



האגודה הישראלית לצפייה בירח החדש

The Israeli New Moon Society



Guide to Observing the New Moon from Israel in 5776 (2015/6)

by Roy Hoffman

The commandment (*mitzvah*) of sanctifying the month is the first one that the Children of Israel were commanded with on leaving Egypt. This commandment is of great importance because the dates of the festivals, including over 60 commandments, depend on it.

For over a thousand years, the Hebrew calendar has been fixed by calculation. Today, the Hebrew calendar does not match that fixed by observing the Moon. Even as the gap between the two calendars continues to increase, we do not have the authority to alter the calendar until a new authorized Sanhedrin (religious high court) is reestablished. While sanctification of the month according to observation is not practiced today, it is important to carry out calculations and practice observing the New Moon in order to be ready for when the Sanhedrin is reestablished. Of course, we are not intending to change the current calendar (this is a task for an authorized Sanhedrin, recognized by all) but just to increase involvement in and embellish the Torah.

For many years now, **the Israeli New Moon Society** has been asking the public at large to join us by trying to observe the New Moon at the beginning of each month. The Israeli New Moon Society was founded for this purpose by Rabbi Dr. Nachum Rabinovitch, head of Yeshivat Birkat Moshe, Maale Adumim. The society works with the Institute for Kiddush Hachodesh Studies and includes scientists and rabbis from Universities, Yeshivot and elsewhere. The society presents the subject from the point of view of mainstream (Rabbinical Orthodox) Judaism. Nevertheless, the society welcomes participation from anyone.

Our aims

1. **To practice observing and to improve technique:** For this purpose you need to know when and where to look. To this end, we supply software, diagrams and instructions. Generally, an observer can develop the necessary skill after a few months of practice.
2. **To develop criteria for the limit of visibility:** For this, one has to find the Moon the moment it becomes visible to the naked eye of an experienced observer. The results can be analyzed according to physical, meteorological and physiological considerations to improve existing visibility criteria.
3. **To encourage general awareness of Jewish calendar issues.**

Our achievements

1. Many of our members have become expert observers.
2. We have improved the accuracy of lunar visibility predictions.
3. New software has been developed to predict the appearance of the Moon.
4. We have made a number of important observations.

Important lunar events in 5776 (2015/6)

There will be three lunar eclipses, two of which will be visible from Israel this year. On Monday 28th September 2015, there will be a total lunar eclipse setting at sunrise in Israel before the eclipse finishes. On Friday 16th September 2016 there will be a penumbral lunar eclipse in the evening that may be discerned as a slight dimming of the lunar disk. Although not connected with the Moon, there will be another interesting event: there will be a Mercury transit on Monday 9th May 2016 starting

at 14:12 in Israel until sunset at 19:30. The transit will not be visible to the naked eye but may be seen by binocular or telescopic **projection**. (Observing the Sun directly through a telescope or binoculars causes **immediate and irreversible blindness**.)

Eclipse	Date	Extent from Israel	Start Time	Mid Time	End Time
Solar	13 th Sep. 2015	Not visible			
Lunar	28 th Sep. 2015	Full	04:07	05:48	06:40 set
Solar	9 th Mar. 2016	Not visible			
Lunar	23 rd Mar. 2016	Not visible-penumbral	14:58	15:01	15:02
Solar	1 st Sep. 2016	Not visible			
Lunar	16 th Sep. 2016	Penumbral	18:54	21:55	23:54

How to observe and report

In order to determine the moment when the Moon appears, one needs to know where to look. Diagrams and instructions showing how to find the Moon using simple techniques are given below for this purpose. An obvious object such as the Sunset or a bright planet is used to help locate the Moon. The angular distance between the Moon and the object and its height above the horizon is measured using fingers at arm's length, the fist or span (the distance between the thumb and little finger with the fingers outstretched) though more advanced techniques such as using calibrated scales may be to some advantage. The figures below are calculated for Jerusalem. They may be used throughout Israel with an accuracy of five minutes. For observations from elsewhere in the World, the parameters have to be calculated for each place separately. Our program LunaCal available from our Internet site <http://sites.google.com/site/moonoc> or other programs: Hazon Shamayim, MoonCalc or Skyglobe, can be used for this purpose. Hazon Shamayim can be bought from Rabbi Tskuni +972 8-9945621, MoonCalc is available free of charge from <http://chem.ch.huji.ac.il/nmr/foo/moonc60.zip> and Skyglobe is available from <http://astro4.ast.vill.edu/skyglobe.htm>.

