

**WinJUPOS**

# Measuring Features on Jupiter

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*Euro planet Workshop, Nice, 2016 May*

## 3 stages :

- Setting the outline frame
- Testing the date and time using the longitude of well-known objects
- Measurements

Setting the outline frame

# On hires images

WinJUPUS 10.25 - Database for Object Positions on Jupiter [ Winjupos settings ]

Program Recording Analysis Lists Administration Tools Window ?

### Measurements of Jupiter images 2016-01-11-1926.0 CGo

Imag | Adj. | Pos. | Misc. | Opt. | CM1 187.2° CM2 135.2° CM3 134.1° CLat -2.1° X -2.746 NR Close

Open image (F7)

Dgte [2016/01/11] [yyyy/mm/dd]

UT [19:26.0] [hh:mm.t]

Geogr. longit. [+015 00] [±ddd°mm']

Geogr. latit. [+50 00] [±dd°mm']

Ephemerides (F8)

Observer [CGo]

Image info

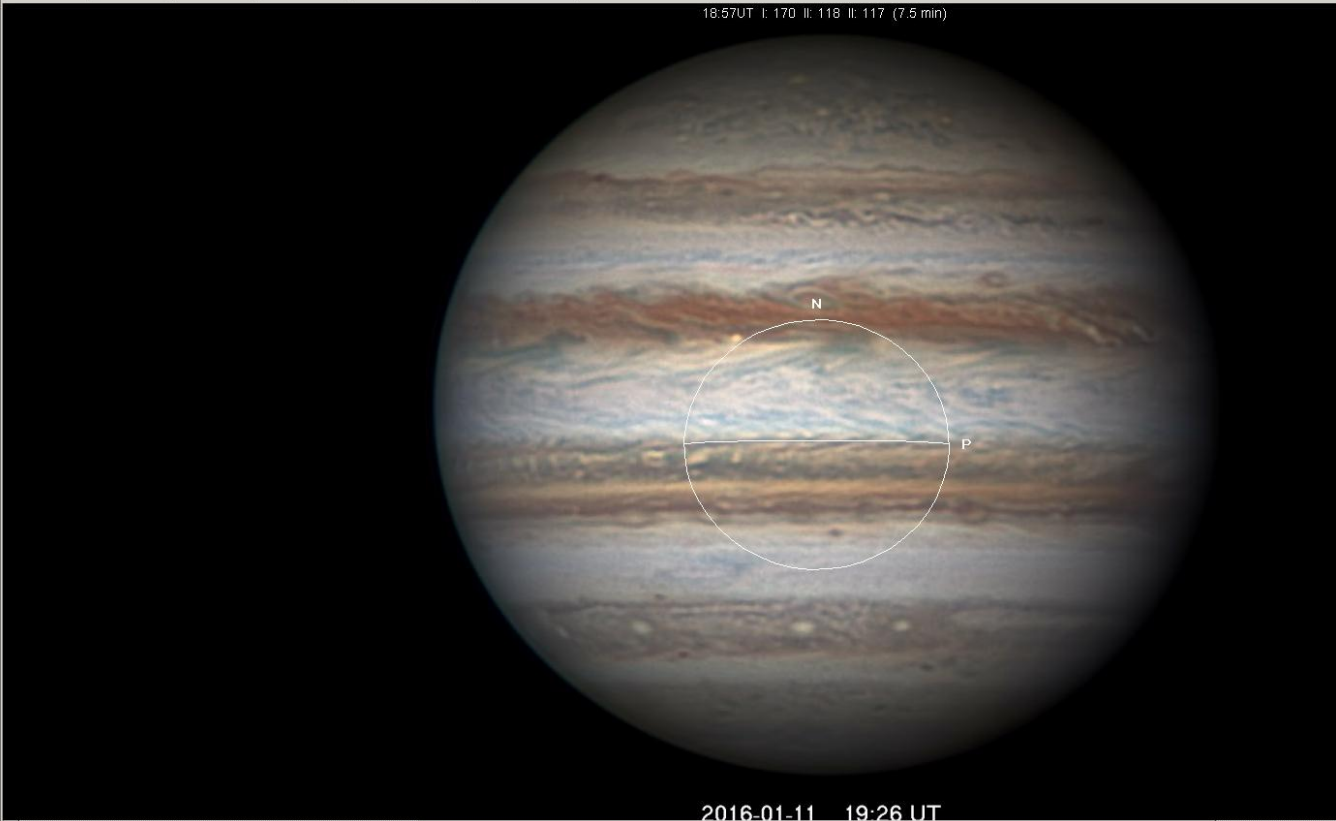
Settings

Reset

Save (F2)

Load (F3)

18:57UT I: 170 II: 118 III: 117 (7.5 min)



2016-01-11 19:26 UT

F:\Jupiter\Mesures Jupos\Nice workshop\Opposition 2016\Images\20160111a\_cgo.jpg

Démarrer | Gestionnaire des tâches... | Calendrier Windows - C... | Boîte de réception - Win... | &Nouvelles images | A mesurer | Nice workshop | Météo Satellite Pays-Ba... | Measurement of the ima... | Microsoft PowerPoint - [... | WinJUP

# 1) Automatic detection

WinJUPOS 10.2.5 - Database for Object Positions on Jupiter [Winjupos settings]

Program Recording Analysis Lists Administration Tools Window ?

Measurements of Jupiter images 2016-01-11-1926.0-CGo

Imag Adj. Pos. Misc. Opt. CM1 187.2° CM2 135.2° CM3 134.1° CLat -2.1° X -5.114 NR Close  
Y +2.804 Help

Open image (F7)

Date [2016/01/11] [yyyy/mm/dd]  
UT [19:26.0] [hh:mm.τ]  
Geogr. lngit. [+015 00] [±ddd°mm']  
Geogr. latit. [+50 00] [±dd°mm']

Ephemerides (F8)

Observer  
CGo  
Image info

Settings  
Reset  
Save (F2)  
Load (F3)

Automatic detection of outline frame F11  
LD compensation Ctrl+F11  
Colour  
Red channel  
Green channel  
Blue channel  
Grey  
Original size of image Alt+O  
Original rotation of image Ctrl+O  
Reset outline frame  
Centre outline frame (and image)  
Rotate equator of outline frame (and image) horizontally  
Normal image  
Mirrored/inverted image  
Quick move  
High image quality  
Image info

18.57UT L 170 B 118 IL 117 (7.5 min)

