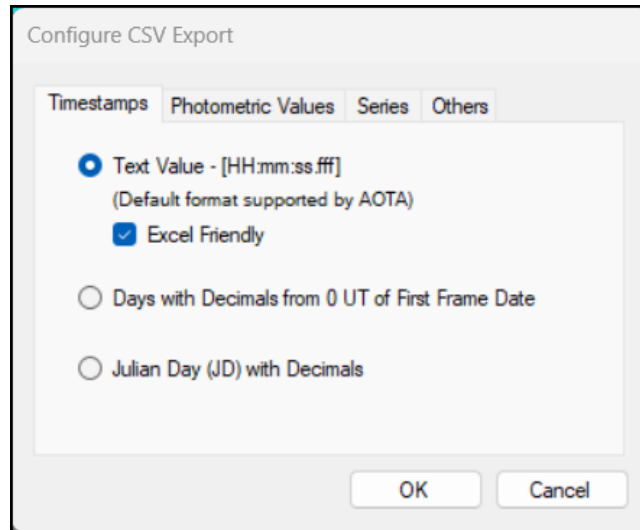


## Occult Tools

### Check Occultation Signal Help

This module is used in the field before the expected moment of occultation to optimise the video recording parameters (exposure time, gain, etc.).

Record a short video of 200 to 300 images of the target star. Reduce this video with Tangra. Export the light curve as a .csv file (Default AOTA format).



This file contains the ADU values of the star signal.

The module calculates the mean and standard deviation of the ADU signal. From the expected drop in magnitude and the mean of the signal, it is possible to calculate the expected value of the occulted signal from Pogson's law.

Pogson's law       $\Delta_m = m_1 - m_2 = -2.5 \cdot \log_{10} (E_1/E_2)$       [Ref1]

If E1 is the occulted signal and E2 is the unoccluded signal, this formula can be written as follows :

$$E_1 = E_2 \cdot 10^{(-\Delta_m/2.5)}$$

For  $\Delta_m = 1$  and  $E_2 = 2500$ , we find  $E_1 = 995$  or approximately 1000.

The noise and scintillation of the star is measured with the standard deviation Sigma of the signal. This fluctuation is 99.7% within the interval  $\pm 3 \cdot \text{Sigma}$ .

To be distinguished from this fluctuation, the value of the occulted signal must be below a threshold equal to **Mean - 3\*Sigma**.

In practice, the software calculates two thresholds: Threshold 3 Sigma and Threshold 2 Sigma.

If the ADU value found (Threshold occulted) is less than the 3 Sigma threshold (Threshold 3 Sigma), the recording parameters are considered valid and **Meaningful** to observe the occultation if it occurs. Otherwise they will be considered **Doubtfull**.

To make the result easier to read, the drop in calculated magnitude is also expressed in sigma units of noise.

In the case of a Doubtfull response, you will need to increase the exposure time and/or the gain.

**IMPORTANT NOTE:**

The CSV file may contain various anomalies detected or not by the software. In this case the results should be aberrant, check the contents of the CSV file.

It is up to the observer to think critically about the results displayed: "garbage in, garbage out".

[Ref1]: [https://en.wikipedia.org/wiki/Apparent\\_magnitude](https://en.wikipedia.org/wiki/Apparent_magnitude)

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