

# Journal for Occultation Astronomy



FORMERLY OCCULTATION NEWSLETTER

## Measurement region of Limovie for occultation by Earth-lit Lunar limb

August 10, 2009 ■ Kazuhisa Miyashita\* ■ [k\\_miyash@js5.so-net.ne.jp](mailto:k_miyash@js5.so-net.ne.jp)

\*Japanese regional coordinator for Lunar Occultation observation)

### 1. Introduction

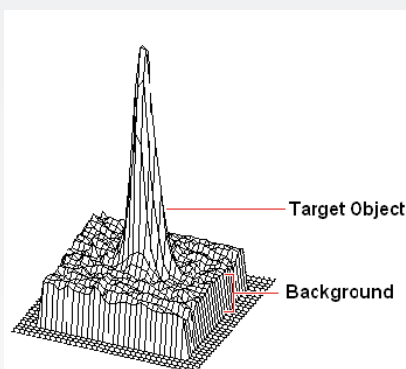


Figure 1 3D graph of video image

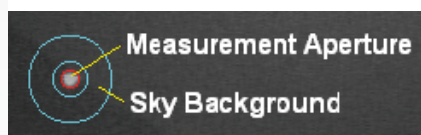


Figure 2: Measurement region of Limovie

In this paper, it is impossible to directly measure the background-light in the measurement aperture. Instead, the background-light is estimated from the neighbouring sky background area using the background aperture. The measurement value is obtained by subtracting the estimated background-light from the value of measurement aperture. Therefore the background region should be positioned on an area which represents the backgroundlight of measurement aperture. In an asteroidal occultation, the video image usually has a uniform sky background. On the other hand, in a lunar-occultation the target star comes into contact with the earth-lit dark limb of moon. In that case, measurement aperture includes both sky background and earth-lit lunar surface. As a

Limovie measures the luminous intensity of the target object with a measurement region which consists of a measurement aperture (called aperture in Limovie) and background region (called background). The sum of the pixel values in the measurement aperture contains CCD noise, light of neighbouring stellar objects and haze in addition to the target star. The light sources other than the target star are called background-light in

result, it is difficult to estimate the background-light by using standard annular background region because no information about the area and brightness of lunar surface in the measurement aperture can be obtained. In this paper, I describe a study about the form of background region which most accurately estimates the background-light.

### 2. Photometric measurement region of Limovie, and earth-lit lunar limb

Figure 3, which is derived from the 3D graph of Limovie, shows the distribution of pixel values around a star. The sky-background looks like a coastal plain, the moon's surface is a plateau, and the lunar limb is a linear precipice. The figures at the right side show three different location of measurement region. In (a), the measurement aperture is placed on the sky background. However, the annular background region includes a part of lunar surface. As a result, the background-light value derived from background region is higher than the real background-light of the measurement aperture. In (c), the measurement region lies on the moon's surface. In this case, the background-light value is lower than its real value because the background region includes sky background, and the calculated luminous intensity of star becomes higher than its real value. Therefore, at a disappearance event the luminous intensity which is derived from Limovie analysis gradually increases according to movement of moon. The situation is shown in Figure 4. It is the value of an empty (that is, not including any star) measurement-aperture as the moon limb passes through the aperture. If there is a star in the measurement aperture, the light change will consist of the change caused by the occultationtogether with the influence of moon surface. And it can become difficult to detection the event time. Additionally, in the case of a faint double star, any estimate of component's magnitude will be inaccurate.

Dear reader,

a long-term astronomical friend, Ingo Reiman, , passed away a few weeks ago. He was very experienced in grazing occultations and a brilliant observer as well as a teacher of astronomy.

Looking around many of my old friends have grown old – just like me: But where are the young ones?

Is astronomy no longer of interest to younger people? As a 13 year old boy I kept in touch with astronomy. At school an astronomy class was held and many students were active within this group until they left school for university studies.

When studying at Hannover University some friends and I still were active at our former school but had to discover that the astronomical interest of younger people was slowly vanishing. We checked some more schools with astronomy classes and talked to their teaching leaders: The situation we discovered was similar everywhere. It must be a result of modern technologies: TV, internet, play stations, etc.