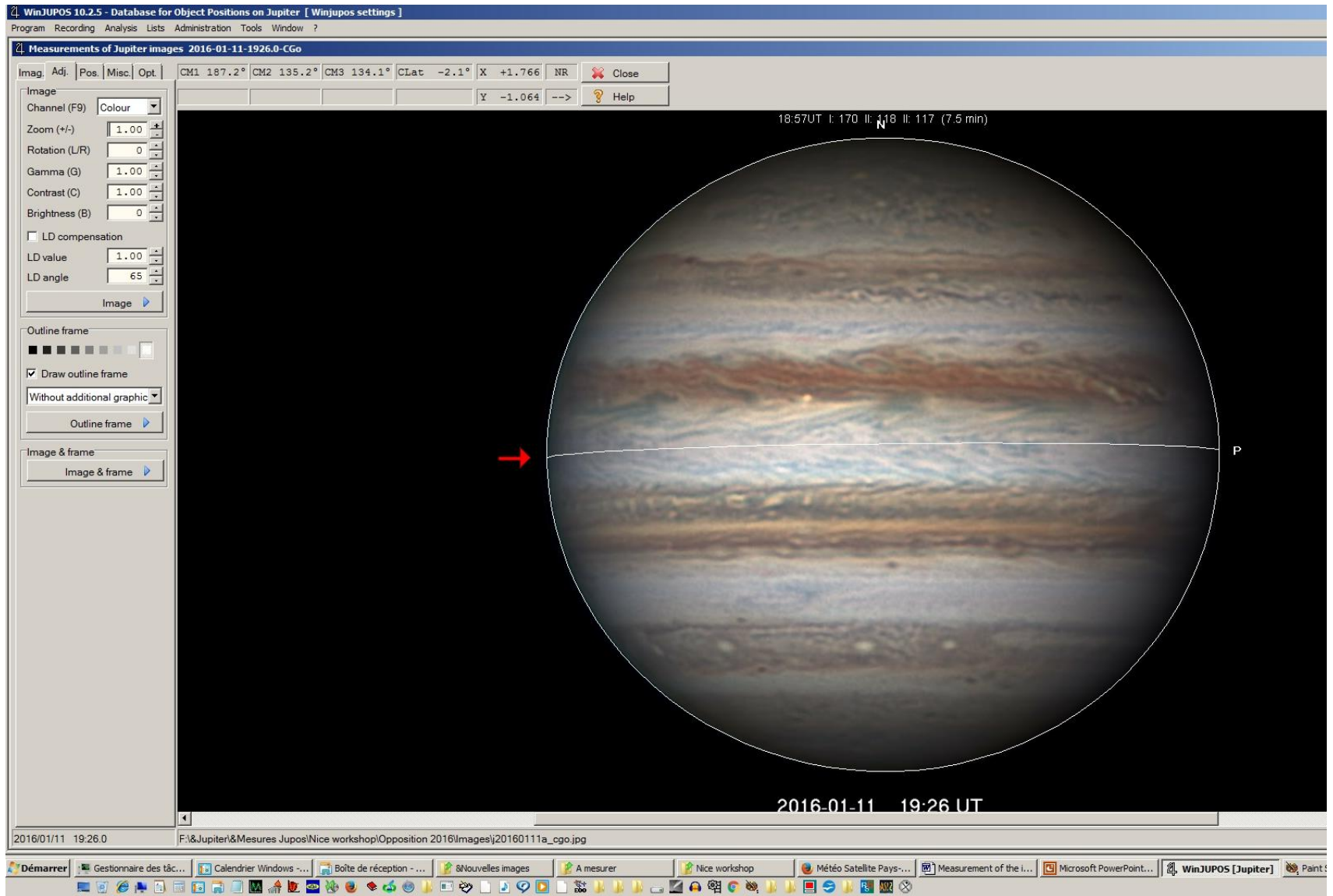
N P

2016-01-11 19:26 UT

2016/01/11 19:26.0 F:\Jupiter\Mesures Jupos\Nice workshop\Opposition 2016\Images\20160111a\_cgo.jpg

Démarrer Gestionnaire des tâches Calendrier Windows Boîte de réception Nouvelles images A mesurer Nice workshop Météo Satellite Pays... Measurement of the I... Microsoft PowerPoint... WinJUPOS [Jupiter] Paint Shop

## 2) Manual correction



# WinJUPOS 10.2.5 - Database for Object Positions on Jupiter [Winjupos settings]

Program Recording Analysis Lists Administration Tools Window ?

## Measurements of Jupiter images 2016-01-11-1926.0-CGo

Imag Adj Pos Misc Opt CM1 187.2° CM2 135.2° CM3 134.1° CLat -2.1° X -0.510 NR Close