You should start searching for the Moon about five minutes (or earlier if using binoculars or a telescope) before it is expected to appear. Use the predicted times as a rough guide (they will only be correct for 95% of observations). At the end of the text at the bottom of each diagram the apparent topocentric illumination and lag time are given. (The simplified geocentric illumination is given in brackets.) The larger these values, the easier the Moon is to see. An observer that is looking hard sometimes tends to imagine that he has seen the Moon. To be sure that you really saw it, divert your gaze for a moment then look back to see if the Moon really is visible. Once the Moon has been found, please fill out an observation form available from our website (<http://sites.google.com/site/moonoc>) to report your observation. One should ideally continue looking till the Moon fades or sets.

Using binoculars (diameter 50 mm) it is possible to see the Moon 10 to 15 minutes earlier than with the naked eye. In order to see the Moon with the naked eye, it is easiest to start with binoculars in order to locate it and then confirm the sighting with the naked eye. When the observation is difficult, binoculars can confirm that what was seen was the Moon rather than something else. For this purpose one should choose an appropriate pair of binoculars (magnification 7 to 20 ×, diameter 30 to 80 mm).

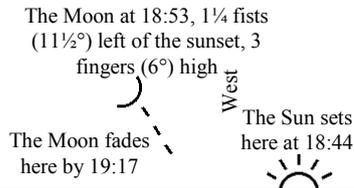
It is best to find a place to look from where the horizon is unobstructed and where there are no bright lights from that direction. The height of the skyline should be less than 3°, *i.e.*, do not stand in a valley.

Want to join?

For further details, please contact Gadi Eidelheit, The Israeli New Moon Society, 1 David Eliezer, Givat Shmuel 54032, Israel., Fax +972 722495292, Tel. +972 507325927, Internet site <http://sites.google.com/site/moonsoc>, Email moonsoic@gmail.com.

The Moon on Monday 14th September 2015

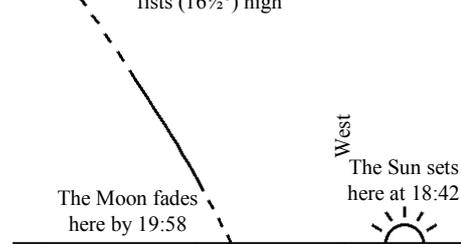
Mercury at 18:53, the Moon is 1 fist (10°) right of and 1 finger (2½°) below it



The Moon might appear over the Western horizon between 18:53 and 19:17 on Monday 14th September 2015 at azimuth 262°, ¼ fists left of the sunset and 3 fingers (at arm's length) high. This month, Mercury can be used to find the Moon. The Moon will be very difficult to see. Illum. 1.52 (1.68)% Lag 39 m.

The Moon on Tuesday 15th September 2015

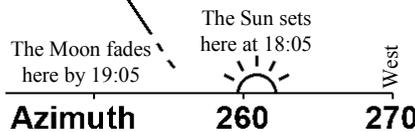
The Moon at 18:33, 1 span (22½°) left of the sunset, ¼ fists (16½°) high



The Moon is likely* to appear over the Western horizon between 18:33 and 19:06 on Tuesday 15th September 2015 at azimuth 253°, 1 span left of the sunset and ¼ fists (at arm's length) high. The Moon will be very easy to see until it fades between 19:40 and 19:58. Illum. 4.71 (4.95)% Lag 73 m.

The Moon on Wednesday 14th October 2015

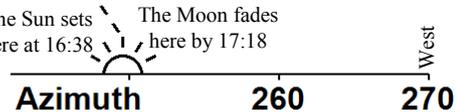
The Moon at 18:05, ¼ fists (13°) left of the sunset, ¼ fists (12°) high



The Moon is likely* to appear over the Western horizon between 18:05 and 18:38 on Wednesday 14th October 2015 at azimuth 247½°, ¼ fists left of the sunset and ¼ fists (at arm's length) high. The Moon will be easy to see until it fades between 18:46 and 19:05. Illum. 2.24 (2.45)% Lag 61 m.

