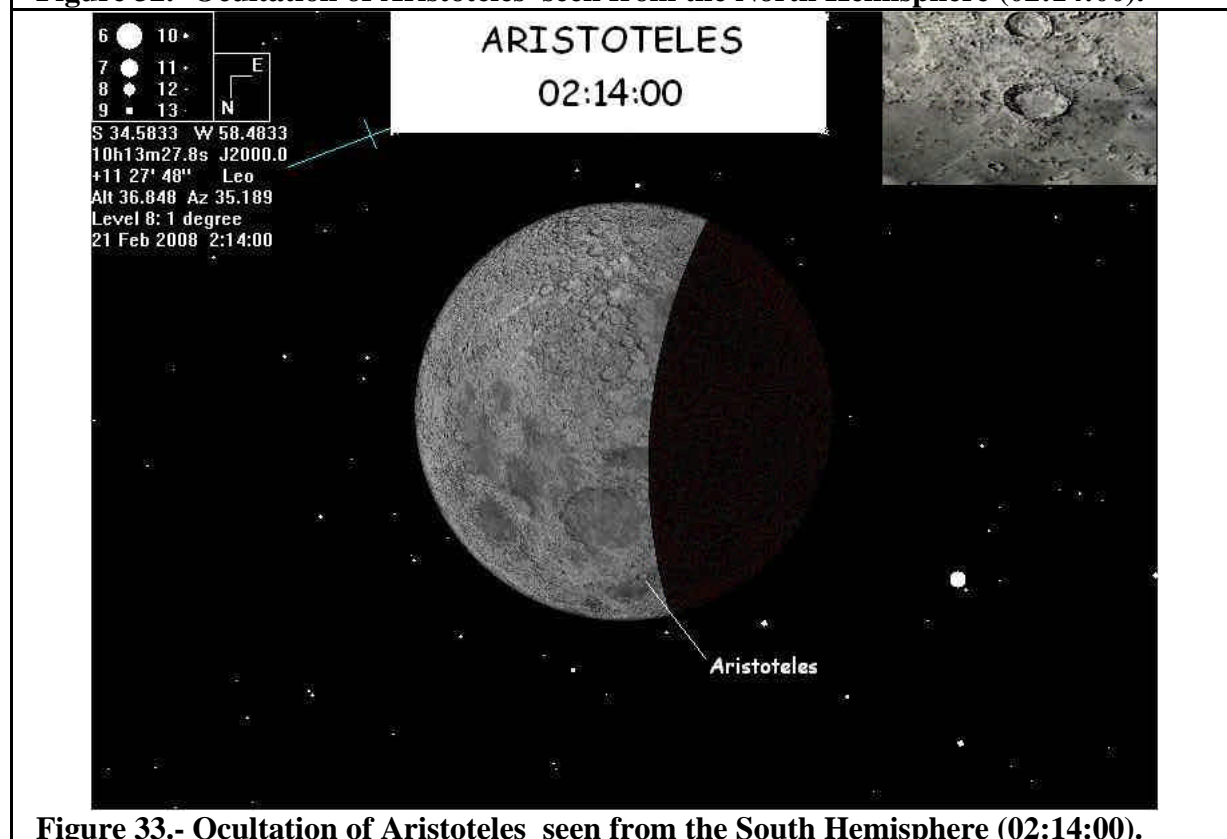


Figure 33.- Ocultation of Aristoteles seen from the South Hemisphere (02:14:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

EUDOXUS

Category	Diameter	Depth
Circus	67 Km	3350 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:15:00

FIFTH ACTIVITY STEP BY STEP

02:14:30 Monitor Circus Eudoxus (figures 34 and 35).

02:15:00 Timing the arrival of the umbra to both borders and calculate the average time. At the ocultation of the circus record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
---------------	--

Interval until next step..... 0 minutes.

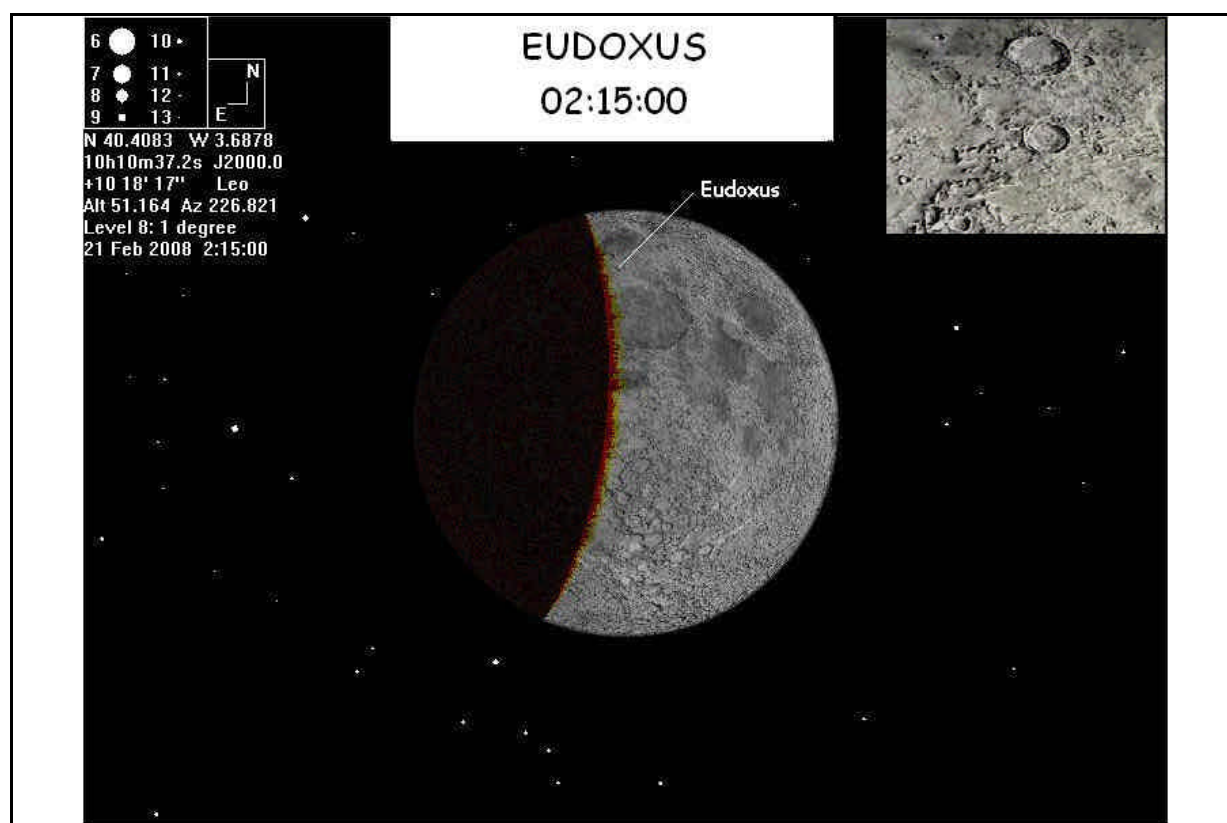


Figure 34.- Ocultation of Eudoxus seen from the North Hemisphere (02:15:00).

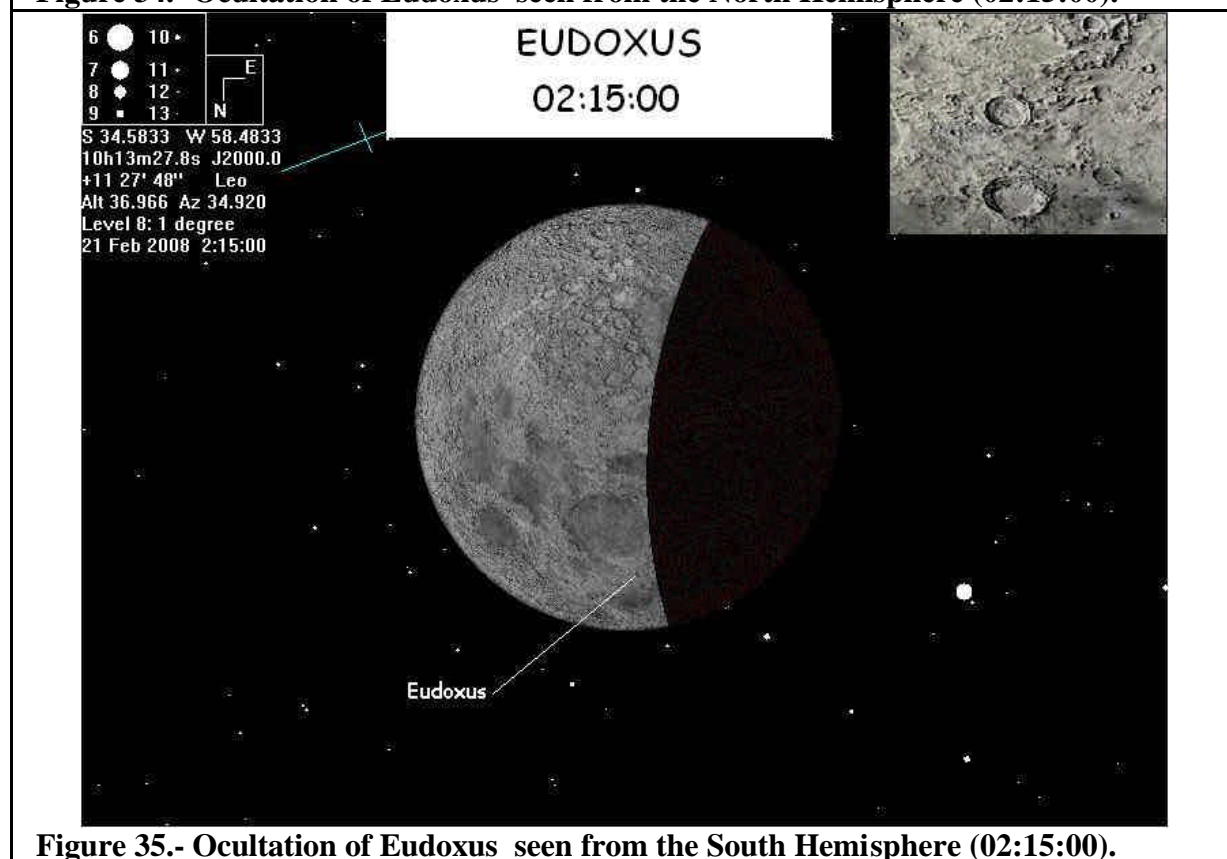


Figure 35.- Ocultation of Eudoxus seen from the South Hemisphere (02:15:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

MANILIUS

Category	Diameter	Depth
Crater	39 Km	3050 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:16:00

FIFTH ACTIVITY STEP BY STEP

02:15:30 Monitor Crater Manilius (figures 36 and 37).

02:16:00 At the occultation of the crater, record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
---------------	--

Interval until next step..... 2 minutes for the South Hemisphere.
3 minutes for the North Hemisphere.

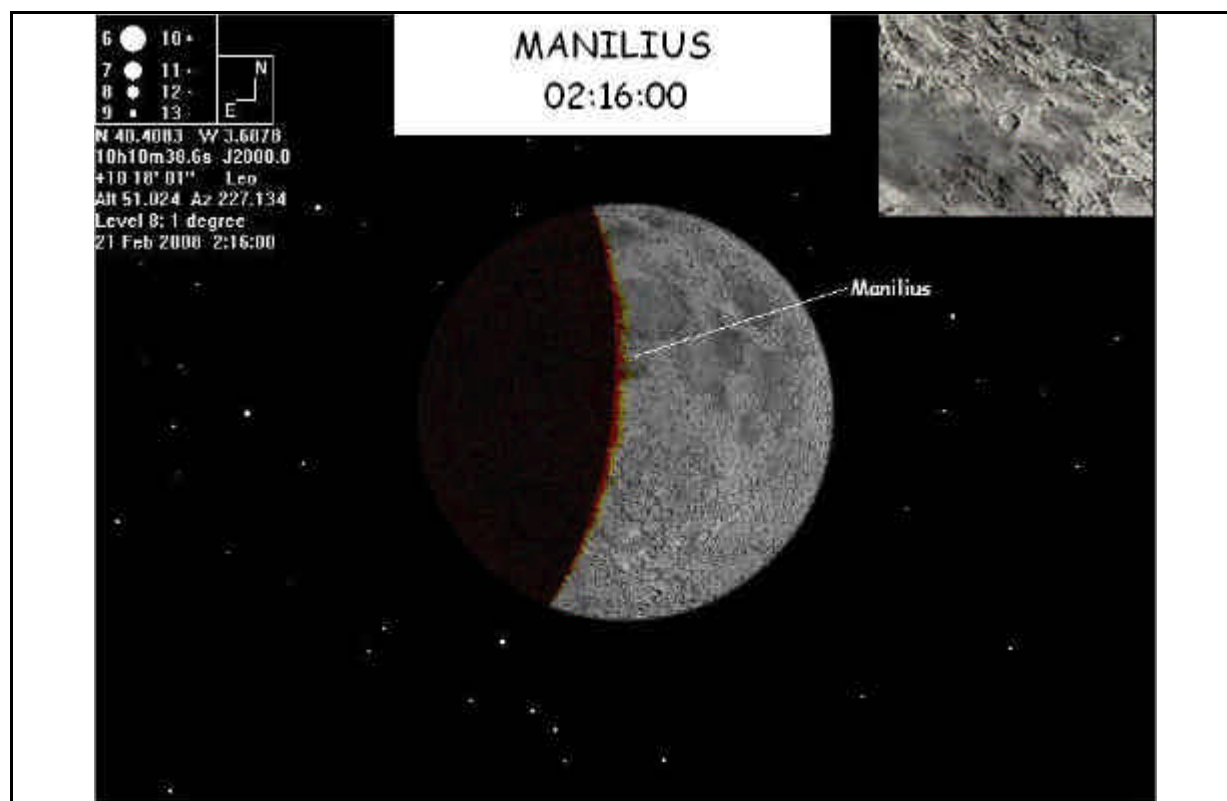


Figure 36.- Ocultation of Manilius seen from the North Hemisphere (02:16:00).

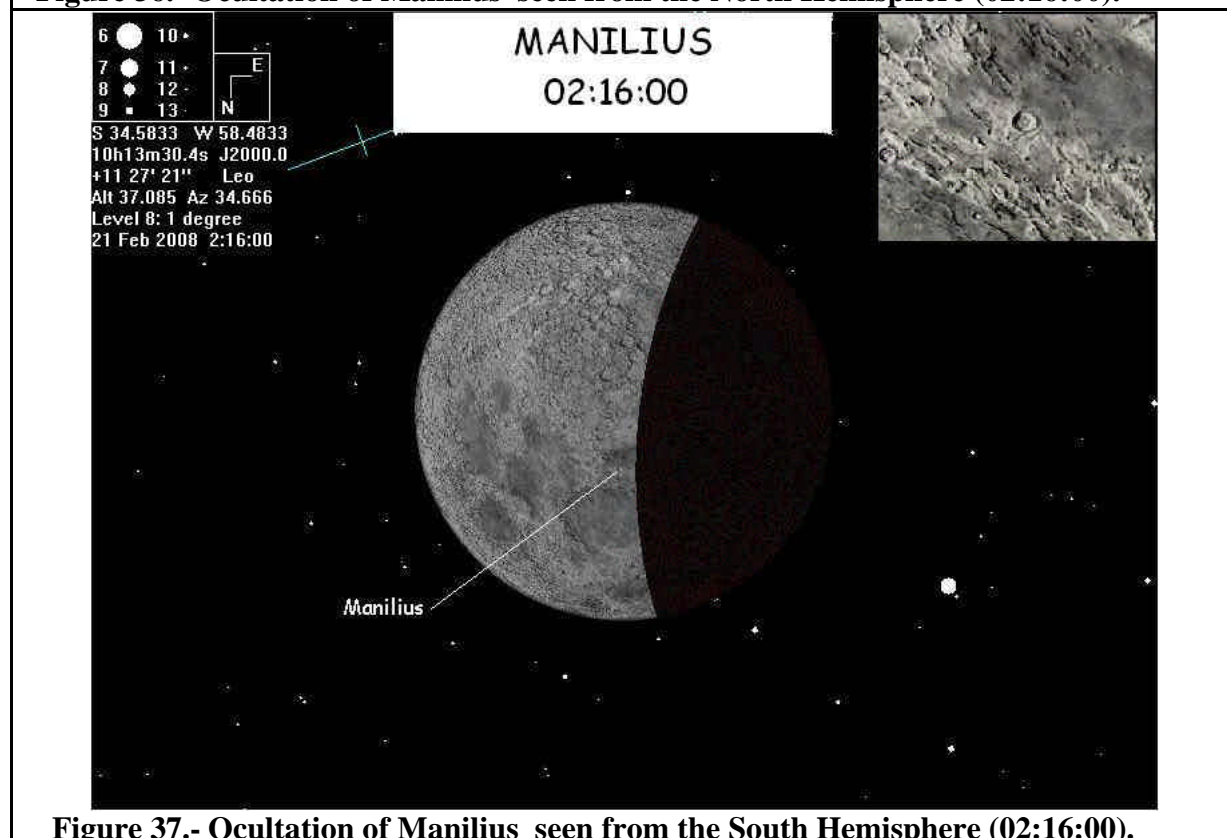


Figure 37.- Ocultation of Manilius seen from the South Hemisphere (02:16:00).

TIMING OF THE EMERSION OF STARS FROM THE MOON
FROM BUENOS AIRES

GSC 840 185

M_v = 8,6

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:19:15

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

from Buenos Aires (from other sites, see note).
Large Aperture Telescope with a medium power magnification (200x) without polarizers.
Chronometer with alarm
Optional picture if additional telescope and camera are available.

ACTIVITY

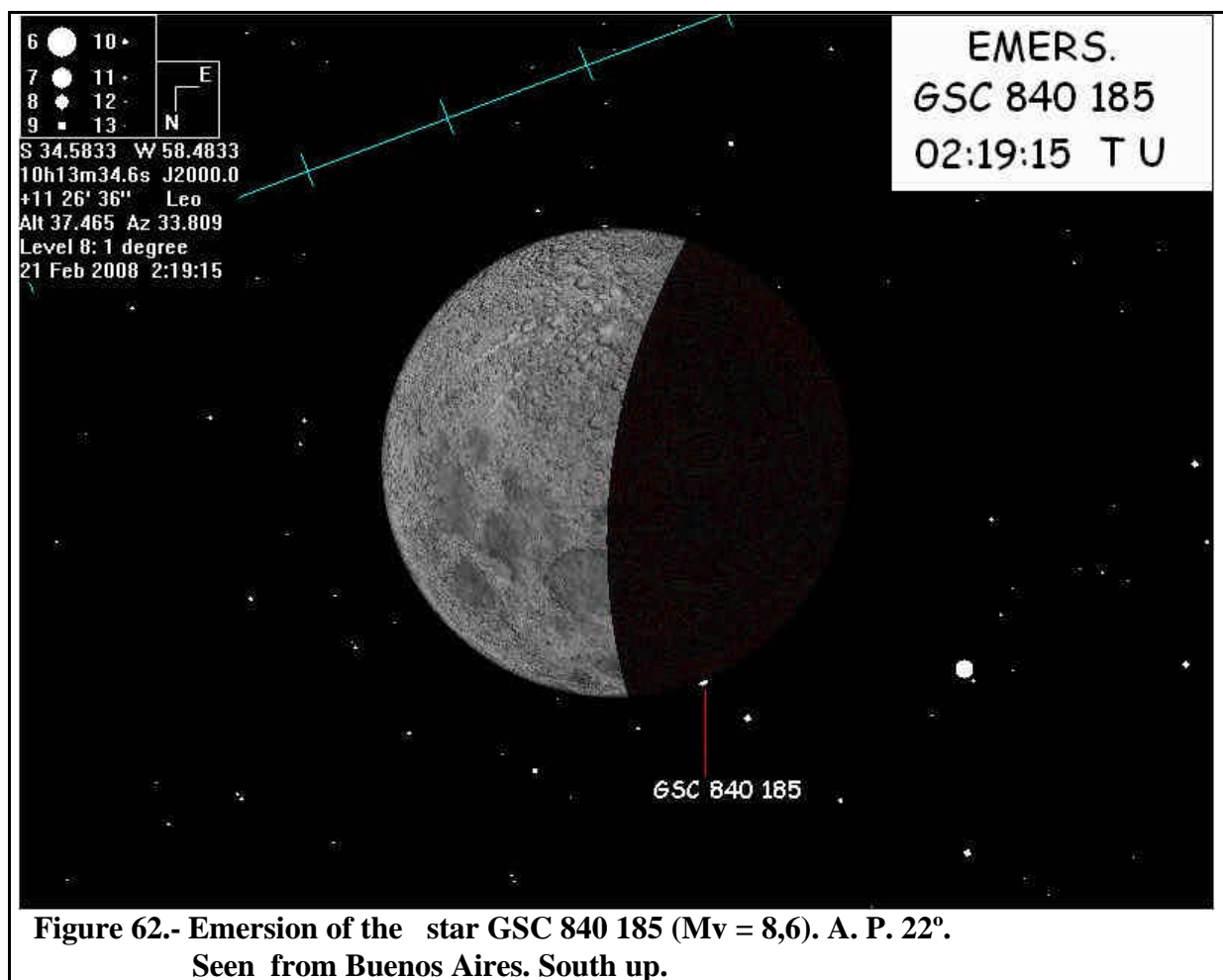
IN BUENOS AIRES:

02:18:00 Monitor limb North of the Moon, where the star must appear (see figure 62).

02:19:15 At the star emersion record time identifying the event ("Emersion star 1") and take a picture with the camera.

EVENTUAL END OF THE ACTIVITY FROM BUENOS AIRES

Interval until next step..... 0 minutes.



Measured Time	
---------------	--

NOTE: In order to know if the Emersion is visible from other Southamerica sites and the time, it is necessary to perform a new simulation.

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

MENELAUS

Category	Diameter	Depth
Crater	27 Km	3010 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:20:00

FIFTH ACTIVITY STEP BY STEP

02:19:15 Monitor Crater Menelaus (figures 38 and 39).

02:20:00 At the ocultation of the crater, record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
---------------	--

Interval until next step..... 3 minutes.

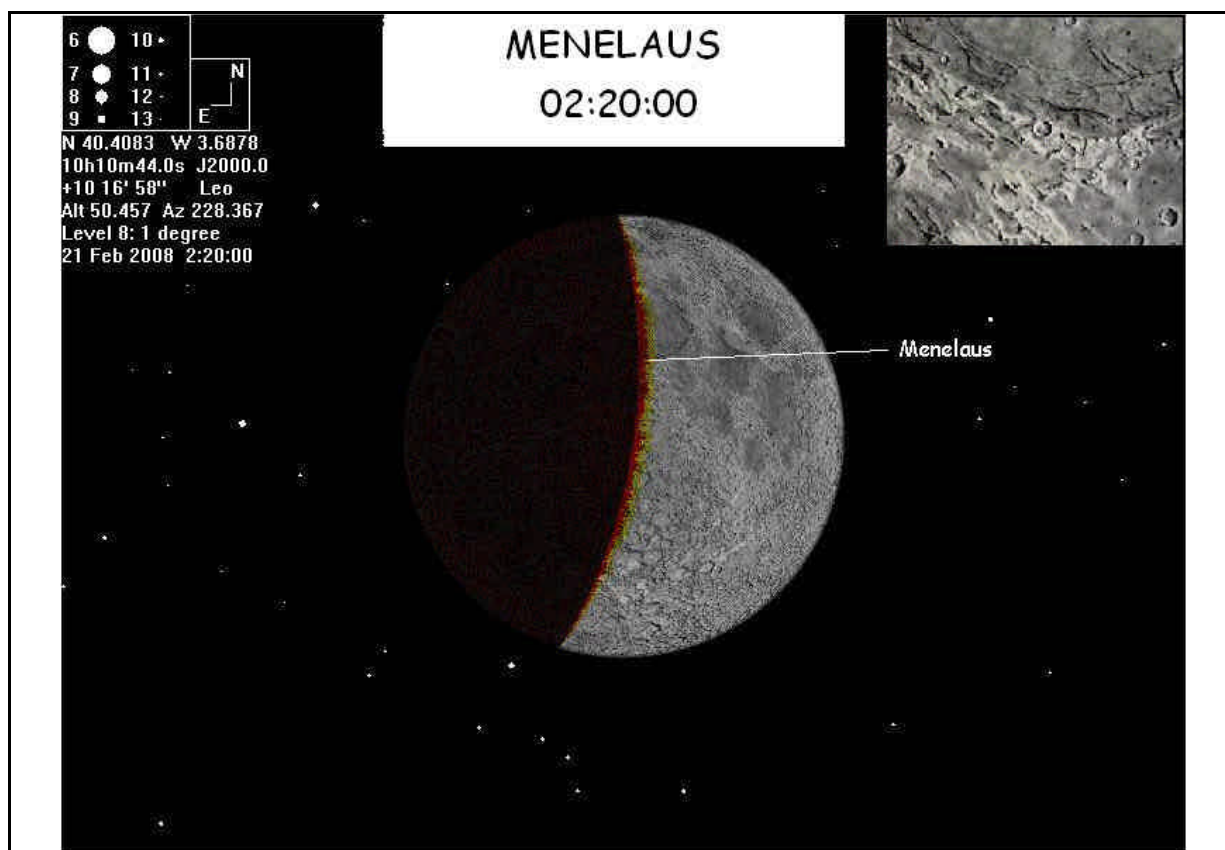


Figure 38.- Ocultation of Menelaus seen from the North Hemisphere (02:20:00).

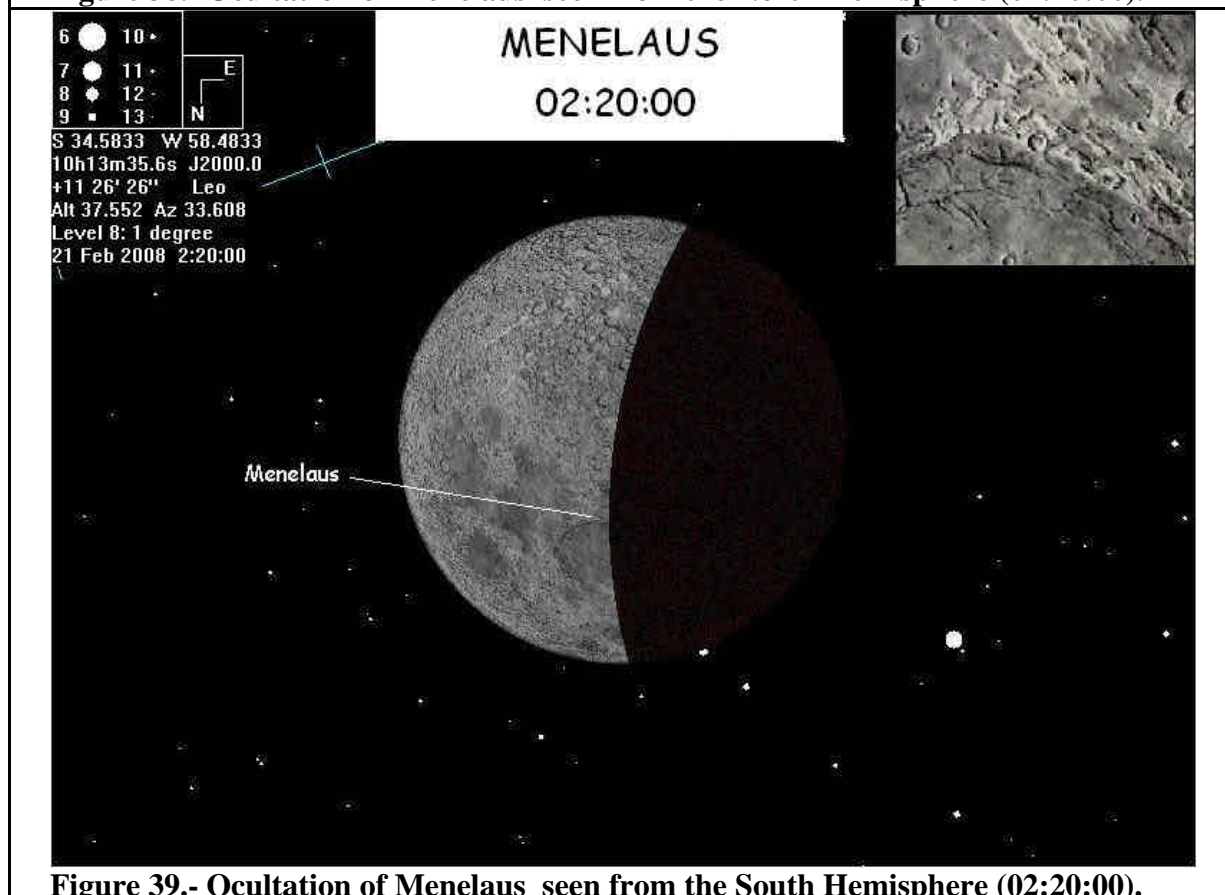


Figure 39.- Ocultation of Menelaus seen from the South Hemisphere (02:20:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

DIONYSIUS

Category	Diameter	Depth
Crater	18 Km	2700 m

PLINIUS

Category	Diameter	Depth
Crater	43 Km	2320 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:24:00

FIFTH ACTIVITY STEP BY STEP

02:23:00 Vigilar the Craters Dionysius and Plinius (figures 40 and 41).

02:24:00 At the ocultation of the crater, record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

NOTE: If the ocultation is not simultaneous, record the times of each event separately.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time for Dionysius	
--------------------------------	--

Measured Time for Plinius	
------------------------------	--

Interval until next step..... 1 minute for the South Hemisphere;
2 minutes for the North Hemisphere.

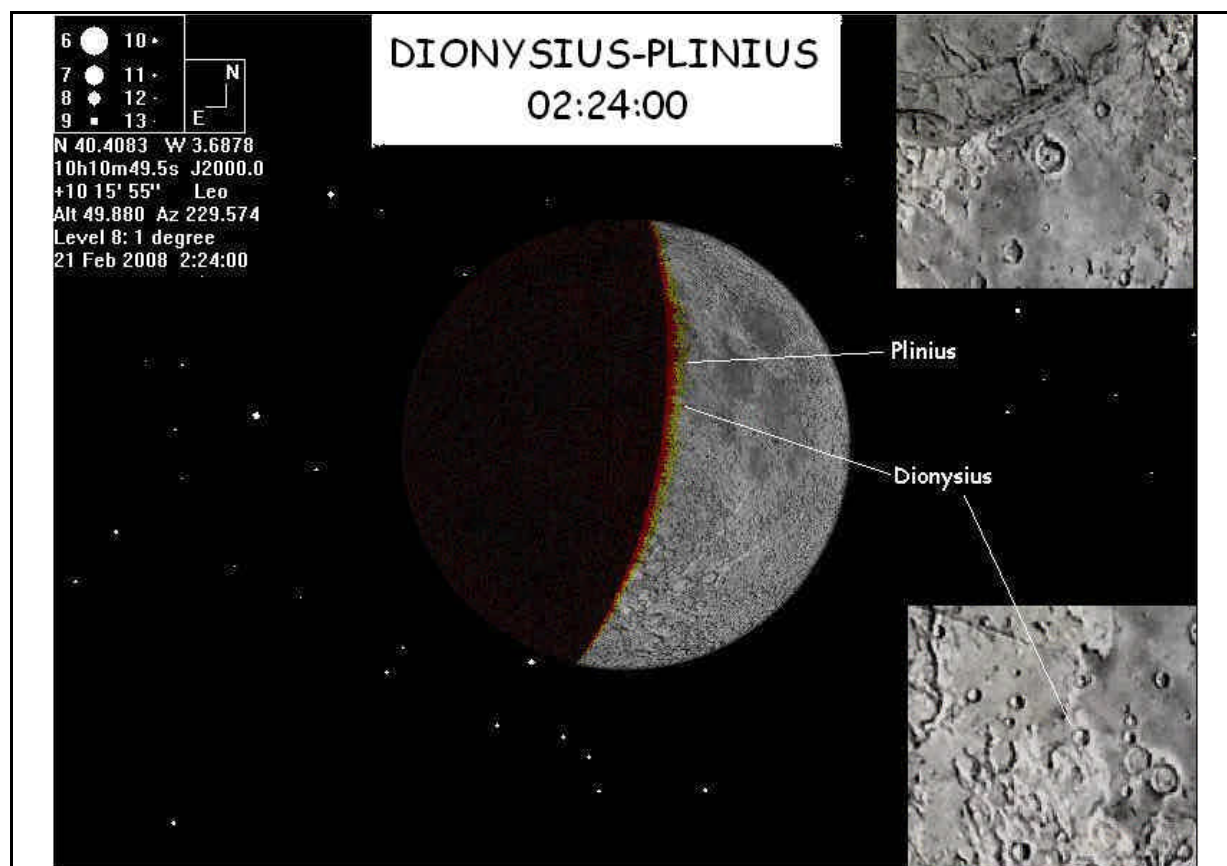


Figure 40.- Ocultation of Dionysius and Plinius seen from the North Hemisphere (02:24:00).

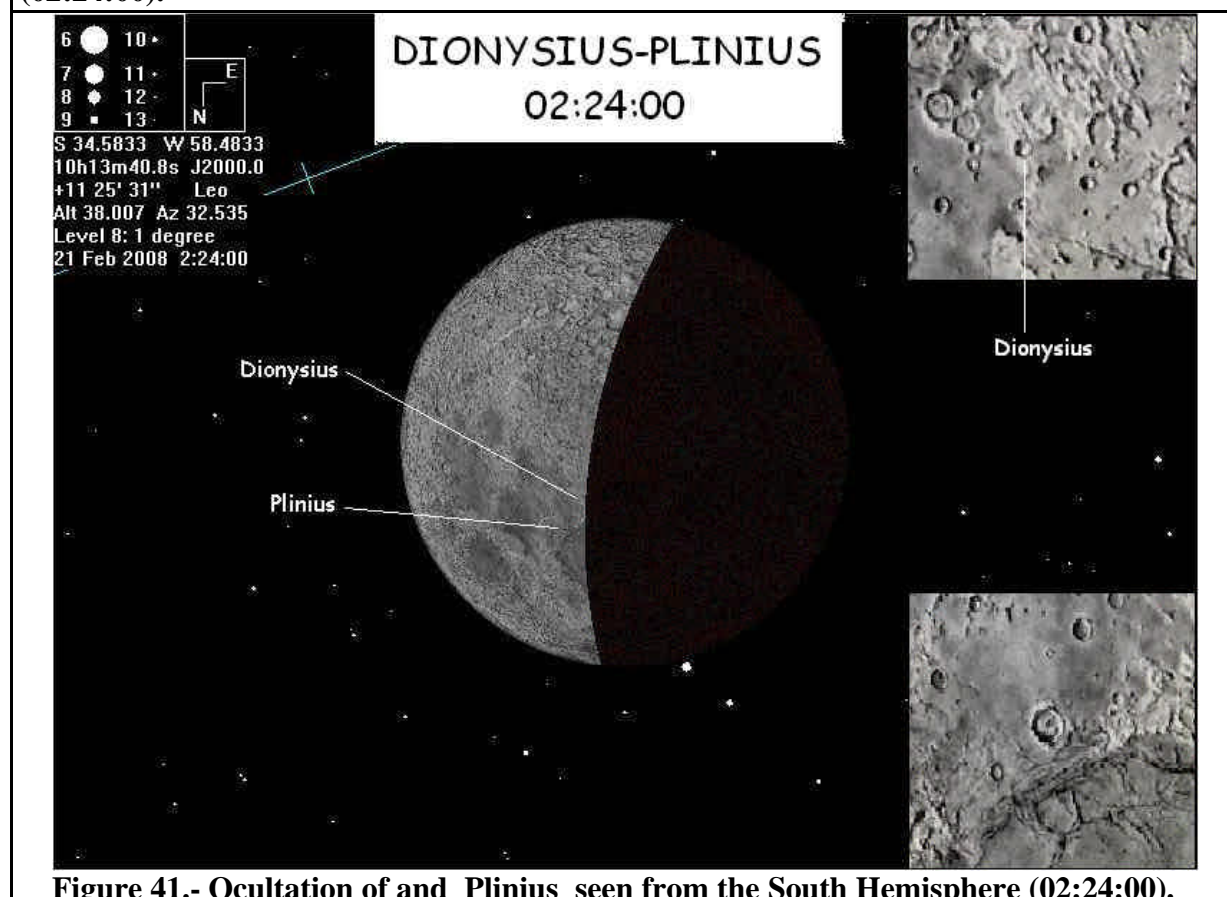


Figure 41.- Ocultation of and Plinius seen from the South Hemisphere (02:24:00).

TIMING OF THE OCULTATION OF STARS BY THE MOON FROM MADRID

GSC 833 1091

$M_v = 10$

Proposed Equipment.

Large Aperture Telescope;
Medium Focal Telescope (if available)
DSLR Camera (if the auxiliary telescope is available)
GPS and/or Chronometer and Voice recorder.

ESTIMATED TIME: 02:26:10

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

from Madrid (from other sites, see note).

Large Aperture Telescope with a medium power magnification (200x) without polarizers.

Chronometer with alarm

Optional picture if additional telescope and camera are available.

ACTIVITY

IN MADRID :

ATTENTION: the Ocultation of Circus Tycho ocurrirá inmediatamente OFspués of acabar esta ACTIVITY.

02:25:00 Monitor the star GSC 833 1091 in the SSO of the Moon (see figure 57). Record time. If a camera and a telescope is available, capture test exposures to estimate the shutter velocity required to image. Saturate the Moon if necessary. Other telescopes are taken good pictures.

01:59:30 Take a fast sequence of pictures during the contact and occultation of the star with the limb of the Moon.