Y -1.017 --> Help

Image

Channel (F9) Colour

Zoom (+/-) 1.00

Rotation (L/R) 0

Gamma (G) 1.00

Contrast (C) 1.00

Brightness (B) 0

☐ LD compensation

LD value 1.00

LD angle 65

Image

Outline frame

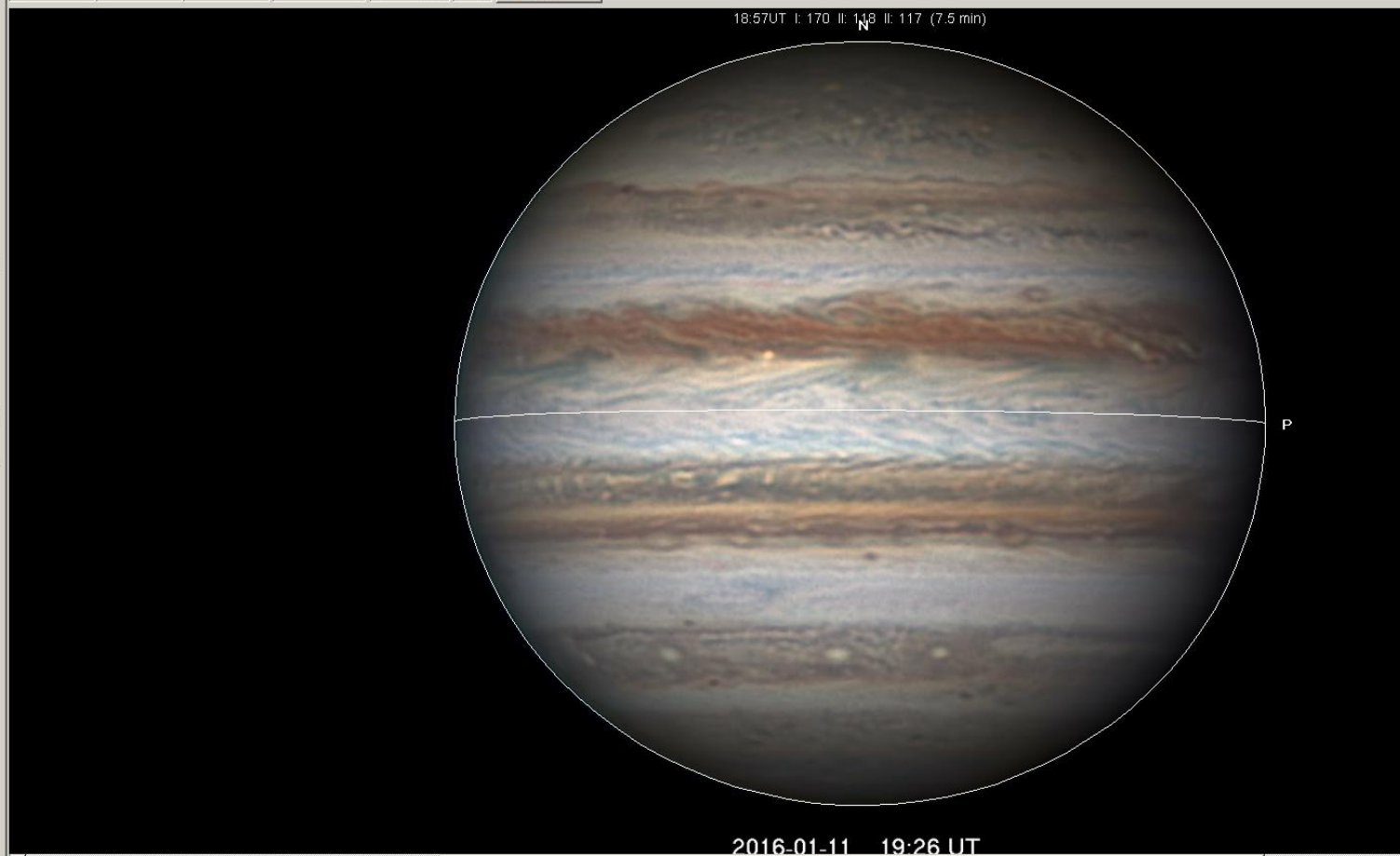
☒ Draw outline frame

Without additional graphic

Outline frame

Image & frame

Image & frame



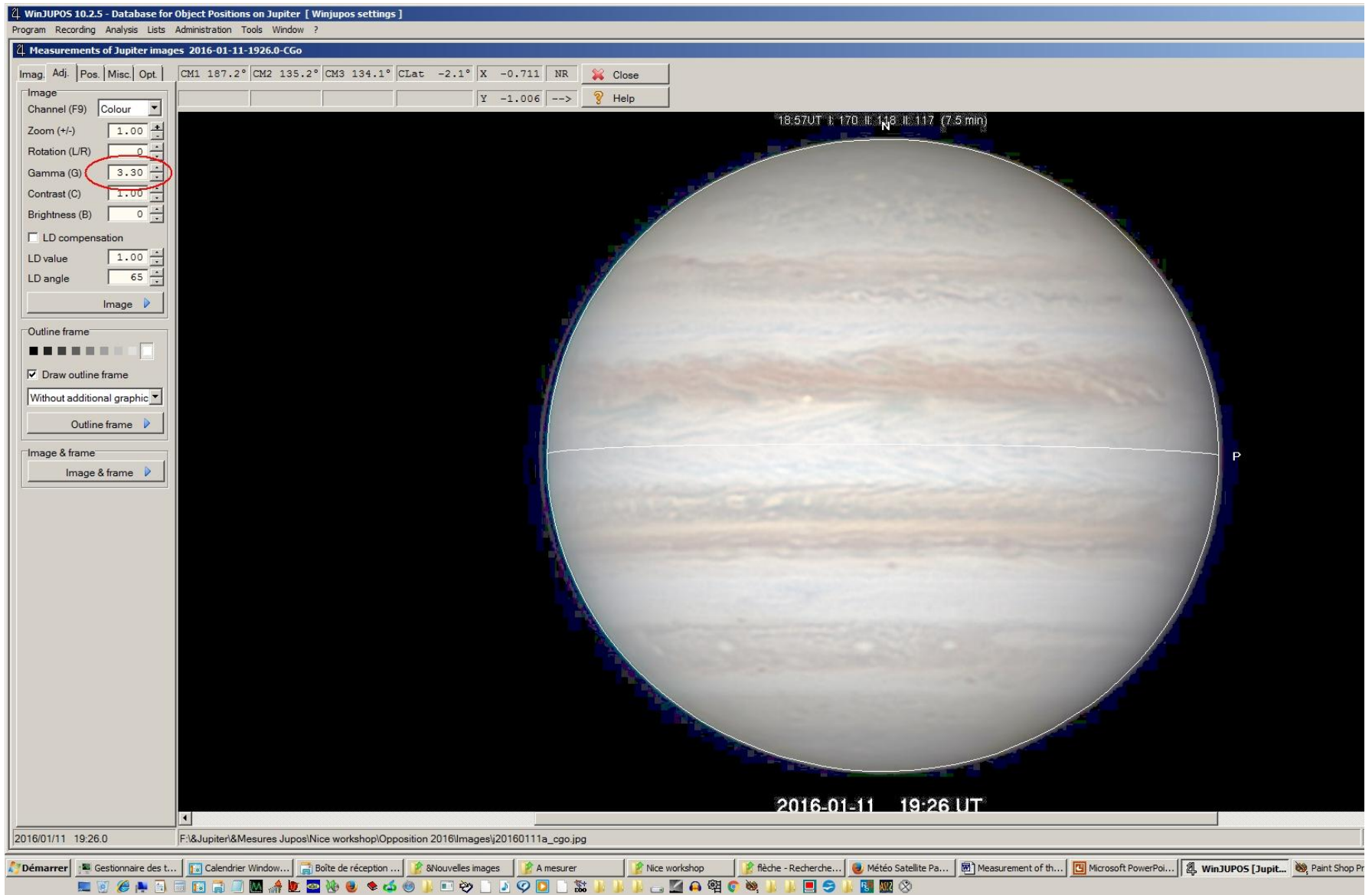
2016/01/11 19:26.0

F:\Jupiter\Mesures Jupos\Nice workshop\Opposition 2016\Images\20160111a\_cgo.jpg

Démarrer Gestionnaire des t... Calendrier Window... Boîte de réception ... &Nouvelles images A mesurer Nice workshop Rêche - Recherche... Météo Satellite Pa... Measurement of th... Microsoft PowerPo... WinJUPOS [Jupit... Paint S



### 3) Searching for the true edge





# WinJUPOS 10.2.5 - Database for Object Positions on Jupiter [ Winjupos settings ]

Program Recording Analysis Lists Administration Tools Window ?

## Measurements of Jupiter images 2016-01-11-1926.0-CGo

Imag. Adj. Pos. Misc. Opt. CM1 187.2° CM2 135.2° CM3 134.1° CLat -2.1° X +1.931 NR Close

