

# Comenius project "In orbit with Europa"

Photometry with SalsaJ

Images of Victoria on November 3rd 2011 Telescope INO\_AZ2

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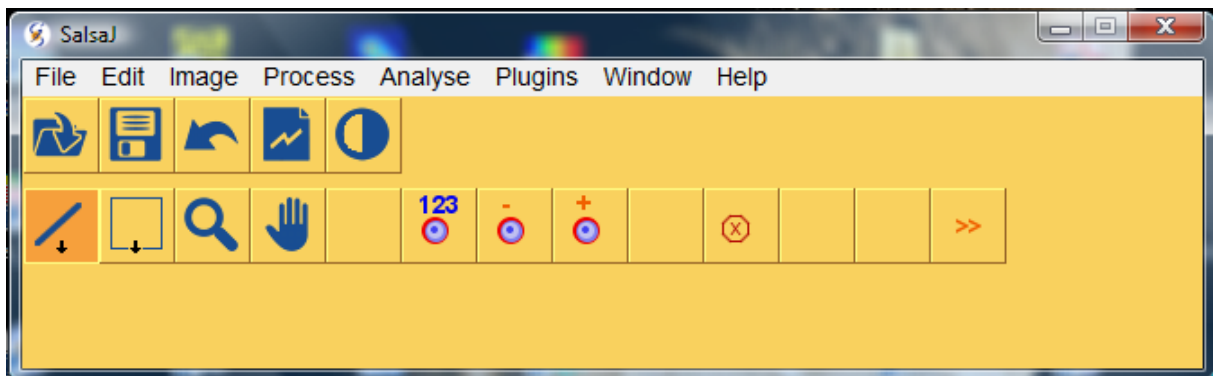
1) First have a look on this link :