The Moon on Thursday 12th November 2015

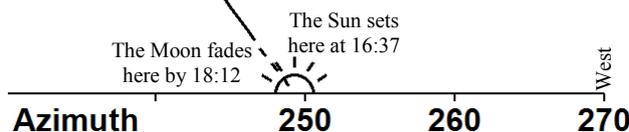
The Moon at 16:47, 2 fingers (4°) left of the sunset, ¾ fingers (7½°) high



The Moon might appear over the South-Western horizon between 16:47 and 17:18 on Thursday 12th November 2015 at azimuth 244½°, 2 fingers left of the sunset and ¾ fingers (at arm's length) high. The Moon will be very difficult to see. Illum. 0.72 (0.88)% Lag 46 m.

The Moon on Friday 13th November 2015

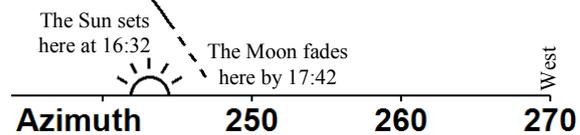
The Moon at 16:27, ½ fists (15½°) left of the sunset, ¼ fists (18½°) high



The Moon is likely* to appear over the South-Western horizon between 16:27 and 17:02 on Friday 13th November 2015 at azimuth 235½°, ½ fists left of the sunset and ¼ fists (at arm's length) high. The Moon will be very easy to see until it fades between 17:53 and 18:12. Illum. 3.29 (3.57)% Lag 91 m.

The Moon on Saturday 12th December 2015

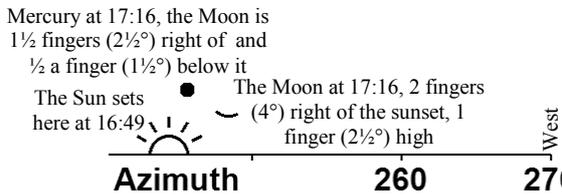
The Moon at 16:32, 3 fingers (5½°) left of the sunset, ¼ fists (13°) high



The Moon is likely* to appear over the South-Western horizon between 16:32 and 17:08 on Saturday 12th December 2015 at azimuth 237½°, 3 fingers left of the sunset and ¼ fists (at arm's length) high. The Moon will be easy to see until it fades between 17:23 and 17:42. Illum. 1.43 (1.66)% Lag 72 m.

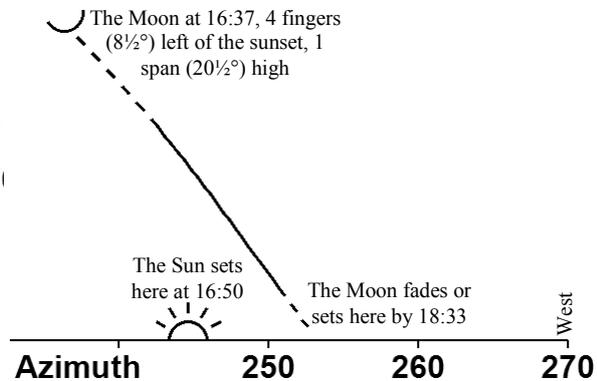
*Assuming that it is not cloudy, there is still a 5% chance that the Moon will appear or disappear before or after the stated time. The times are about as reliable as the weather forecast for tomorrow.

The Moon on Sunday 10th January 2016



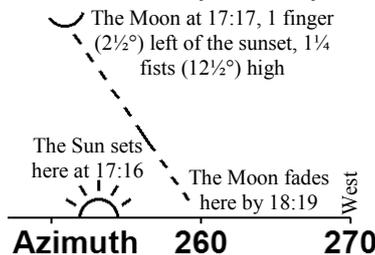
The Moon will be impossible to see with the naked eye but may be visible with a telescope on Sunday 10th January 2016. This month, Mercury can be used to find the Moon. The best chance of seeing the Moon will be at 17:16. Illum. 0.37 (0.51)% Lag 38 m.