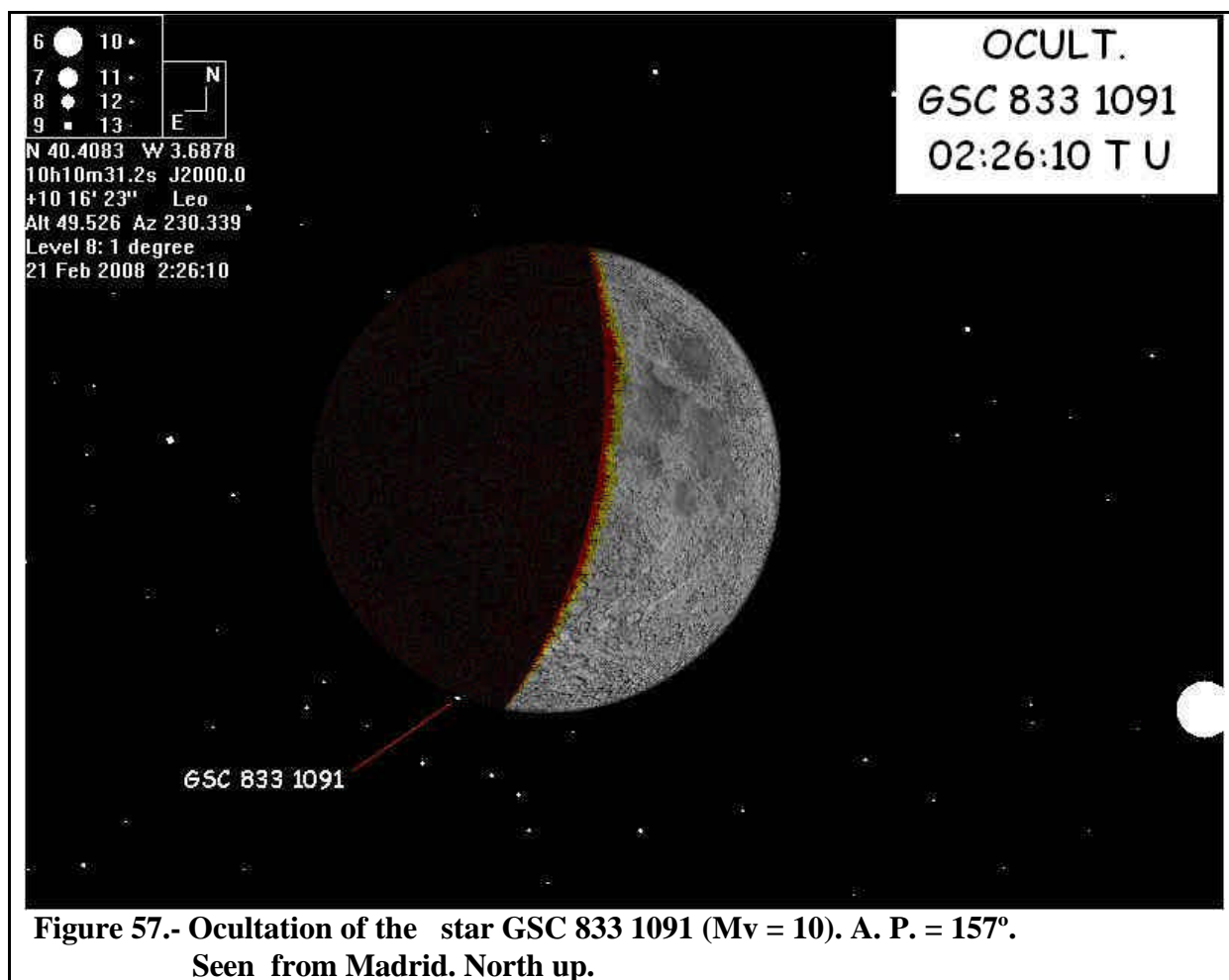
02:26:00 Take a fast sequence of pictures during the contact and occultation of the star with the limb of the Moon.

02:26:10 At the star occultation, record the identifying the event ("Ocultation star 2").

02:26:30 ATTENTION: Ocultation of Circus Tycho immediate.

EVENTUAL END of the ACTIVITY FROM MADRID.

Interval until next step..... 0 minutes.



Measured Time	
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NOTE: In order to know if the ocultation is visible from other Western Europe sites and the time, it is necessary to perform a new simulation.

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

TYCHO

Category	Diameter	Depth
Circus	85 Km	4850 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:27:00

FIFTH ACTIVITY STEP BY STEP

02:26:00 Monitor Circus Tycho (figures 42 and 43).

02:27:00 Timing the arrival of the umbra to both borders and calculate the average time. At the ocultation of the circus record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

02:28:00 Set the chronometer alarm at 02:33:00.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 5 minutes.

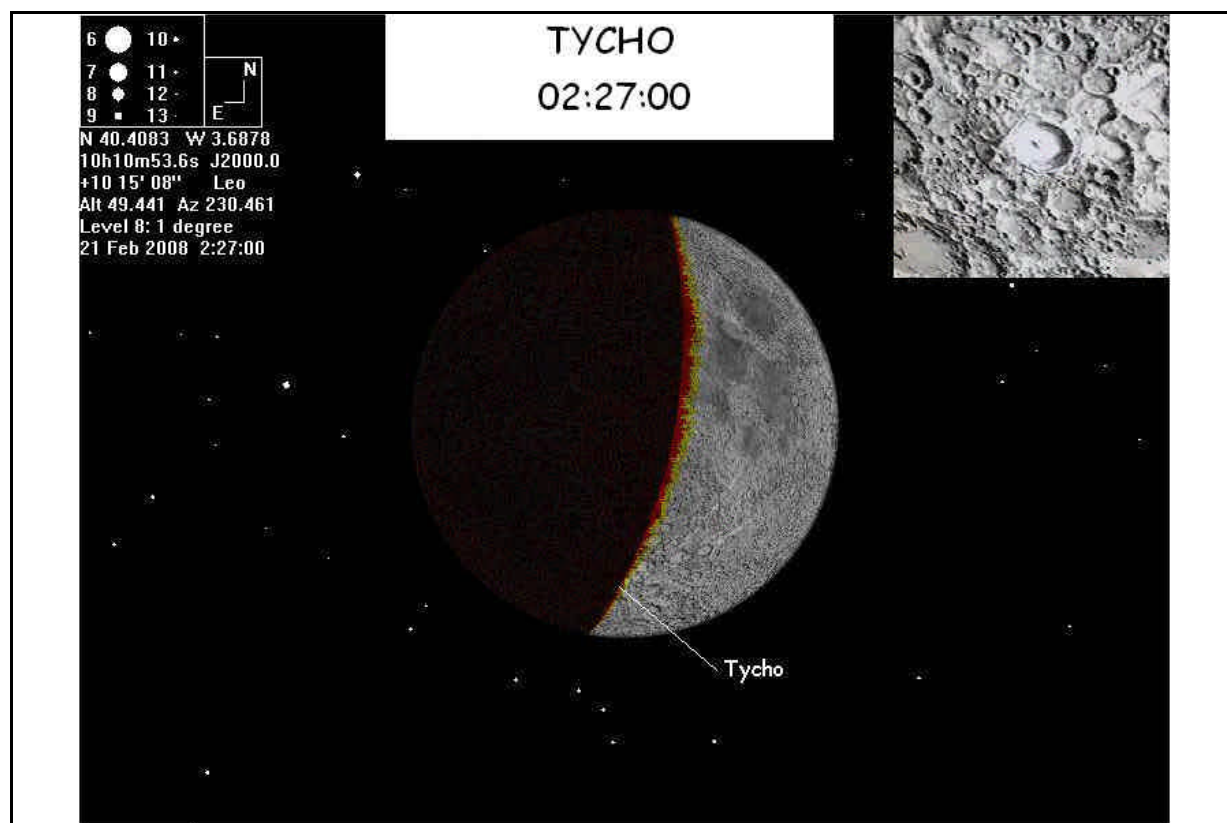


Figure 42.- Ocultation of Tycho seen from the North Hemisphere (02:27:00).

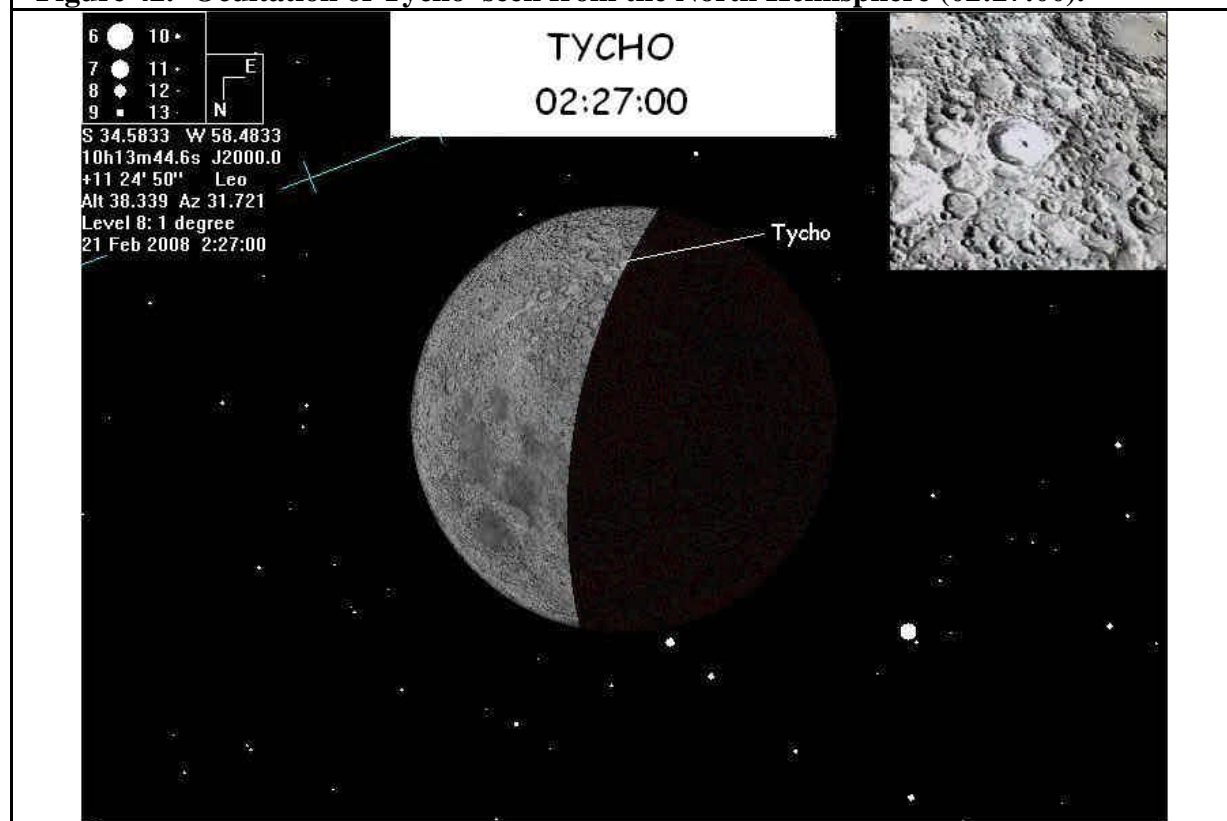


Figure 43.- Ocultation of Tycho seen from the South Hemisphere (02:27:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

PROCLUS

Category	Diameter	Depth
Crater	28 Km	2400 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:34:00

FIFTH ACTIVITY STEP BY STEP

02:33:00 Monitor Crater Proclus (figures 44 and 45).

02:34:00 At the occultation of the crater, record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 3 minutes.

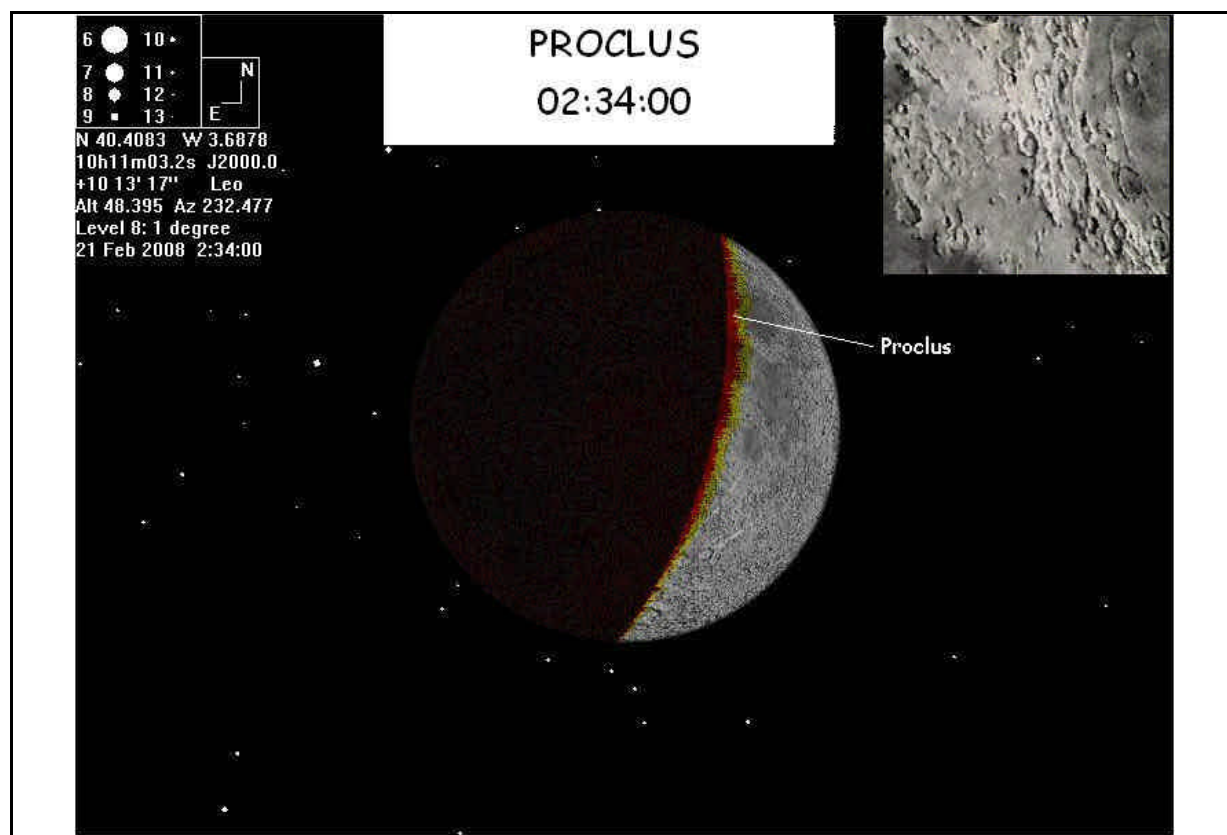


Figure 44.- Ocultation of Proclus seen from the North Hemisphere (02:34:00).

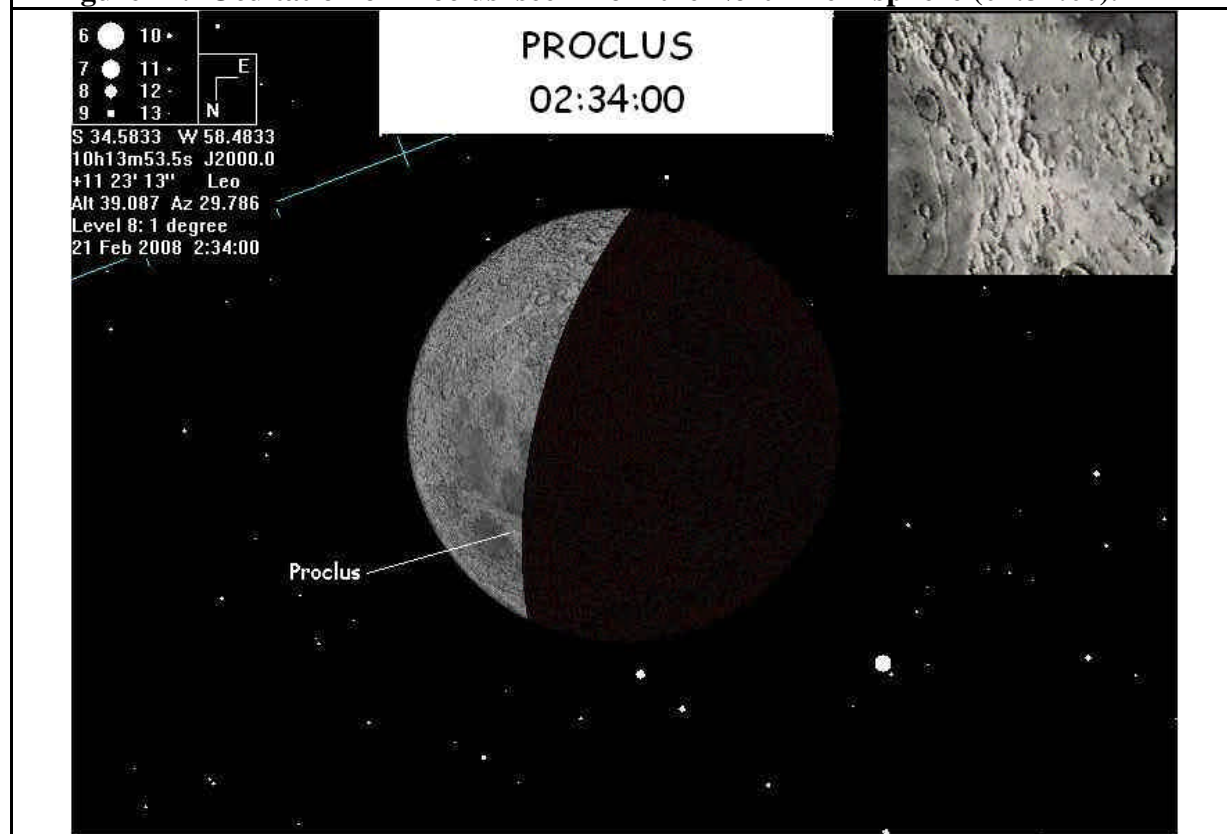


Figure 45.- Ocultation of Proclus seen from the South Hemisphere (02:34:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

TARUNTIUS

Category	Diameter	Depth
Circus	56 Km	1150 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:38:00

FIFTH ACTIVITY STEP BY STEP

02:37:00 Monitor Circus Taruntius (figures 46 and 47).

02:38:00 Timing the arrival of the umbra to both borders and calculate the average time. At the ocultation of the circus record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 3 minutes.

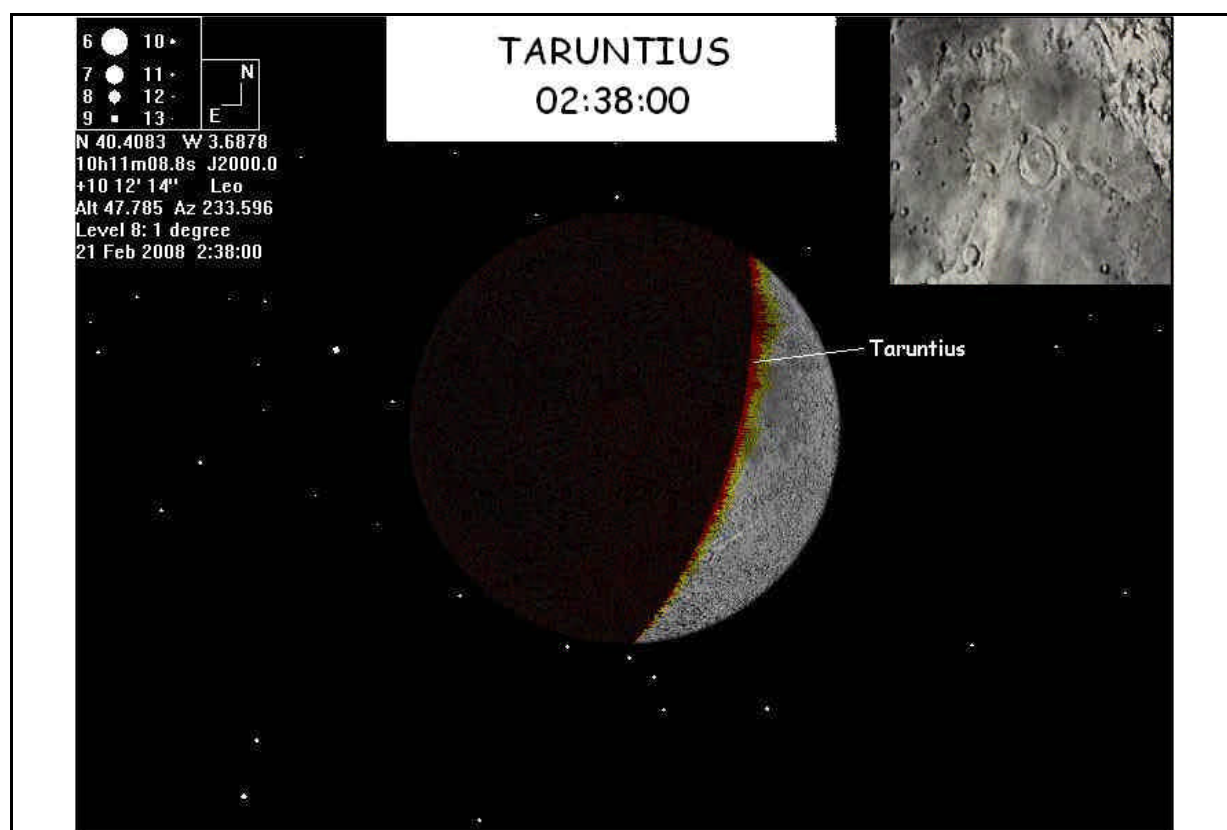


Figure 46.- Ocultation of Taruntius seen from the North Hemisphere (02:38:00).

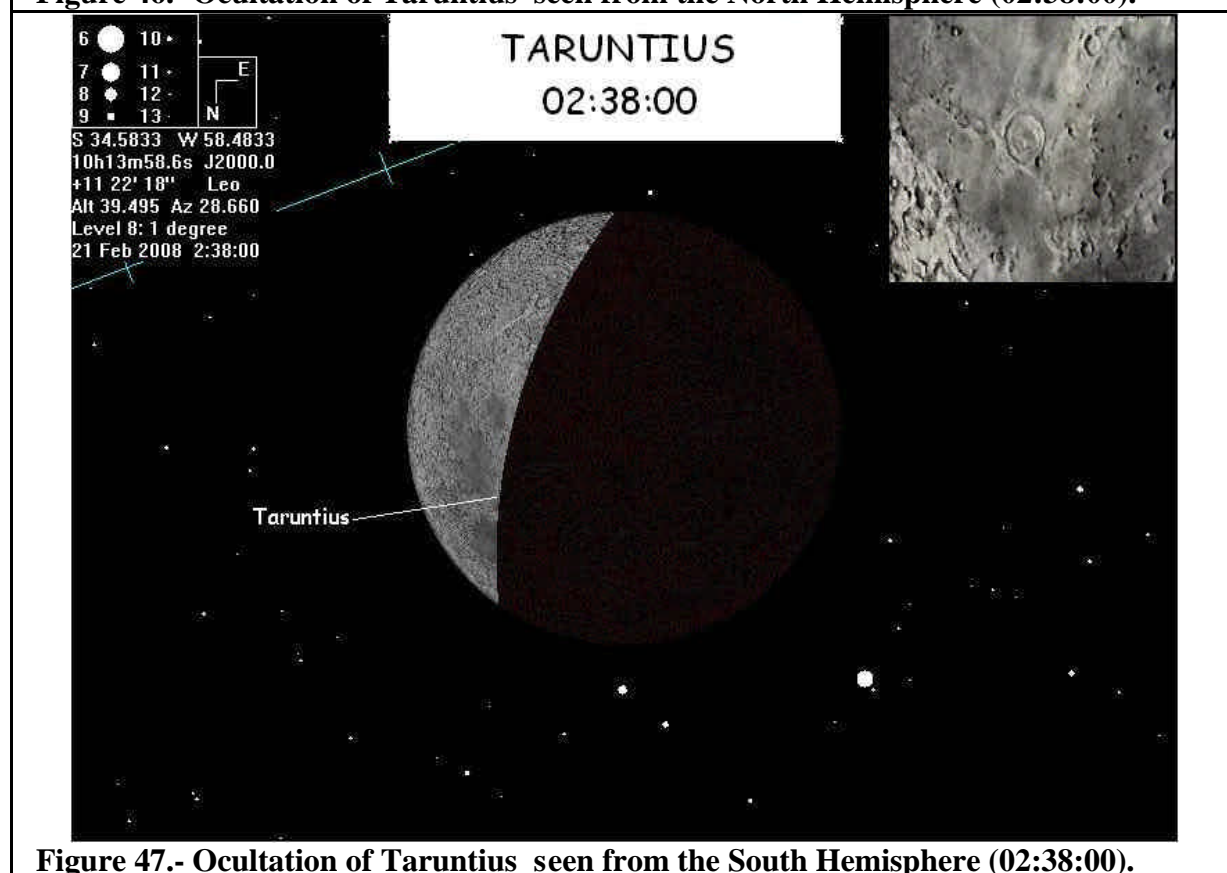


Figure 47.- Ocultation of Taruntius seen from the South Hemisphere (02:38:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

GOCLENIUS

Category	Diameter	Depth
Circus	54x72 Km	1500 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 02:42:00

FIFTH ACTIVITY STEP BY STEP

02:41:00 Monitor Circus Goclenius (figures 48 and 49).

02:42:00 Timing the arrival of the umbra to both borders and calculate the average time. At the ocultation of the circus record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 5 minutes.

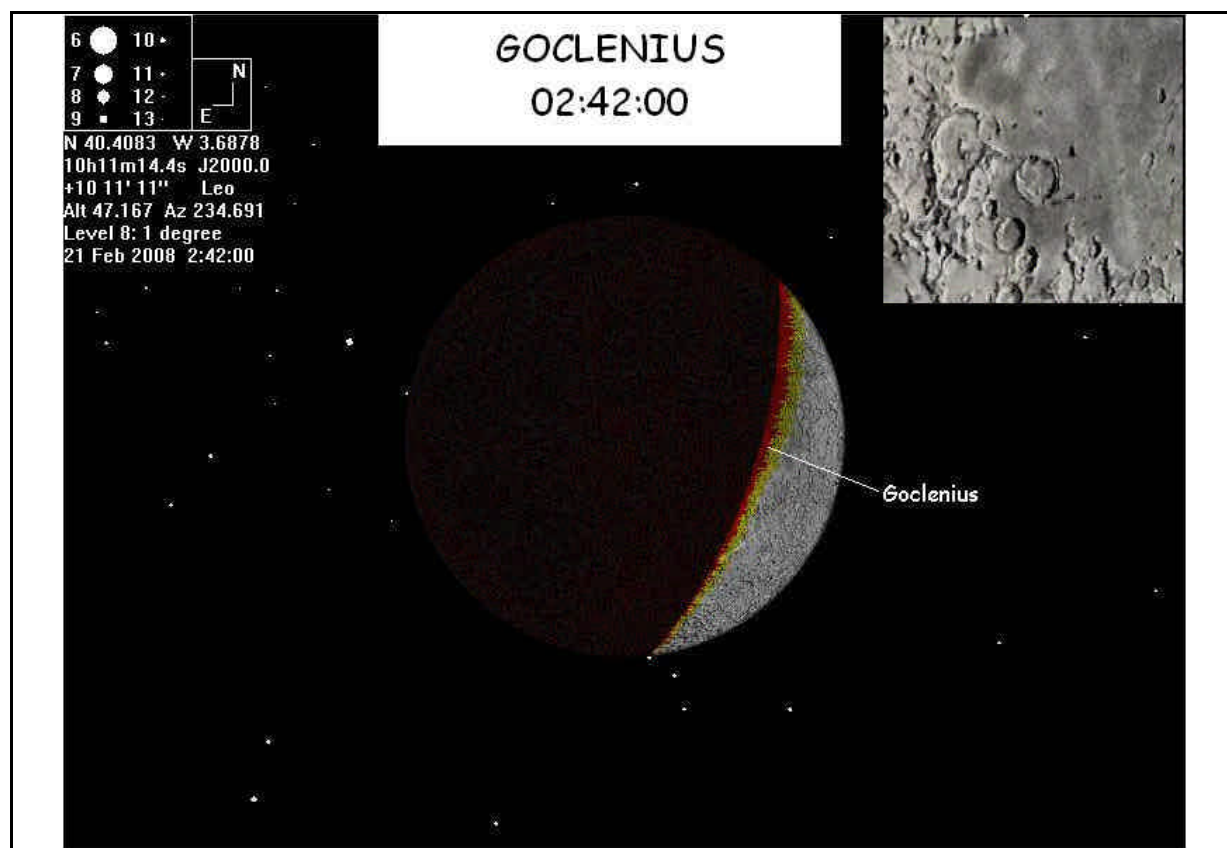


Figure 48.- Ocultation of Goclenius seen from the North Hemisphere (02:42:00).

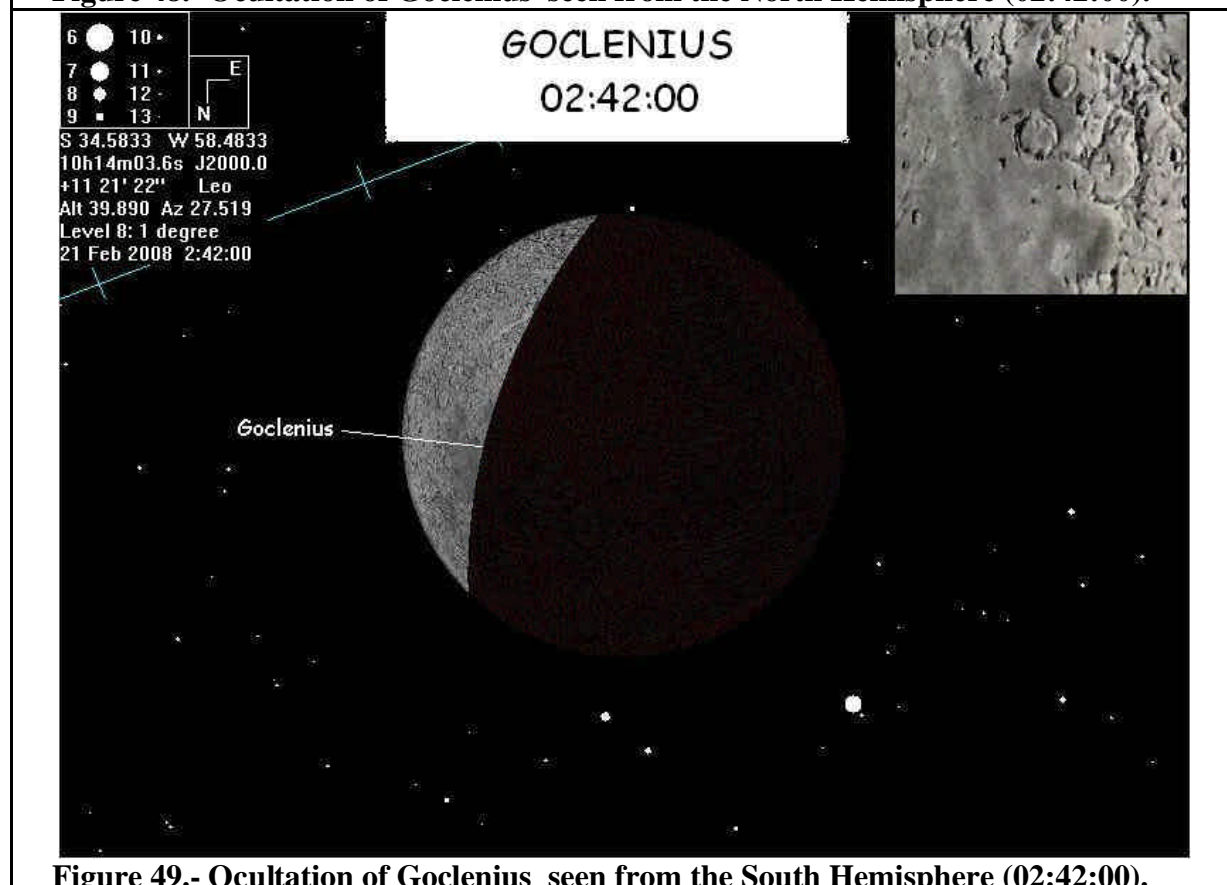


Figure 49.- Ocultation of Goclenius seen from the South Hemisphere (02:42:00).

TIMING OF THE IMMERSION OF LUNAR FEATURES IN THE EARTH SHADOW

LANGRENUS

Category	Diameter	Depth
Circus	132 Km	2600 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliary telescope is available) GPS and/or Chronometer and Voice recorder.

ESTIMATED TIME: 02:48:00

FIFTH ACTIVITY STEP BY STEP

02:47:00 Once the alarm rings, Monitor Circus Langrenus (figures 50 and 51).
02:48:00 Timing the arrival of the umbra to both borders and calculate the average time. At the occultation of the circus record the time and the identification of the event in the voice recorder if available. Take a picture if a camera and a telescope are available.
02:49:00 Set chronometer alarm at 02:59:00.
Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).
END OF THE ACTIVITY.

Measured Time	
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Interval until next step..... 10 minutes for the South Hemisphere;
12 minutes for the North Hemisphere.

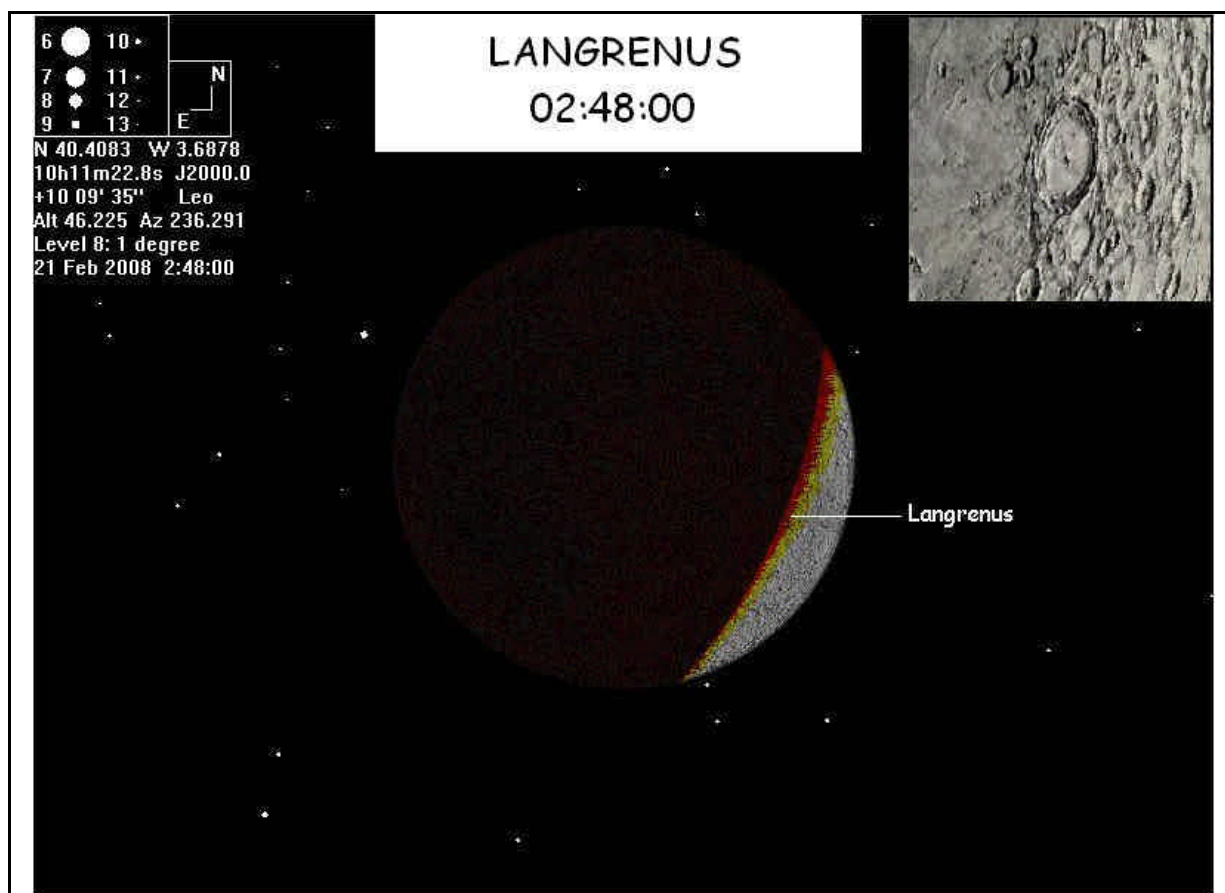


Figure 50.- Ocultation of Langrenus seen from the North Hemisphere (02:48:00).

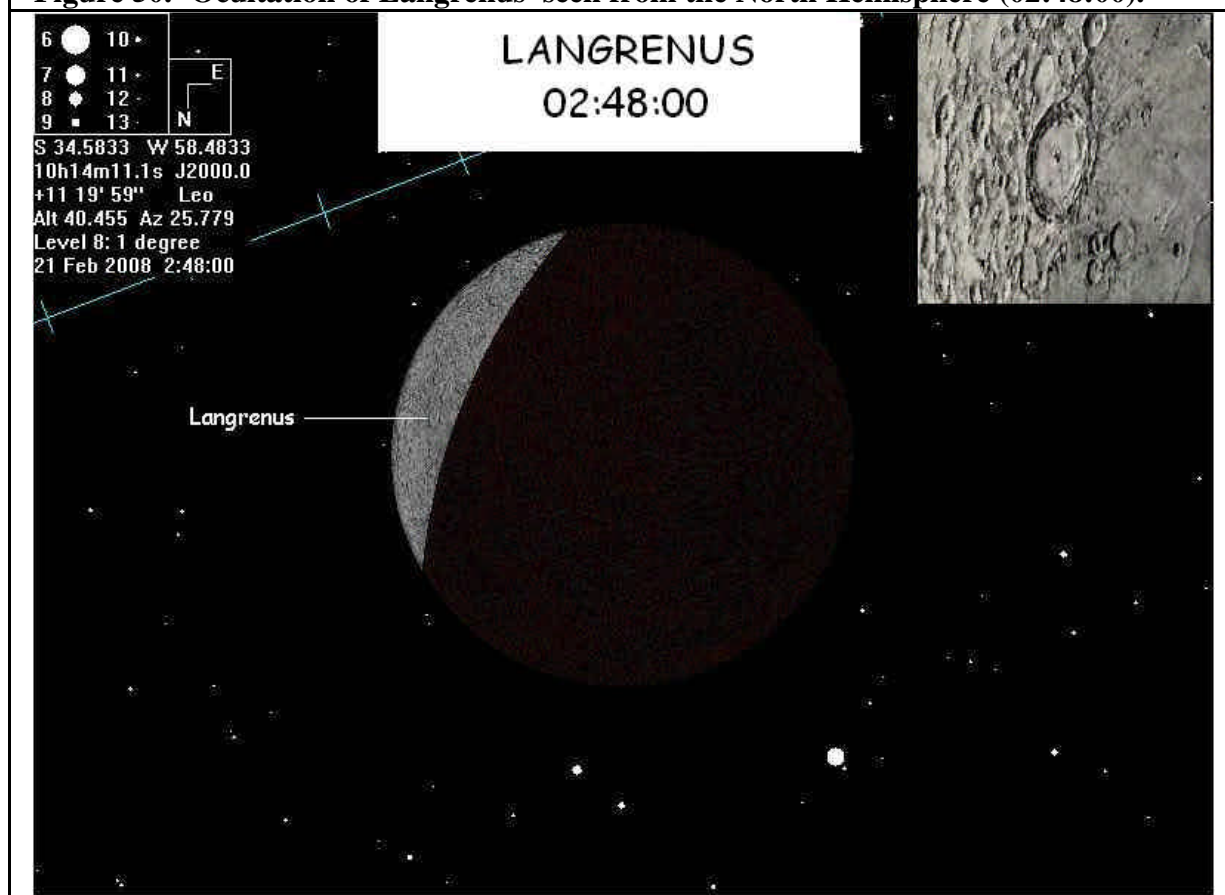


Figure 51.- Ocultation of Langrenus seen from the South Hemisphere (02:48:00).