What are our conclusions for the future?

I think it is necessary to publish our ideas, plans, efforts, and results using the internet and additionally the classical print media!

Everybody who is doing astronomical work ought to also present and publish what he/she does wherever possible!

Hans-J. Bode (editor in chief)

■ JOA Vol.1, No. 3 ■ For IOTA suscription purposes ON Vol.14, No. 4  
 JULY 2011 · \$ 5.00 · \$ 6.25 OTHER · (ISSN 0737-6766)

## In this issue:

Measurement region of Limovie for occultation by Earth-lit Lunar limb. ....	1
An Apology and a Pledge. ....	6
New double star discoveries. ....	7
Total Lunar Eclipse in the Bukowiec Observatory – short report. ...	8
Eta Geminorum Graze in Arizona April 10: The Rise of the Machines. ....	9
Highlights and Minutes of the 28 <sup>th</sup> IOTA Annual Meeting, December 4-5, 2010. ....	10
IOTA External Publications. ....	18
Phobos slips past Jupiter. ....	18
Pluto Occultation May 22, 2011. ....	19
ESOP XXX in Berlin at the Archenhold Observatory. ....	21
Occultations of UCAC 143-31 4889 and UCAC 143-31 3802 by Pluto and his moons. ....	23
Impressum. ....	24

## Writing articles for JOA:

The rules below should be regarded while writing an article; using them will greatly facilitate the production and layout of ON!

If your article does not conform to these rules, please correct it.

There are 3 different possibilities for submitting articles:

- pdf-articles (must be editable – these can be converted)
- unformatted Word \*.doc-files containing pictures/graphs or their names (marked red: <figure\_01>) at the desired position(s)
- \*.txt-files must contain at the desired position the name of each graph/picture

The simplest way to write an article is just use Word as usual and after you have finished writing it, delete all your format-commands by selecting within the push-down-list "STYLE" (in general it's to the left of FONT & FONTSIZE) the command "CLEAR FORMATTING". After having done this you can insert your pictures/graphs or mark the positions of them (marked red: <figure\_01>) within the text.

txt-files: Details, that should be regarded

- Format-commands are forbidden
- In case of pictures, mark them within the text like <picture001> where they should be positioned

Name of the author should be written in the 2<sup>nd</sup> line of the article, right after the title of the article; a contact e-mail address (even if just of the national coordinator) should be given after the author's name.

IMPORTANT: Use only the end-of-line command (press ENTER) if it's really necessary (new paragraph, etc.) and not when you see it's the end of the line!

## Sending articles to JOA:

Each country / state has a coordinator who will translate your article to English – if necessary.

In case there is no one (new country) please send a mail to the editorial staff at: [info@occultations.info](mailto:info@occultations.info)

- Africa: NN
- America: David Dunham - [dunham@starpower.net](mailto:dunham@starpower.net)
- Australia / New Zealand: NN
- Europe: Pawel Maksym - [p.maksym@astronomia.pl](mailto:p.maksym@astronomia.pl) +  
 Alfons Gabel - [alfons.gabel@t-online.de](mailto:alfons.gabel@t-online.de)
- England: Alex Pratt - [alexander.pratt@btinternet.com](mailto:alexander.pratt@btinternet.com)
- Finland: Matti Suhonen - [suhonen@ursa.fi](mailto:suhonen@ursa.fi)
- Germany: Alfons Gabel - [alfons.gabel@t-online.de](mailto:alfons.gabel@t-online.de)
- Greece: Vagelis Tsamis - [vtsamis@aegean.gr](mailto:vtsamis@aegean.gr)
- Italy: NN
- Japan: Mitsuru Soma - [mitsuru.soma@gmail.com](mailto:mitsuru.soma@gmail.com)
- Poland: Pawel Maksym - [p.maksym@astronomia.pl](mailto:p.maksym@astronomia.pl)
- Spain: Carles Schnabel - [cschnabel@foradobita.com](mailto:cschnabel@foradobita.com)