The Moon on Monday 11th January 2016



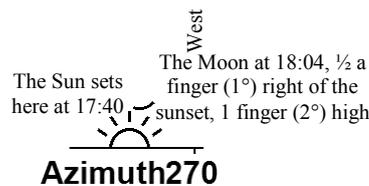
The Moon is likely* to appear over the South-Western horizon between 16:37 and 17:14 on Monday 11th January 2016 at azimuth 238½°, 4 fingers left of the sunset and 1 span (at arm's length) high. The Moon will be very easy to see until it fades or sets between 18:14 and 18:33. Illum. 2.74 (3.06)% Lag 99 m.

The Moon on Tuesday 9th February 2016



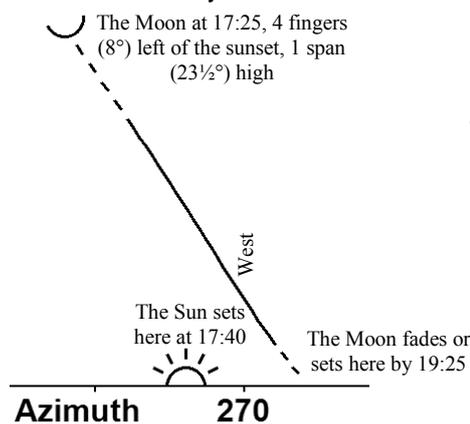
The Moon is likely* to appear over the Western horizon between 17:17 and 17:52 on Tuesday 9th February 2016 at azimuth 250½°, 1 finger left of the sunset and 1¼ fists (at arm's length) high. The Moon will be easy to see until it fades between 18:01 and 18:19. Illum. 1.22 (1.46)% Lag 65 m.

The Moon on Wednesday 9th March 2016



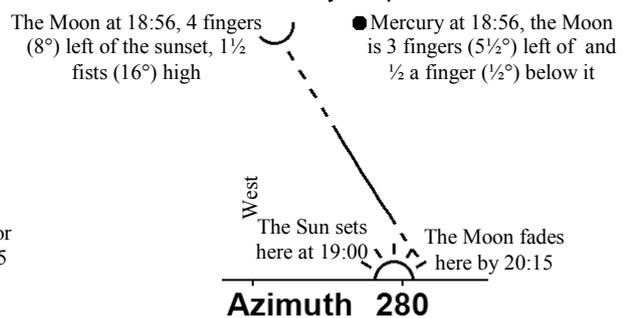
The Moon will be impossible to see with the naked eye but may be visible with a telescope on Wednesday 9th March 2016. The best chance of seeing the Moon will be at 18:04. Illum. 0.35 (0.49)% Lag 34 m.

The Moon on Thursday 10th March 2016



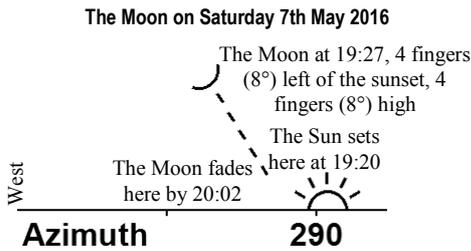
The Moon is likely* to appear over the Western horizon between 17:25 and 17:59 on Thursday 10th March 2016 at azimuth 260°, 4 fingers left of the sunset and 1 span (at arm's length) high. The Moon will be very easy to see until it fades or sets between 19:09 and 19:25. Illum. 3.31 (3.67)% Lag 101 m.

The Moon on Friday 8th April 2016

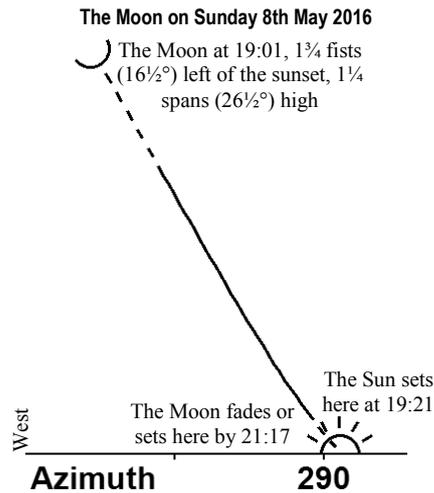


The Moon is likely* to appear over the Western horizon between 18:56 and 19:30 on Friday 8th April 2016 at azimuth 272°, 4 fingers left of the sunset and 1½ fists (at arm's length) high. This month, Mercury can be used to find the Moon. The Moon will be very easy to see until it fades between 19:57 and 20:15. Illum. 1.99 (2.28)% Lag 75 m.