TIMING OF THE EMERSION OF STARS FROM THE MOON
FROM BUENOS AIRES

GSC 840 963

M_v = 10

Proposed Equipment.

Large Aperture Telescope;
Medium Focal Telescope (if available)
DSLR Camera (if the auxiliar telescope is available)
GPS and/or Chronometer and Voice recorder.

ESTIMATED TIME: 03:00:30

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

From Buenos Aires (from other sites, see note).
Large Aperture Telescope with a medium power magnification (200x) without polarizers.
Chronometer with alarm
Optional picture if additional telescope and camera are available.

ACTIVITY

IN BUENOS AIRES:

ATTENTION: The **THIRD CONTACT** will be produced 10 segundos after the end of this **ACTIVITY**.

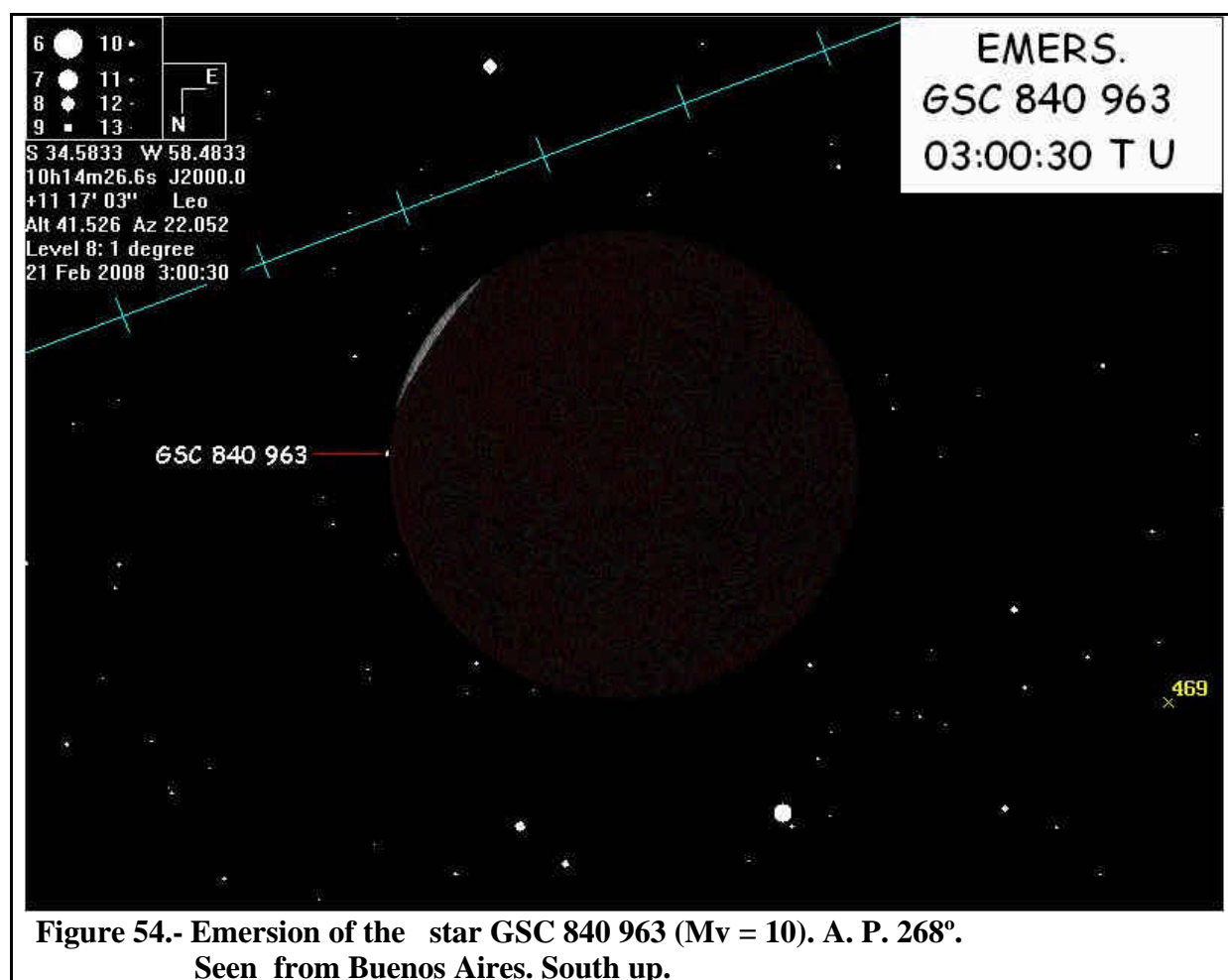
02:59:00 Monitor limb SE of the Moon, where the star must appear (see figure 54).

03:00:30 At the star emersion record time identifying the event ("Emersion star 3") and take a picture with the camera.

00:00:38 TOTALITY START immediate.

EVENTUAL END OF THE ACTIVITY FROM BUENOS AIRES

Interval until next step..... 0 minutes.



Measured Time	
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NOTE: In order to know if the Emersion is visible from other Southamerica sites and the time, it is necessary to perform a new simulation.

TIMING OF THE ECLIPSE CONTACTS

TOTALITY START

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) Binoculars DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.

ESTIMATED TIME: 03:00:48

FOURTH ACTIVITY STEP BY STEP

CONFIGURATION

Large Aperture Telescope acoplado a Camera DSLR con cable disfordor.
Auxiliar telescope with a medium power eyepiece (200x).
Binoculars of 8x50.

ACTIVITY

Put the shutter cable of the camera in mode CONTINUOUS;
Point the Telescopes to the limb SW of the Moon;

03:00:40 Record the event identification ("TOTALITY START") an a time record

03:00:45 Start the continuous capture while it is monitored the limb **SE** of the Moon;

03:00:48 Once the illuminated Moon disk dissapears completely, record a time mark and stop
the sequence of picture.

EVENTUAL END of the ACTIVITY.

NOTE: This activity continues at 03:25:00.

Measured Time	
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Interval until next step..... 0 minutes for the South Hemisphere.
9 minutes for the North Hemisphere.

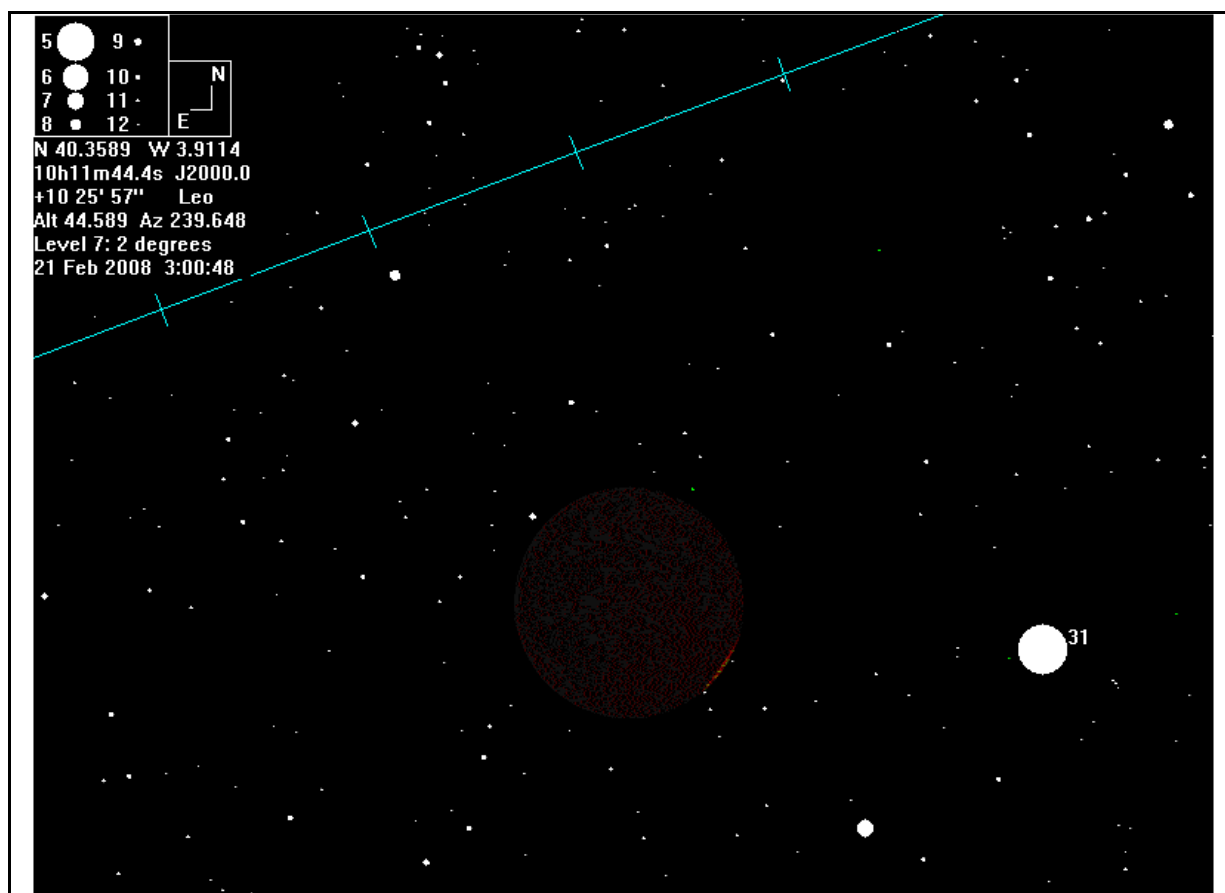


Figure 164.- TOTALITY START from Madrid.

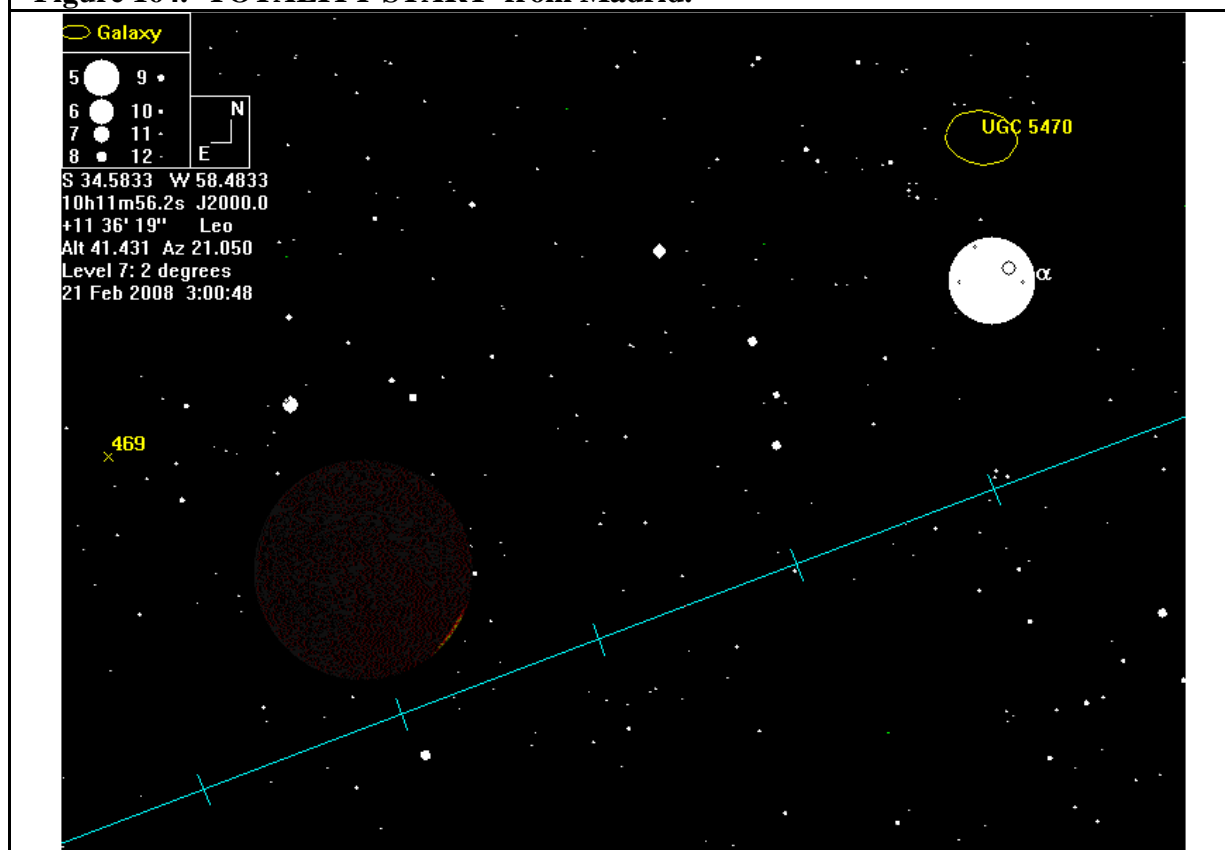


Figure 165.- TOTALITY START from Buenos Aires.

TIMING OF THE EMERSION OF STARS FROM THE MOON
FROM BUENOS AIRES

GSC 840 869

M_v = 9,5

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 03:02:15

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

from Buenos Aires (from other sites, see note).
Large Aperture Telescope with a medium power magnification (200x) without polarizers.
Chronometer with alarm
Optional picture if additional telescope and camera are available.

ACTIVITY

IN BUENOS AIRES:

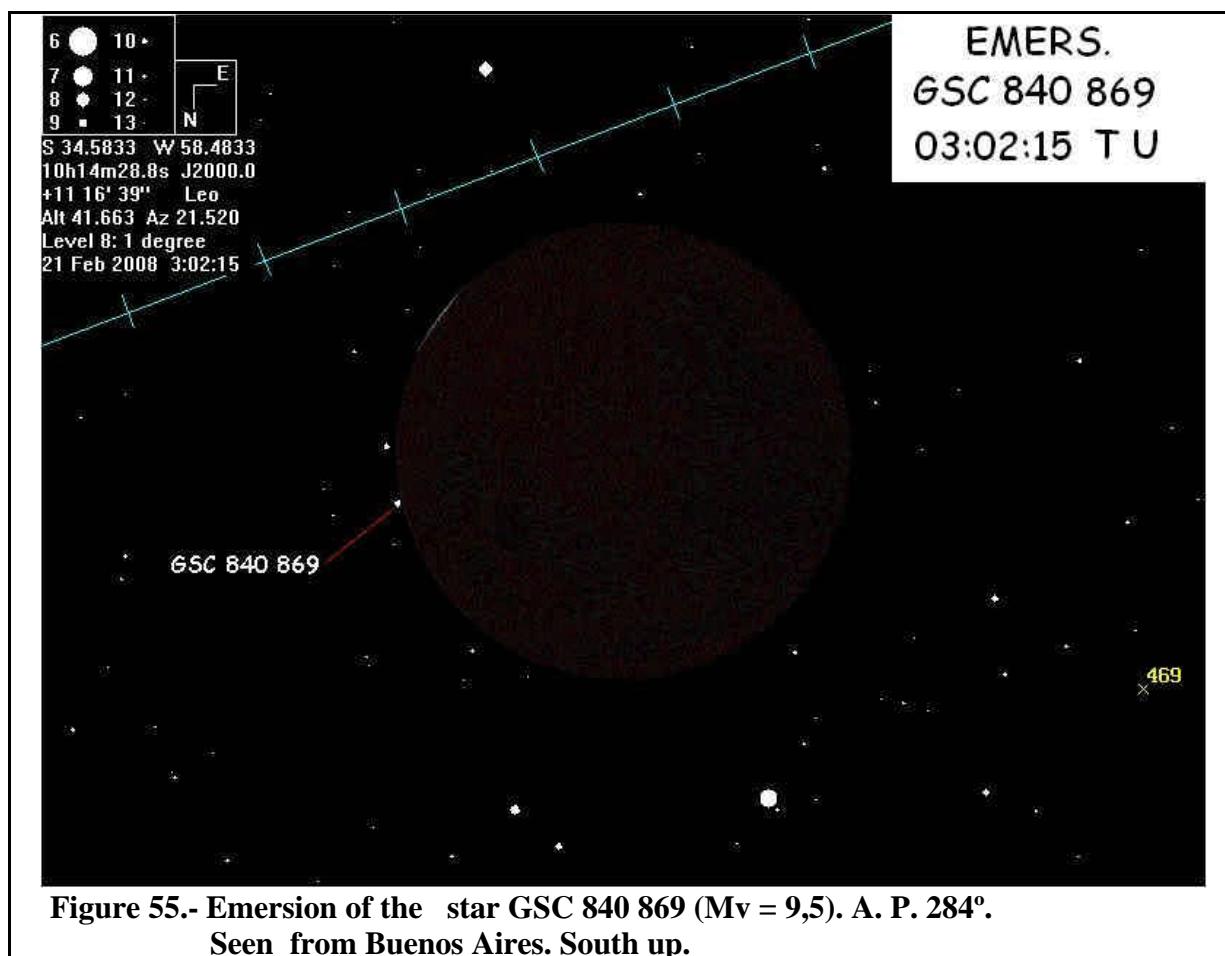
03:01:00 Monitor the western limb of the moon around the area where the star must appear (see figure 55).

03:02:00 At the star emersion record time identifying the event ("Emersion star 4") and take a picture with the camera.

03:03:00 Set chronometer alarm at 03:07:00

EVENTUAL END OF THE ACTIVITY FROM BUENOS AIRES

Interval until next step..... 4 minutes.



Measured Time	
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NOTE: In order to know if the Emersion is visible from other Southamerica sites and the time, it is necessary to perform a new simulation.

TIMING OF THE EMERSION OF STARS FROM THE MOON

FROM BUENOS AIRES

GSC 840 944

M_v = 10

Proposed Equipment.

Large Aperture Telescope;
Medium Focal Telescope (if available)
DSLR Camera (if the auxiliary telescope is available)
GPS and/or Chronometer and Voice recorder.

ESTIMATED TIME: 03:08:30

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

from Buenos Aires (from other sites, see note).

Large Aperture Telescope with a medium power magnification (200x) without polarizers.

Chronometer with alarm

Optional picture if additional telescope and camera are available.

ACTIVITY

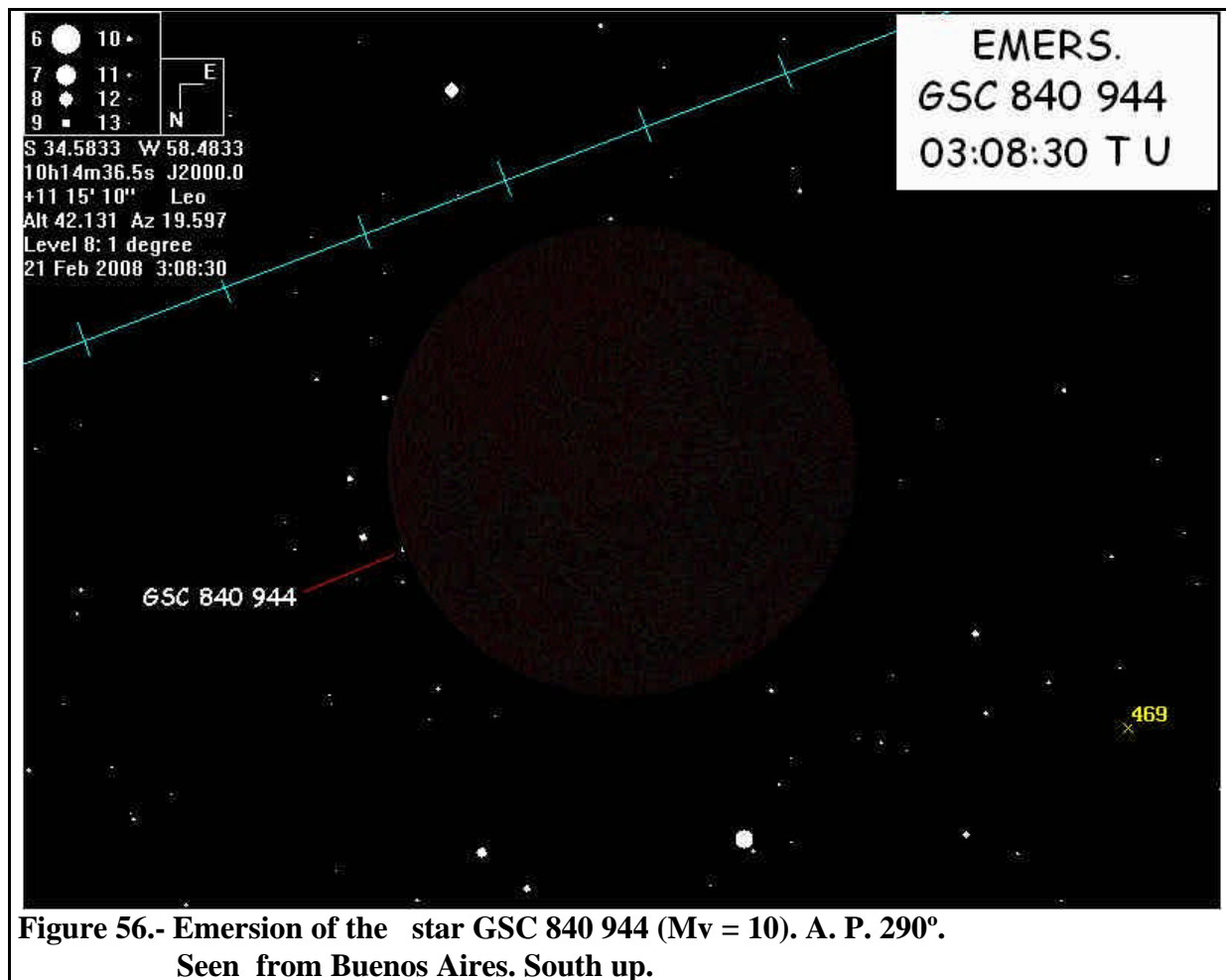
IN BUENOS AIRES:

03:07:00 Once the alarm rings, monitor the western limb of the Moon around the area where the star must appear (see figure 56).

03:08:30 At the star emersion record time identifying the event ("Emersion star 5") and take a picture with the camera.

EVENTUAL END OF THE ACTIVITY FROM BUENOS AIRES

Interval until next step..... 1 minute.



Measured Time	
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NOTE: In order to know if the Emersion is visible from other Southamerica sites and the time, it is necessary to perform a new simulation.

LTP MONITORING

Proposed Equipment.

Large Aperture Telescope; Binoscope or a filter wheel Red Filter (Wratten #25) and Blue Filter (Wratten #38); Camera DSLR; Camera web.
--

INTERVAL: 03:10:00 - 03:20:00

EIGHTH ACTIVITY STEP BY STEP

CONFIGURATION:

Large Aperture Telescope with an attached binoscope and with two identical medium power eyepieces (200x).

Red filter (Wratten #25) in one ocular and Blue filter (Wratten #38) in the other.

ACTIVITY

Only for very experienced observers.

03:10:00 Start visual exploration by blinking eye observation of Aristarchus, Proclus, Plato, Tycho, Dionysius and Grimaldi (see following pictures from both hemispheres);.

03:11:00 Set chronometer alarm at 03:24:00;

In case of discovery or suspect of a LTP by darkening take a picture. Look for a confirmation by other observers.

In case of discovery or suspect of a LTP by color change, take video (aprox. 500 frames AVI) with a webcam configured for color capture.

03:20:00 Record the time and the result ("Positive" or "Negative"). Stop the voice recorder.

Interval until next step..... 4 minutes.

NORTH HEMISPHERE



Plato



Proclus



Dionysius



Tycho



Aristarchus



Grimaldi

SOUTH HEMISPHERE



Plato



Proclus



Dionysius



Tycho



Aristarchus



Grimaldi

TIMING OF THE ECLIPSE CONTACTS

ECLIPSE MAXIMUM

Proposed Equipment.

Binoculars 8x50. GPS and/or Chronometer and Voice recorder. Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available)

ESTIMATED TIME: 03:25:42

FOURTH ACTIVITY STEP BY STEP

<u>CONFIGURATION</u>

Binoculars of 8x50.

<u>ACTIVITY</u>

03:24:00 Using the Binoculars, estimate the brighness of the Moon in the Danjon Scale (TABLE XI)
--

03:25:30 Record the event identification (“Maximum of the eclipse”) and the time.

03:25:42 Record brightness estimation.
--

EVENTUAL END of the ACTIVITY.

<u>NOTE:</u> This activity continues at 03:50:36.

Measured Time	
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Interval until next step..... 0 minutes for the North Hemisphere.
24 minutes for the South Hemisphere.

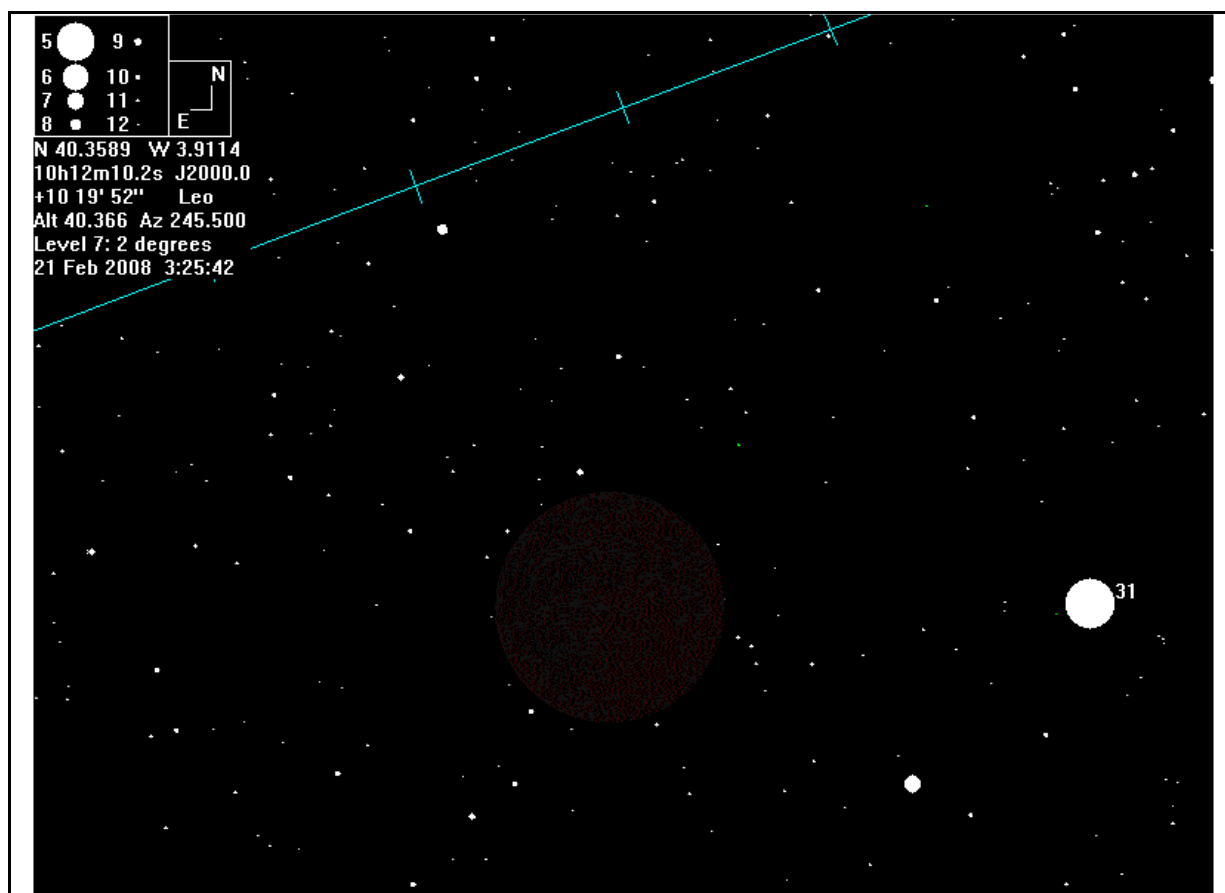


Figure 166.- Maximum Eclipse from Madrid.

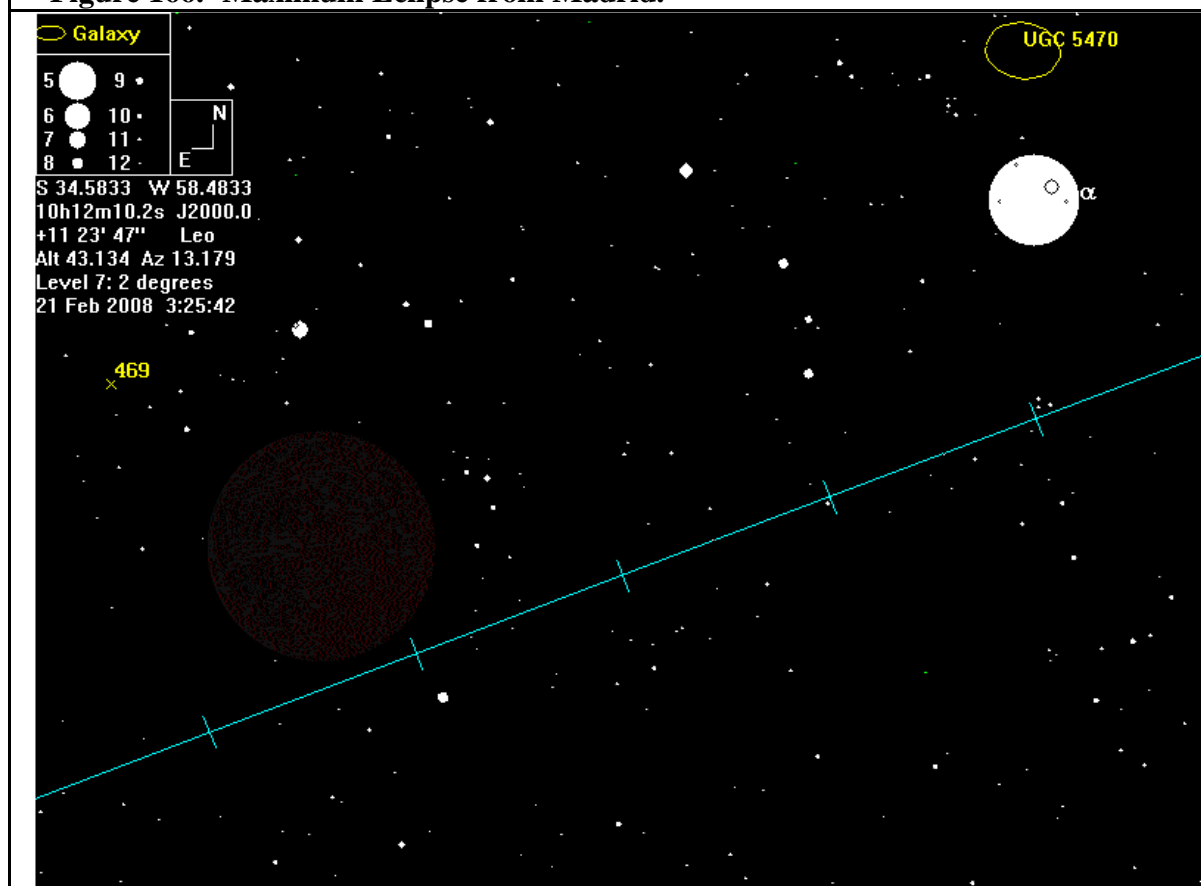


Figure 167.- Maximum Eclipse from Buenos Aires.

TIMING OF THE EMERSION OF STARS FROM THE MOON
FROM MADRID

GSC 833 1091

M_v = 10

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder

ESTIMATED TIME: 03:27:10

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

from Madrid (from other sites, see note).

Large Aperture Telescope with a medium power magnification (200x) without polarizers.

Chronometer with alarm

Optional picture if additional telescope and camera are available.

ACTIVITY

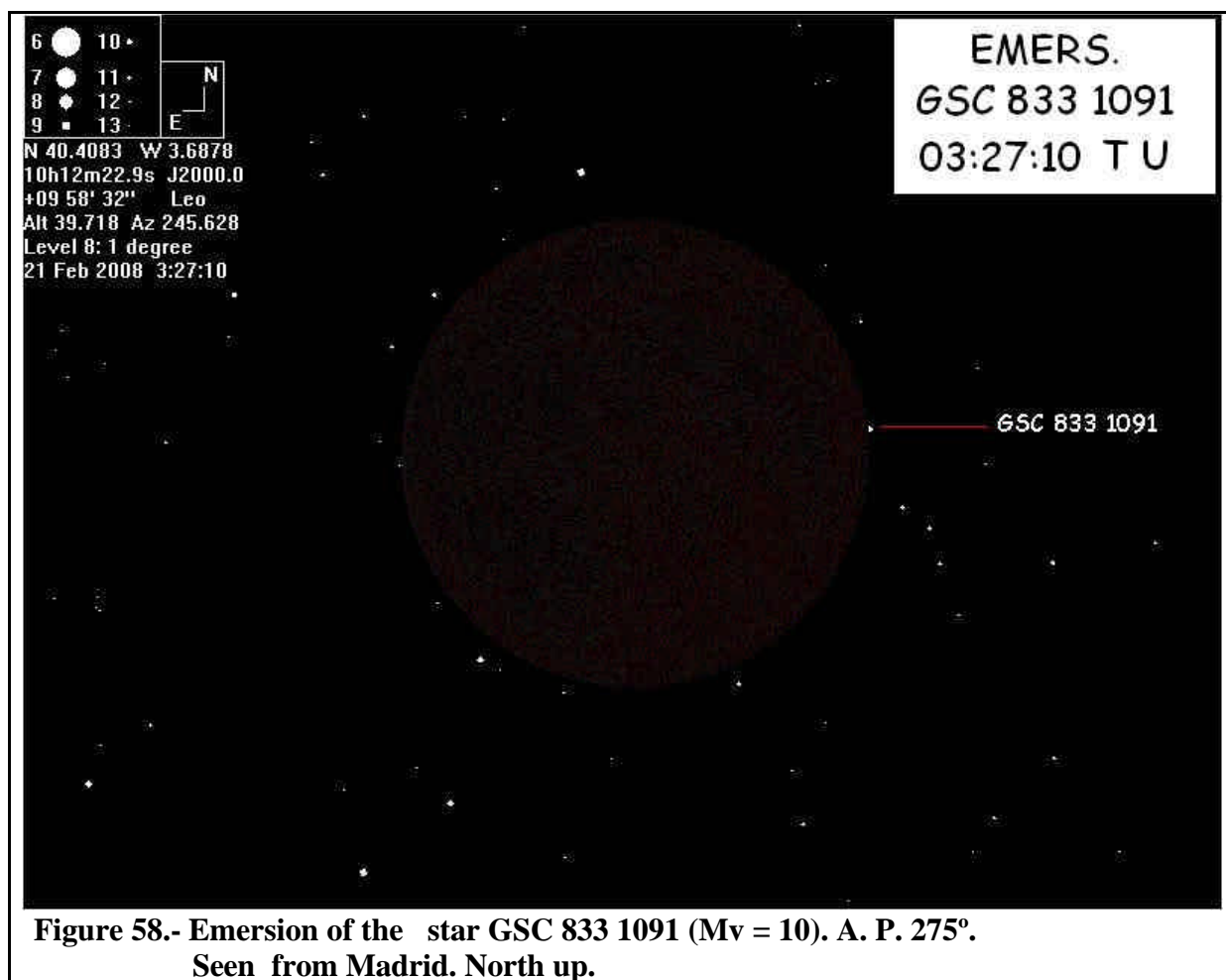
IN MADRID :

03:26:00 Monitor the western limb of the moon around the area where the star must appear (see figure 58).

03:27:10 At the star emersion record time identifying the event ("Emersion star 2") and take a picture with the camera.

EVENTUAL END OF THE ACTIVITY FROM MADRID

Interval until next step..... 2 minutes.



Measured Time	
---------------	--

NOTE: In order to know if the Emersion is visible from other Western Europe sites and the time, it is necessary to perform a new simulation.

TIMING OF THE OCULTATION OF STARS BY THE MOON FROM MADRID

GSC 837 442

M_v = 9,9

Proposed Equipment.

Large Aperture Telescope;
Medium Focal Telescope (if available)
DSLR Camera (if the auxiliar telescope is available)
GPS and/or Chronometer and Voice recorder.

ESTIMATED TIME: 03:30:30

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

from Madrid (from other sites, see note).

Large Aperture Telescope with a medium power magnification (200x) without polarizers.

Chronometer with alarm

Optional picture if additional telescope and camera are available.

ACTIVITY

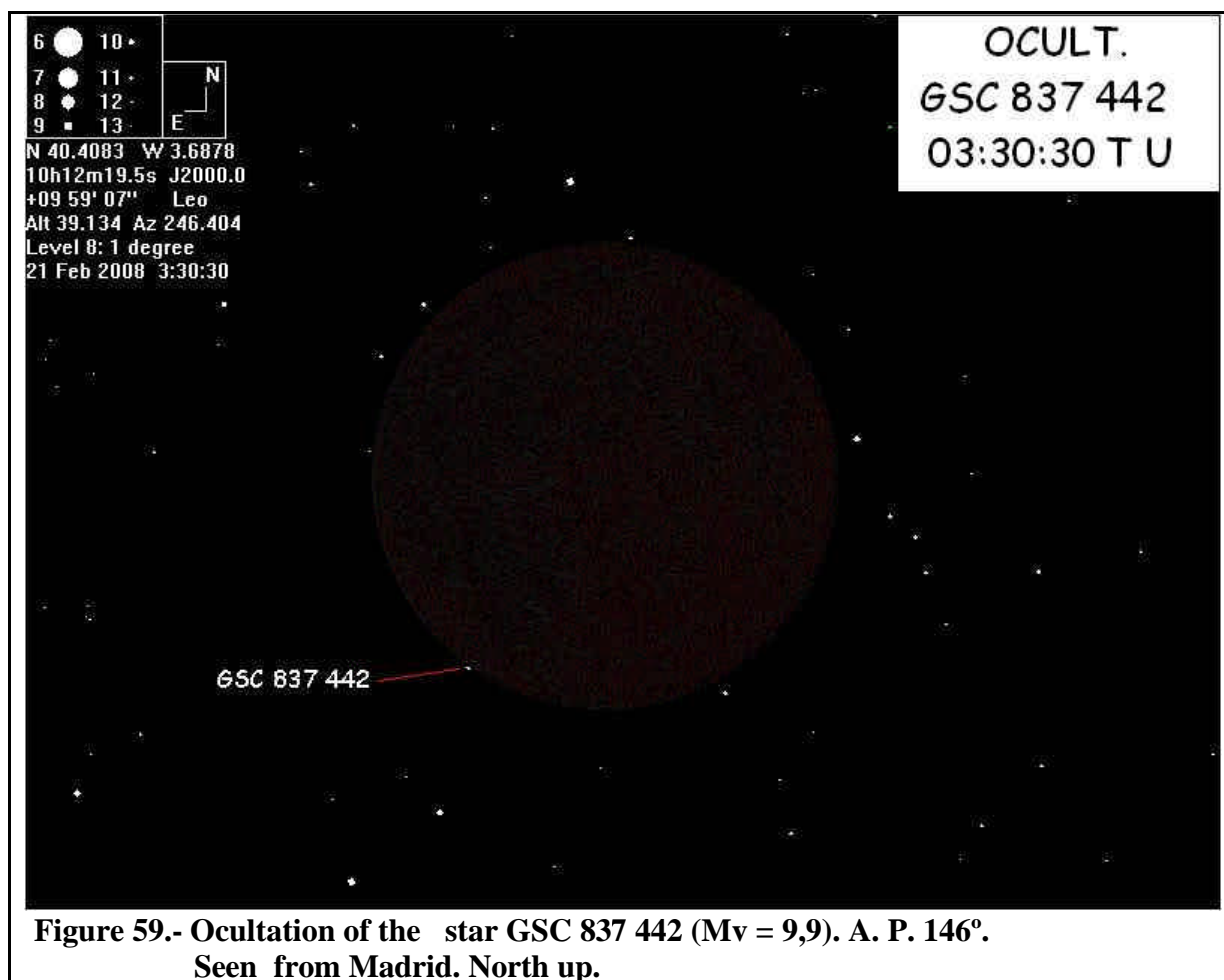
IN MADRID :

03:29:00 Monitor the star GSC 837 442 in the SW of the Moon (see figure 59). Record Time.