Y -1.037 --> Help

Image

Channel (F9) Colour

Zoom (+/-) 1.00

Rotation (L/R) 0

Gamma (G) 3.30

Contrast (C) 1.00

Brightness (B) 0

☐ LD compensation

LD value 1.00

LD angle 65

Image

Outline frame

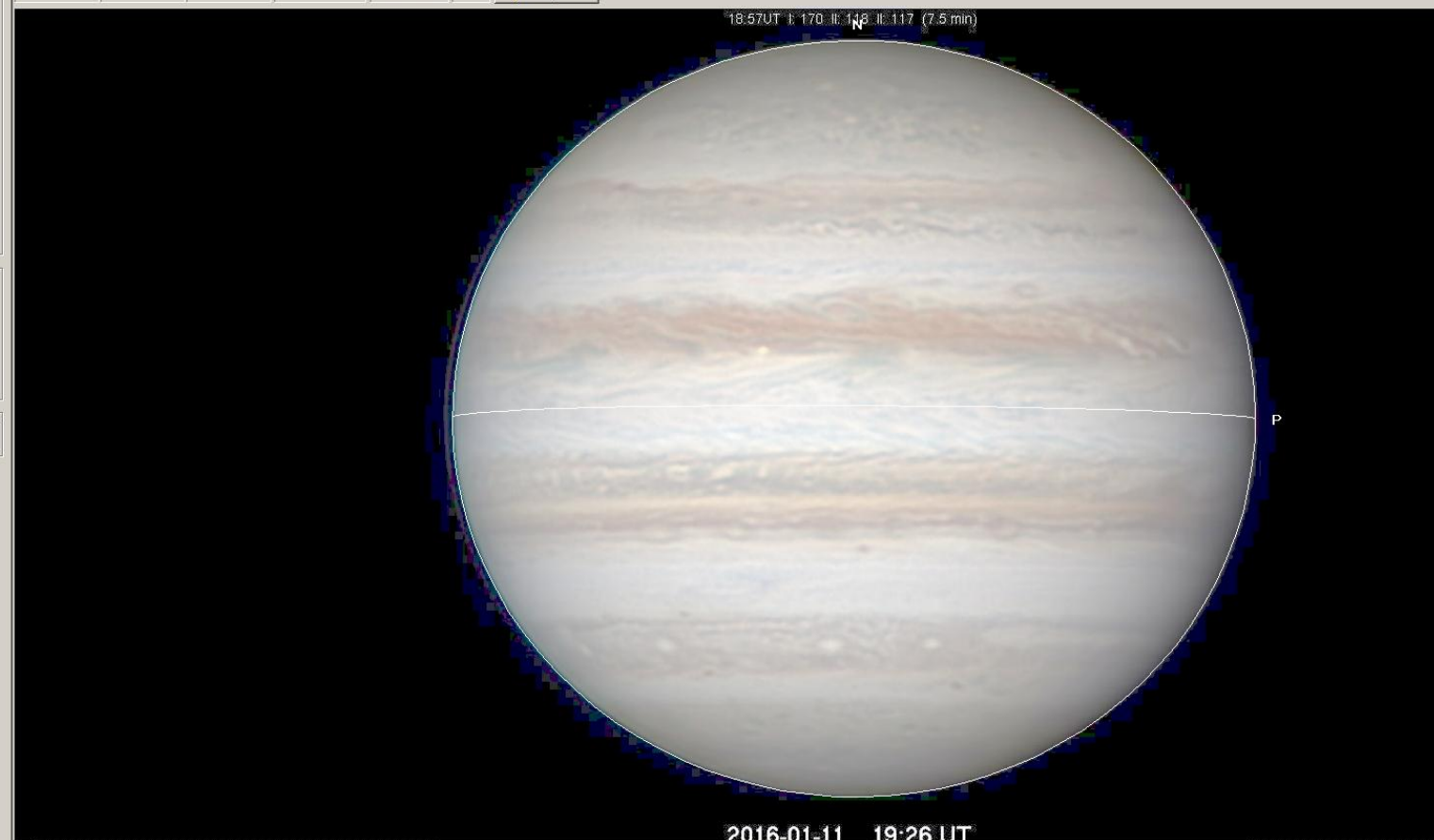
☒ Draw outline frame

Without additional graphic

Outline frame

Image & frame

Image & frame



2016/01/11 19:26.0

F:\Jupiter\Mesures Jupos\Nice workshop\Opposition 2016\Images\20160111a\_cgo.jpg

Démarrer Gestionnaire des t... Calendrier Window... Boîte de réception ... 8Nouvelles images A mesurer Nice workshop Rêche - Recherche... Météo Satellite Pa... Measurement of th... Microsoft PowerPoi... WinJUPOS [ Jupit... Paint Shop Pro - I

## 4) Testing the latitude of well-known features

WinJUPOS 10.2.5 - Database for Object Positions on Jupiter [Winjupos settings]

Program Recording Analysis Lists Administration Tools Window ?

Measurements of Jupiter images 2016-01-11-1926.0-CGo

Imag| Adj. | Pos. | Misc. | Opt. | CM1 187.2° CM2 135.2° CM3 134.1° CLat -2.1° X -1.563 NR Close  
Y -0.941 --> Help

Cross-wires  
X -0.062  
Drift ["/d]~ Y -0.559  
+6.9 L1 191.4°  
-0.8 L2 139.4°  
-0.5 L3 100.0°  
B -40.6°

Type Small  
Size (F6) 1  
Draw cross-wires (Space) ☒

Measurements file

Save object position

Measured object positions  
☐ Display (Ctrl+Space)  
☒ Object descriptions  
Size 1  
In time interval ± 1 minute(s)

18:57UT I: 170 II: 118 III: 117 (7.5 min)

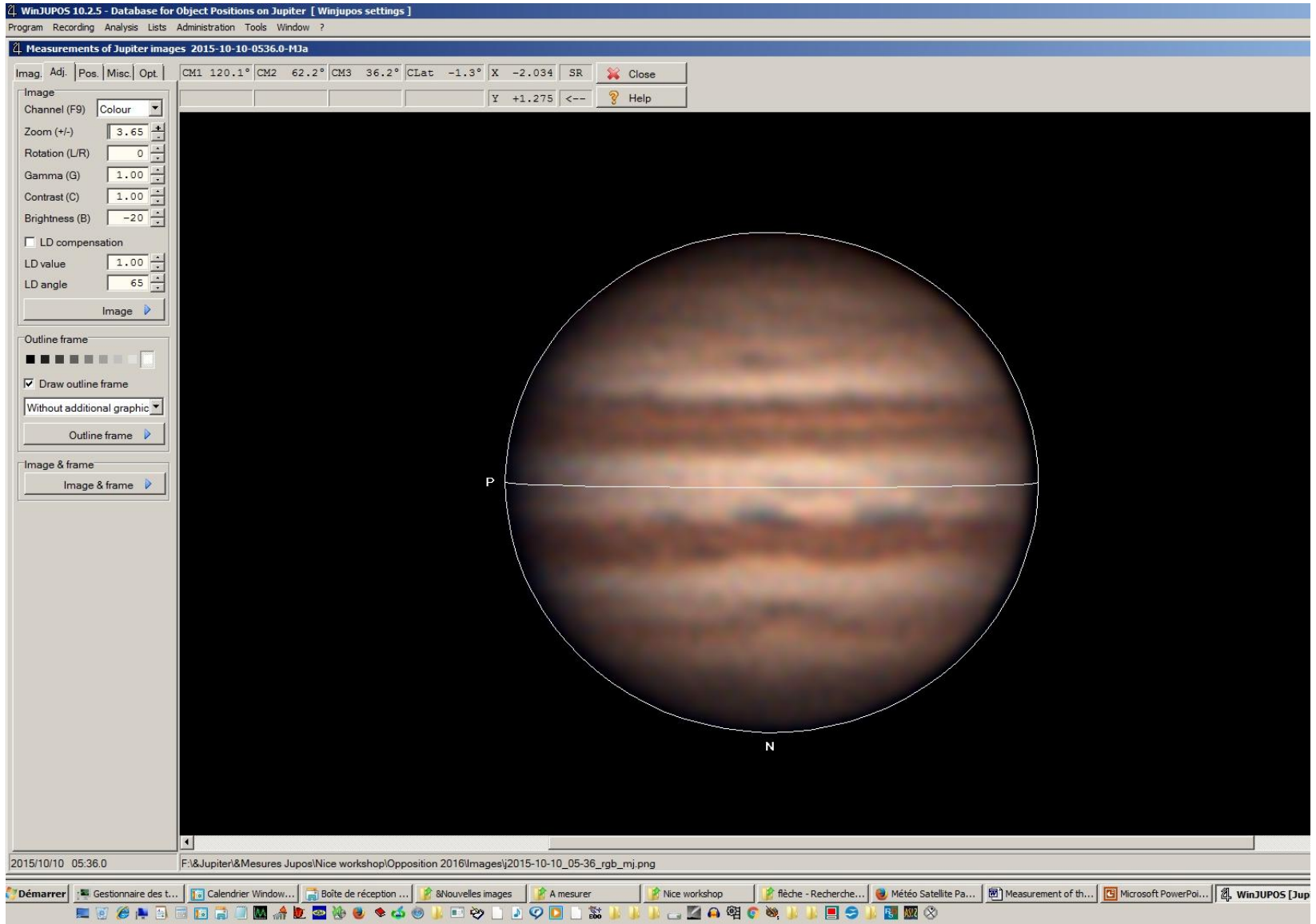
2016-01-11 19:26 UT

F:\Jupiter\Mesures Jupos\Nice workshop\Opposition 2016\Images\20160111a\_cgo.jpg

Démarrer | Gestionnaire des t... | Calendrier Window... | Boîte de réception ... | Nouvelles images | A mesurer | Nice workshop | fêche - Recherche... | Météo Satellite Pa... | Measurement of th... | Microsoft PowerPol... | WinJUPOS [Jupit... | Paint S