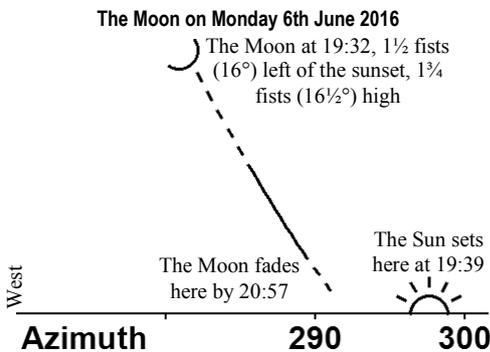
*Assuming that it is not cloudy, there is still a 5% chance that the Moon will appear or disappear before or after the stated time. The times are about as reliable as the weather forecast for tomorrow.



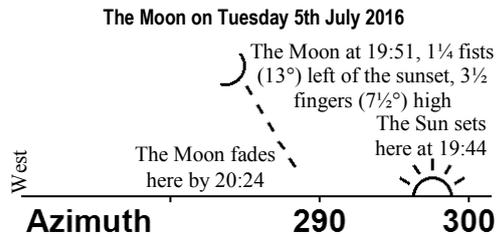
The Moon might appear over the Western horizon between 19:27 and 20:02 on Saturday 7th May 2016 at azimuth 282°, 4 fingers left of the sunset and 4 fingers (at arm's length) high. The Moon will be very difficult to see. Illum. 1.13 (1.32)% Lag 47 m.



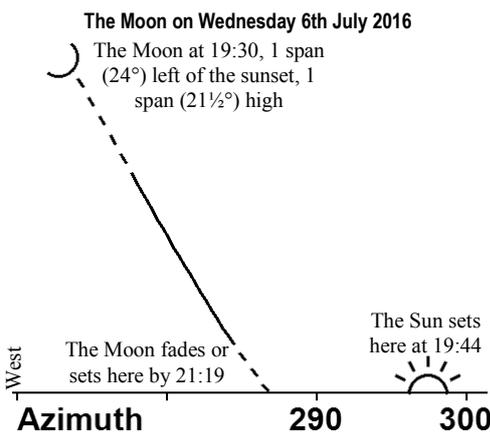
The Moon is likely* to appear over the Western horizon between 19:01 and 19:37 on Sunday 8th May 2016 at azimuth 277°, 1 1/4 fists left of the sunset and 1 1/4 spans (at arm's length) high. The Moon will be very easy to see until it fades or sets between 21:02 and 21:17. Illum. 4.97 (5.35)% Lag 113 m.



The Moon is likely* to appear over the Western horizon between 19:32 and 20:10 on Monday 6th June 2016 at azimuth 282°, 1 1/2 fists left of the sunset and 1 1/4 fists (at arm's length) high. The Moon will be very easy to see until it fades between 20:38 and 20:57. Illum. 3.32 (3.60)% Lag 78 m.



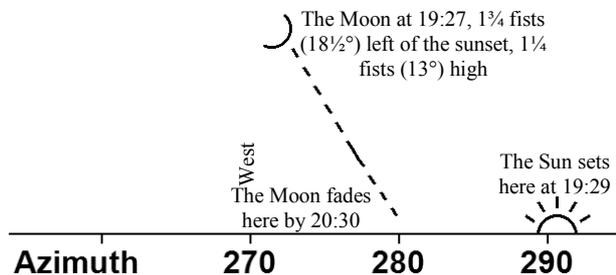
The Moon is likely* to appear over the Western horizon between 19:51 and 20:24 on Tuesday 5th July 2016 at azimuth 283 1/2°, 1 1/4 fists left of the sunset and 3 1/2 fingers (at arm's length) high. The Moon will be difficult to see. Illum. 1.87 (2.05)% Lag 44 m.