03:30:30 When the star dissapears, record the time identifying the event ("Ocultation star 6")
and take a picture with the camera.

EVENTUAL END OF THE ACTIVITY FROM MADRID

Interval until next step..... 19 minutes.



Measured Time	
---------------	--

NOTE: In order to know if the occultation is visible from other Western Europe sites and the time, it is necessary to perform a new simulation.

TIMING OF THE ECLIPSE

TOTALITY END

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) Binoculars DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 03:50:36

FOURTH ACTIVITY STEP BY STEP

CONFIGURATION

Large Aperture Telescope acoplado a Camera DSLR con cable disfordor.
Auxiliar telescope with a medium power eyepiece (200x).
Binoculars of 8x50.

ACTIVITY

Put the shutter cable of the camera in mode CONTINUOUS;
Point the Telescopes to the limb SW of the Moon;

03:49:00 Record the event identification ("En of the totality") an a time record

03:50:00 Start the continuous capture while the limb **SE** of the Moon is monitored (figures 168 and 169);

03:50:36 Once the disk of the Moon exit from the umbra, record a time mark and stop the photographic sequence.

EVENTUAL END of the ACTIVITY.

NOTE: This activity continues at 03:25:00.

Measured Time	
---------------	--

Interval until next step..... 3 minutes for the North Hemisphere.
14 minutes for the South Hemisphere.

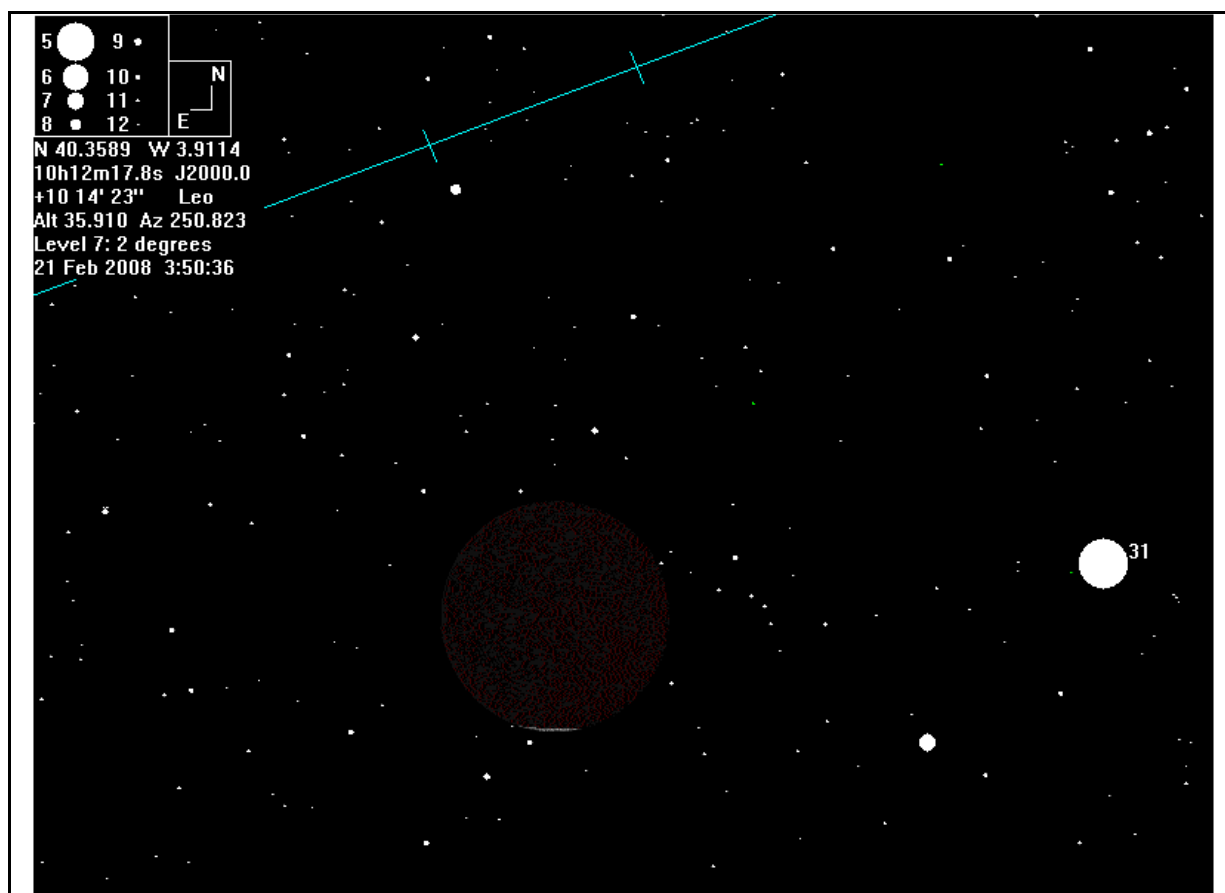


Figure 168.- Totality End from Madrid.

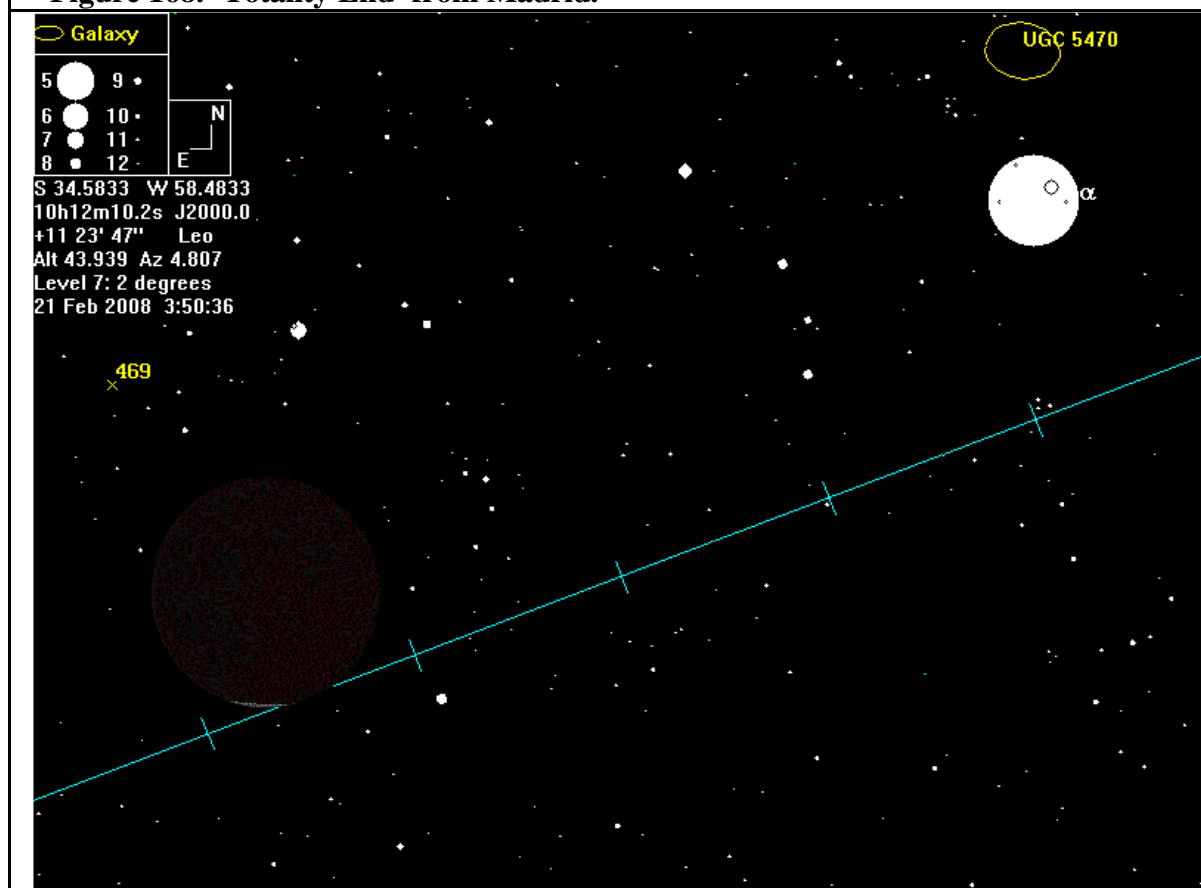


Figure 169.- Totality End from Buenos Aires.

TIMING OF THE OCULTATION OF STARS BY THE MOON
FROM MADRID

GSC 837 82

M_v = 9,8

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 03:55:30

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

from Madrid (from other sites, see note).

Large Aperture Telescope with a medium power magnification (200x) without polarizers.

Chronometer with alarm

Optional picture if additional telescope and camera are available.

ACTIVITY

IN MADRID :

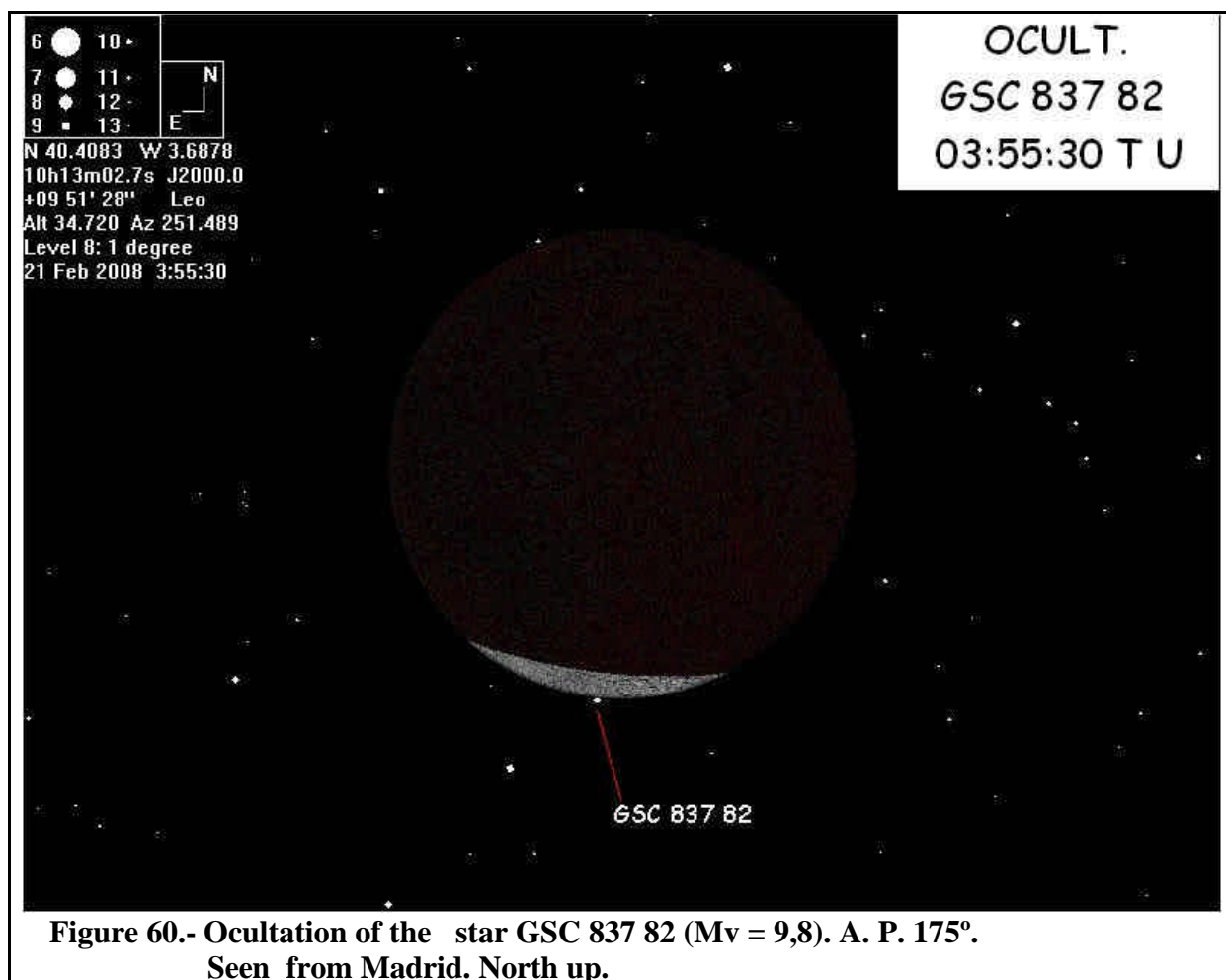
03:54:00 Monitor the star GSC 837 82 in the SSO of the Moon (see figure 60). Grabar una marca of tiempo.

03:55:30 When the star dissapears, record the time identifying the event ("Ocultation star 7") and take a picture with the camera.

03:56:00 Set chrono meter alarm at 04:05:00.

EVENTUAL END OF THE ACTIVITY FROM MADRID

Interval until next step..... 9 minutes.



Measured Time	
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NOTE: In order to know if the ocultation is visible from other Western Europe sites and the time, it is necessary to perform a new simulation.

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

GRIMALDI

Category	Diameter	Depth
Cuenca	430 Km	2000 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:06:00

SEVENTH ACTIVITY STEP BY STEP

04:05:00 Once the alarm rings, monitor the Emersion point of the Grimaldi basin (figures 66 and 67).
04:06:00 Timing the umbra exit of both borders and calculate the average. A the Emersion of the cuenca Grimaldi, record the time identifying the event ("Grimaldi"). Take a picture if additional telescope and camera are available.
Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
---------------	--

Interval until next step..... 0 minutes.

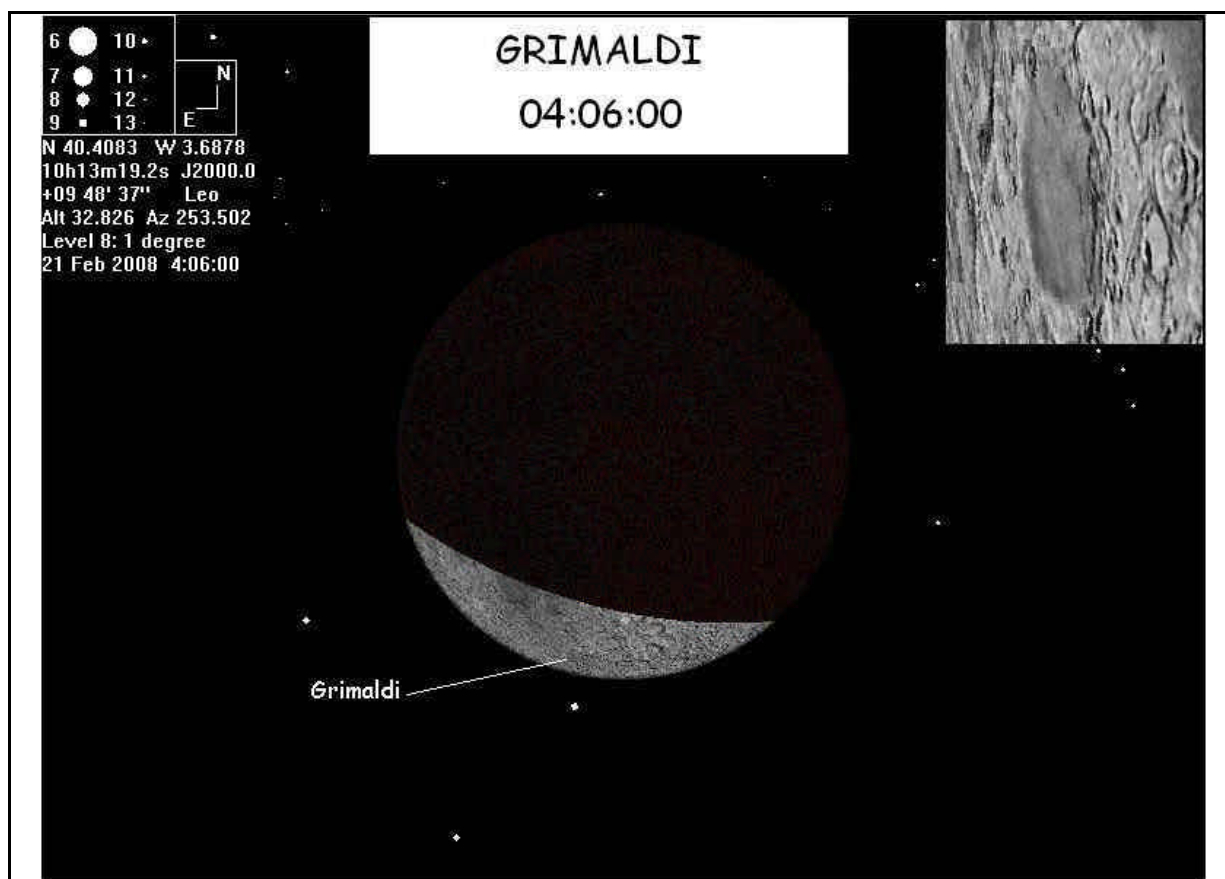


Figure 66.- Emersion of Grimaldi seen from the North Hemisphere (04:06:00).

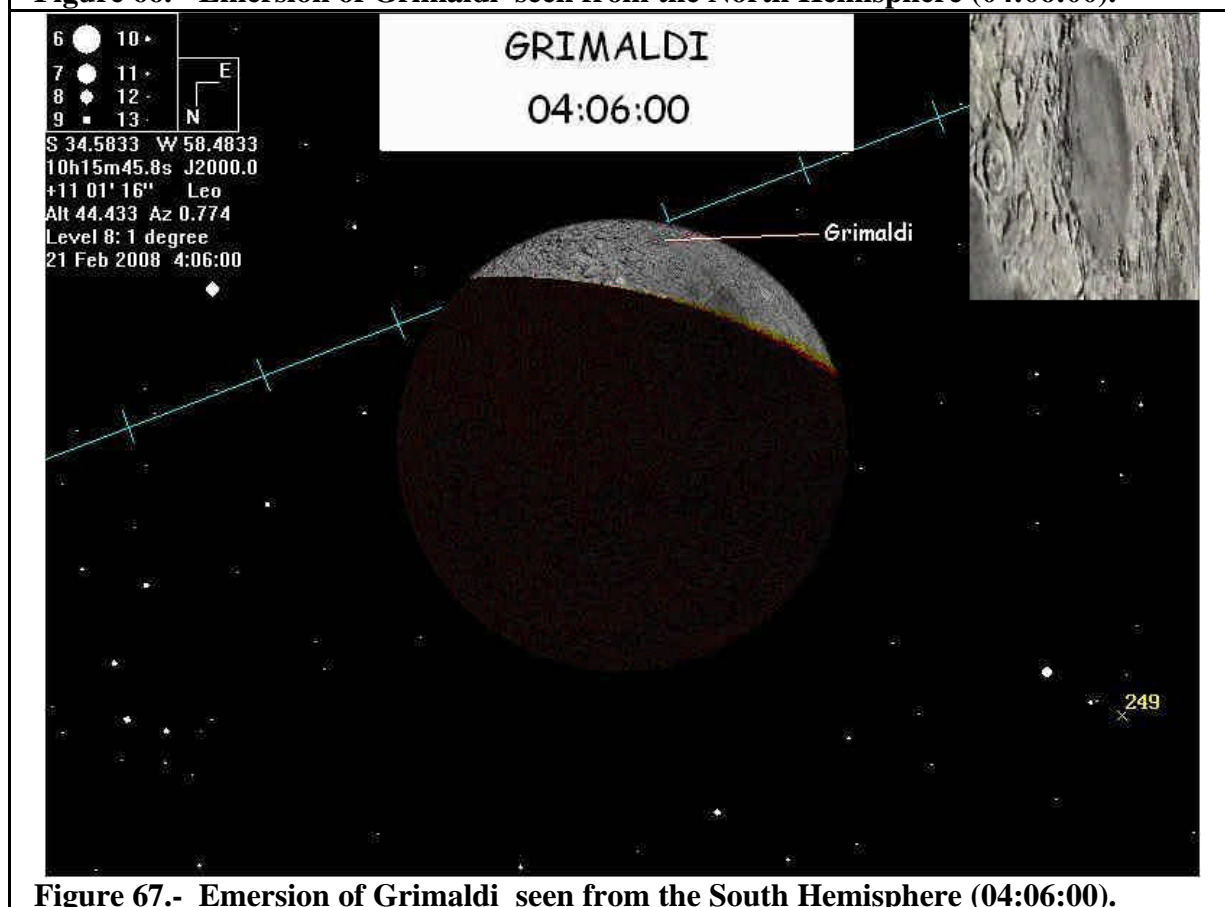


Figure 67.- Emersion of Grimaldi seen from the South Hemisphere (04:06:00).

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

BILLY

Category	Diameter	Depth
Crater	46 Km	1210 m

TYCHO

Category	Diameter	Depth
Circus	85 Km	4850 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:07:00

SEVENTH ACTIVITY STEP BY STEP

04:06:00 Monitor emersion area of Circus Tycho and Crater Billy (figures 68 and 69).

04:07:00 At the emersion of Crater Billy and Circus Tycho (in a double emersion, the bisection by the umbra shall be recorded), record the time identifying the event (“Billy and Tycho”). Take a picture if additional telescope and camera are available.

NOTE: If the occultation is not simultaneous, the the times of each event separately. .

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 1 minute.

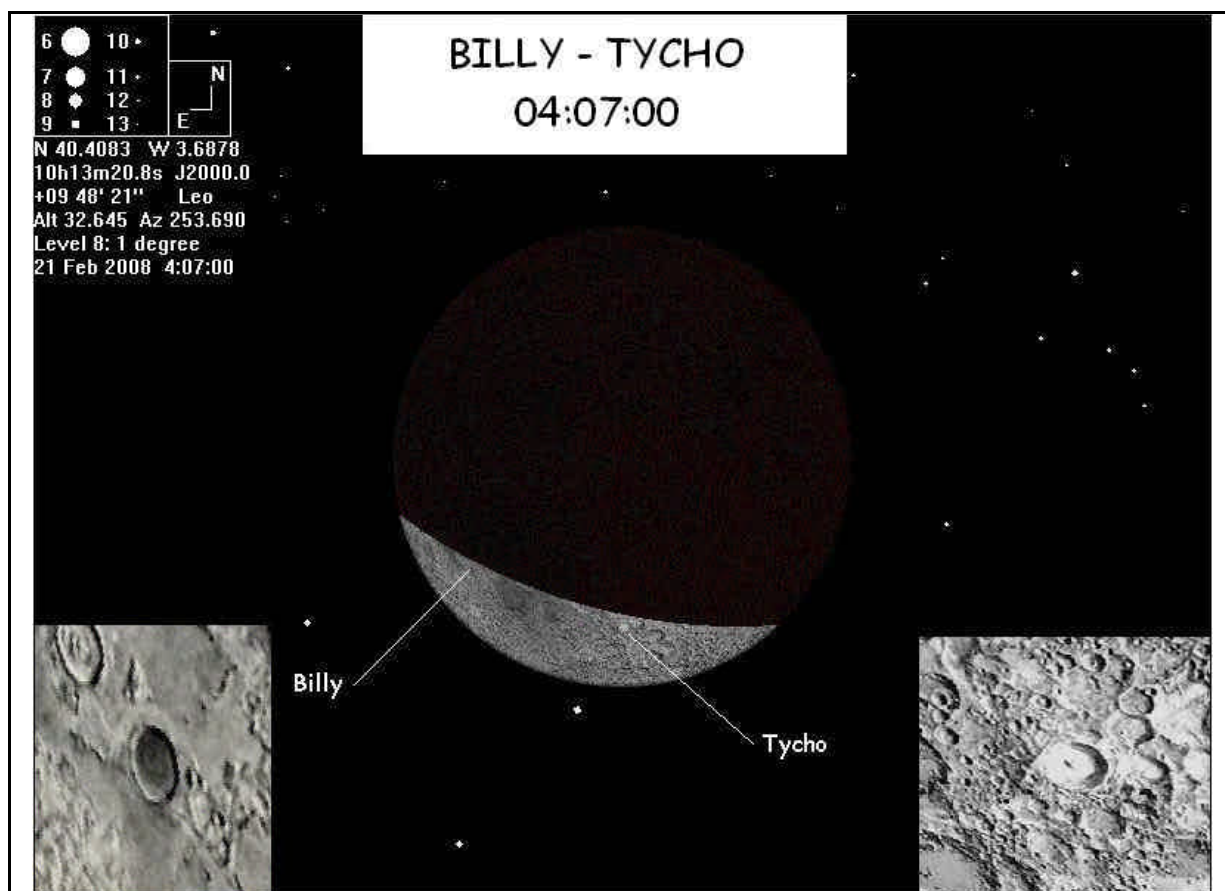


Figure 68.- Emersion of Billy and Ticho seen from the North Hemisphere (04:07:00).

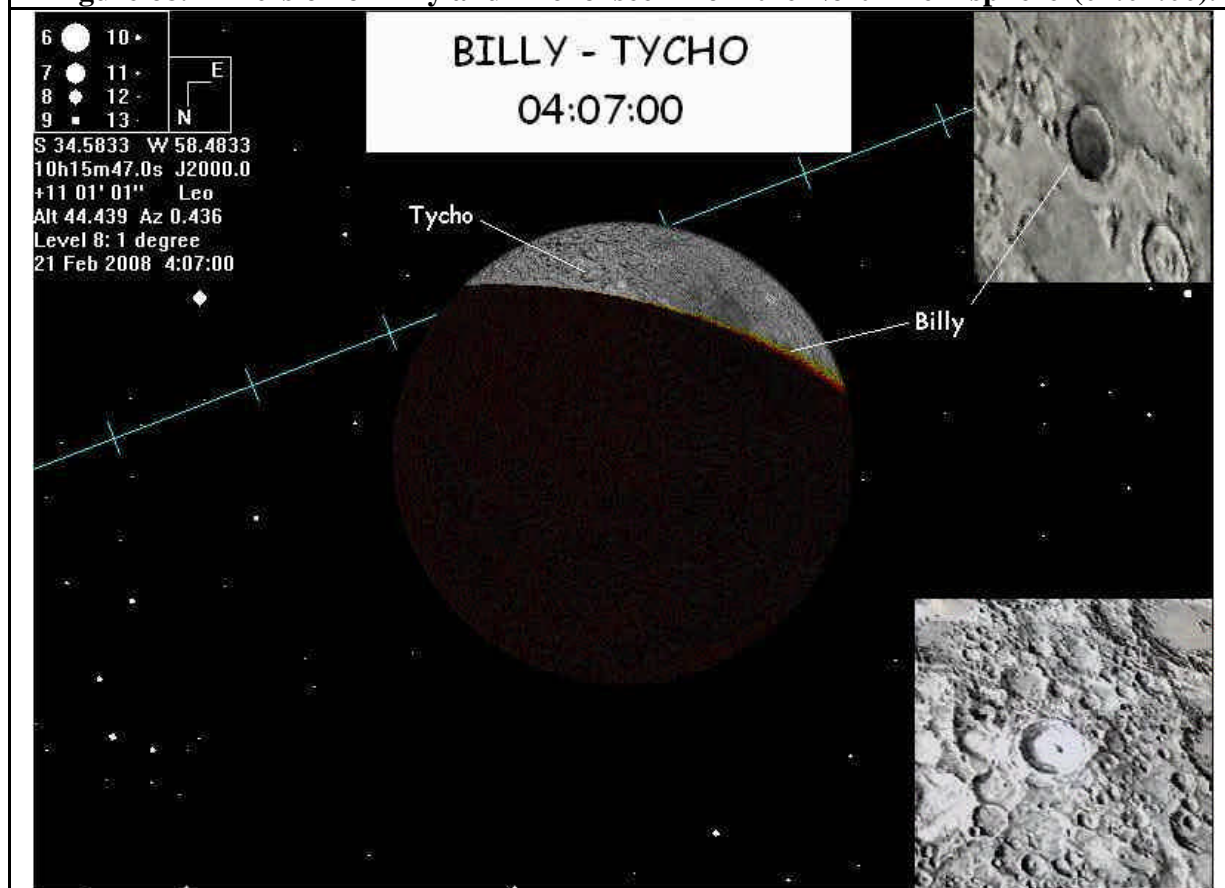


Figure 69.- Emersion of Billy and Ticho seen from the South Hemisphere (04:07:00).

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

CAMPANUS

Category	Diameter	Depth
Crater	48 Km	2080 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:09:00

SEVENTH ACTIVITY STEP BY STEP

04:08:00 Monitor point of Emersion of Crater Campanus (figures 70 and 71).
--

04:09:00 At the emersion of Crater Campanus, record the time identifying the event ("Campanus"). Take a picture if additional telescope and camera are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).
--

Measured Time	
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Interval until next step..... 2 minutes for the North Hemisphere.
9 minutes for the South Hemisphere.

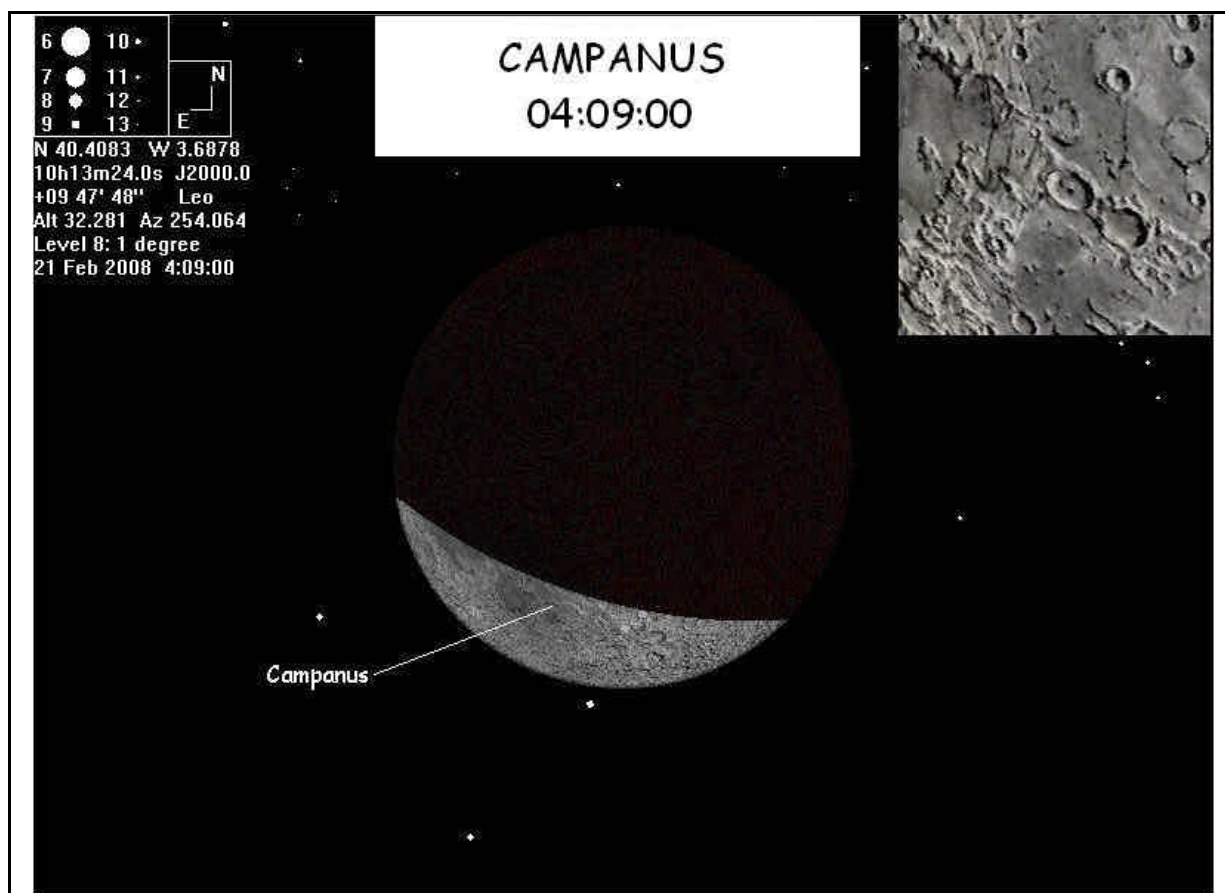


Figure 70.- Emersion of Campanus seen from the North Hemisphere (04:09:00).

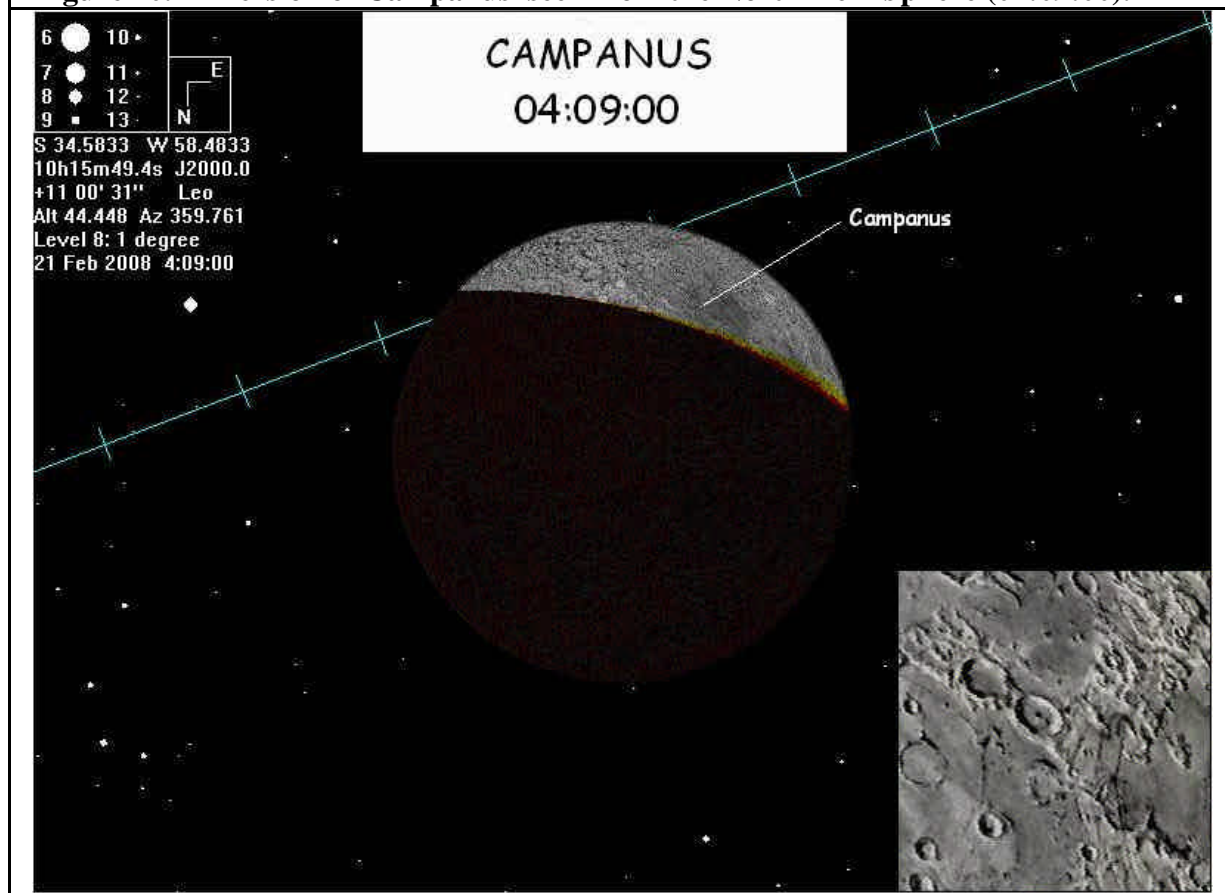


Figure 71.- Emersion of Campanus seen from the South Hemisphere (04:09:00).

TIMING OF THE OCULTATION OF STARS BY THE MOON FROM MADRID

GSC 837 606

Mv = 9,4

Proposed Equipment.

Large Aperture Telescope;
Medium Focal Telescope (if available)
DSLR Camera (if the auxiliar telescope is available)
GPS and/or Chronometer and Voice recorder.

ESTIMATED TIME: 04:12:45

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

from Madrid (from other sites, see note).

Large Aperture Telescope with a medium power magnification (200x) without polarizers.

Chronometer with alarm

Optional picture if additional telescope and camera are available.