<http://resources.faulkes-telescope.com/mod/resource/view.php?id=946>

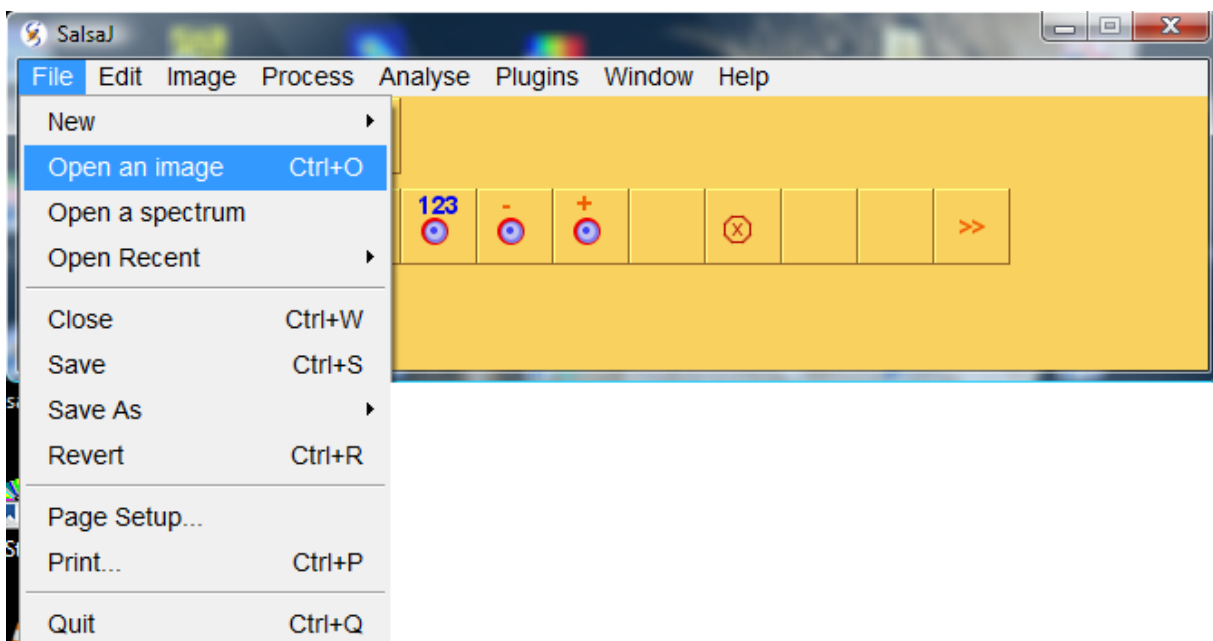
Authors: Daniel Duggan & Sarah Roberts

2) Loading Images

•First, launch SalsaJ

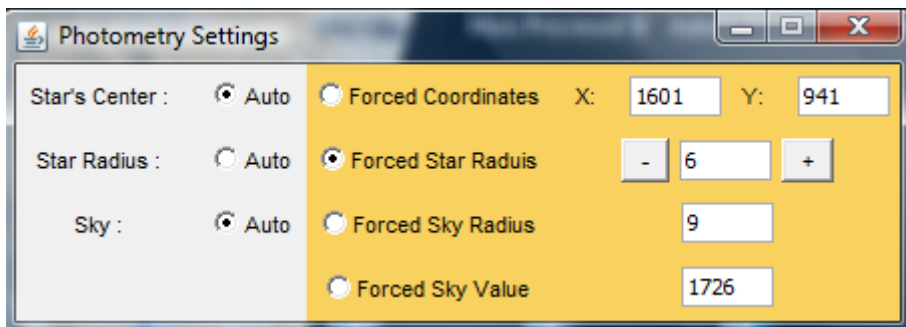


•Next, load your first image.

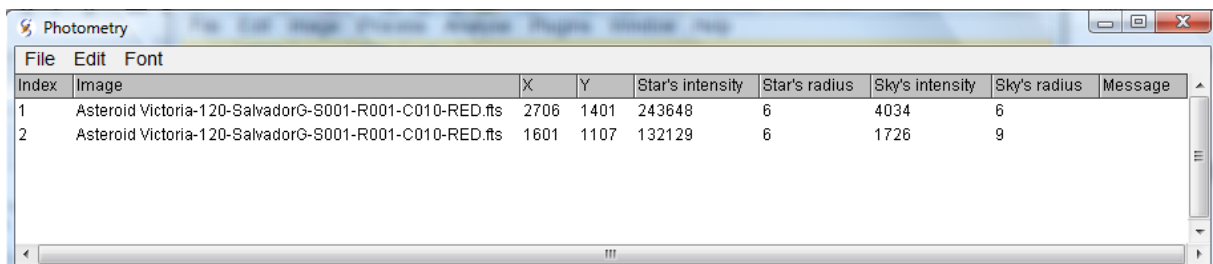


3) Photometry

Analyse>Photometry Settings. At the bottom of the new window, change the Star Radius to 6.



Next, go to Analyse>Photometry and another empty window will then appear.



Using the mouse, click on the standard star in your image. You will see a circle appear and in the new window a data entry is added.

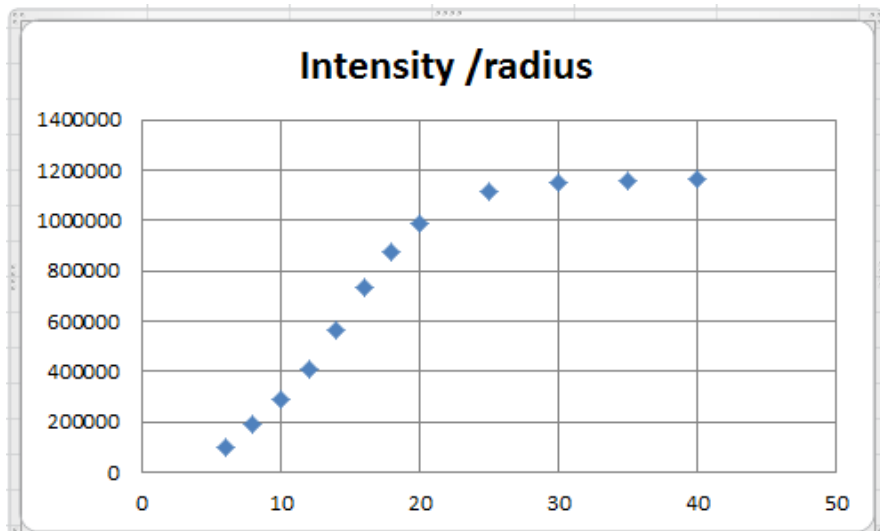
In Excel (or other package) create two columns for Radius and Intensity then, add radius 6 and the intensity value from SalsaJ.

