



ESOP XLIV
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The Current Status of Lunar Occultation Observations in Europe

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Responsibility for the Collection of the Observations

Jan Manek was responsible within the IOTA/ES from 2008 to 2024.

In August 2024, Dietmar Büttner took over the role as the European regional collector for lunar occultation observations.

The Steps in the Reporting Process

Observer:

- Creates the report file and sends it to the collector.

Regional Collector:

- Receives the report files.
- Checks them formally and corrects them if necessary.
- Computes the residuals with OCCULT.
- Checks for large residuals.
- Sends the residuals and feedback to the observers.
- Creates a summary (batch) file with all received observations.
- Sends the batch file to Dave Herald.

Dave Herald:

- Incorporates the batch into the IOTA database.

Statistics for Total Occultations

From August to December 2024,

39 reports with a total of 216 observations
made by 11 observers in 7 European countries.

During the first half-year 2025,

47 reports with a total of 382 observations
made by 21 observers in 8 European countries.

Some Problems with the Reports 1/3

- Incomplete information.
- Missing country or observer name.
- Sending the same observations several times.
- Sending frequently reports with only one observation.

Some Problems with the Reports 2/3

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- Sending the same observations several times.
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This causes unnecessary additional work for the regional collector to correct or sort out.

Therefore, observers are asked to be careful when creating their reports.

Schedule for Reporting

The batch file is created and sent to Dave Herald **twice a year**.

This is at the end of the first half-year and at the end of the year.

Thus, it is enough for the observers to send in their reports at the **end of June** and at the **end of December**.

Lunar Occultation Article in the JOA

A general article on lunar occultations was written by Dietmar Büttner. It was published in JOA 2025-2, 9-13.

Lunar Occultation Observations Former Developments – Current Situation – Future Prospects

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ABSTRACT: The article describes the current situation with lunar occultation observations and why they deserve a new interest by the observers and by the people to analyse them.

Introduction

In the early years of the IOTA the prediction, observation and analysis of lunar occultations were the IOTA's main concern. So, in 1988 about 13,000 such observations were made worldwide. This changed fundamentally.

Some Statistics

The IOTA database containing all lunar occultation observations can be accessed via [3]. Furthermore, it forms the basis for the publication in Vizier [4].

Explanation Sheet

Furthermore, an explanation sheet on the reductions was written by Dietmar Büttner. It is sent to the observers together with the reduction results.



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Explanations on the enclosed reduction and on the usage of your observations

Dear observer,

thank you for your lunar occultation observation report. Attached is a preliminary reduction of your observations which was calculated using the program Occult.

On the Meaning of the Residuals

Sometimes, observers have a wrong understanding on the meaning of the residuals.

Therefore, observers are referred to the article in the JOA and to the explanation sheet to read more on the exact meaning of the residuals O-C.

The residual is **not only** a measure for the **timing accuracy** of the particular observation. It is a **summary error** for:
Lunar position, lunar limb, star position, observer position, earth axis orientation, timing, computing algorithm.

Grazing Occultations

Lunar grazing occultations made worldwide are collected and analysed by Mitsuru Soma, Japan.

Number of grazes observed in Europe:

2024: $n=2$ (of 10 worldwide)

2025: $n=5$ (of 9 worldwide) Stand 2025 July 20

Currently, nearly all graze observations come from Japan and Europe.

To be Solved: Discrepancies in the Residuals

The residuals for total occultations computed with OCCULT have much greater values than expected.

They imply that the occultations occur 0,1-0,2 s too late.

Possible causes could be:

- Larger timing errors than adopted so far.
- Larger errors in the star positions reference system than expected.
- Errors in the algorithms or in the software.

Consequence

To find out the cause of these unexpected large residuals, up-to-date observations of lunar occultations are required.

Observations are Welcome Always

Observations can be replaced by observations only!

Finale

Thank you for your interest!