ACTIVITY

IN MADRID :

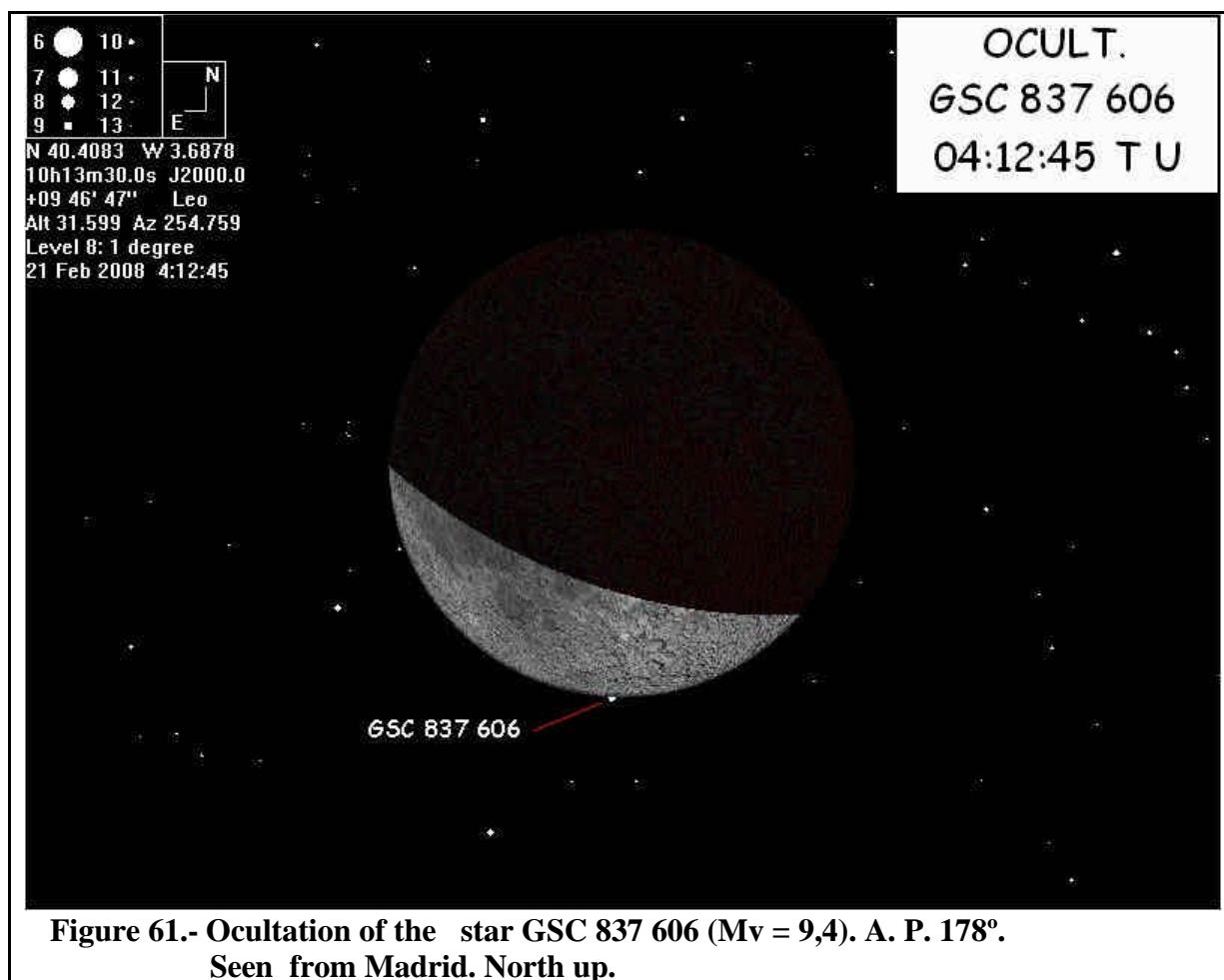
04:11:00 Monitor the star GSC 837 606 in the South of the Moon (see figure 61). Record time.

04:12:45 When the star dissapears, record the time identifying the event ("Ocultation star 8") and take a picture with the camera (if available).

04:14:00 Set chronometer alarm at 04:18:00.

EVENTUAL END OF THE ACTIVITY FROM MADRID

Interval until next step..... 4 minutes.



Measured Time	
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NOTE: In order to know if the occultation is visible from other Western Europe sites and the time, it is necessary to perform a new simulation.

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

KEPLER

Category	Diameter	Depth
Crater	32 Km	2570 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:19:00

SEVENTH ACTIVITY STEP BY STEP

04:18:00 Once the alarm rings, Monitor point of Emersion of Crater Kepler (figures 72 and 73). Record Time.
04:09:00 At the emersion of Crater Kepler, record the time identifying the event (“Kepler”). Take a picture if additional telescope and camera are available.
Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 2 minutes.

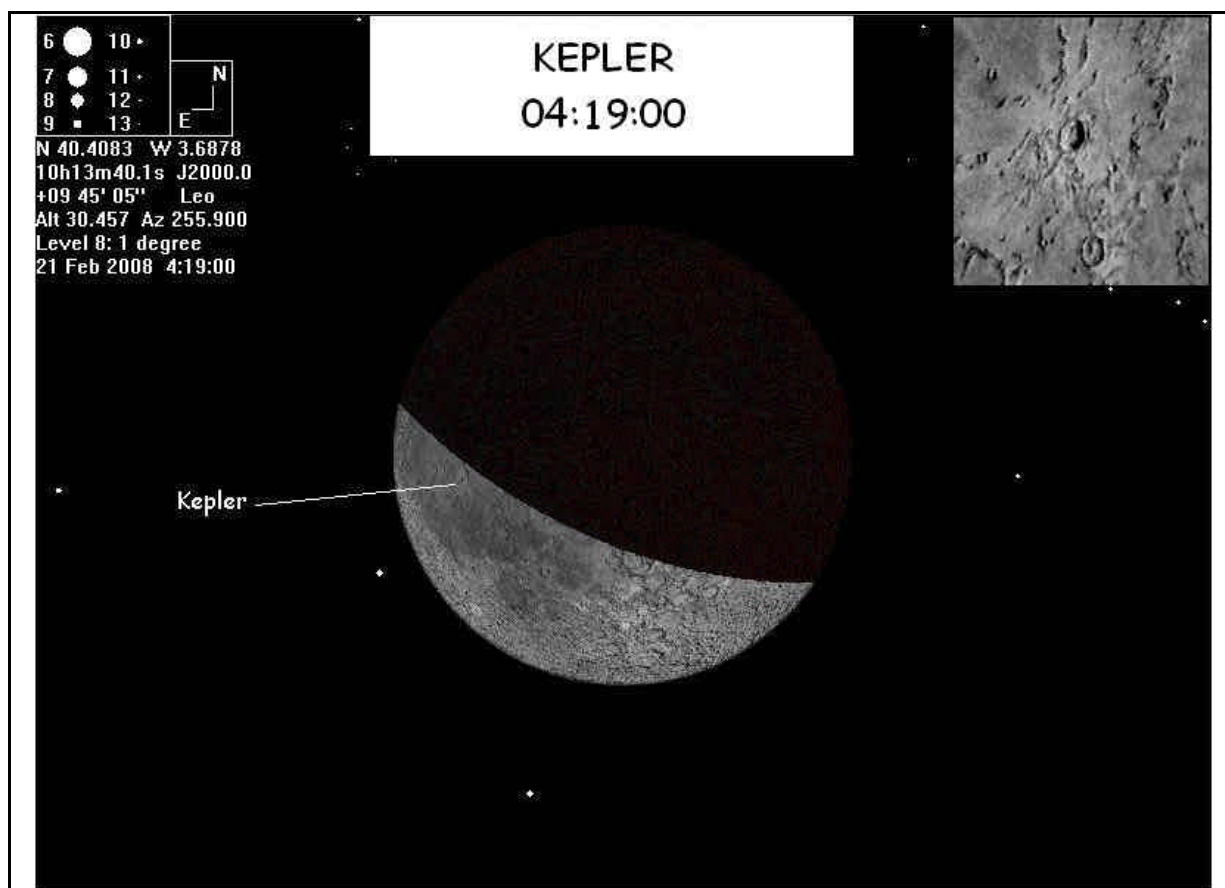


Figure 72.- Emersion of Kepler seen from the North Hemisphere (04:19:00).

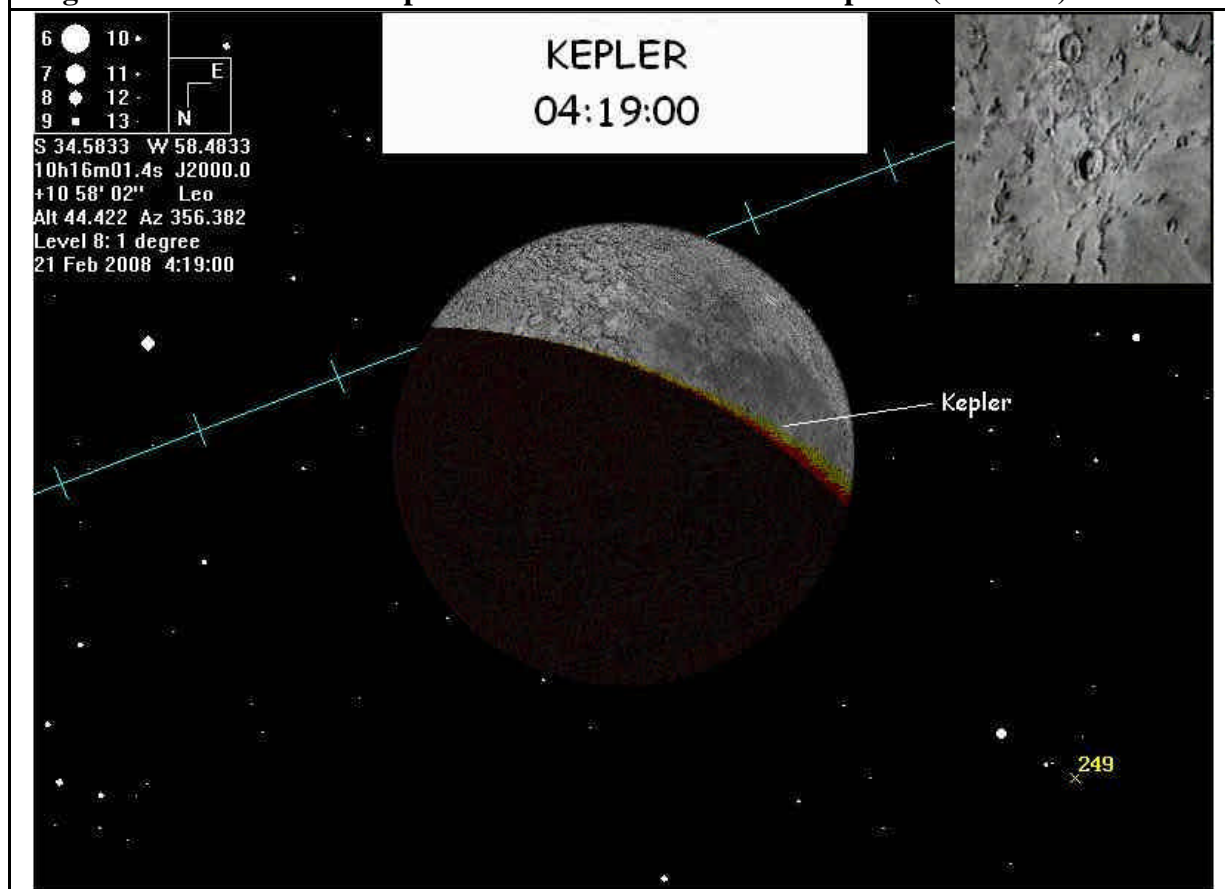


Figure 73.- Emersion of Kepler seen from the South Hemisphere (04:19:00).

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

ARISTARCHUS

Category	Diameter	Depth
Crater	40 Km	3000 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:22:00

SEVENTH ACTIVITY STEP BY STEP

04:21:00 Monitor point of Emersion of Crater Aristarchus (figures 74 and 75). Record Time.
04:22:00 At the emersion of Crater Aristarchus, record the time identifying the event (“Aristarchus”). Take a picture if aditional telescope and camera are available.
Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 1 minute for the North Hemisphere.
4 minutes for the South Hemisphere.

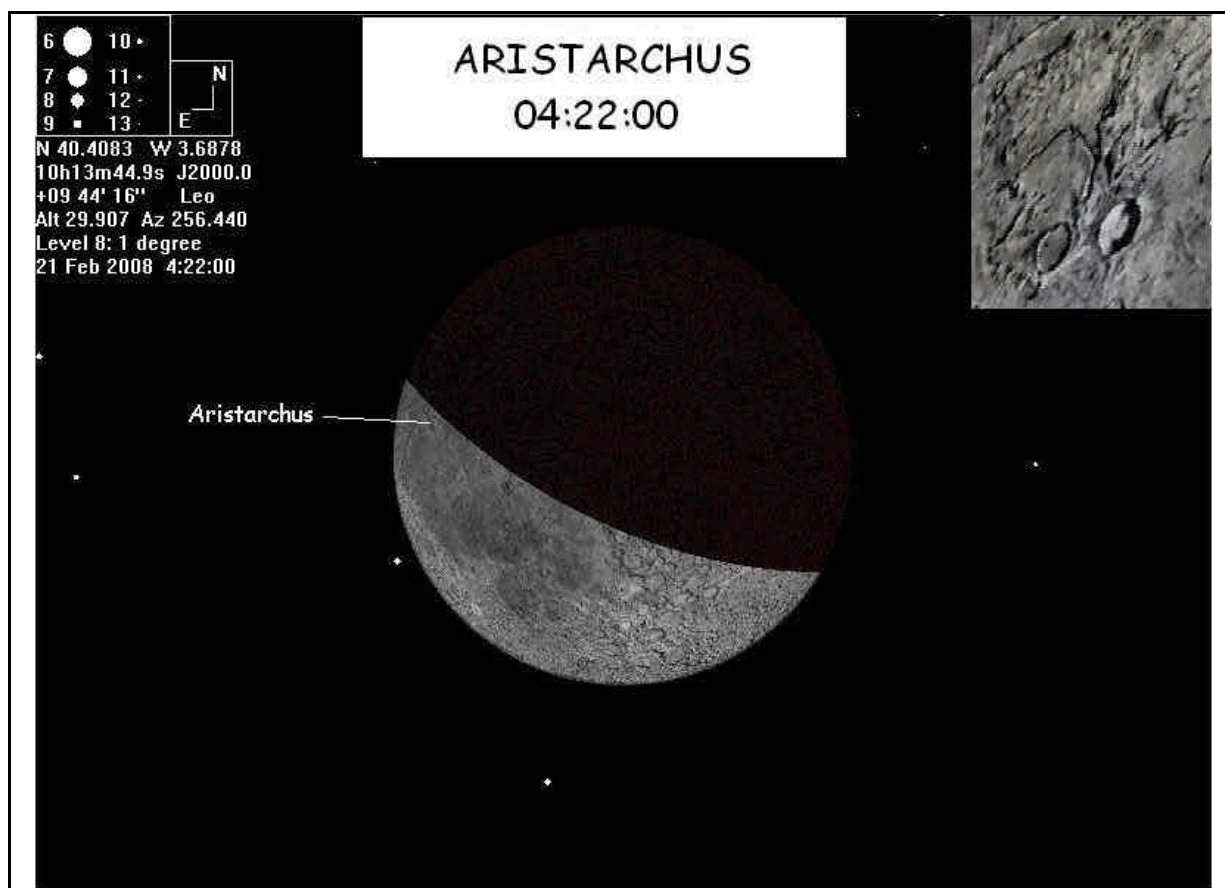


Figure 74.- Emersion of Aristarchus seen from the North Hemisphere (04:22:00).

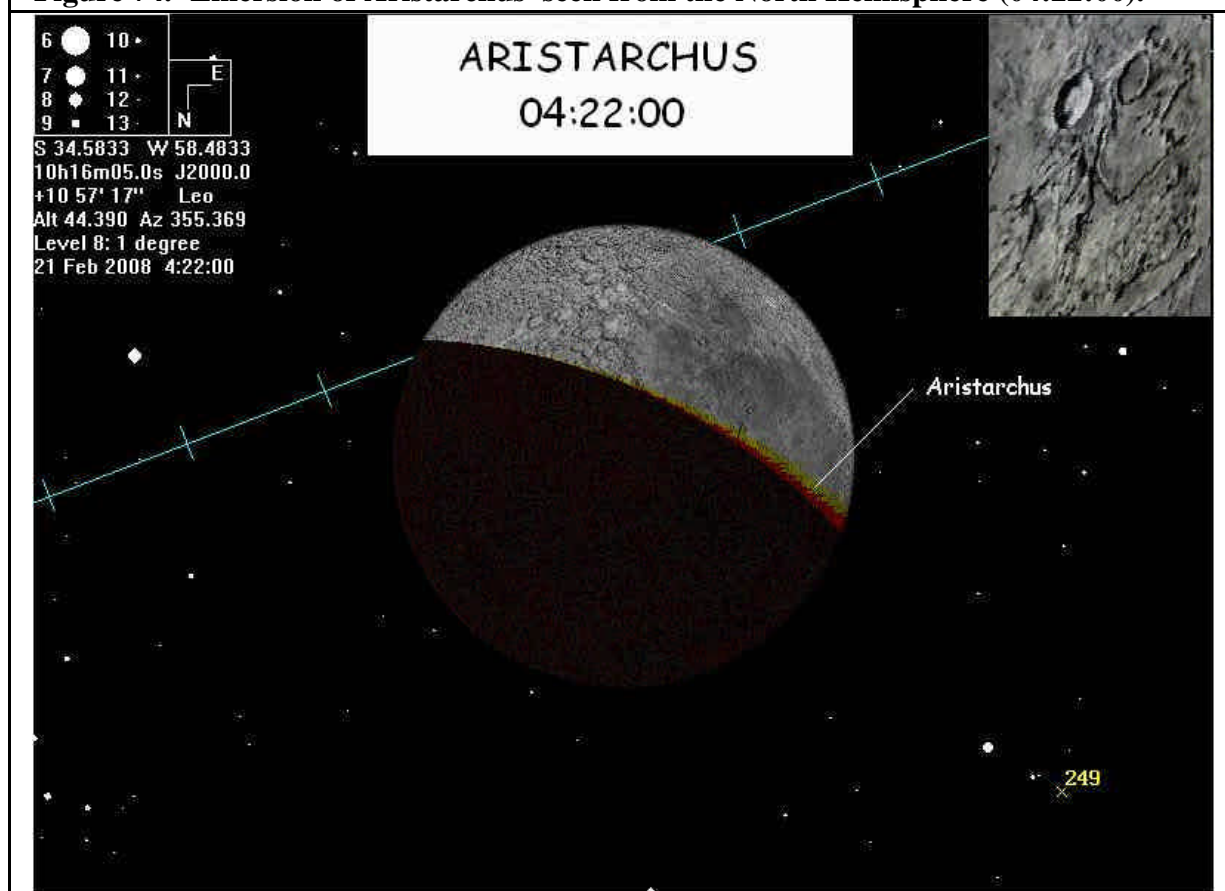


Figure 75.- Emersion of Aristarchus seen from the South Hemisphere (04:22:00).

TIMING OF THE OCULTATION OF STARS BY THE MOON FROM MADRID

GSC 837 40

M_v = 9,8

Proposed Equipment.

Large Aperture Telescope;
Medium Focal Telescope (if available)
DSLR Camera (if the auxiliar telescope is available)
GPS and/or Chronometer and Voice recorder.

ESTIMATED TIME: 04:24:45

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

from Madrid (from other sites, see note).

Large Aperture Telescope with a medium power magnification (200x) without polarizers.

Chronometer with alarm

Optional picture if additional telescope and camera are available.

ACTIVITY

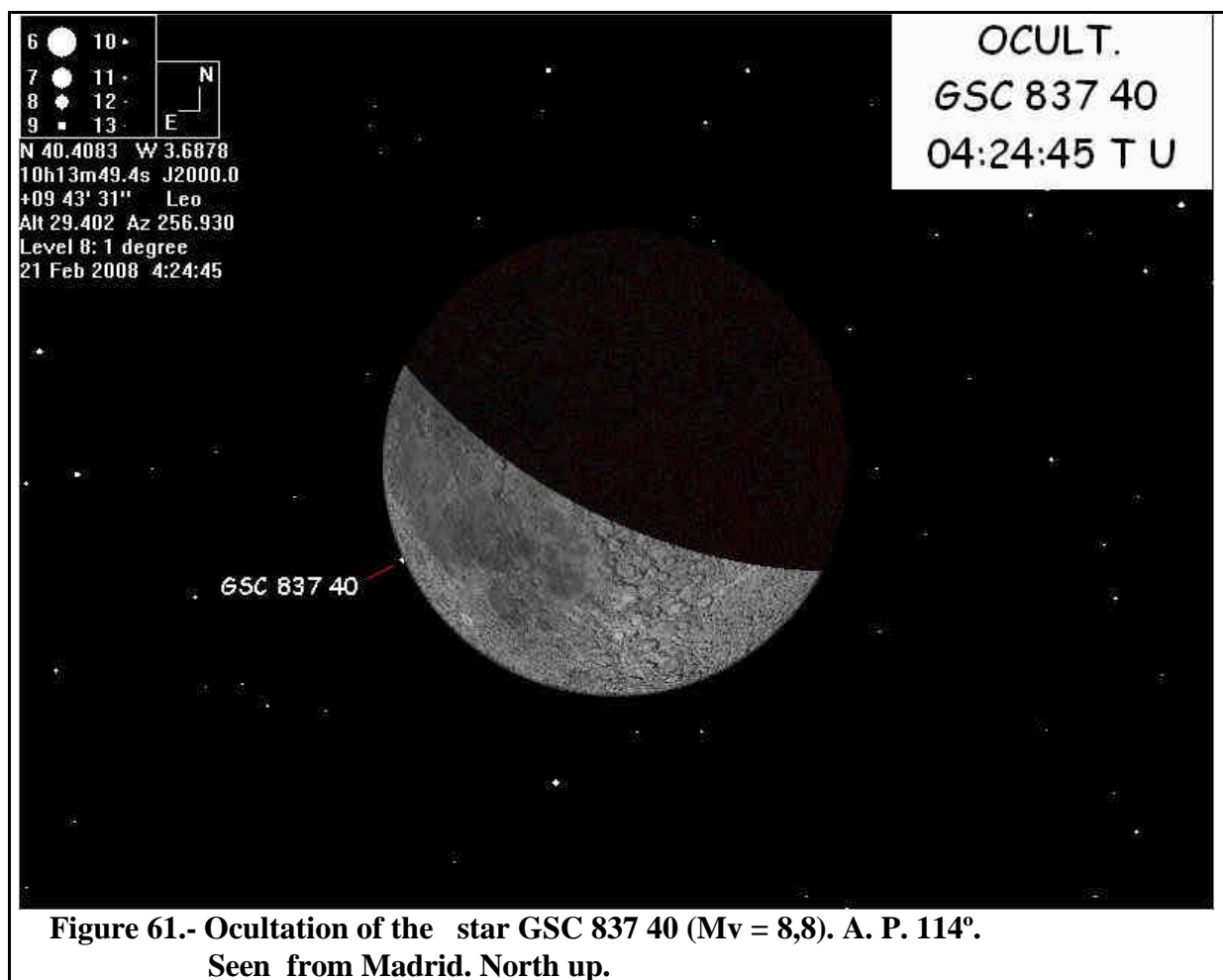
IN MADRID :

04:23:00 Monitor the star GSC 837 40 in the Oeste of the Moon (see figure 61). Record time.

04:24:45 When the star dissapears, record the time identifying the event ("Ocultation star 9") and take a picture with the camera (if available).

EVENTUAL END OF THE ACTIVITY FROM MADRID

Interval until next step..... 1 minute.



Measured Time	
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NOTE: In order to know if the ocultation is visible from other Western Europe sites and the time, it is necessary to perform a new simulation.

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

COPERNICUS

Category	Diameter	Depth
Impact Ring	93 Km	3760 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:27:00

SEVENTH ACTIVITY STEP BY STEP

04:26:00 Monitor point of Emersion of Impact Ring Copernicus (figures 76 and 77). Record Time.
04:27:00 At the emersion of Crater Aristarchus, record the time identifying the event (“Aristarchus”). Take a picture if aditional telescope and camera are available.
Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 2 minutes.

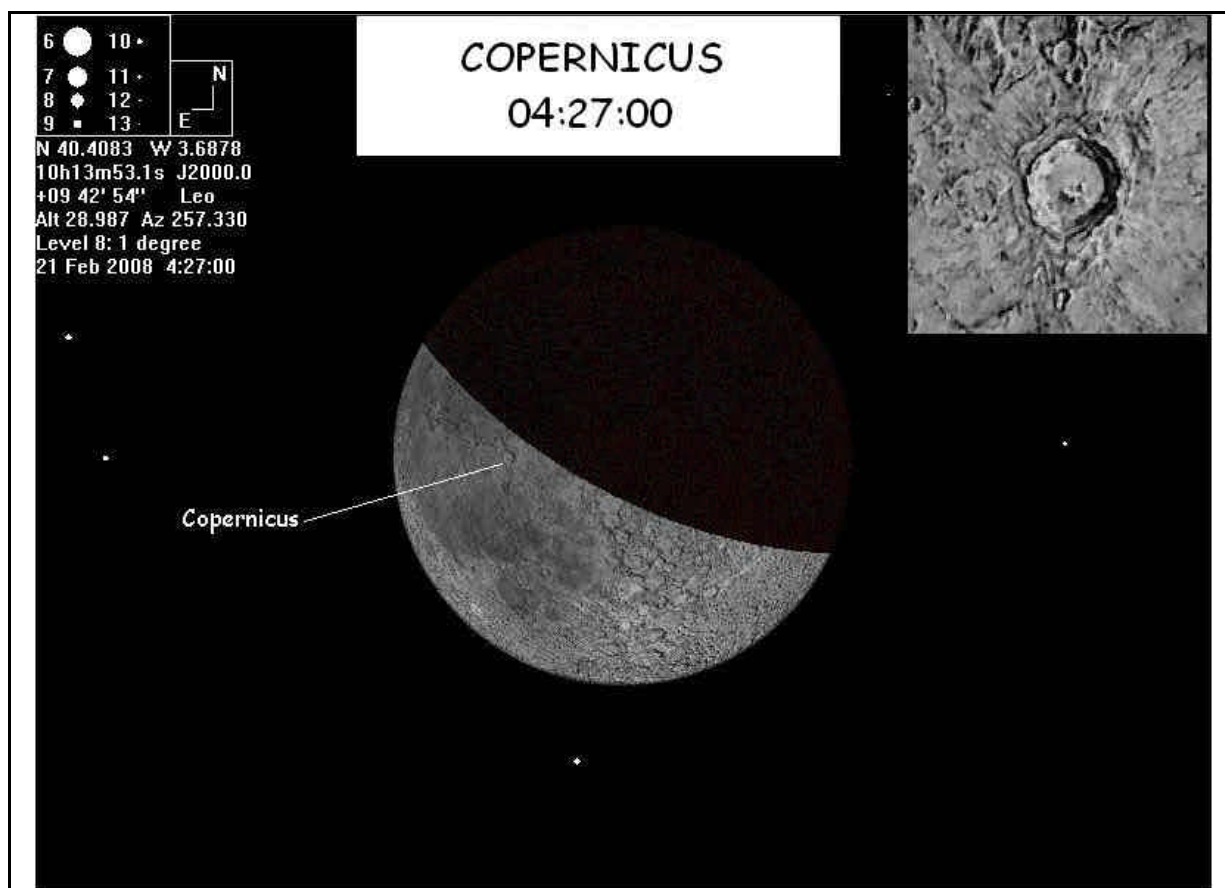


Figure 76.- Emersion of Copernicus seen from the North Hemisphere (04:27:00).

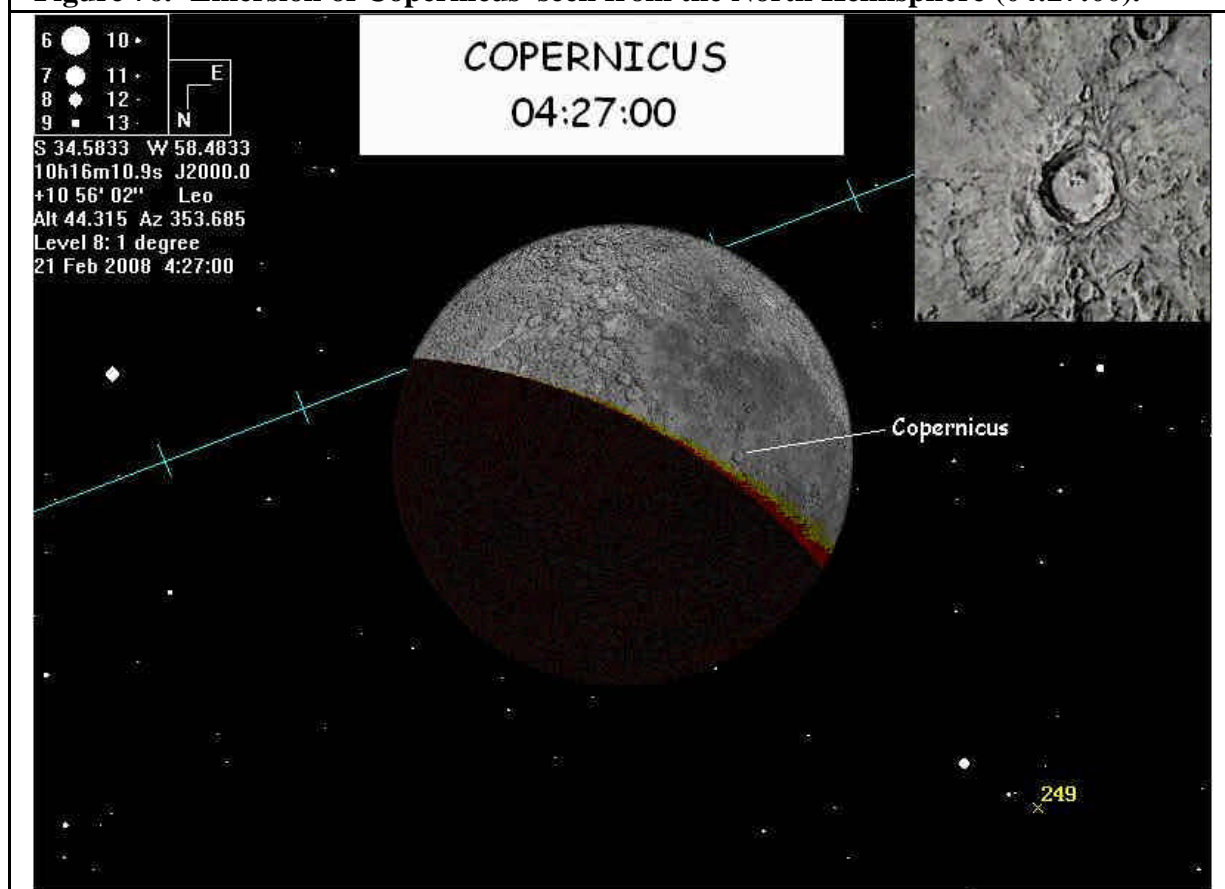


Figure 77.- Emersion of Copernicus seen from the South Hemisphere (04:27:00).

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

PYTHEAS

Category	Diameter	Depth
Crater	20 Km	2530 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:30:00

SEVENTH ACTIVITY STEP BY STEP

04:29:00 Monitor point of Emersion of Crater PYTHEAS (figures 78 and 79). Record Time.
04:30:00 At the emersion of Crater PYTHEAS, record the time identifying the event ("PYTHEAS"). Take a picture if additional telescope and camera are available.
Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 1 minute for the North Hemisphere;
..... 5 minutes for the South Hemisphere.

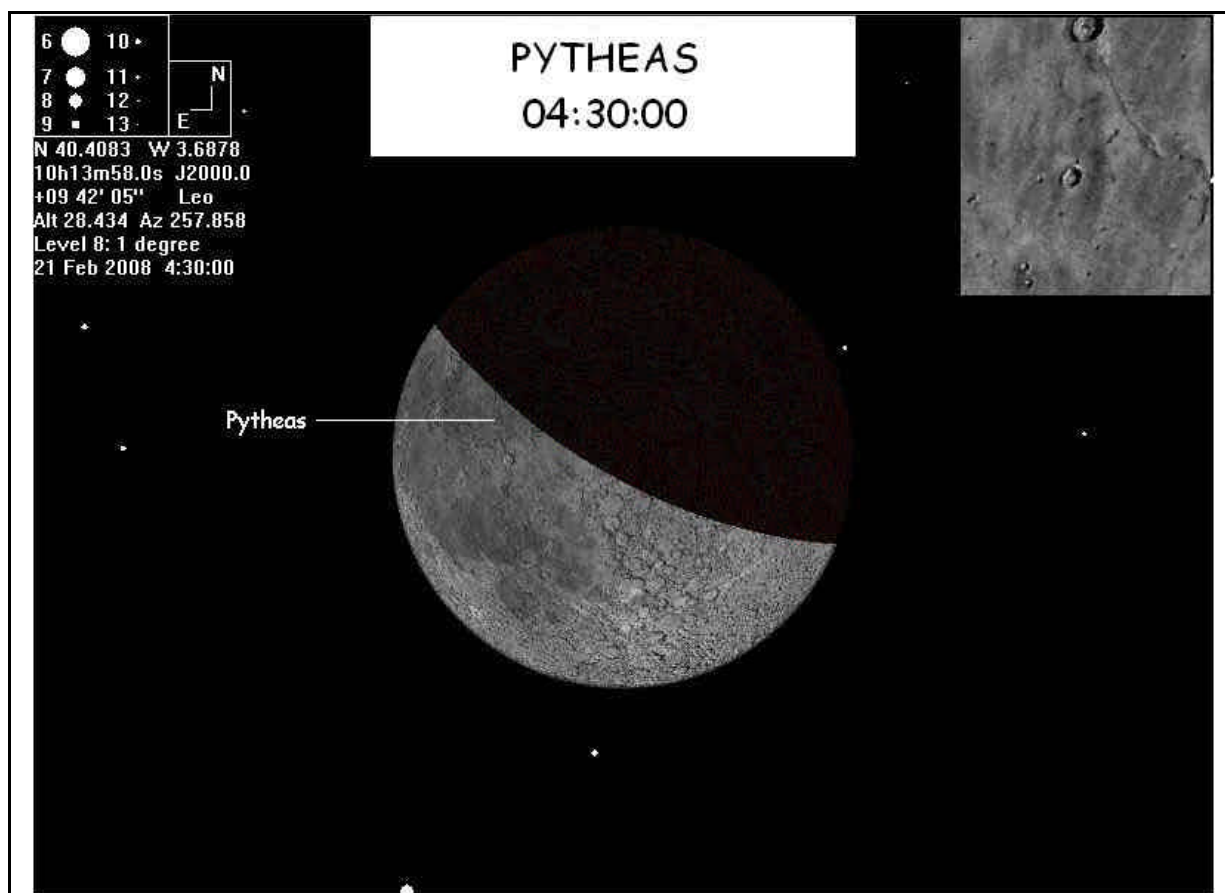


Figure 78.- Emersion of PYTHEAS seen from the North Hemisphere (04:30:00).

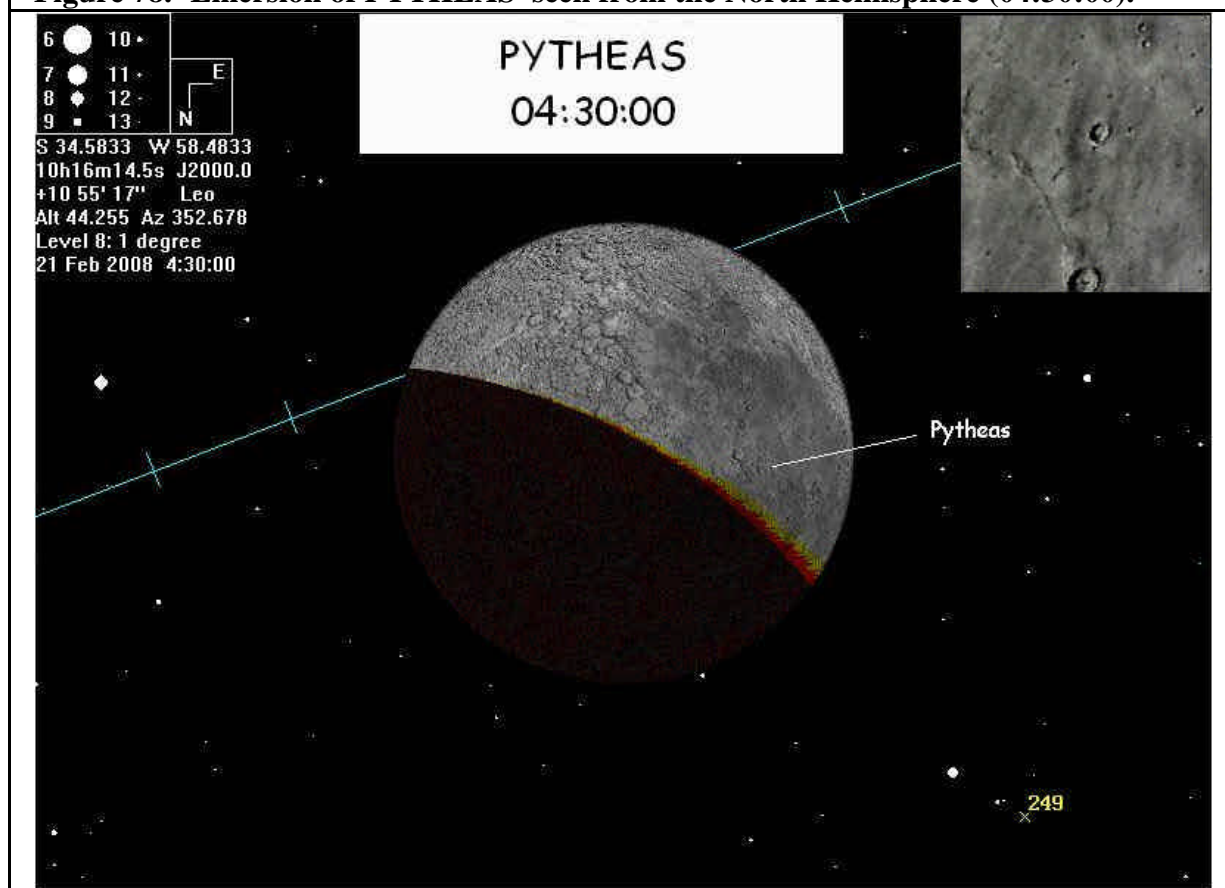


Figure 79.- Emersion of Pytheas seen from the South Hemisphere (04:30:00).

TIMING OF THE EMERSION OF STARS FROM THE MOON FROM MADRID

GSC 837 442

M_v = 9,9

Proposed Equipment.

Large Aperture Telescope;
Medium Focal Telescope (if available)
DSLR Camera (if the auxiliar telescope is available)
GPS and/or Chronometer and Voice recorder.

ESTIMATED TIME: 04:32:50

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

from Madrid (from other sites, see note).

Large Aperture Telescope with a medium power magnification (200x) without polarizers.

Chronometer with alarm

Optional picture if additional telescope and camera are available.