The Moon is likely* to appear over the Western horizon between 19:30 and 20:08 on Wednesday 6th July 2016 at azimuth 275°, 1 span left of the sunset and 1 span (at arm's length) high. The Moon will be very easy to see until it fades or sets between 21:01 and 21:19. Illum. 5.86 (6.17)% Lag 90 m.

The Moon on Thursday 4th August 2016

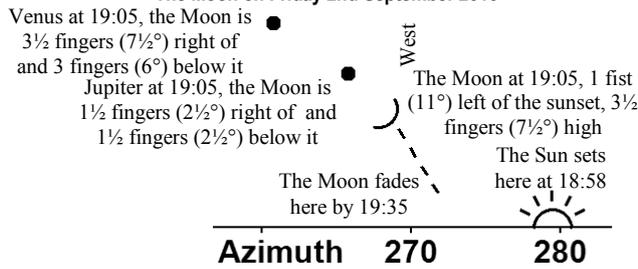
- Jupiter at 19:27, the Moon is 1 1/2 fists (14 1/2°) right of and 1 1/4 fists (13°) below it



The Moon is likely* to appear over the Western horizon between 19:27 and 20:03 on Thursday 4th August 2016 at azimuth 272 1/2°, 1 1/4 fists left of the sunset and 1 1/4 fists (at arm's length) high. This month, Jupiter can be used to find the Moon. The Moon will be very easy to see until it fades between 20:12 and 20:30. Illum. 3.44 (3.67)% Lag 61 m.

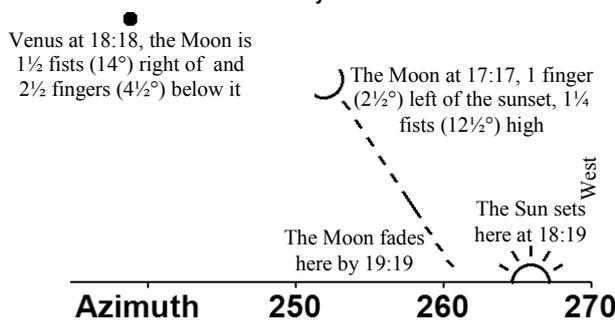
*Assuming that it is not cloudy, there is still a 5% chance that the Moon will appear or disappear before or after the stated time. The times are about as reliable as the weather forecast for tomorrow.

The Moon on Friday 2nd September 2016



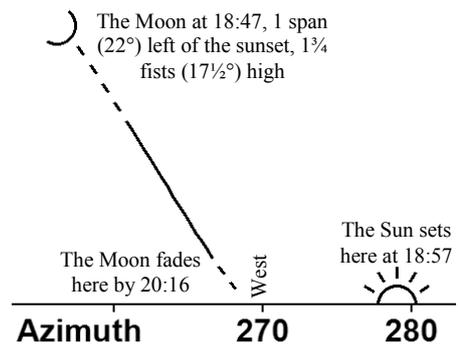
The Moon might appear over the Western horizon between 19:05 and 19:35 on Friday 2nd September 2016 at azimuth 267½°, 1 fist left of the sunset and 3½ fingers (at arm's length) high. This month, Venus and Jupiter can be used to find the Moon. The Moon will be very difficult to see. Illum. 1.50 (1.67)% Lag 41 m.

The Moon on Sunday 2nd October 2016



The Moon is likely* to appear over the Western horizon between 18:18 and 18:52 on Sunday 2nd October 2016 at azimuth 252½°, 1¼ fists left of the sunset and 1¼ fists (at arm's length) high. This month, Venus can be used to find the Moon. The Moon will be easy to see until it fades between 19:01 and 19:19. Illum. 2.32 (2.54)% Lag 61 m.

The Moon on Saturday 3rd September 2016



The Moon is likely* to appear over the Western horizon between 18:47 and 19:21 on Saturday 3rd September 2016 at azimuth 258°, 1 span left of the sunset and 1¼ fists (at arm's length) high. The Moon will be very easy to see until it fades between 19:59 and 20:16. Illum. 4.86 (5.12)% Lag 77 m.