The screenshot displays the WinJUPOS software interface. The main window shows a Jupiter image with a red crosshair. A red circle highlights the 'B' latitude value (-40.6°) in the left panel. The top panel shows the current measurements: CM1 187.2°, CM2 135.2°, CM3 134.1°, CLat -2.1°, X -1.563, NR, Y -0.941. The bottom panel shows the date and time: 2016-01-11 19:26 UT. The taskbar at the bottom shows various open applications, including WinJUPOS.

# On bad quality images



# WinJUPOS 10.2.5 - Database for Object Positions on Jupiter [Winjupos settings]

Program Recording Analysis Lists Administration Tools Window ?

## Ephemerides of Jupiter 2015/10/10 05:36.0

Date 2015/10/10 (Sat) UT 05:36.0 Geogr. longit. +004 05 Geogr. latit. +49 36  
 [yyyy/mm/dd] [hh:mm.tt] [±ddd°mm'] [±dd°mm']

Close

Help

Time -10 -1 Real time ±1 +10 minutes Animation Real time

Ephemerides Moon coordinates Moon ephemerides Graphics Options

System: I II III  
 C.M.: 120.1° 62.2° 36.2°

3h - 25.0 327.9 301.9  
 4h - 61.6 4.2 338.1  
 5h - 98.1 40.4 14.4

Altitude : 26°  
 Azimuth : 251° [ESE]

Jupiter rise : 2 h 48 min UT  
 culmin. : 9 h 27 min UT  
 set : 16 h 6 min UT

Sun rise : 5 h 57 min UT  
 set : 17 h 4 min UT

Elongation : 33.9° [ W ]

Light-time : 51.6 min

Diameter  
 (phase corrected) : 31.7" equat.

Position angle : 24.75° equat.

: 62.5° horiz.

Equ. phase angle : 5.9° p. limb

Visual magnitude : -1.7 mag

Declin. of Sun : -1.0°

Earth : -1.1°, B" -1.3°

Longitude of Sun : 157°

JD : 2457305.73333

Apparent tropocentric coordinates  
 (Equinox of date)

Right asc. 10h 57m 39.6s 164.415°  
 Hour angle 20h 8m 43.3s 302.180°  
 Declination 7° 39' 45" 7.663°

Astrometric tropocentric coordinates  
 (Equinox J2000)