Now increase the radius in SalsaJ by 2 and measure the intensity of the same star again. Add the new data to your spreadsheet. Repeat this until you reach a radius of 20, then start increasing the radius by 5 each time until you reach 40.

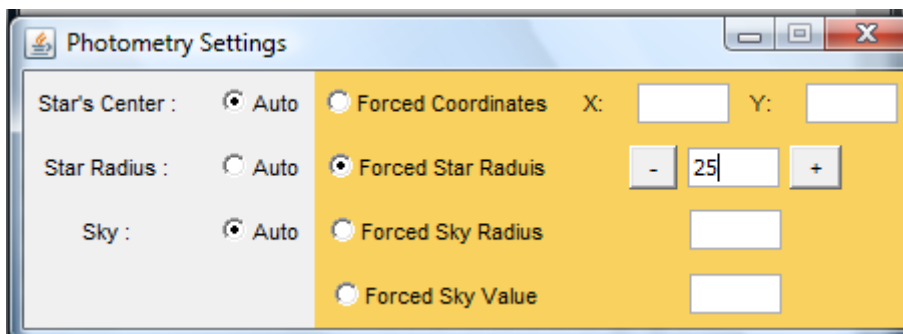
You should have a set of results that looks like this:

Star radius	Star intensity
6	98878
8	193951
10	292034
12	410777
14	567027
16	731848
18	873779
20	985060
25	1116313
30	1149870
35	1159120
40	1162490

When you plot a graph of this data, you should get this:



We choose star radius = 25



Next, go to Analyse>Photometry

Clic on the comparison star you ave choose on your first image. (1st image 10h06m10s UT), then clic on the asteroid Victoria.

Index	Image	X	Y	Star's intensity	Star's
1	Asteroid Victoria-Maria-120-S001-R001-C001-RED.fits	2628	1399	2905136	25
2	Asteroid Victoria-Maria-120-S001-R001-C001-RED.fits	1437	1081	926002	25

**1 star NOMAD 1106-0074850 Rmag 9.730**

**2 asteroid Victoria**

- Next, load your second image. (2<sup>nd</sup> image 12h03m03s UT)

The screenshot shows the SalsaJ software interface. The main window displays an astronomical image with four objects marked with red numbers 1, 2, 3, and 4. The 'Photometry Settings' window is open, showing parameters for star center, radius, and sky value. The 'Photometry' window displays a table of detected objects.

Index	Image	X	Y	Star's intensity	Star's
1	Asteroid Victoria-Maria-120-S001-R001-C001-RED.fits	2628	1399	2905136	25
2	Asteroid Victoria-Maria-120-S001-R001-C001-RED.fits	1437	1081	926002	25
3	Asteroid Victoria 120-S001-R001-C001-RED.fits	2420	1419	2848776	25
4	Asteroid Victoria 120-S001-R001-C001-RED.fits	1323	1128	1189413	25

1 star NOMAD 1106-0074850 Rmag 9.730  
 2 asteroid Victoria  
 3 same star  
 4 asteroid Victoria

#### 4) Calculations

$$m = -2.5 \log (I)$$

1st measure  $I_1 = 2905136$  and  $I_2 = 926002 \rightarrow m_1 = -16.16$  (R=9.730)  $\rightarrow$  cste = 25.89