*Assuming that it is not cloudy, there is still a 5% chance that the Moon will appear or disappear before or after the stated time. The times are about as reliable as the weather forecast for tomorrow.

Table of Moon visibility parameters from Jerusalem for advanced observers.

OR Orech Rishon or ecliptic elongation 20 minutes after geometric sunset.

KR Keshet Reiyah, time between Geometric sunset and moonset divided by four.

KR+OR The sum of orech rishon and keshet reiyah. According to Maimonides, the Moon may be visible if orech rishon > 9° and KR+OR > 22°

Illumination Apparent topocentric illumination in % at geometric sunset. (The simplified geometric illumination is given in brackets.)

LagTime The time between sunset and moonset (geometric)

Dist. Distance from observer to center of Moon at apparent sunset over sea level horizon

DALT Topocentric difference in altitude between the mid-crescent of the Moon and center of the Sun, at 0.6 of the lagtime after geometric sunset

Width Apparent width of crescent, at 0.6 of the lagtime after geometric sunset

Ease The ease of visibility: <-0.7 impossible, <0 requires binoculars or telescope, <1 might be visible to naked eye, >1 definitely visible unless cloudy.

<i>Date</i>	<i>KR</i>	<i>OR</i>	<i>KR+OR</i>	<i>Lagtime</i>	<i>Illumination</i>	<i>Dist./km</i>	<i>DALT</i>	<i>Width</i>	<i>Ease</i>
2015/09/14	9°39'	15°02'	24°41'	38m36s	1.52(1.68)	405542	8°10'	28"	0.2
2015/09/15	18°14'	25°50'	44°04'	72m56s	4.71(4.95)	404309	15°12'	85"	2.3
2015/10/14	15°15'	17°53'	33°08'	61m01s	2.24(2.45)	401996	12°34'	41"	1.3
2015/11/12	11°34'	9°57'	21°31'	46m15s	0.72(0.88)	396867	9°07'	13"	0.1
2015/11/13	22°48'	21°25'	44°13'	91m13s	3.29(3.57)	393059	17°51'	62"	2.5
2015/12/12	17°55'	14°09'	32°04'	71m39s	1.43(1.66)	385095	13°32'	28"	1.2
2016/01/10	9°34'	7°11'	16°46'	38m17s	0.37(0.51)	376422	7°18'	7"	-0.4
2016/01/11	24°49'	20°02'	44°51'	99m14s	2.74(3.06)	372079	19°09'	55"	2.7
2016/02/09	16°14'	13°58'	30°11'	64m54s	1.22(1.46)	364412	13°01'	25"	1.1
2016/03/09	8°24'	8°11'	16°35'	33m36s	0.35(0.49)	359097	6°58'	7"	-0.5
2016/03/10	25°14'	22°12'	47°27'	100m57s	3.31(3.67)	357368	20°53'	70"	3.2
2016/04/08	18°39'	17°11'	35°50'	74m36s	1.99(2.28)	356338	15°09'	42"	1.8
2016/05/07	11°49'	12°31'	24°20'	47m16s	1.13(1.32)	358923	9°15'	23"	0.3
2016/05/08	28°08'	26°29'	54°38'	112m33s	4.97(5.35)	361147	21°35'	103"	3.7
2016/06/06	19°23'	21°35'	40°58'	77m32s	3.32(3.60)	367642	14°28'	67"	2.0
2016/07/05	11°05'	16°15'	27°21'	44m22s	1.87(2.05)	376081	8°29'	37"	0.4
2016/07/06	22°40'	28°49'	51°29'	90m39s	5.86(6.17)	379957	17°10'	114"	2.9
2016/08/04	15°13'	22°14'	37°27'	60m51s	3.44(3.67)	388511	12°09'	65"	1.5
2016/09/02	10°23'	14°58'	25°21'	41m31s	1.50(1.67)	396269	8°42'	28"	0.3
2016/09/03	19°09'	26°13'	45°23'	76m37s	4.86(5.12)	398492	15°54'	89"	2.5
2016/10/02	15°19'	18°07'	33°25'	61m14s	2.32(2.54)	403320	12°46'	42"	1.3