Right asc. 10h 56m 51.5s 164.215°  
 Declination 7° 44' 45" 7.746°

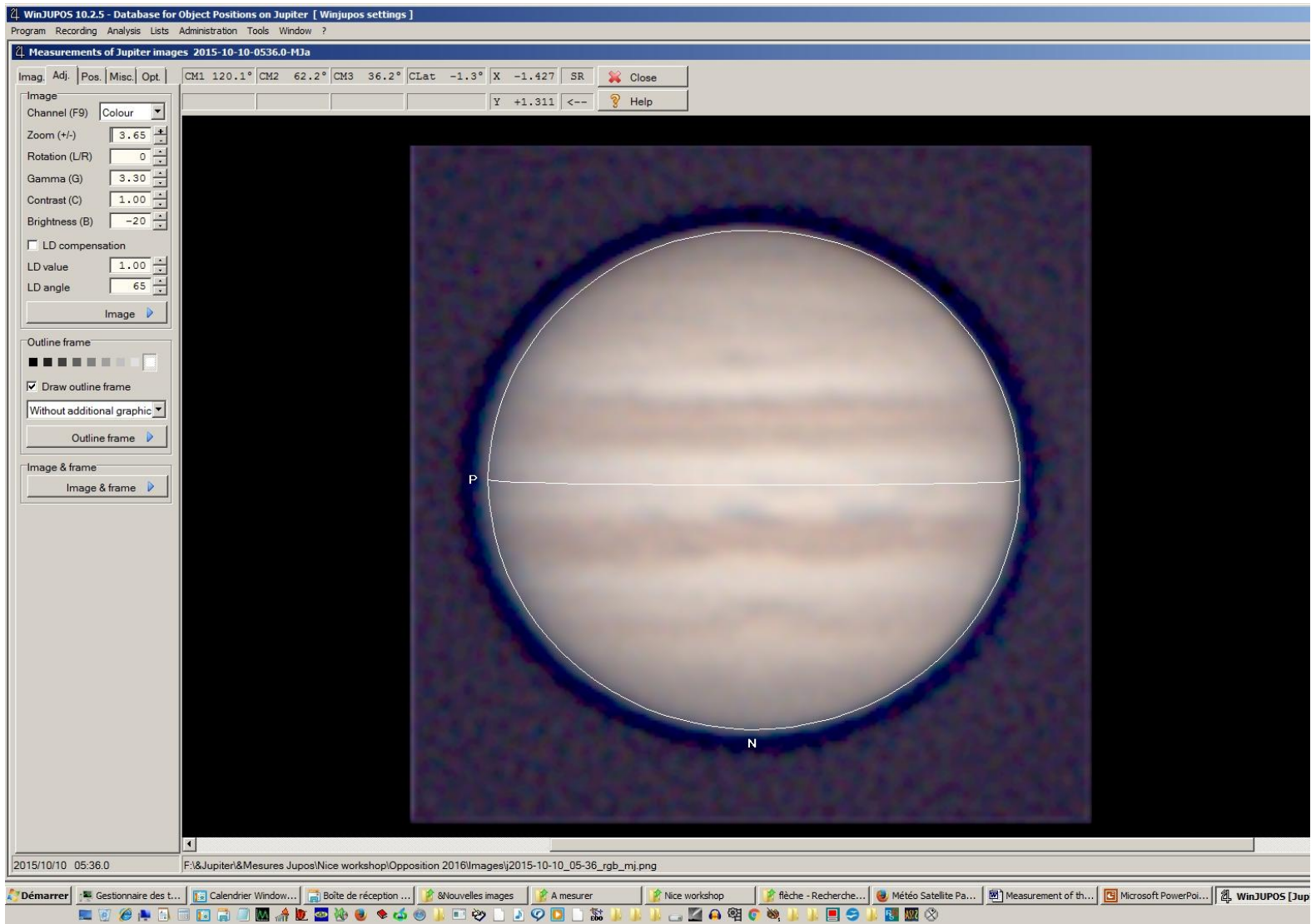
System 1

System 2

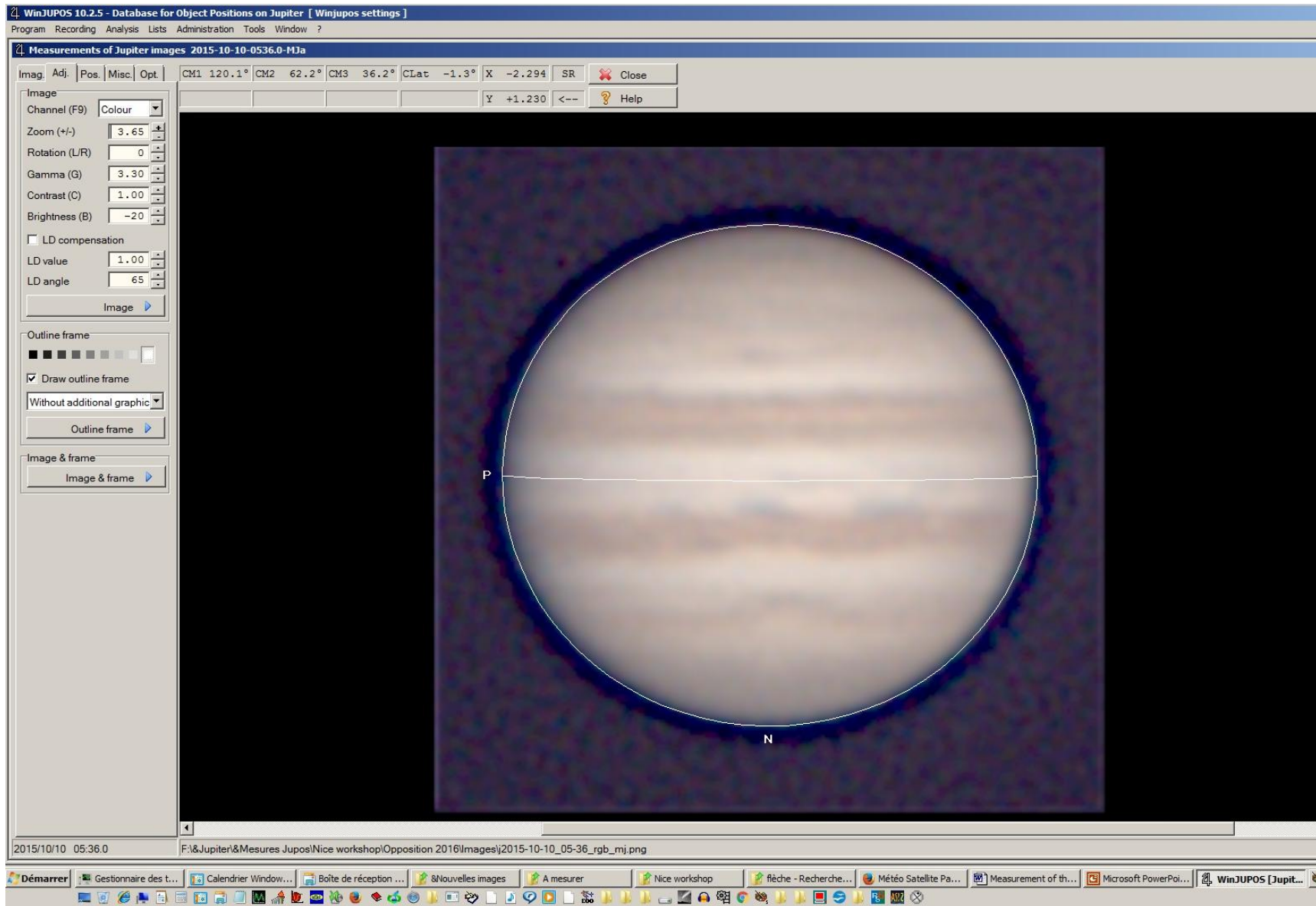
System 3

Load (F3)