$m_2 = -14.92 \rightarrow$  **mag (R) Victoria = 10.97 (10h06m06s UT)**

2<sup>nd</sup> measure  $I_3 = 2848776$  and  $I_4 = 1189413 \rightarrow m_3 = -16.14$  (R=9.730)  $\rightarrow$  cste = 25.87

$m_4 = -15.19 \rightarrow$  **mag (R) Victoria = 10.68 (12h03m03s UT)**

5) Using a standard star : Landolt G 9742

<http://www.noao.edu/wiyn/queue/images/charts/c41.html>

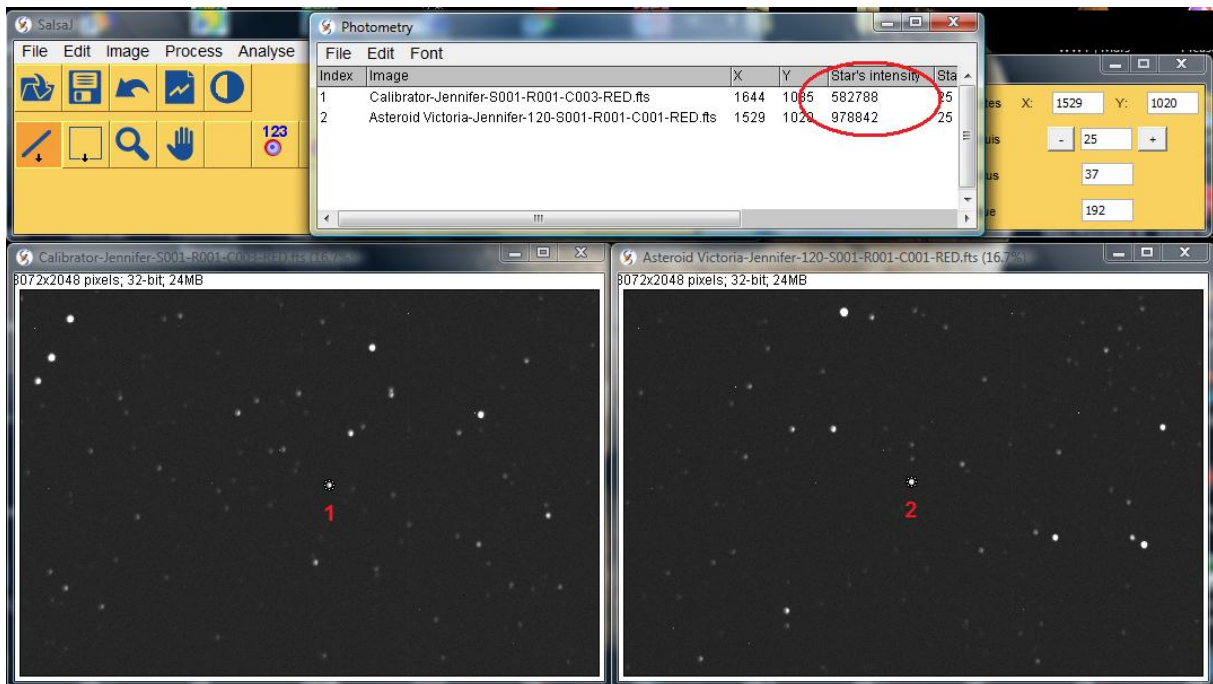
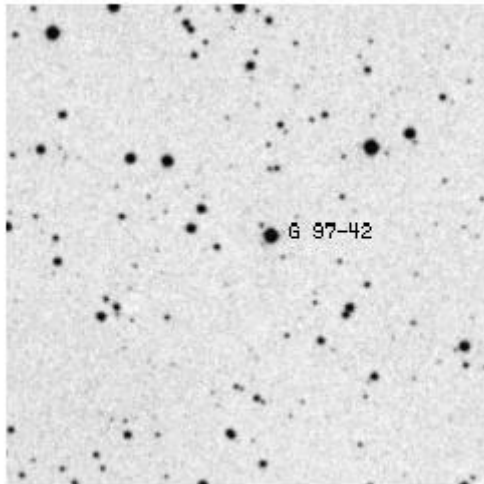
$$V = 12.443$$

$$V-R = 1.171$$

$$R = 12.443 - 1.171$$

$$R = 11.272$$

G 97-42      05:28:02 +09:39:00    J2000



The screenshot shows the Salsa software interface with a Photometry window. The window contains a table with the following data:

Index	Image	X	Y	Star's intensity	Sta
1	Calibrator-Jennifer-S001-R001-C003-RED.fits	1644	1085	582788	25
2	Asteroid Victoria-Jennifer-120-S001-R001-C001-RED.fits	1529	1020	978842	25

The 'Star's intensity' column is circled in red. To the right of the table, there are input fields for X (1529), Y (1020), and other parameters.

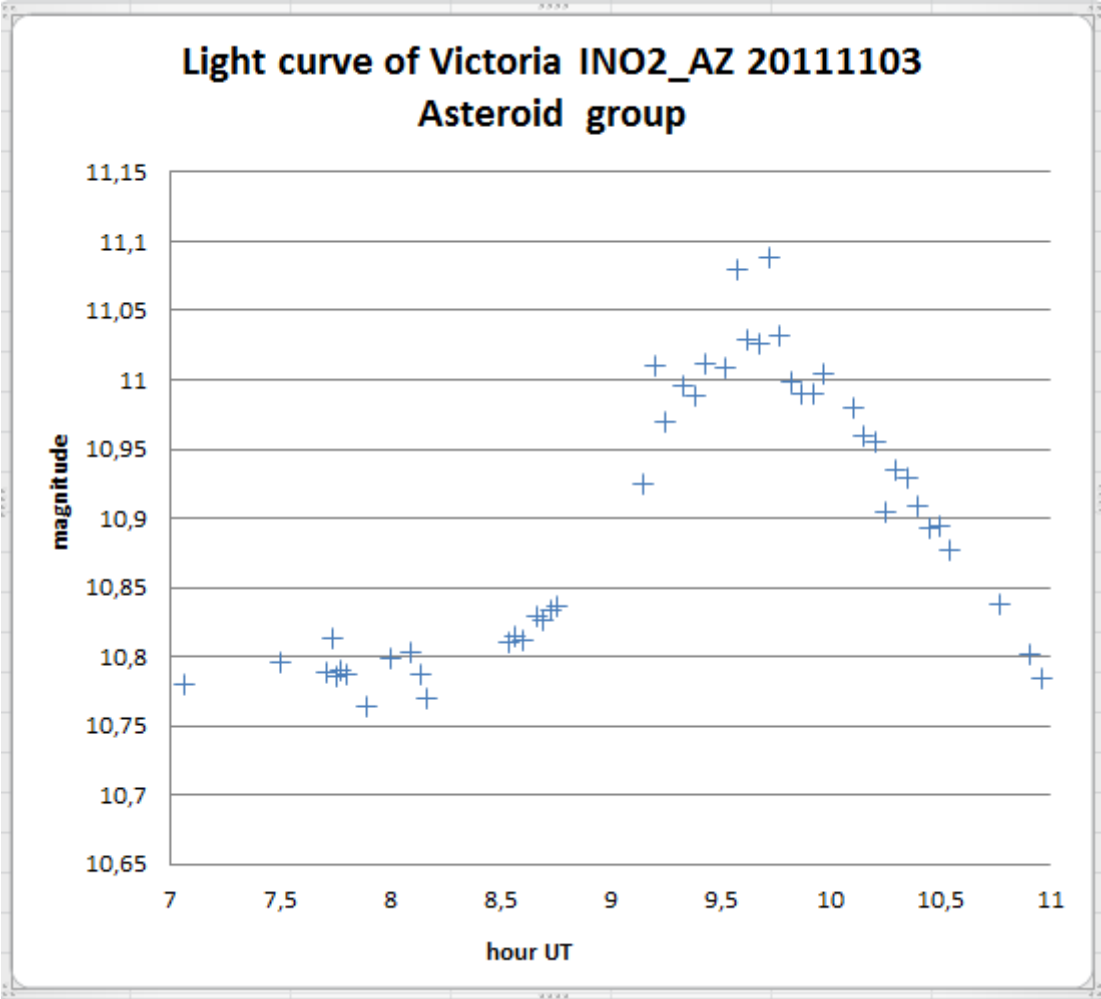
Number 1 : image Landolt star G9742 taken at 9h03m57s UT