ACTIVITY

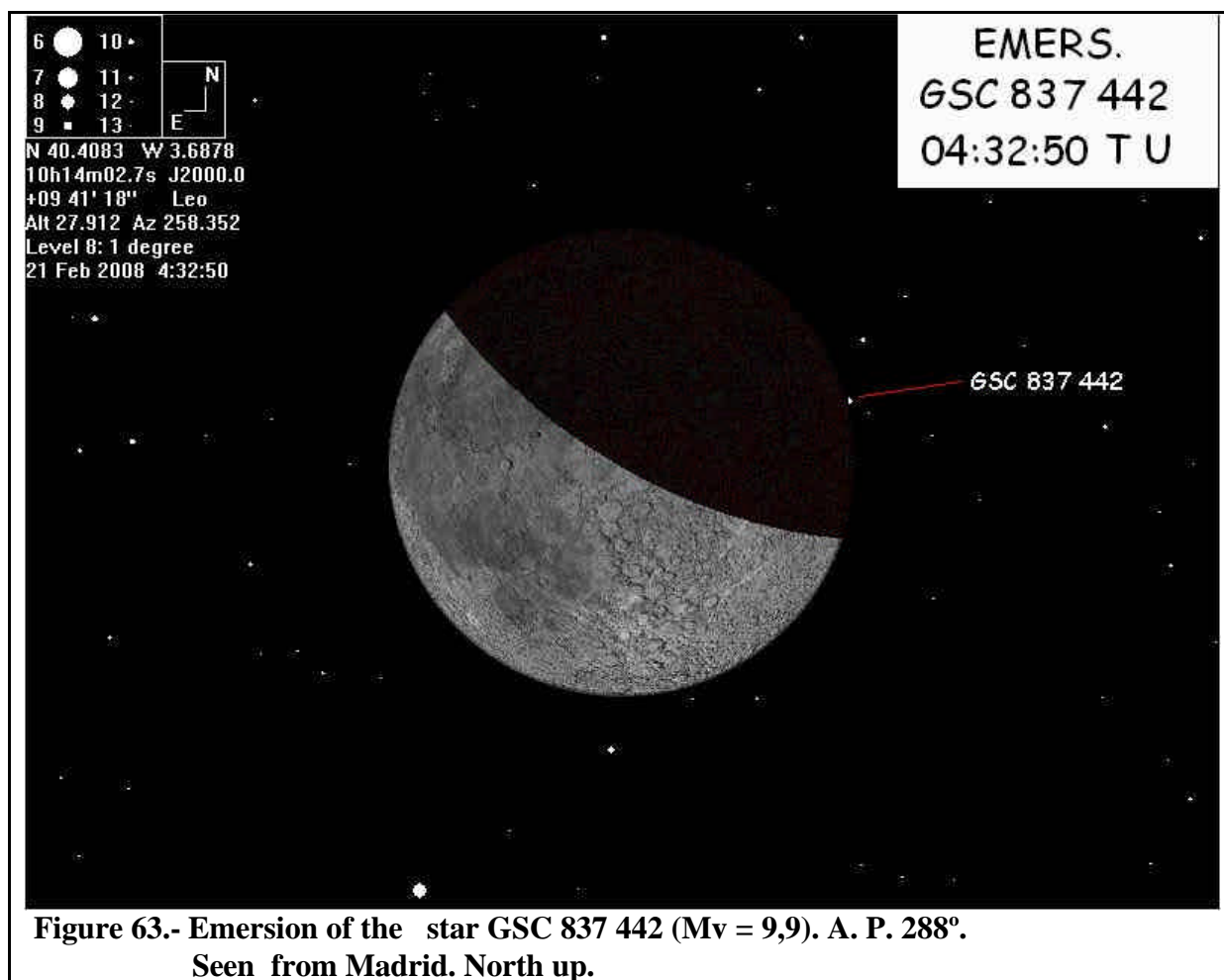
IN MADRID :

04:31:00 Monitor the western limb of the moon around the area where the star must appear (see figure 63).

04:32:50 At the star emersion record time identifying the event ("Emersion star 6") and take a picture with the camera.

EVENTUAL END OF THE ACTIVITY FROM MADRID

Interval until next step..... 2 minutes.



Measured Time	
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NOTE: In order to know if the Emersion is visible from other Western Europe sites and the time, it is necessary to perform a new simulation.

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

TIMOCHARIS

Category	Diameter	Depth
Crater	34 Km	3110 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:36:00

SEVENTH ACTIVITY STEP BY STEP

04:35:00 Monitor point of Emersion of Crater Timocharis (figures 80 and 81). Record Time.
04:36:00 At the emersion of Crater Timocharis, record the time identifying the event (“Timocharis”). Take a picture if aditional telescope and camera are available.
Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 0 minute for the North Hemisphere;
..... 5 minutes for the South Hemisphere.

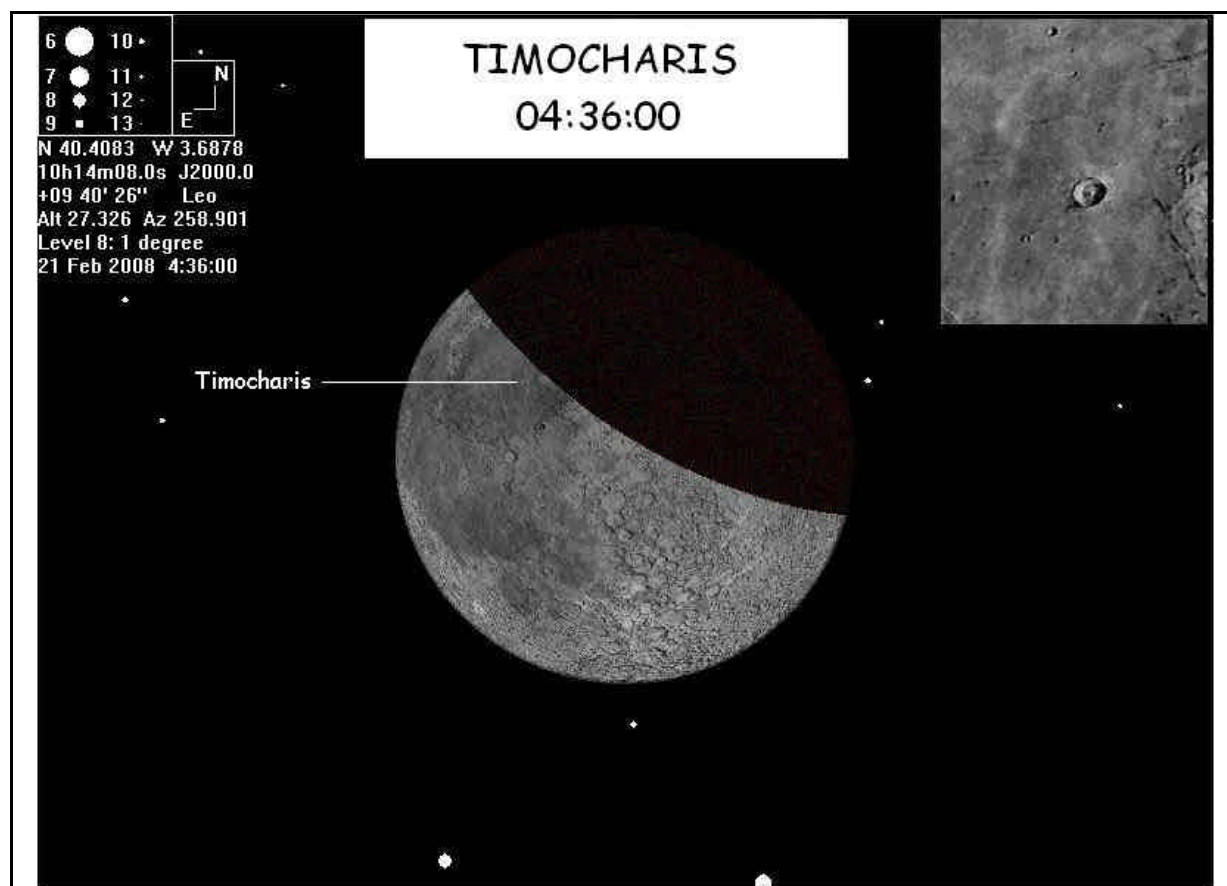


Figure 80.- Emersion of Timocharis seen from the North Hemisphere (04:36:00).

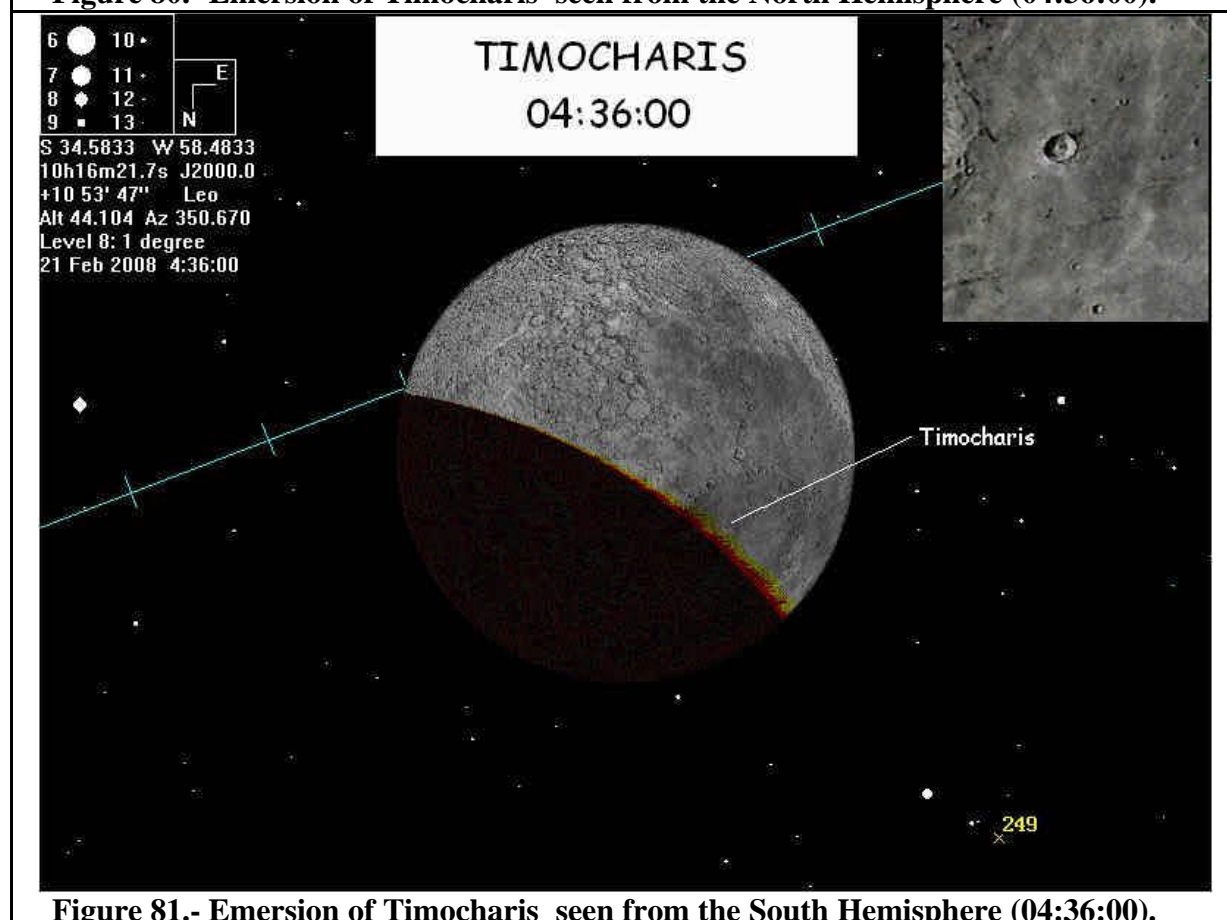


Figure 81.- Emersion of Timocharis seen from the South Hemisphere (04:36:00).

TIMING OF THE EMERSION OF STARS FROM THE MOON FROM MADRID

GSC 837 82

M_v = 9,8

Proposed Equipment.

Large Aperture Telescope;
Medium Focal Telescope (if available)
DSLR Camera (if the auxiliar telescope is available)
GPS and/or Chronometer and Voice recorder.

ESTIMATED TIME: 04:37:25

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

from Madrid (from other sites, see note).

Large Aperture Telescope with a medium power magnification (200x) without polarizers.

Chronometer with alarm

Optional picture if additional telescope and camera are available.

ACTIVITY

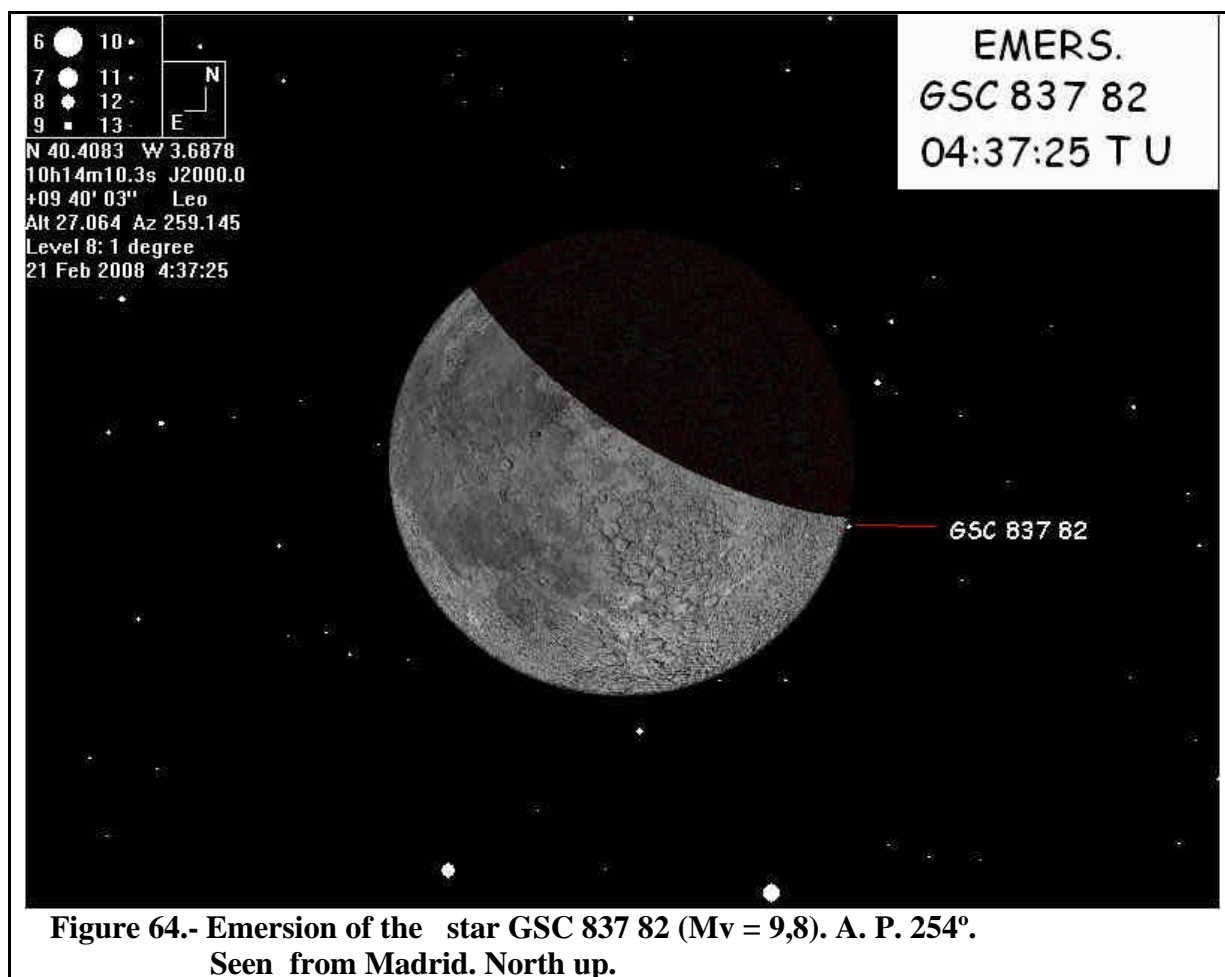
IN MADRID :

04:36:00 Monitor limb SE of the Moon, where the star must appear (see figure 64).

03:37:25 At the star emersion record time identifying the event ("Emersion star 7") and take a picture with the camera.

EVENTUAL END OF THE ACTIVITY FROM MADRID

Interval until next step..... 3 minutes.



Measured Time	
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NOTE: In order to know if the Emersion is visible from other Western Europe sites and the time, it is necessary to perform a new simulation.

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

DIONYSIUS

Category	Diameter	Depth
Crater	18 Km	2700 m

MANILIUS

Category	Diameter	Depth
Crater	39 Km	3050 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:42:00

SEVENTH ACTIVITY STEP BY STEP

04:41:00 Monitor the area of Emersion of the Craters Dionysius and Manilius (figures 82 and 83).

04:42:00 At the Emersion of the Craters Dionysius and Manilius, record the time identifying the event ("Dionysius and Manilius"). Take a picture if additional telescope and camera are available.

NOTE: If the occultation is not simultaneous, the the times of each event separately. .

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 1 minute.

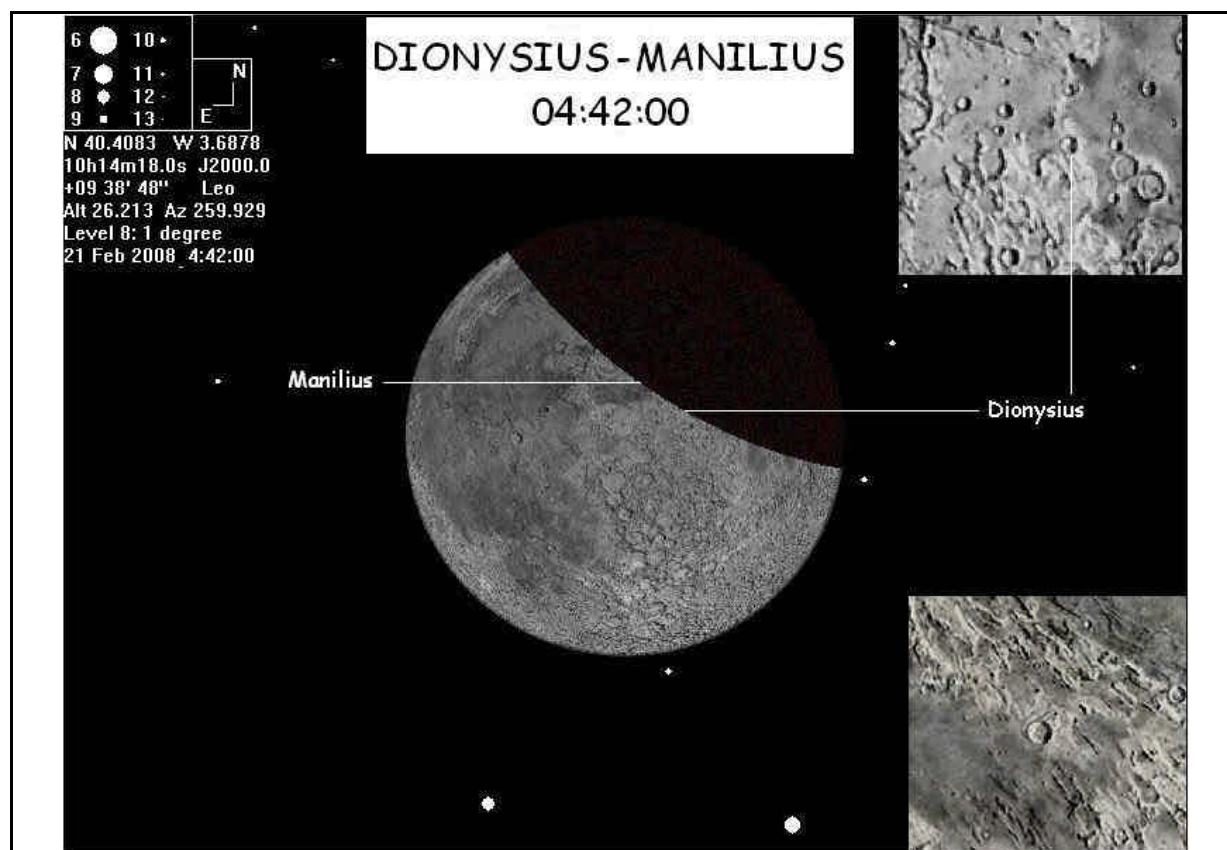


Figure 82.- Emersion of Dionysius and Manilius seen from the North Hemisphere (04:2:00).

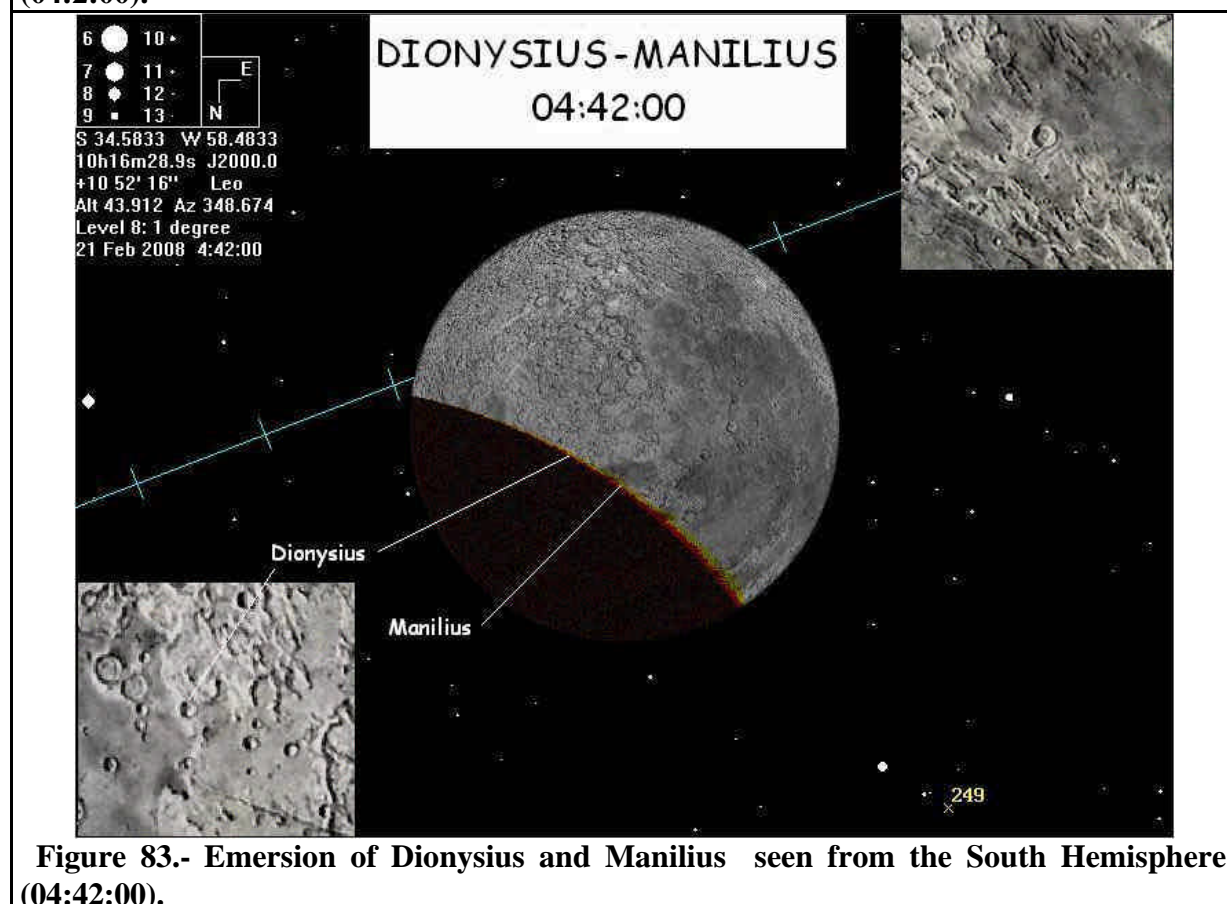


Figure 83.- Emersion of Dionysius and Manilius seen from the South Hemisphere (04:42:00).

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

PLATO

Category	Diameter	Depth
Filled Basin	101 Km	1000 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:44:00

SEVENTH ACTIVITY STEP BY STEP

04:43:00 Monitor point of Emersion of the Plato walled plain (figures 84 and 85). Record Time.
04:44:00 Timing the umbra exit of both borders and calculate the average. A the Emersion of the llanura amurallada Plato, record the time identifying the event ("Plato"). Take a picture if additional telescope and camera are available.
Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 1 minute;

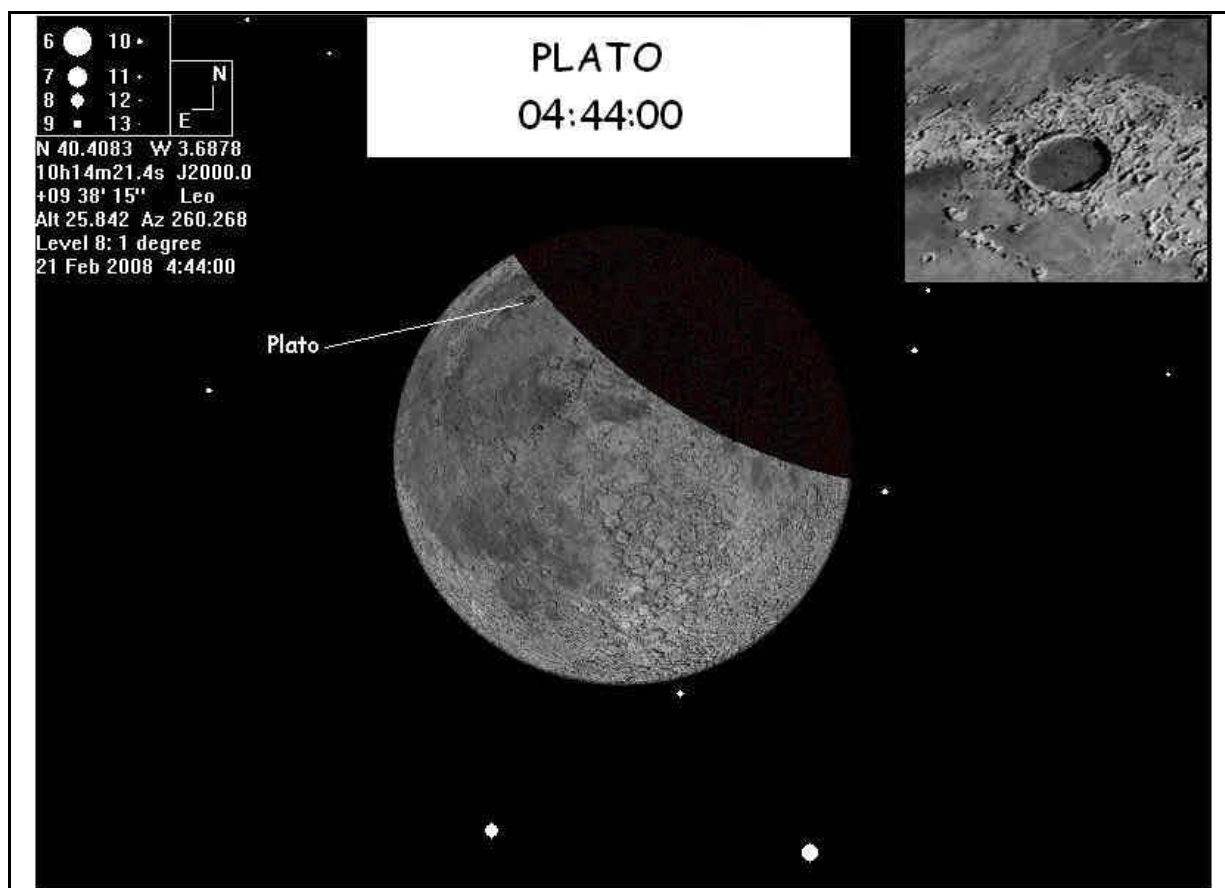


Figure 84.- Emersion of Plato seen from the North Hemisphere (04:44:00).

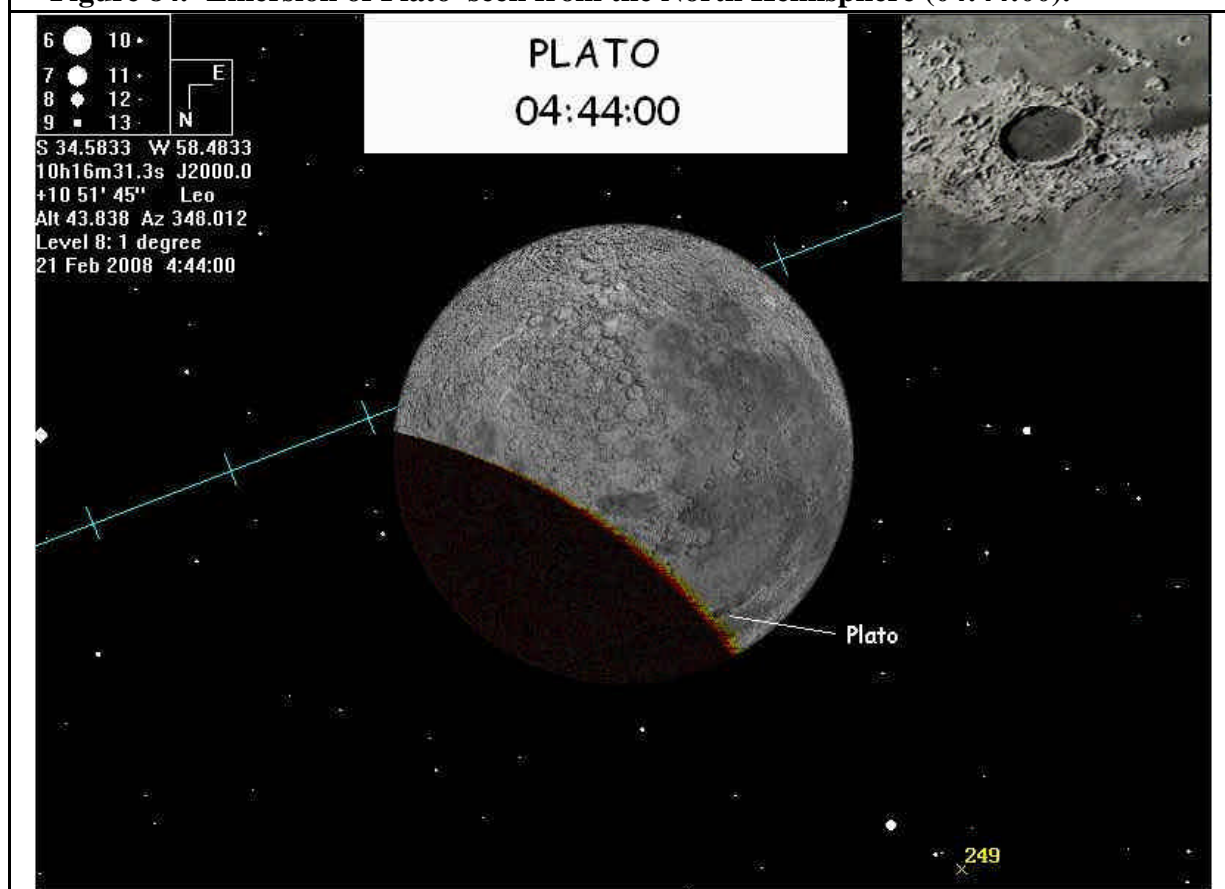


Figure 85.- Emersion of Plato seen from the South Hemisphere (04:44:00).

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

MENELAUS

Category	Diameter	Depth
Crater	27 Km	3010 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:46:00

SEVENTH ACTIVITY STEP BY STEP

04:45:00 Monitor point of Emersion of Crater Menelaus (figures 80 and 81). Record Time.
04:46:00 At the emersion of Crater Menelaus, record the time identifying the event (“Menelaus”). Take a picture if additional telescope and camera are available.
Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 0 minutes.

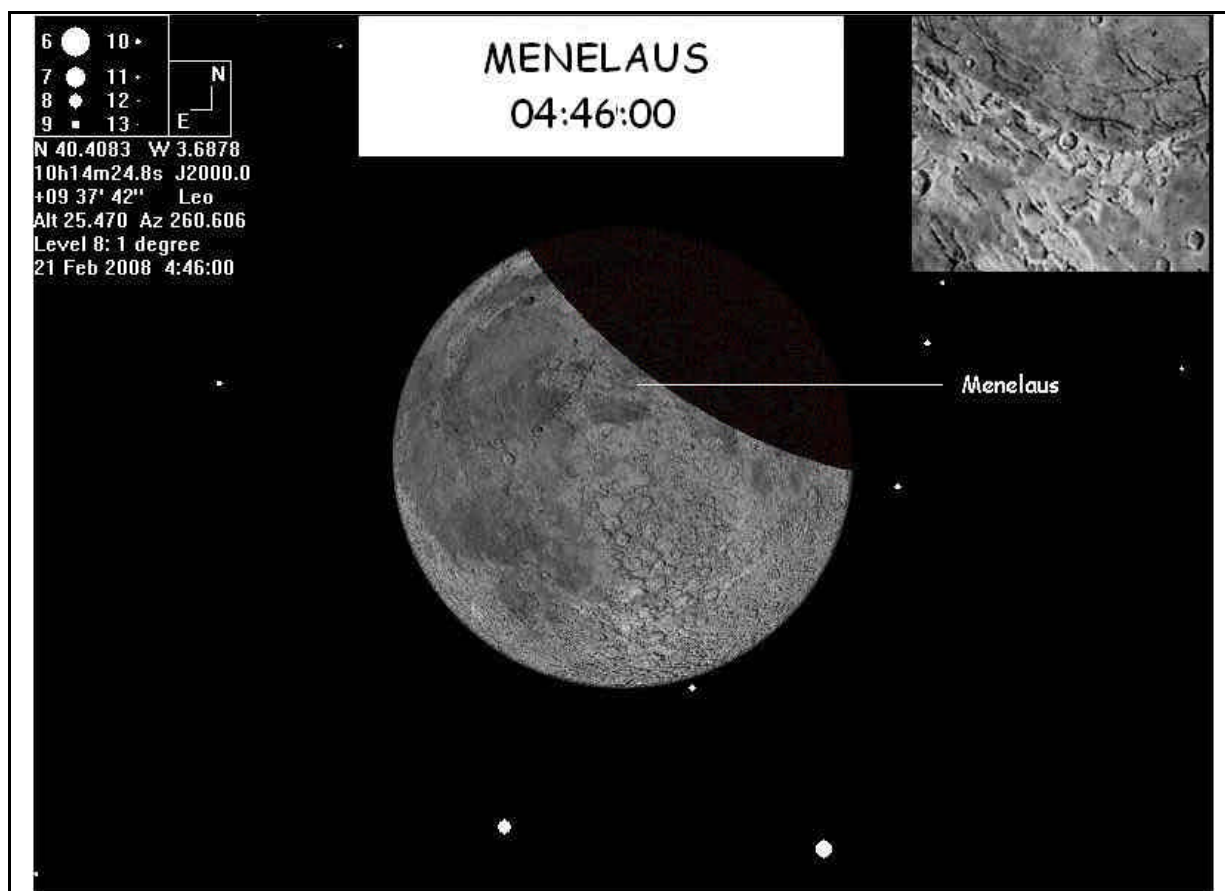


Figure 86.- Emersion of Menelaus seen from the North Hemisphere (04:46:00).

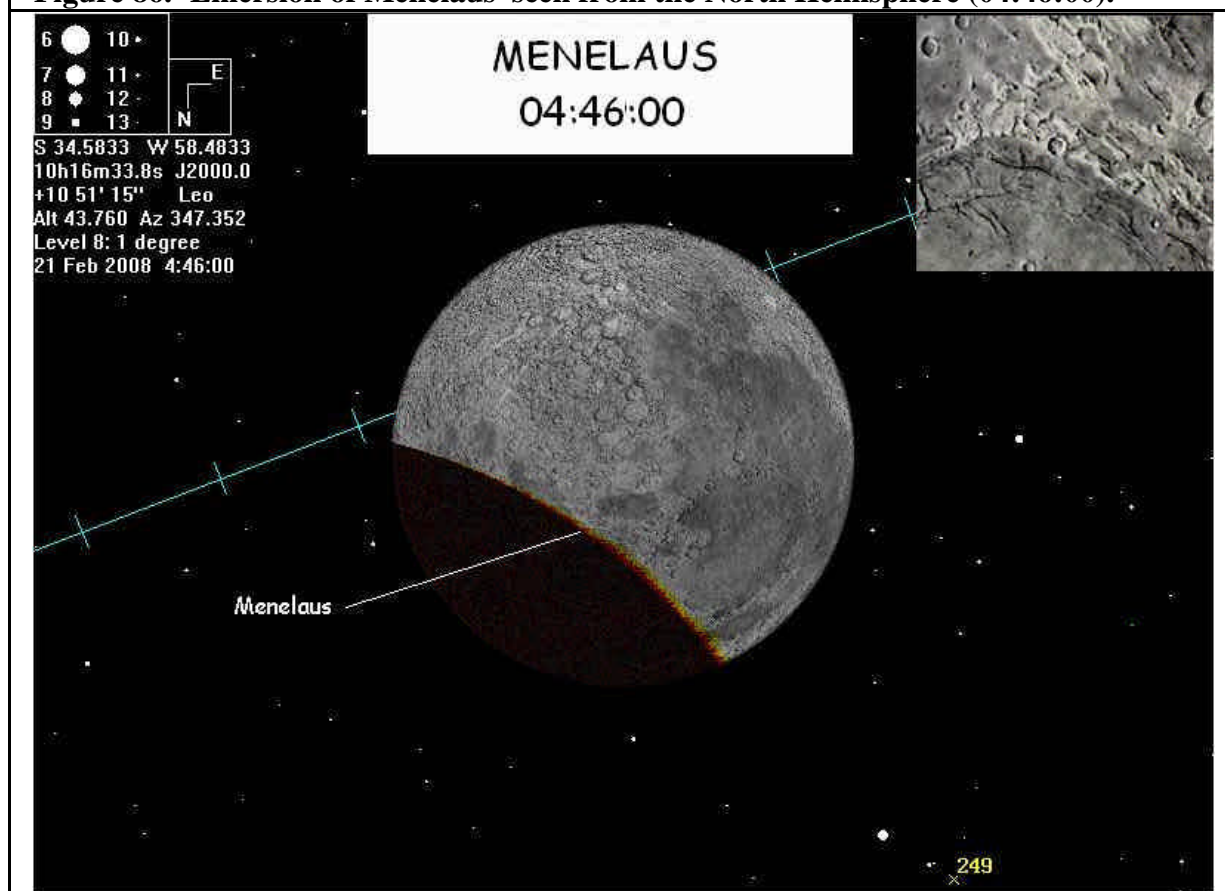


Figure 87.- Emersion of Menelaus seen from the South Hemisphere (04:46:00).

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

GOCLENIUS

Category	Diameter	Depth
Circus	54x72 Km	1500 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:47:00

SEVENTH ACTIVITY STEP BY STEP

04:46:00 Monitor point of Emersion of Circus Goclenius (figures 88 and 89). Record Time.