# True edge?

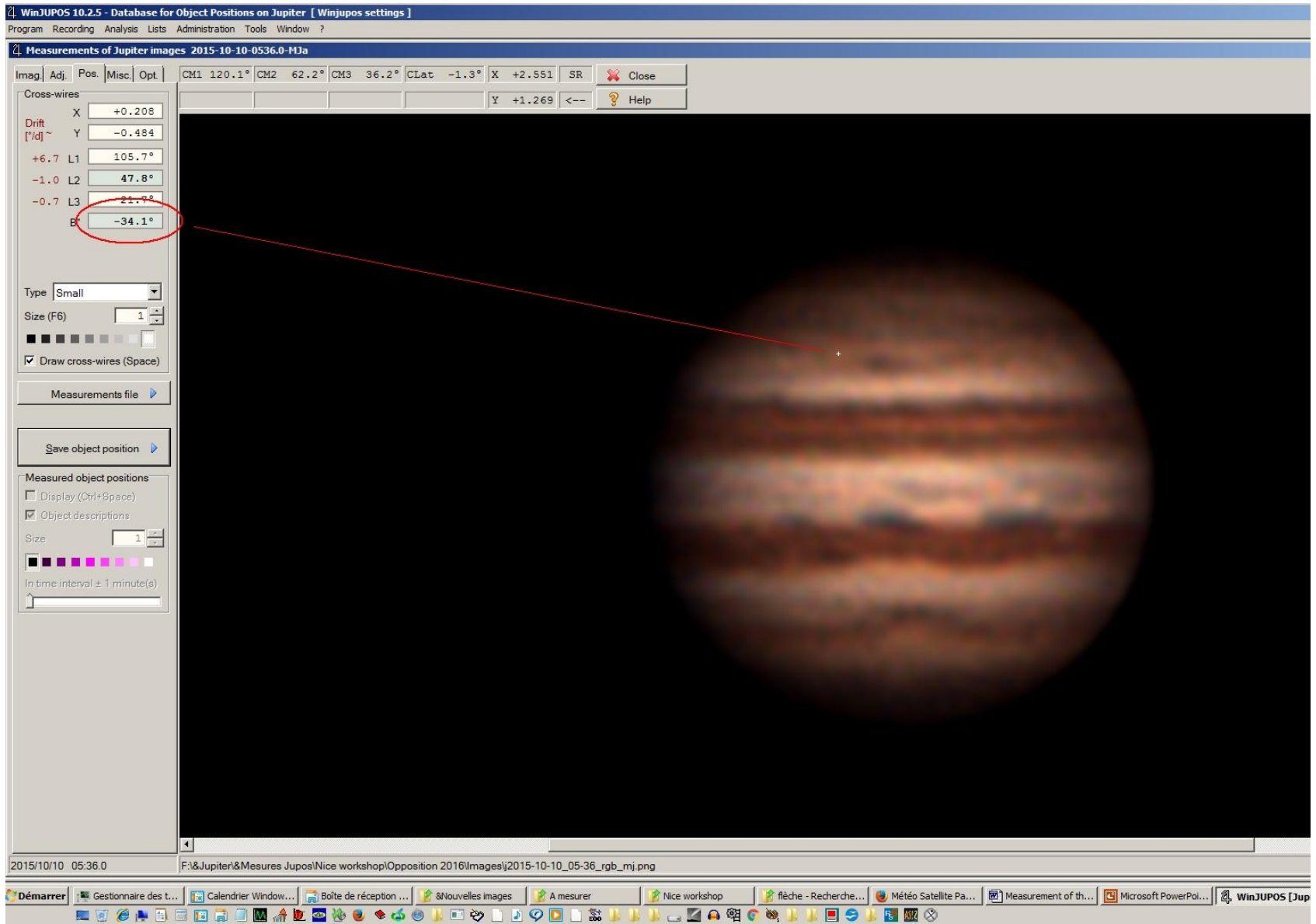




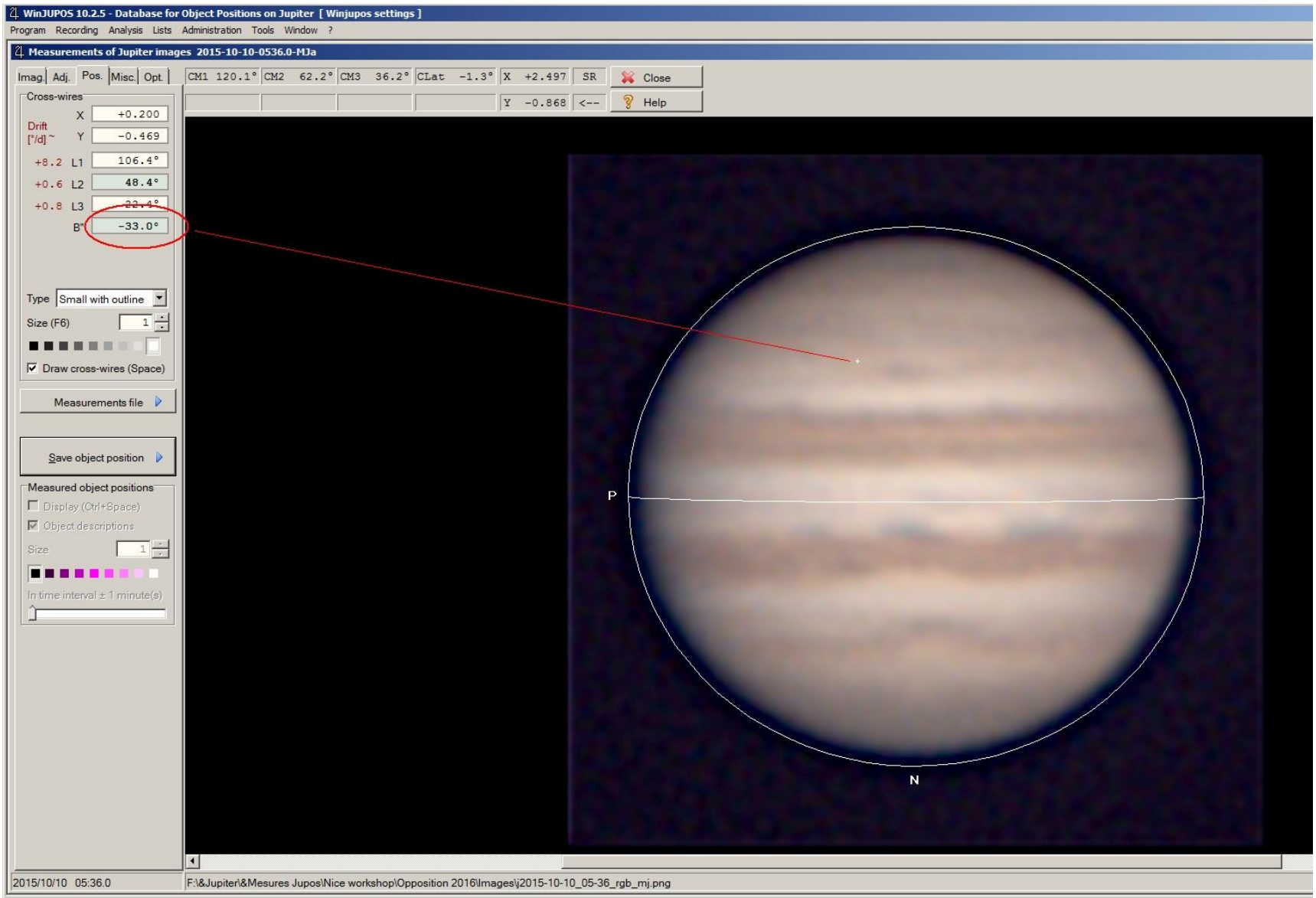




# No, the latitude of BA is too high!



# The true edge is invisible!



Testing the date and time using the  
longitude of well-known objects

# Some cases of time and date errors and their probable reasons

- *A few minutes :*
  - the computer clock has shifted OR the time is not the mean time of the AVI clip
  - I send an e-mail to the observer to ask him a verification of the time.
- *exactly 1 or 2 hours :*
  - bad conversion from local time to UT
- *one day :*
  - error in conversion from local time to UT **around midnight**

## Measurements of Jupiter images 2015-12-21-0933.0-EMo

Imag. Adj. Pos. Misc. Opt.

CM1 108.7° CM2 220.1° CM3 213.3° CLat -2.0° X -1.902 SR

Close

Cross-wires

Drift X -0.259

["/d]~ Y -0.310

+8.3 L1 124.3°

+0.6 L2 235.7°

+0.9 L3 228.9°

B° -22.5°

Type Small

Size (F6) 1

☒ Draw cross-wires (Space)