$I_1 = 582788 \rightarrow m_R = -14.41$  ( $R=11.272$ )  $\rightarrow$  cste = 25.686

Number 2 : image Victoria at 9h09m11s UT

$I_2 = 978842$   $m_2 = -14.98 \rightarrow$  **mag (R) Victoria = 10.71 (9h09m11s UT)**

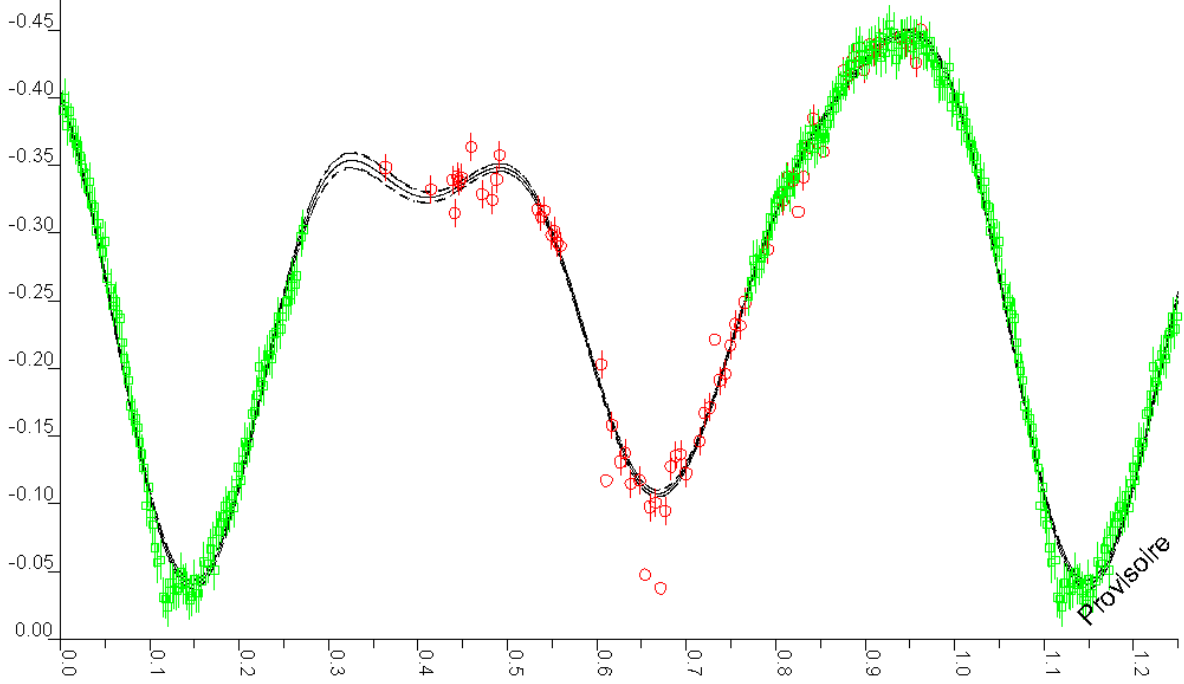
Below the light curve of Victoria obtained with this method :



And the light curve obtained by Raoul Berhend (University of Geneva) from our datas :

# (12) Victoria

E=2012-01-02.78059 M=2028-09-20 T=0.360877 (0.000004) f=0.861



○ EU-HOU/Comenius

■ Maurice Audejean