04:47:00 Timing the umbra exit of both borders and calculate the average. At the emersion of Circus Goclenius, record the time identifying the event (“Goclenius”). Take a picture if additional telescope and camera are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 1 minute;

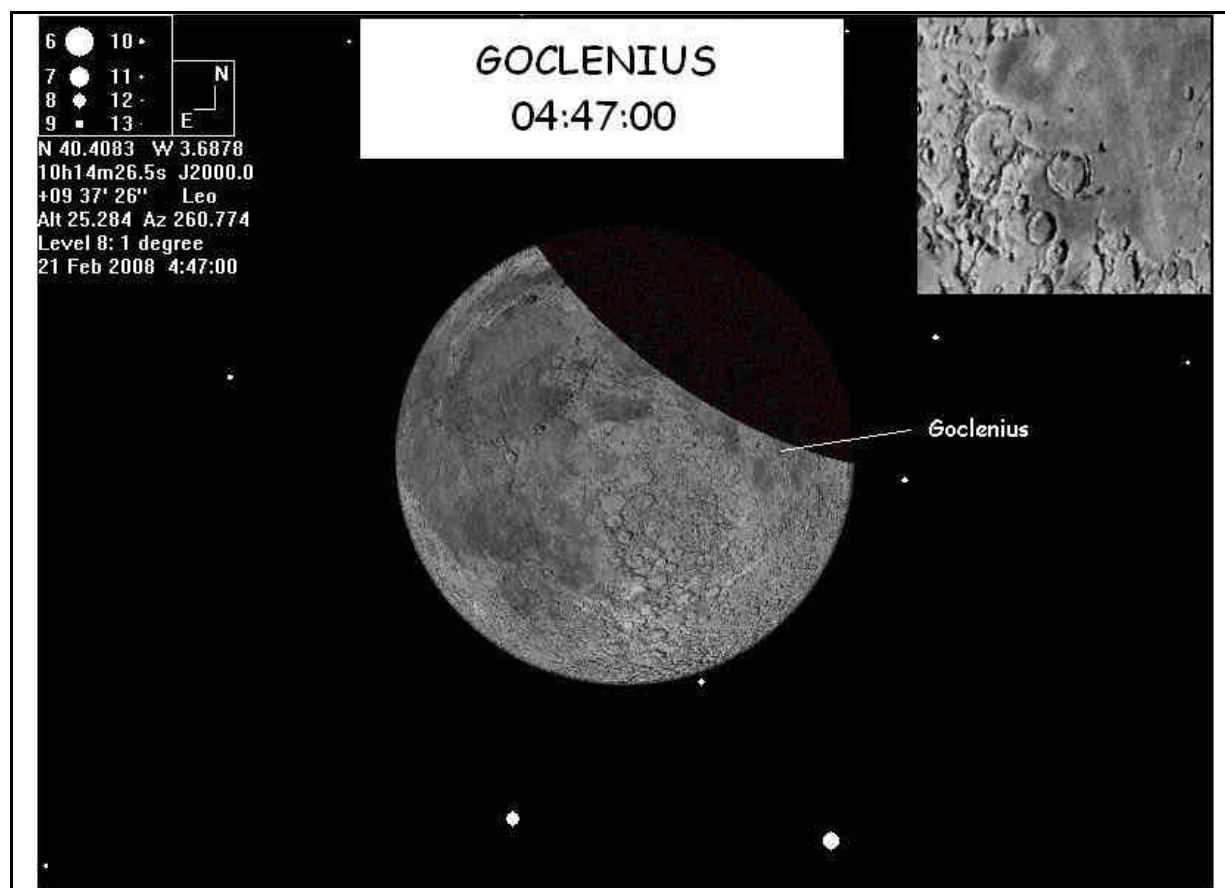


Figure 88.- Emersion of Goclenius seen from the North Hemisphere (04:47:00).

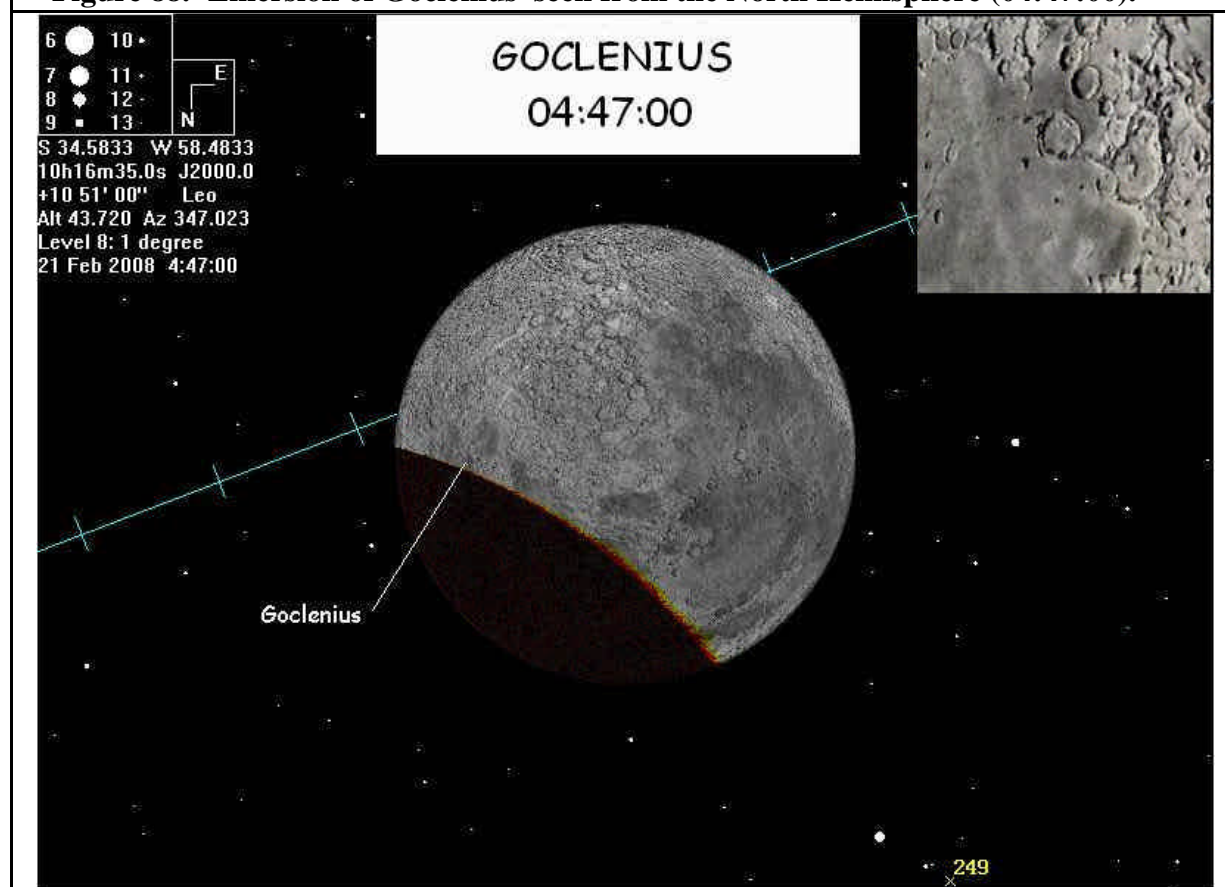


Figure 89.- Emersion of Goclenius seen from the South Hemisphere (04:47:00).

TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW

PLINIUS

Category	Diameter	Depth
Crater	43 Km	2320 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:49:00

SEVENTH ACTIVITY STEP BY STEP

04:48:00 Monitor point of Emersion of Crater Plinius (figures 90 and 91). Record Time.

04:49:00 At the emersion of Crater Plinius, record the time identifying the event (“Plinius”).
Take a picture if aditional telescope and camera are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 0 minute for the North Hemisphere;
..... 1 minute for the South Hemisphere.

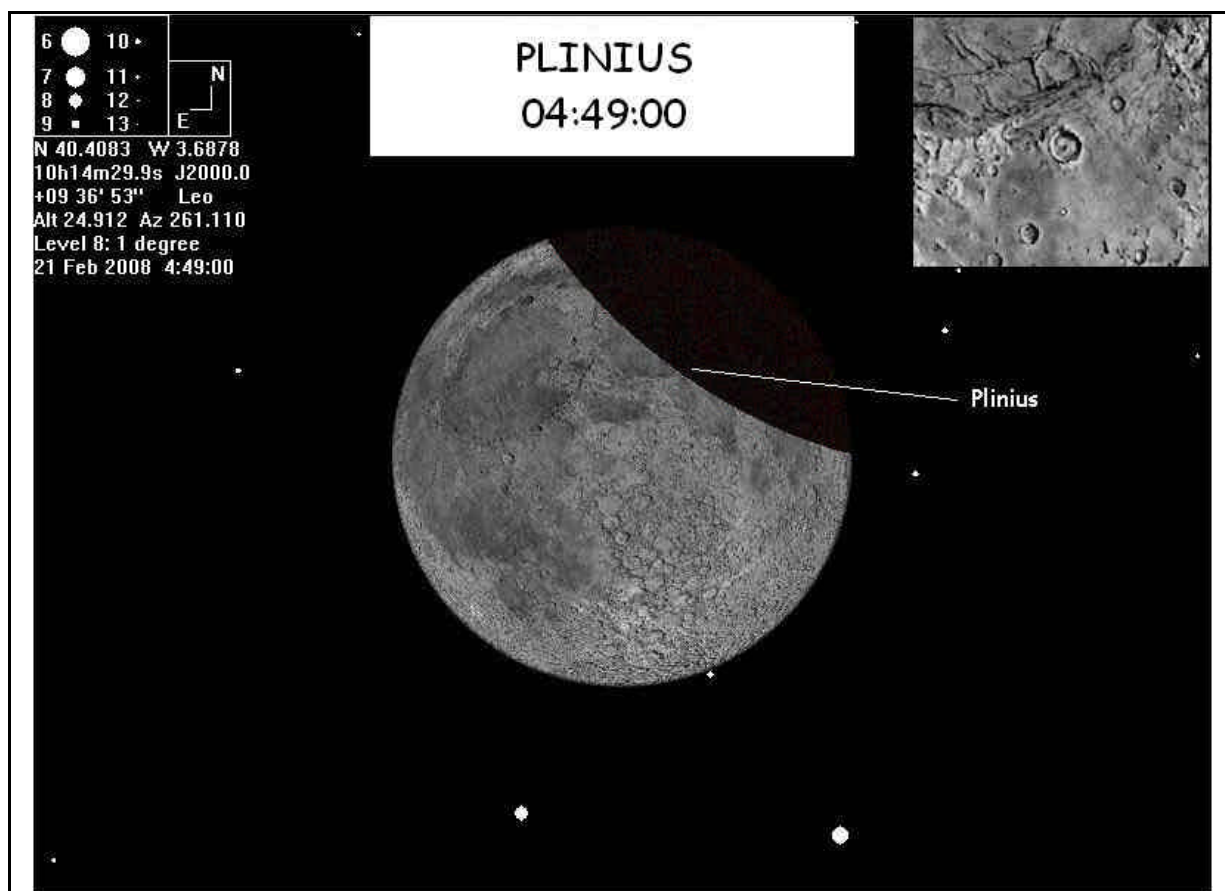


Figure 90.- Emersion of Plinius seen from the North Hemisphere (04:49:00).

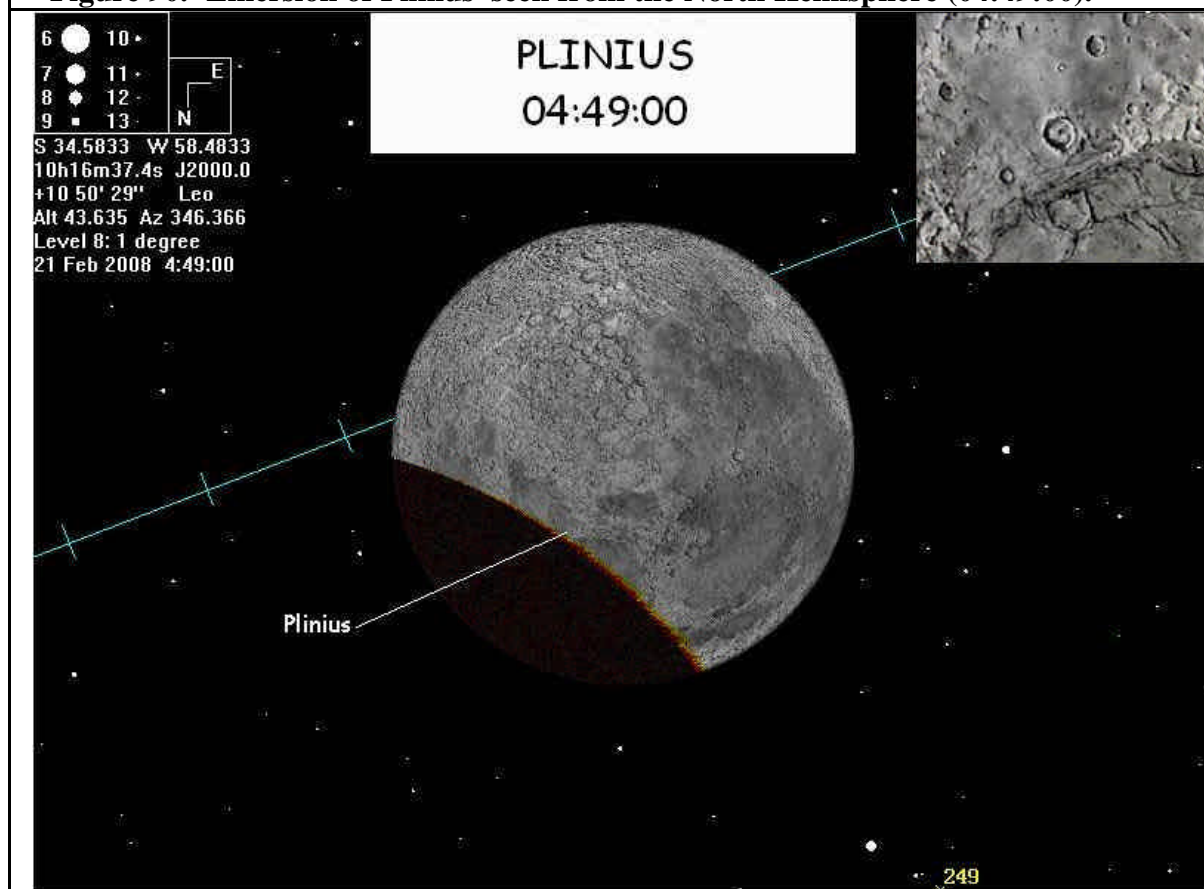


Figure 91.- Emersion of Plinius seen from the South Hemisphere (04:49:00).

TIMING OF THE OCULTATION OF STARS BY THE MOON FROM MADRID

GSC 837 606

M_v = 9,4

Proposed Equipment.

Large Aperture Telescope;
Medium Focal Telescope (if available)
DSLR Camera (if the auxiliar telescope is available)
GPS and/or Chronometer and Voice recorder.

ESTIMATED TIME: 04:50:30

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

From Madrid (from other sites, see note).

Large Aperture Telescope with a medium power magnification (200x) without polarizers.

Chronometer with alarm

Optional picture if additional telescope and camera are available.

ACTIVITY

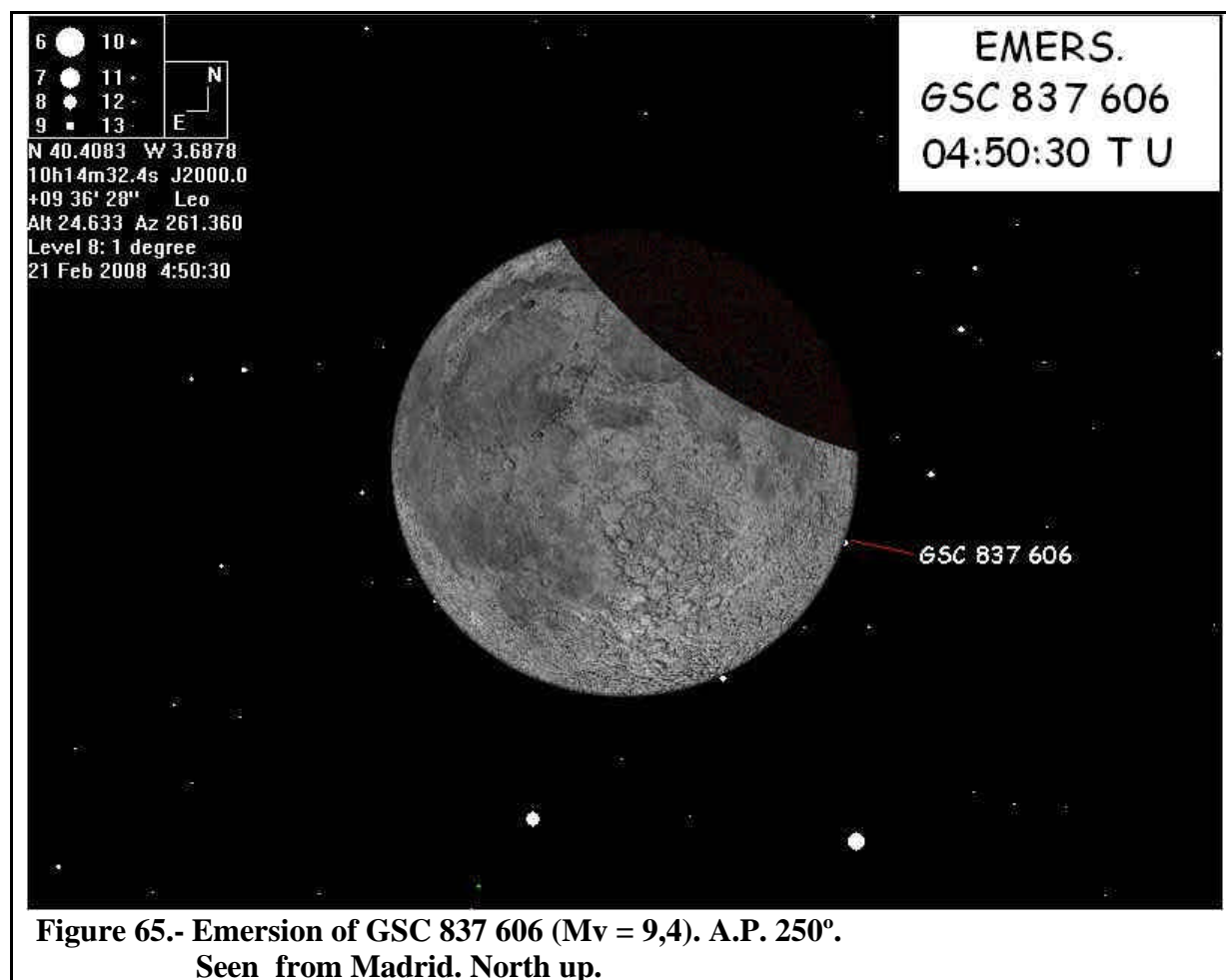
IN MADRID :

04:49:00 Monitor limb SSE of the Moon, where the star must appear (see figure 65).

04:50:30 At the star emersion record time identifying the event ("Emersion star 8") and take a picture with the camera.

EVENTUAL END OF THE ACTIVITY FROM MADRID

Interval until next step..... 0 minutes.



Measured Time	
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NOTE: In order to know if the Emersion is visible from other Western Europe sites and the time, it is necessary to perform a new simulation.

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

EUDOXUS

Category	Diameter	Depth
Circus	67 Km	3350 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:51:00

SEVENTH ACTIVITY STEP BY STEP

04:50:00 Monitor point of Emersion of Circus Eudoxus (figures 92 and 93). Record Time.

04:51:00 Timing the umbra exit of both borders and calculate the average. At the emersion of Circus Eudoxus, record the time identifying the event (“Eudoxus”). Take a picture if additional telescope and camera are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 0 minutes;

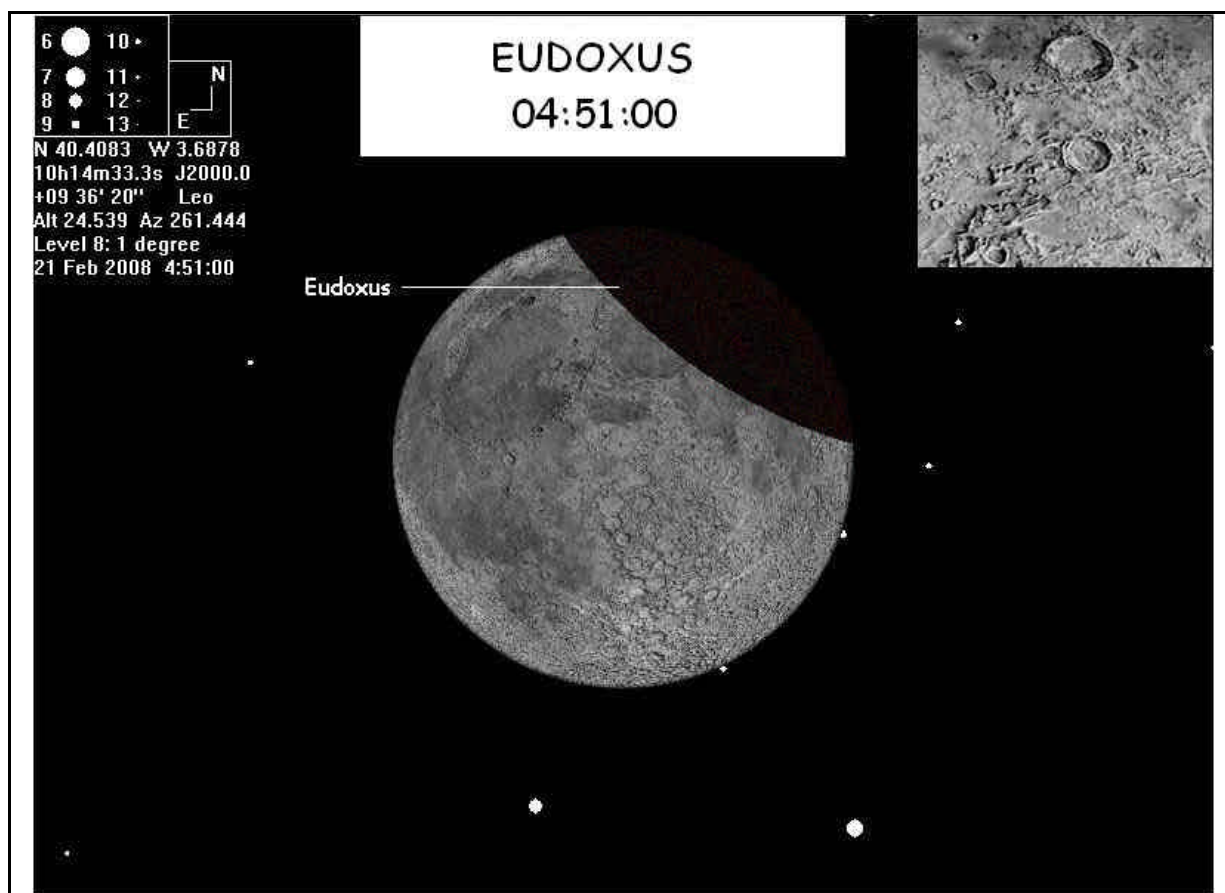


Figure 92.- Emersion of Eudoxus seen from the North Hemisphere (04:51:00).

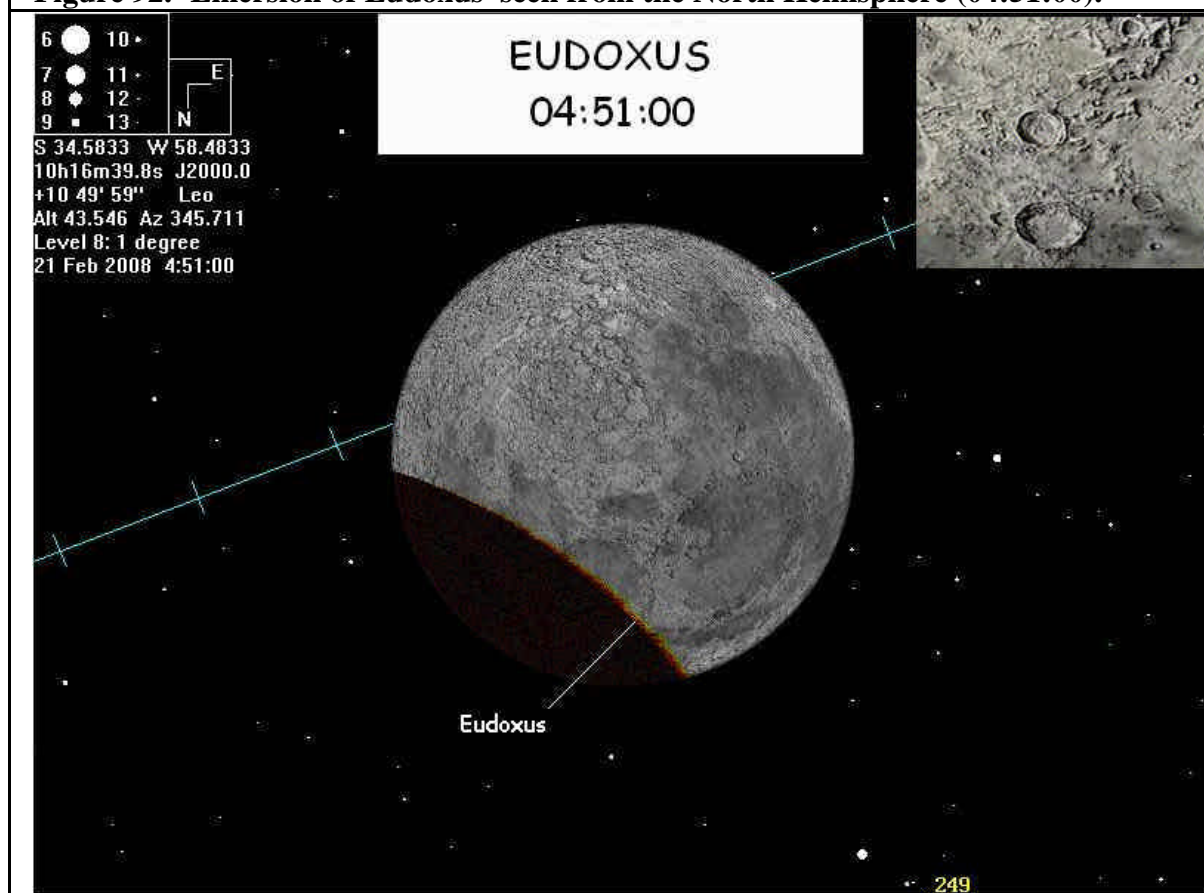


Figure 93.- Emersion of Eudoxus seen from the South Hemisphere (04:51:00).

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

ARISTOTELES

Category	Diameter	Depth
Circus	87 Km	3700 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:52:00

SEVENTH ACTIVITY STEP BY STEP

04:51:00 Monitor point of Emersion of Circus Aristoteles (figures 94 and 95). Record Time.

04:52:00 Timing the umbra exit of both borders and calculate the average. At the emersion of Circus Aristoteles, record the time identifying the event (“Aristoteles”). Take a picture if additional telescope and camera are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 0 minutes;

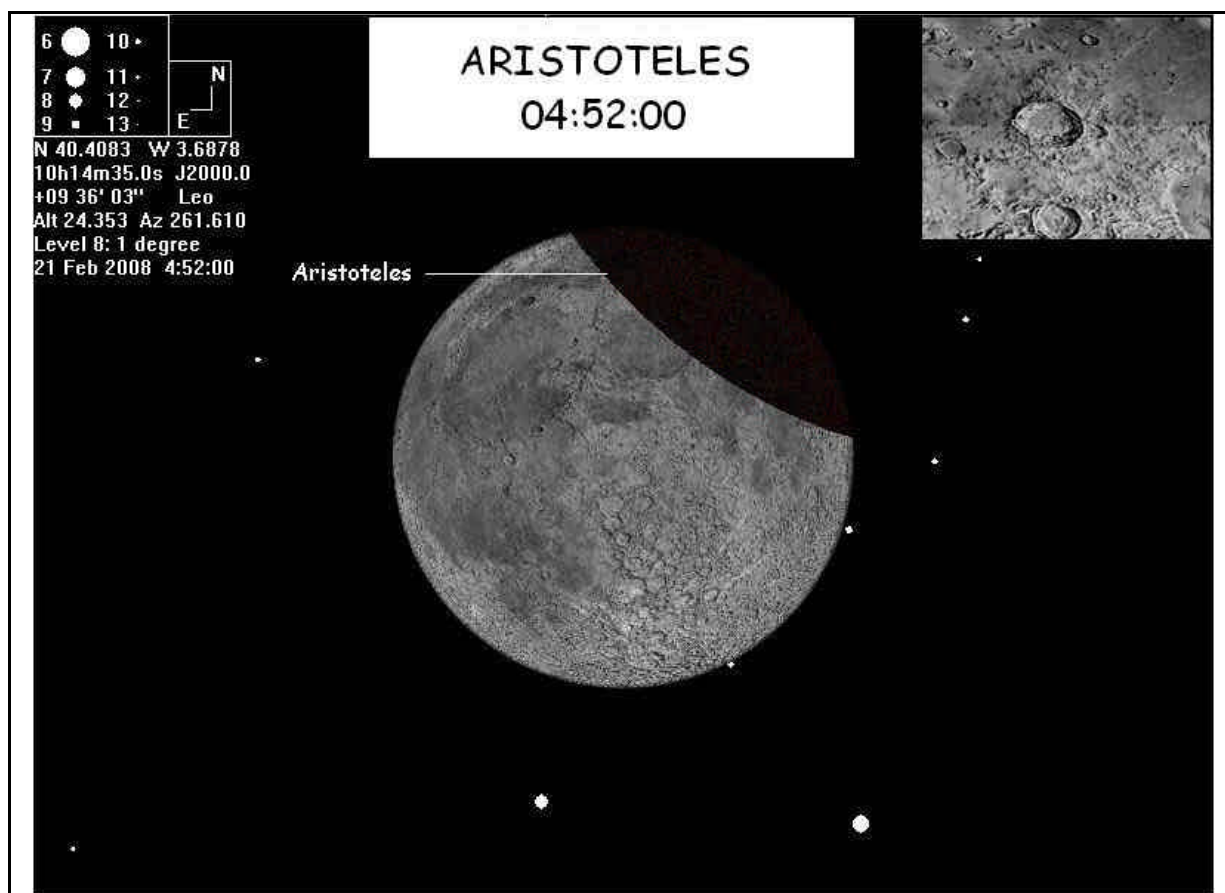


Figure 94.- Emersion of Aristoteles seen from the North Hemisphere (04:52:00).

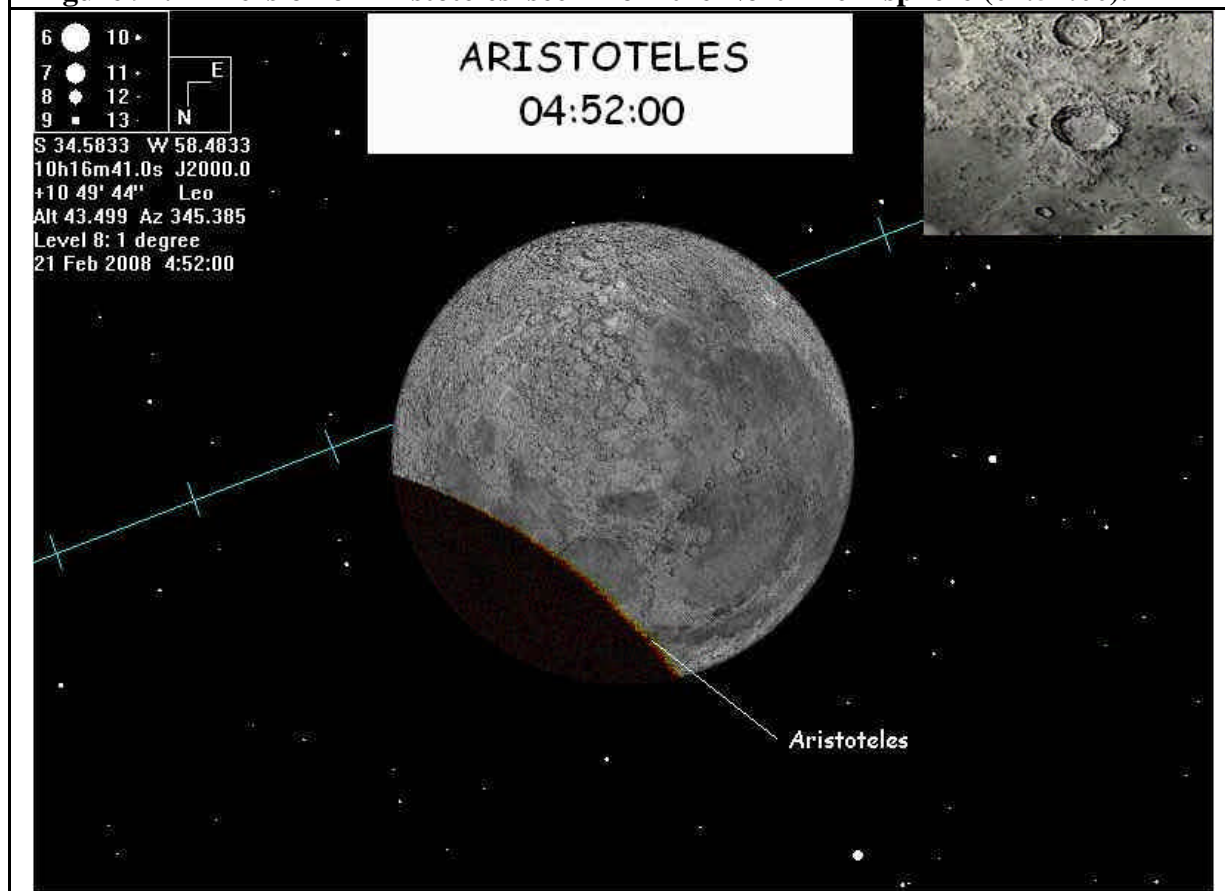


Figure 95.- Emersion of Aristoteles seen from the South Hemisphere (04:52:00).

TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW

LANGRENUS

Category	Diameter	Depth
Circus	132 Km	2600 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:53:00

SEVENTH ACTIVITY STEP BY STEP

04:52:00 Monitor point of Emersion of Circus Langrenus (figures 94 and 95). Record Time.

04:53:00 Timing the umbra exit of both borders and calculate the average. At the emersion of Circus Langrenus, record the time identifying the event (“Langrenus”). Take a picture if additional telescope and camera are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
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Interval until next step..... 1 minute;

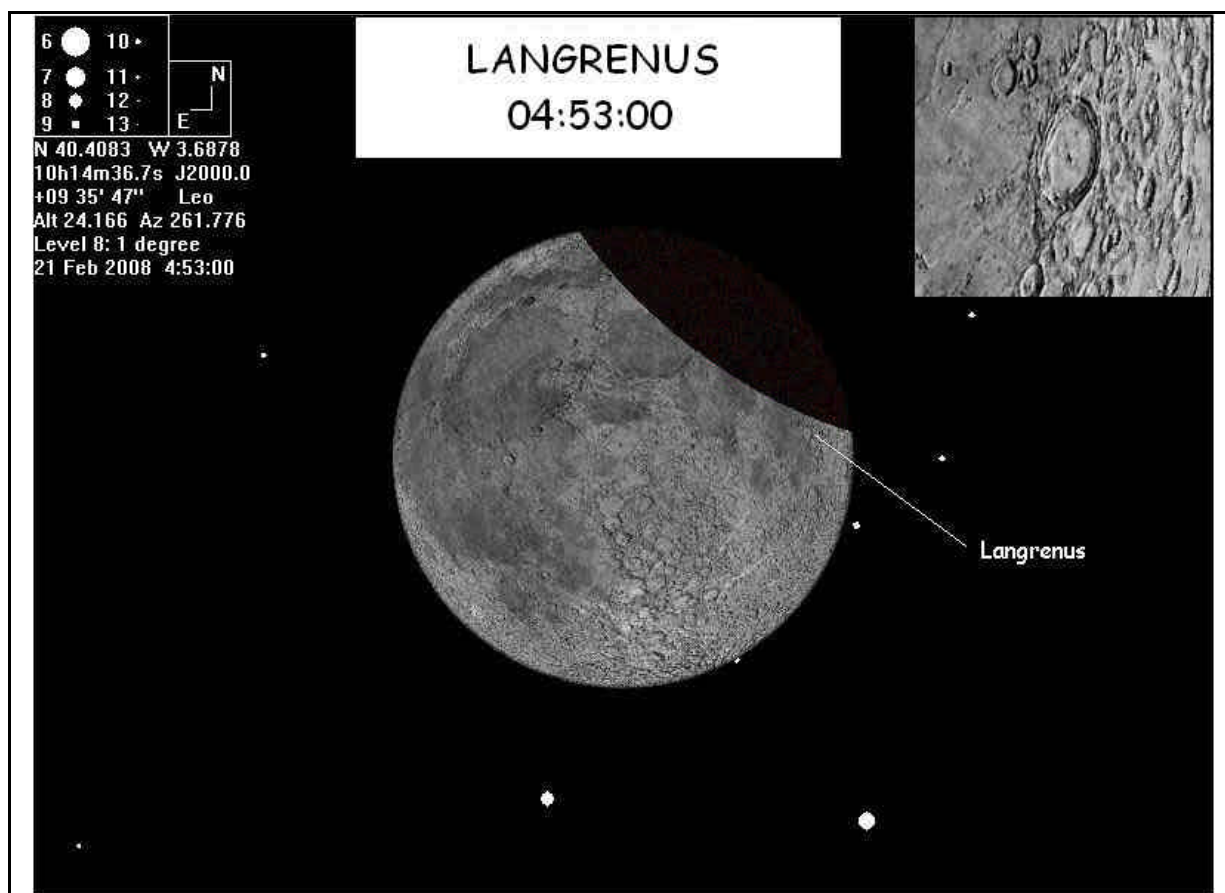


Figure 96.- Emersion of Langrenus seen from the North Hemisphere (04:53:00).

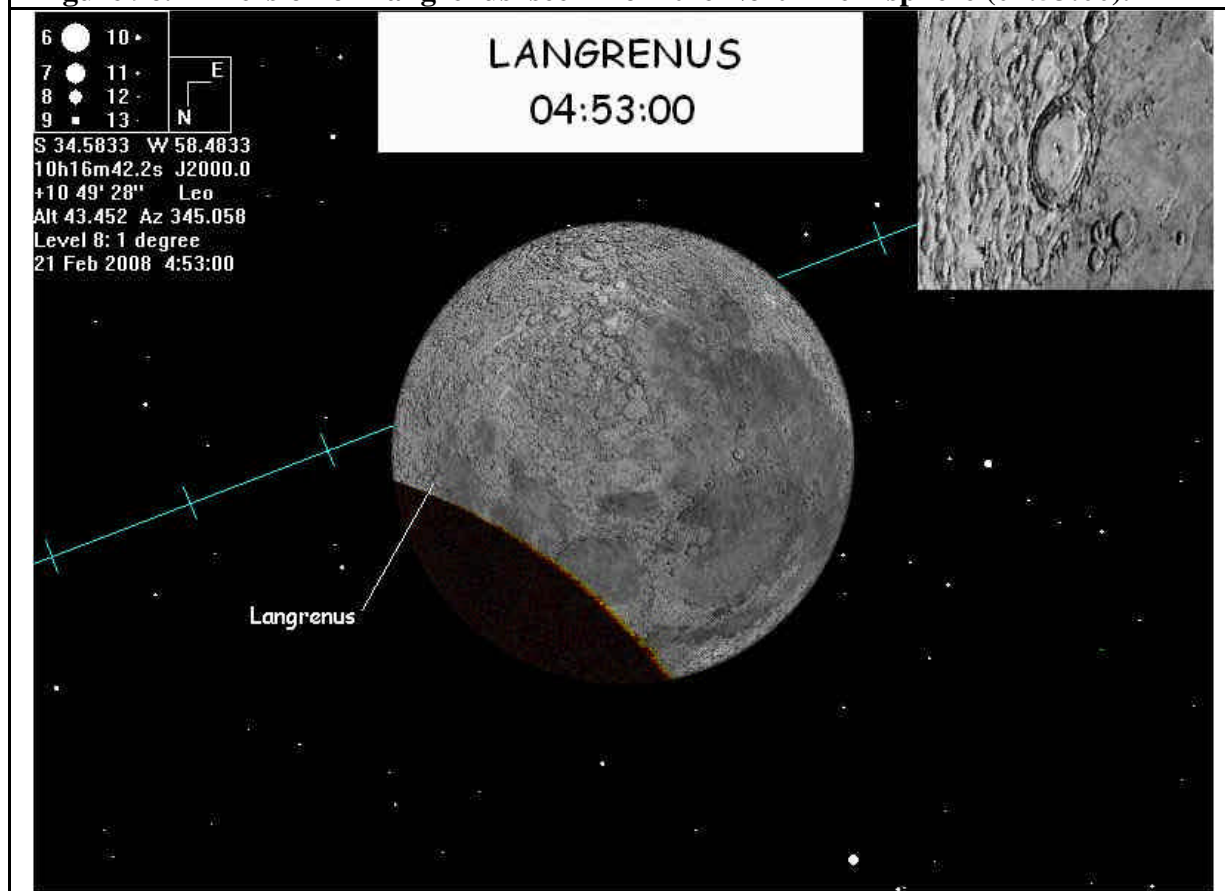


Figure 97.- Emersion of Langrenus seen from the South Hemisphere (04:53:00).

**TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW**

TARUNTIUS

Category	Diameter	Depth
Circus	56 Km	1150 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:55:00

SEVENTH ACTIVITY STEP BY STEP

04:54:00 Monitor point of Emersion of Circus Taruntius (figures 94 and 95). Record Time.

04:55:00 Timing the umbra exit of both borders and calculate the average. At the emersion of Circus Taruntius, record the time identifying the event ("Taruntius"). Take a picture if additional telescope and camera are available.

Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
---------------	--

Interval until next step..... 0 minutes for the North Hemisphere;
..... 3 minutes for the South Hemisphere.

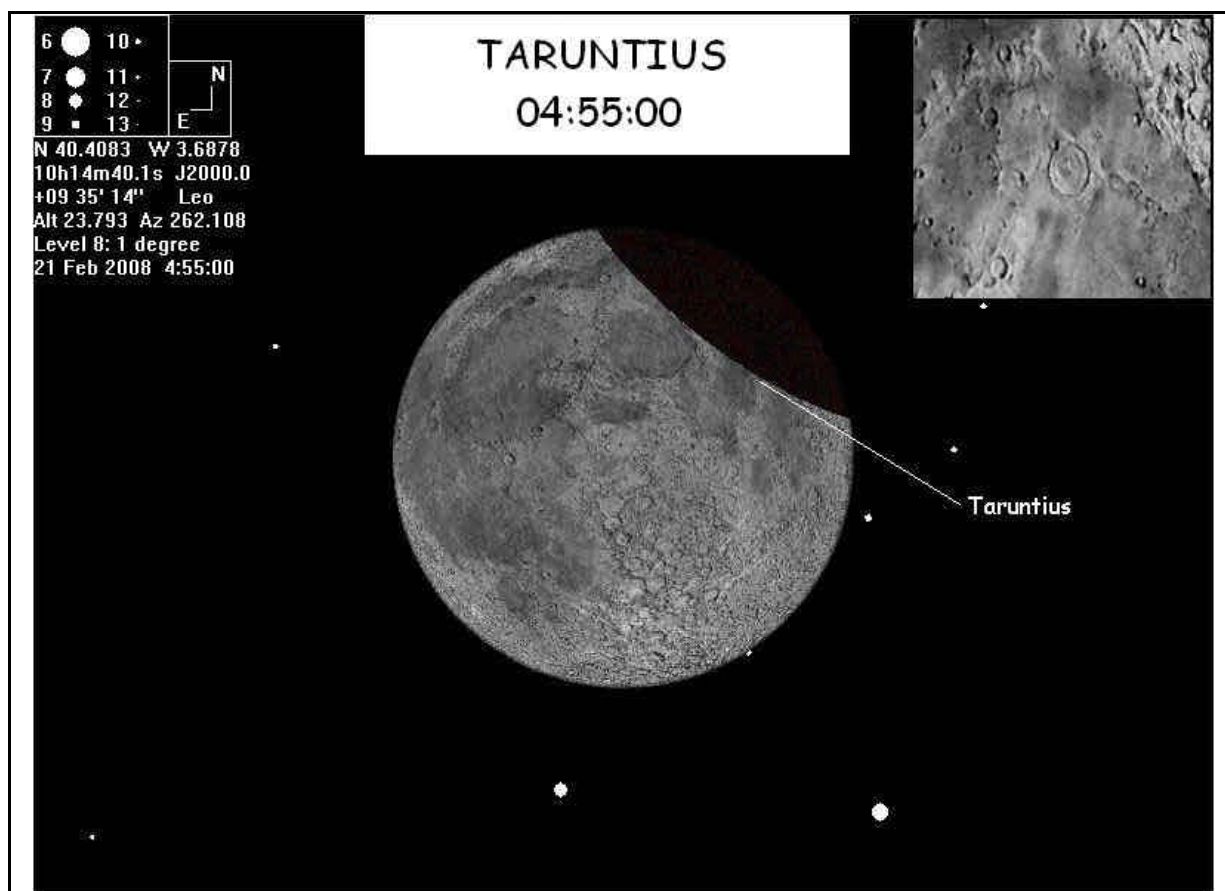


Figure 98.- Emersion of Taruntius seen from the North Hemisphere (04:55:00).

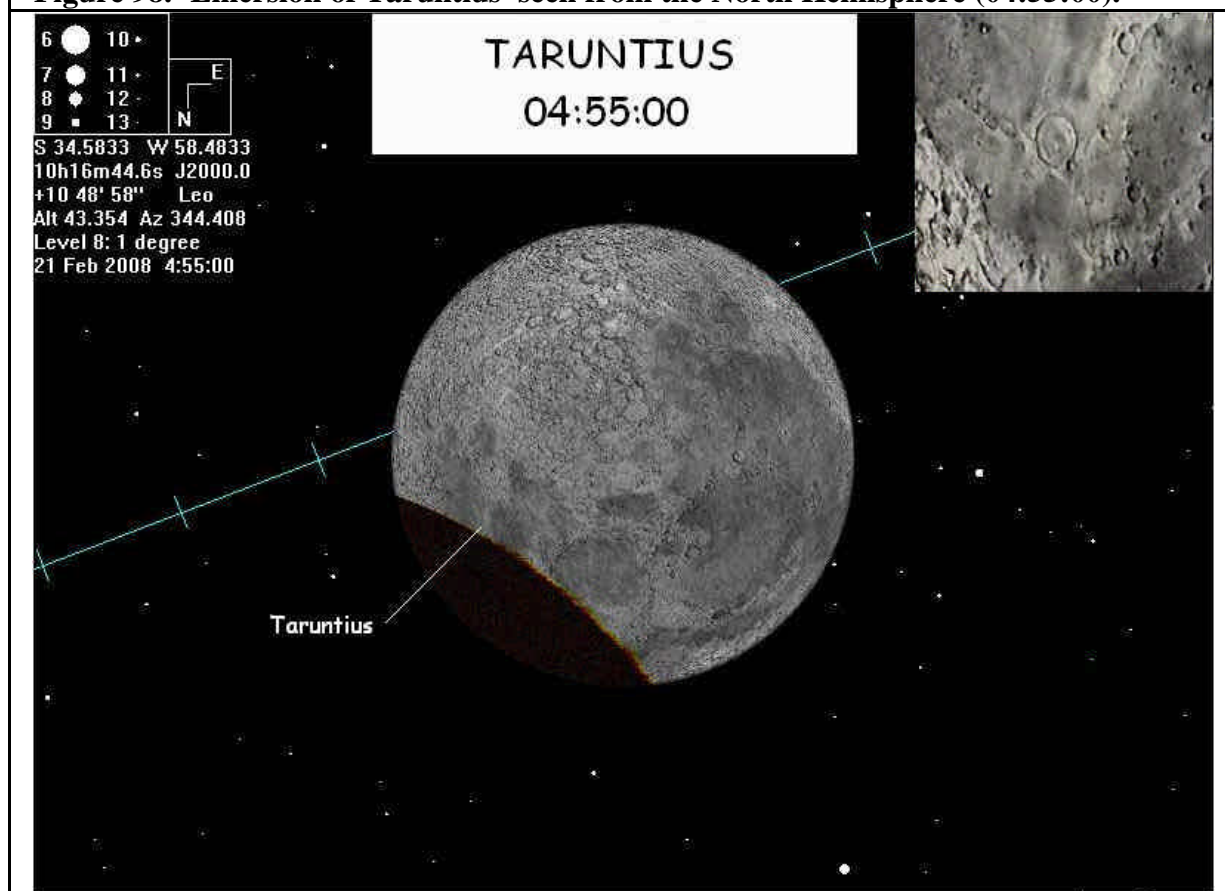


Figure 99.- Emersion of Taruntius seen from the South Hemisphere (04:55:00).

**TIMING OF THE TANGENT OCULTATION OF STARS BY THE MOON FROM
MADRID**

GSC 837 143

M_v = 9,8

Proposed Equipment.

Large Aperture Telescope
Chronometer with alarm
Voice Recorder
Camera DSLR (opcional, if a second telescope is available).

ESTIMATED TIME: 04:56:30

SIXTH ACTIVITY STEP BY STEP

CONFIGURATION

from Madrid (from other sites, see note).

Large Aperture Telescope with a medium power magnification (200x) without polarizers.

Chronometer with alarm

Optional picture if additional telescope and camera are available.

ACTIVITY

IN MADRID :

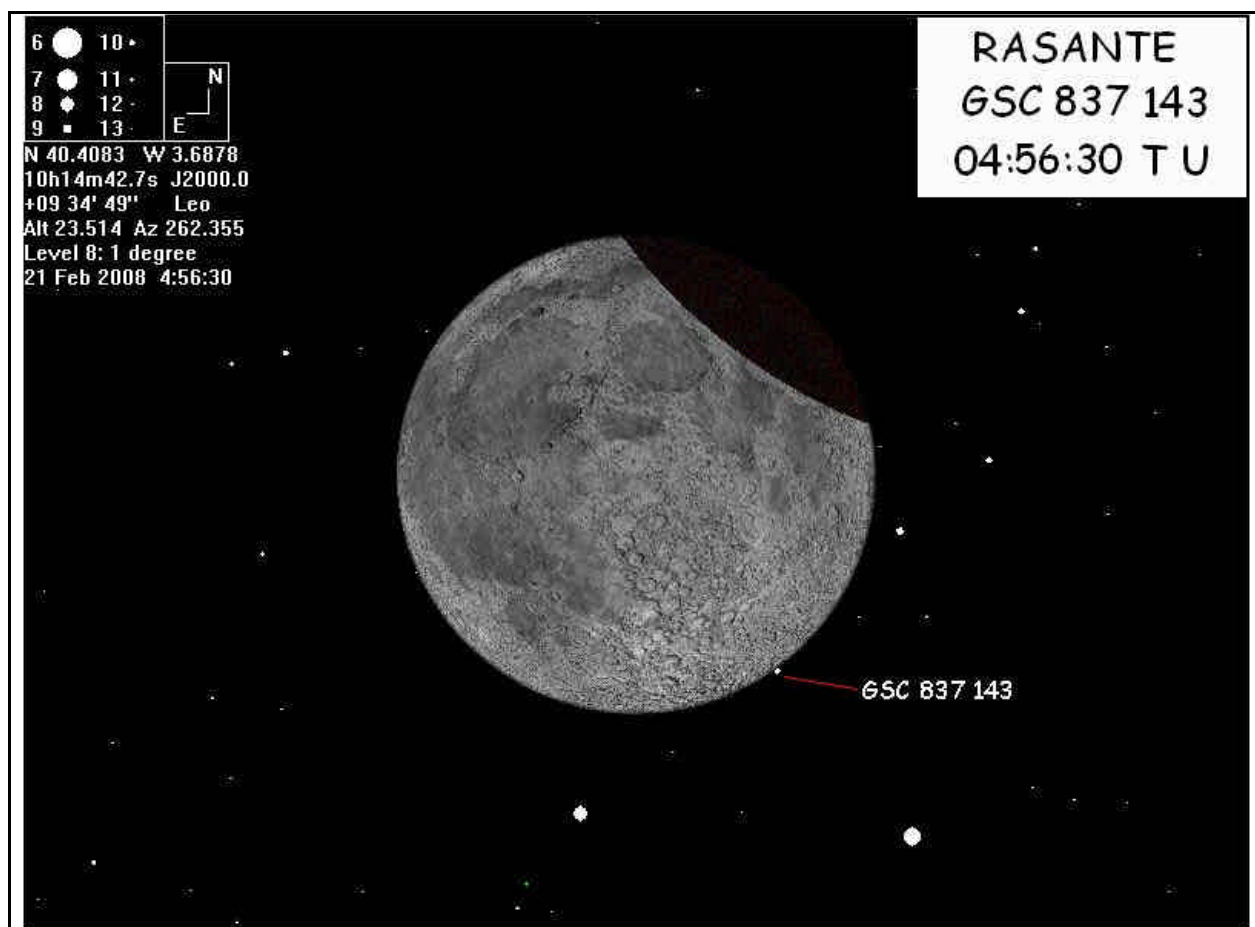
04:55:00 Monitor South limb of the Moon, where the star must tangentially pass (see figure 66).

04:56:30 In the contact of the star with the limb, record the time identifying the ("Tangent Star") and take a picture with the camera.

NOTE: If the contact is not produced, identify the event as "Negative".

EVENTUAL END OF THE ACTIVITY FROM MADRID

Interval until next step..... 1 minute.



**Figure 66.- Tangent Passage of the star GSC 837 143 ($M_v = 9,8$). A. P. 215° .
Seen for Madrid. North up.**

Measured Time	
---------------	--

Interval until next step..... 1 minute;

TIMING OF THE EMERSION OF LUNAR FEATURES FROM THE EARTH
SHADOW

PROCLUS

Category	Diameter	Depth
Crater	28 Km	2400 m

Proposed Equipment.

Large Aperture Telescope; Medium Focal Telescope (if available) DSLR Camera (if the auxiliar telescope is available) GPS and/or Chronometer and Voice recorder.
--

ESTIMATED TIME: 04:59:00

SEVENTH ACTIVITY STEP BY STEP

04:58:00 Monitor point of Emersion of Crater Proclus (figures 100 and 101). Record Time.
04:59:00 At the emersion of Crater Proclus, record the time identifying the event ("Proclus"). Take a picture if additional telescope and camera are available.
Maintain the voice recorder (if available) operating until the last contact with the umbra (50 minutes).

Measured Time	
---------------	--

Interval until next step..... 0 minute for the North Hemisphere;
..... 1 minute for the South Hemisphere.

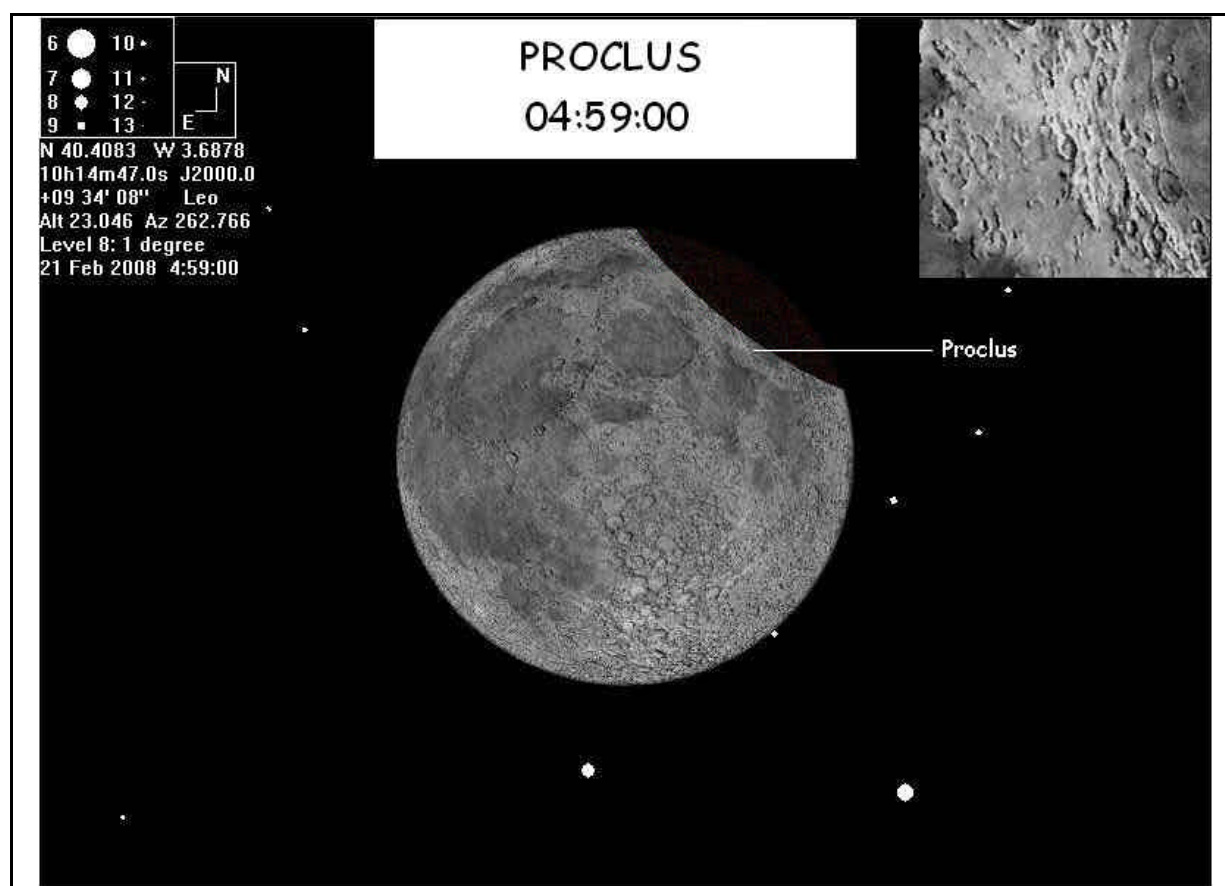


Figure 100.- Emersion of Proclus seen from the North Hemisphere (04:59:00).

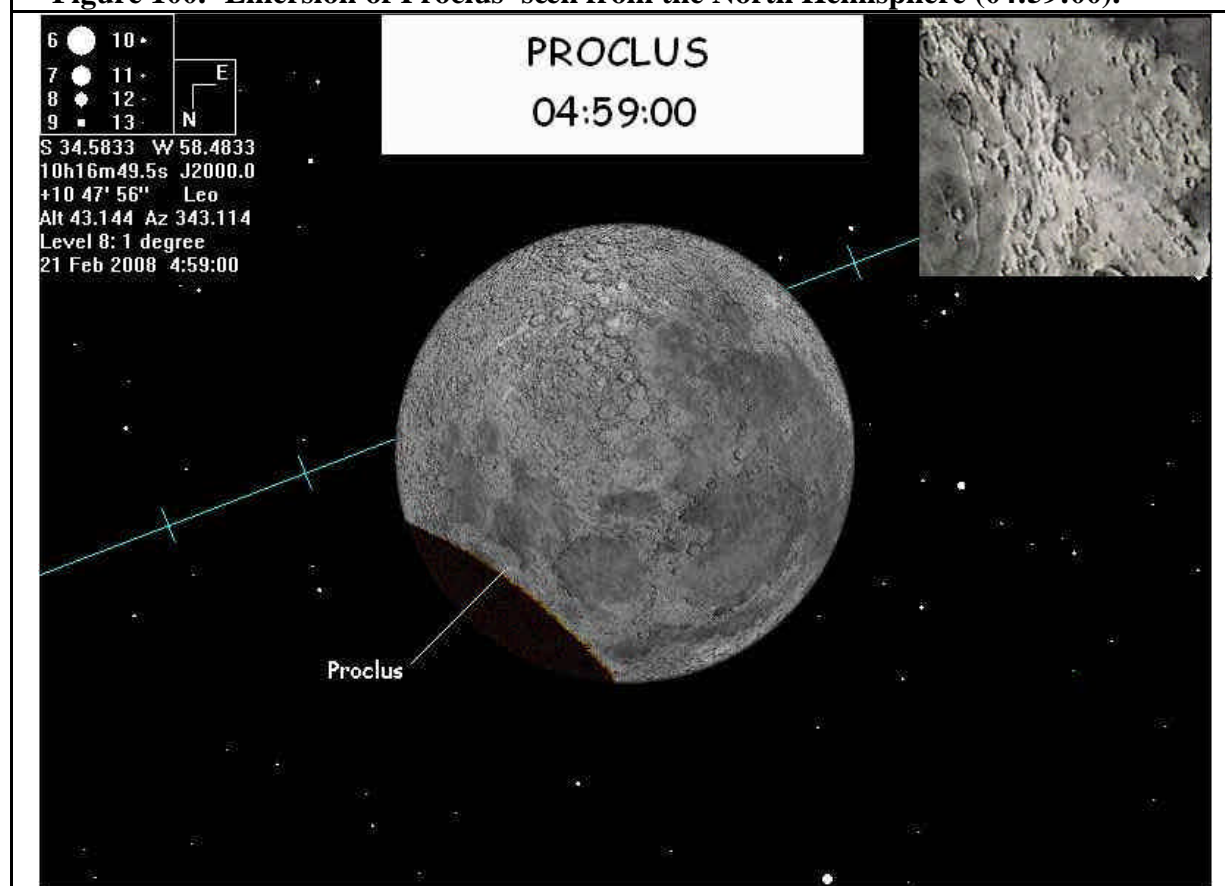


Figure 101.- Emersion of Proclus seen from the South Hemisphere (04:59:00).

TIMING OF THE ECLIPSE CONTACTS

LAST CONTACT WITH THE UMBRA

Proposed Equipment.

Large Aperture Telescope; Telescope of focal media; Binoculars; Chronometer with alarm GPS and/or Chronometer and Voice recorder.
--

TIME: 05:08:24

FOURTH ACTIVITY STEP BY STEP

CONFIGURATION

Large Aperture Telescope attached to a DSLR Camera with shutter cable
Auxiliar telescope with a medium power eyepiece (200x).
Binoculars of 8x50.

ACTIVITY

Put the shutter cable of the camera in mode CONTINUOUS;
Point the Telescope to the limb SW of the Moon;

05:07:30 Record the event identification (“Last contact with the umbra”) and a time record

05:08:00 Start the continuous capture while it is monitored the limb **SE** of the Moon (figures 174 and 175);

05:08:24 When the umbra dissapears completely, record a time mark and stop the photographic sequence.

END of the FOURTH ACTIVITY.

NOTE: This ACTIVITY could continue until 06:15:18. Its utility is not clear.

Measured Time	
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Interval until next step..... 3 minutes.

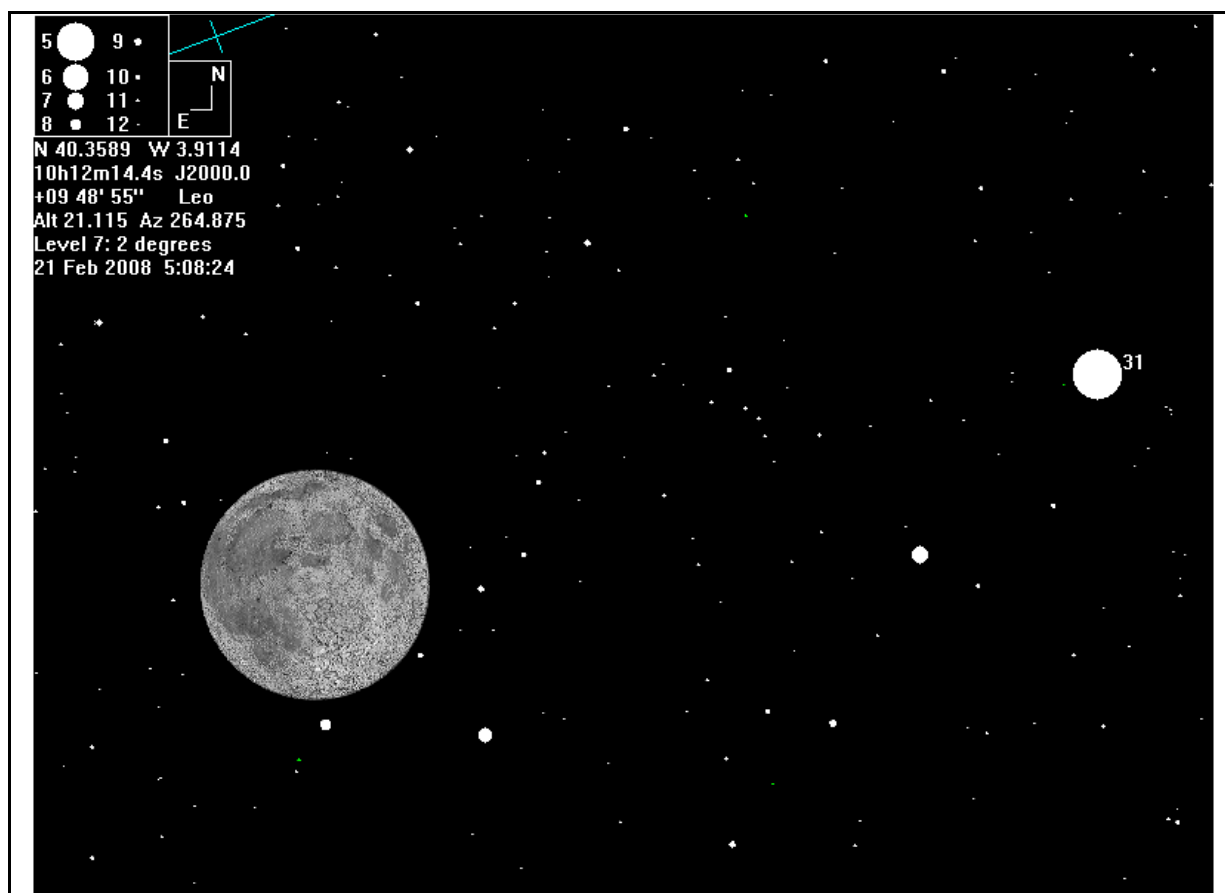


Figure 174.- Last Contact with the Umbra seen from the North Hemisphere (05:08:24).

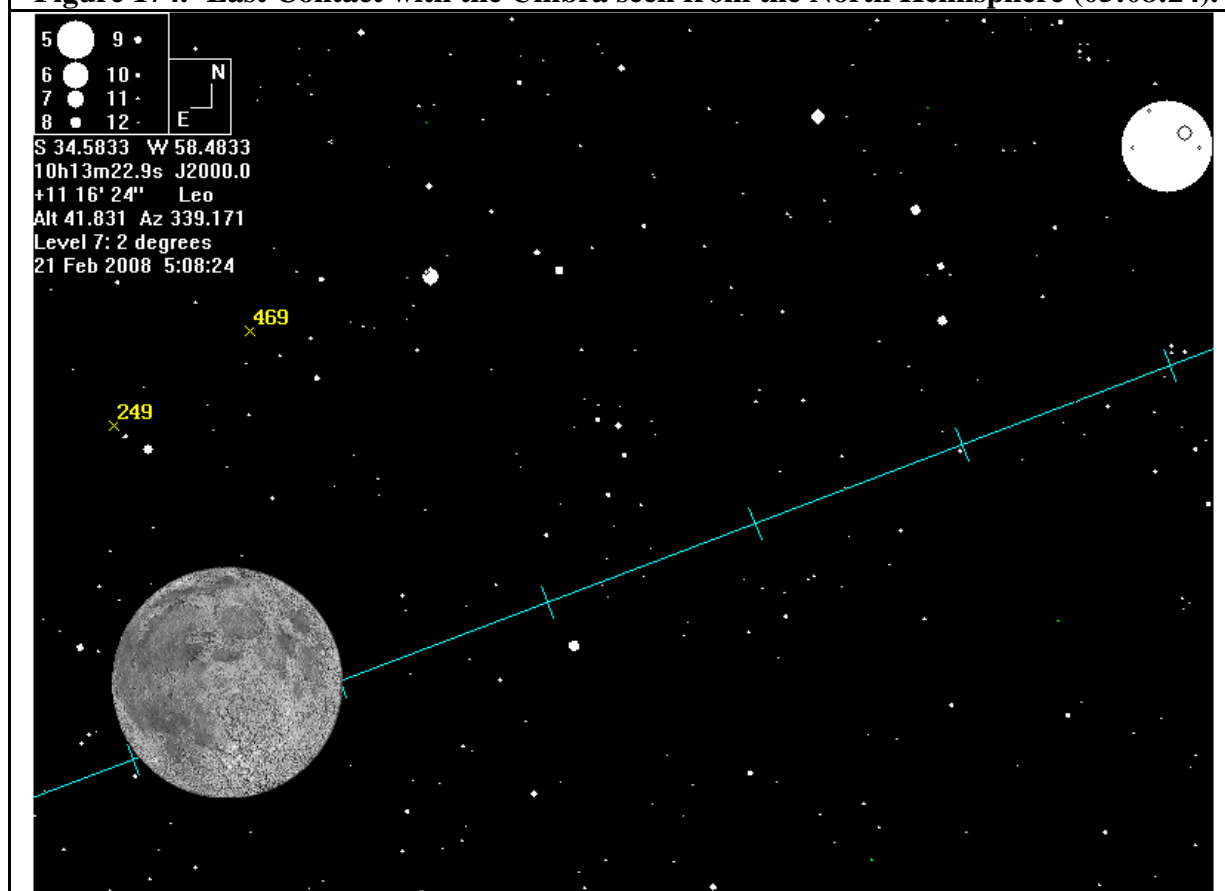


Figure 175.- Last Contact with the Umbra seen from the South Hemisphere (05:08:24).

LTP MONITORING

Proposed Equipment.

Large Aperture Telescope; Binoscope or a filter wheel Red Filter (Wratten #25) and Blue Filter (Wratten #38); Camera DSLR; Camera web.
--

INTERVAL: 05:10:00 - 05:30:00

EIGHTH ACTIVITY STEP BY STEP

CONFIGURATION:

Large Aperture Telescope with an attached binoscope and with two identical medium power eyepieces (200x).

Red filter (Wratten #25) in one ocular and Blue filter (Wratten #38) in the other.

ACTIVITY

Only for very experienced observers.

05:10:00 Start visual exploration by blinking eye observation of Aristarchus, Proclus, Plato, Tycho, Dionysius and Grimaldi (see following pictures from both hemispheres);.

05:30:00 End of the ACTIVITY (opcional);

In case of discovery or suspect of a LTP by darkening take a picture. Look for a confirmation by other observers.

In case of discovery or suspect of a LTP by color change, take video (aprox. 500 frames AVI) with a webcam configured for color capture.

05:40:00 Record the time and the result ("Positive" or "Negative"). Stop the voice recorder.

END OF ALL THE PLANNED ACTIVITIES.

NORTH HEMISPHERE



Plato



Proclus



Dionysius



Tycho



Aristarchus



Grimaldi

SOUTH HEMISPHERE



Plato



Proclus



Dionysius



Tycho



Aristarchus



Grimaldi

TIMING OF THE ECLIPSE CONTACTS

LAST CONTACT WITH THE PENUMBRA

FOURTH ACTIVITY STEP BY STEP

It isn't a preseen ACTIVITY.

Optionally:

06:14:00 Start the voice recorder.

06:15:18 Take a picture. Record Time and identify the event ("Last contact with the penumbra").

00:36:30 Stop the voice recorder.

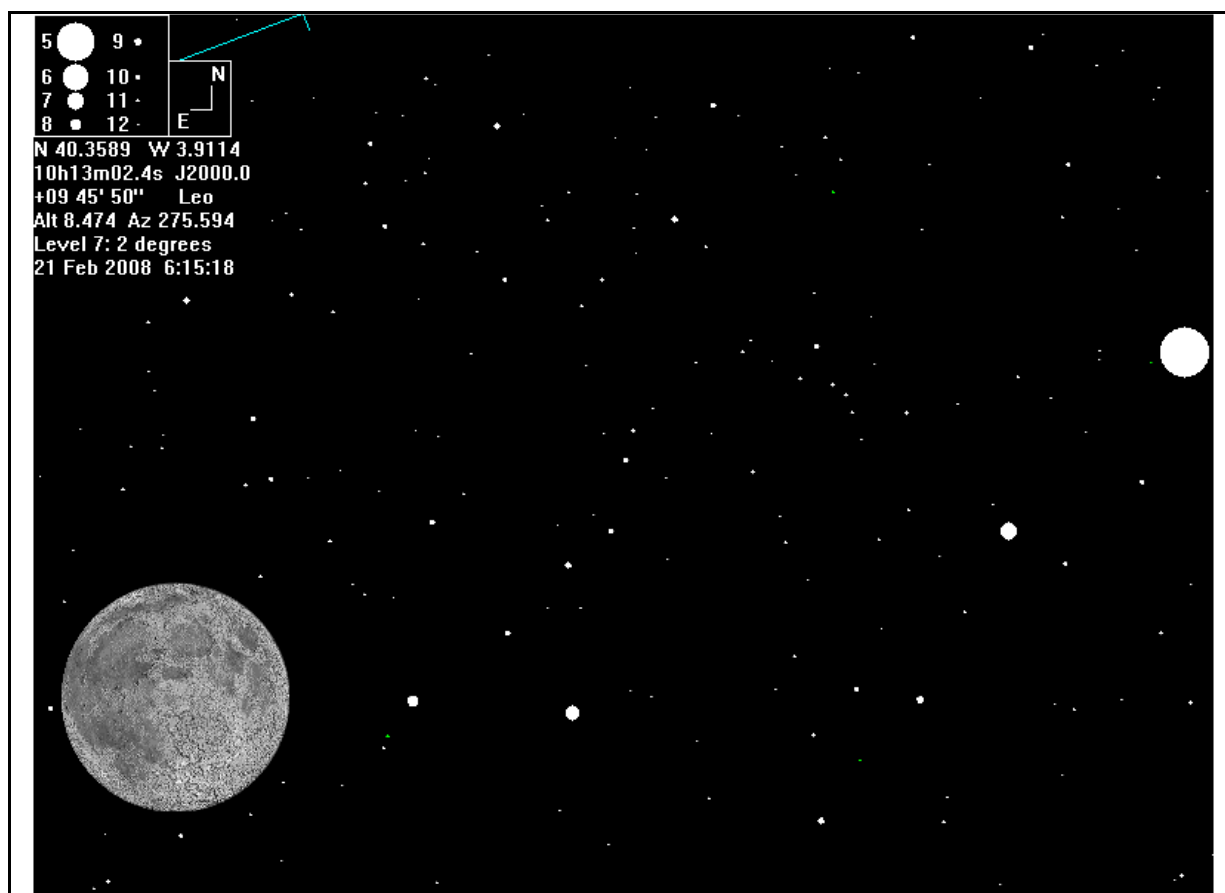


Figure 176.- Last contact with the penumbra from Madrid (06:15:18).

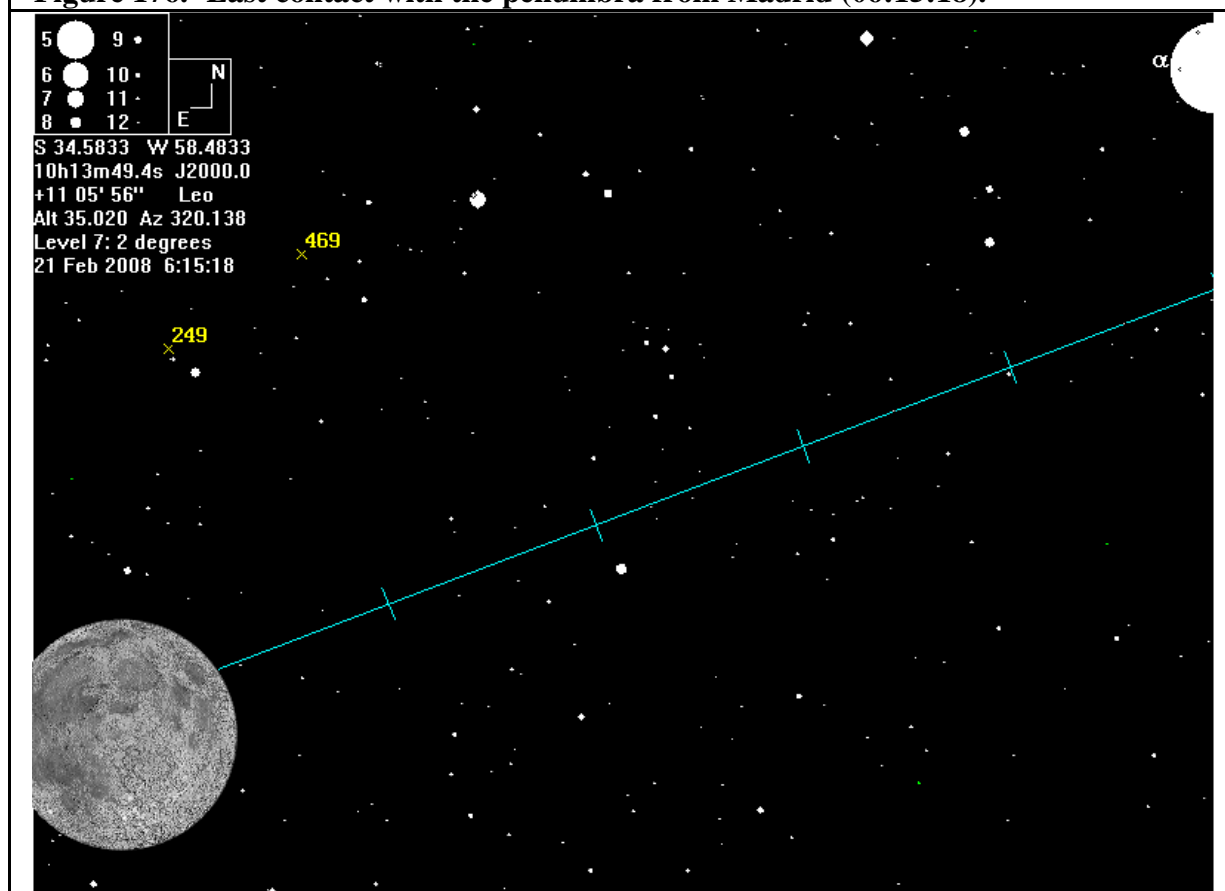


Figure 176.- Last contact with the penumbra from Buenos Aires (06:15:18).

END OF ALL THE ACTIVITIES