Measurements file

&amp;Morales.me

Save object position

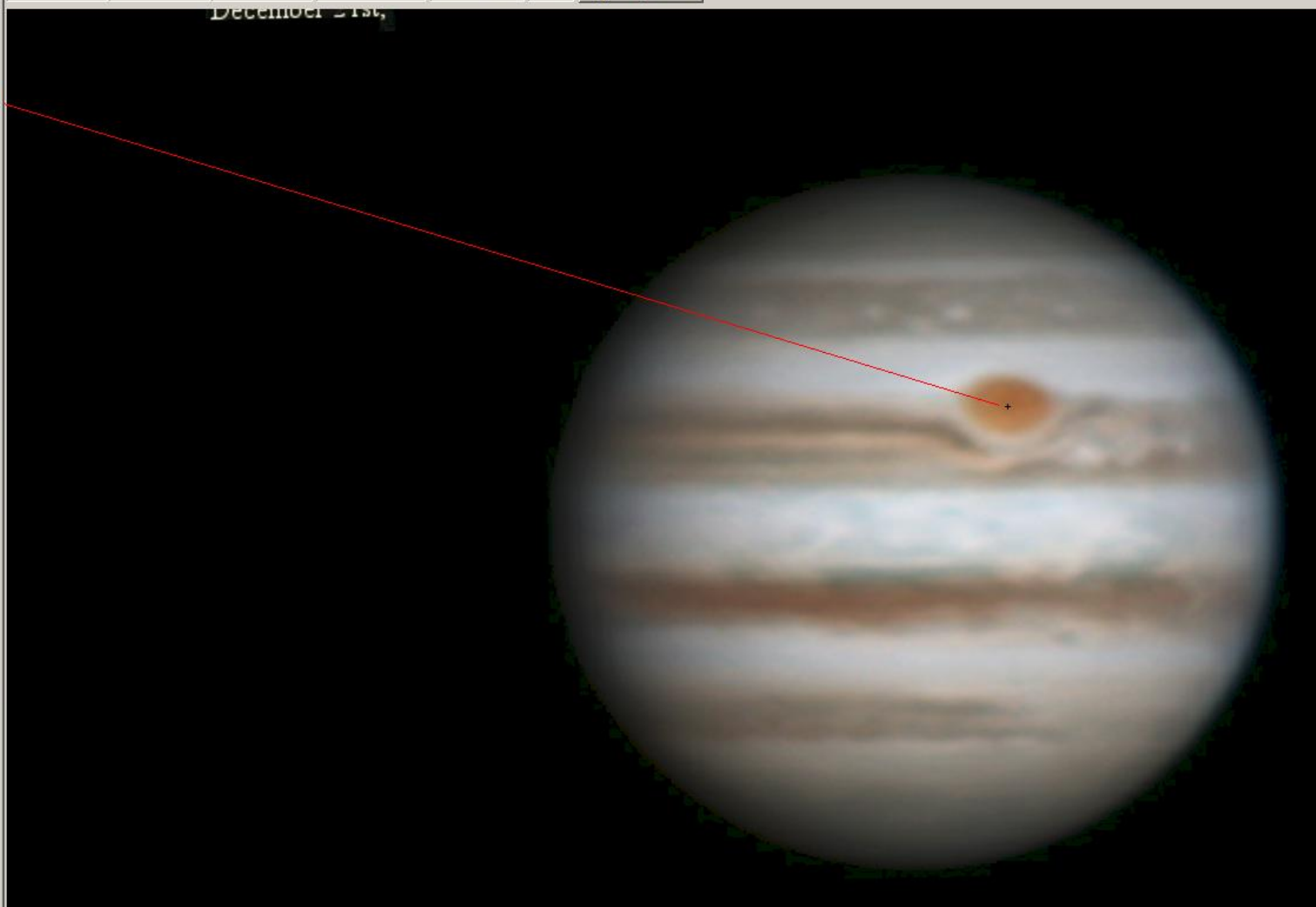
Measured object positions

☒ Display (Ctrl+Space)☒ Object descriptions

Size 1

☒ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

In time interval ± 1 minute(s)





Imag Adj Pos Misc Opt CM1 108.7° CM2 220.1° CM3 213.3° CLat -2.0° X +1.444 SR Close

Cross-wires

Drift X

[ /d ] ~ Y

+8.3 L1

+0.6 L2

+0.9 L3

B"

## Save object position

## Measurements file

File name

F:\Jupiter\Mesures Jupos\Nice workshop\MESSDAT&amp;Morales.mea

Observer

Morales Rivera, Efrain

Object

Record no.

14979

Code

C1\_RS

Region

E3

Date

2015/12/21

UT

09:33.0

Long. L

235.7

+/-

.

Sy.

2

Latit B"

-22.5

+/-

.

[BMV\_CCCCCC] [RR] [yyyy/mm/dd] [hh:mm.τ] [ddd.d] [+dd.d]

ID

Description

X

Y

L1

L2

L3

B"

X

Y

L1

L2

L3

B"

X

Y

L1

L2

L3

B"

X

Y

L1

L2

L3

B"

X

Y

L1

L2

L3

B"

X

Y

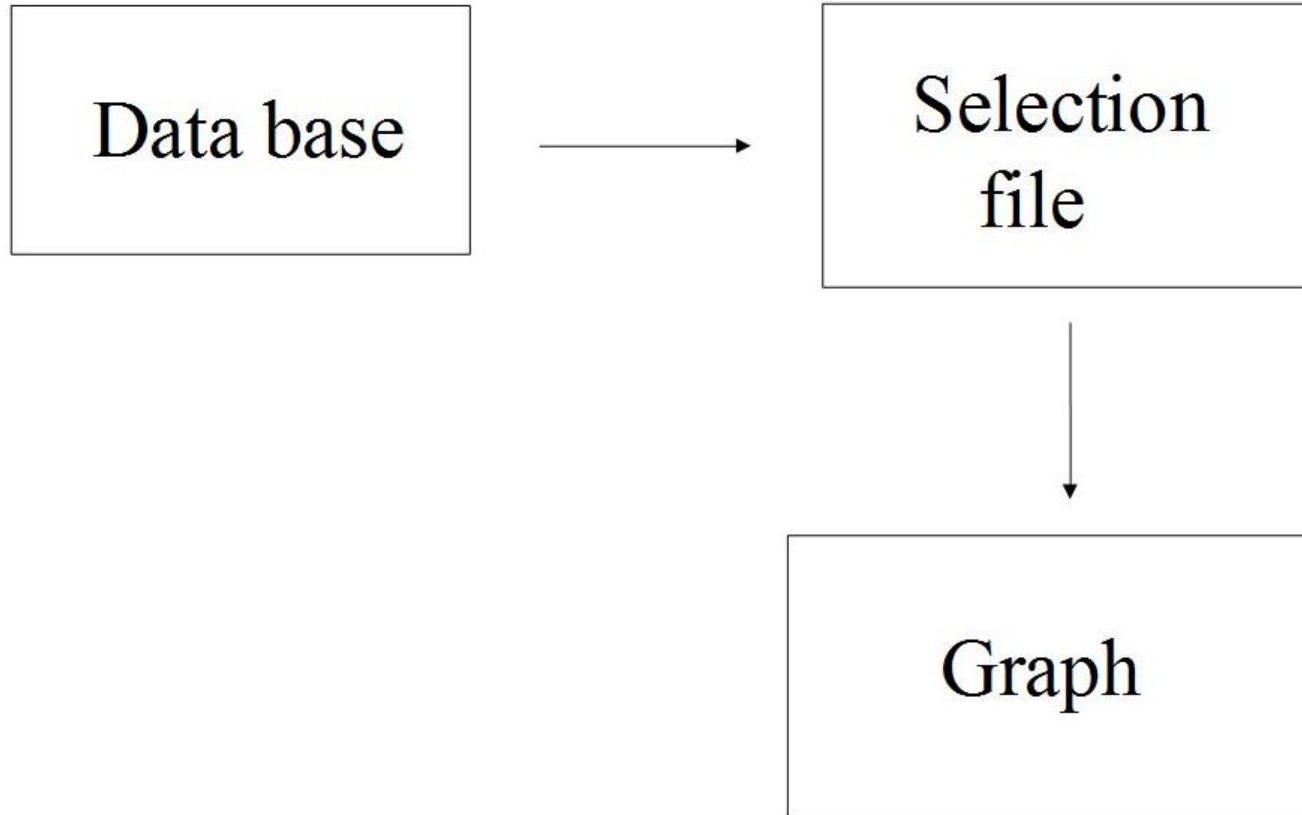
L1

L2

L3

B"





WinJUPOS 10.2.5 - Database for Object Positions on Jupiter [ Winjupos settings ]

Program Recording Analysis Lists Administration Tools Window ?

Macro rs

Macro file:

F:\Mesures Jupos\Nice workshop\Opposition 2016\configurations\5 macros\rs.wjm

Edit

Progress

F:\Jupiter\&Mesures Jupos\Nice workshop\Opposition 2016\configurations\2 sélections\RS\_DC.ses ... ok.  
F:\Jupiter\&Mesures Jupos\Nice workshop\Opposition 2016\configurations\3 graphiques\rs\_dc.grs ...  
> F:\Jupiter\&Mesures Jupos\Nice workshop\Opposition 2016\Fichiers de travail\graphiques\rs\_dc.gif  
ok.

2 process(es) executed.  
0 errors.

Protocol

Save

Start

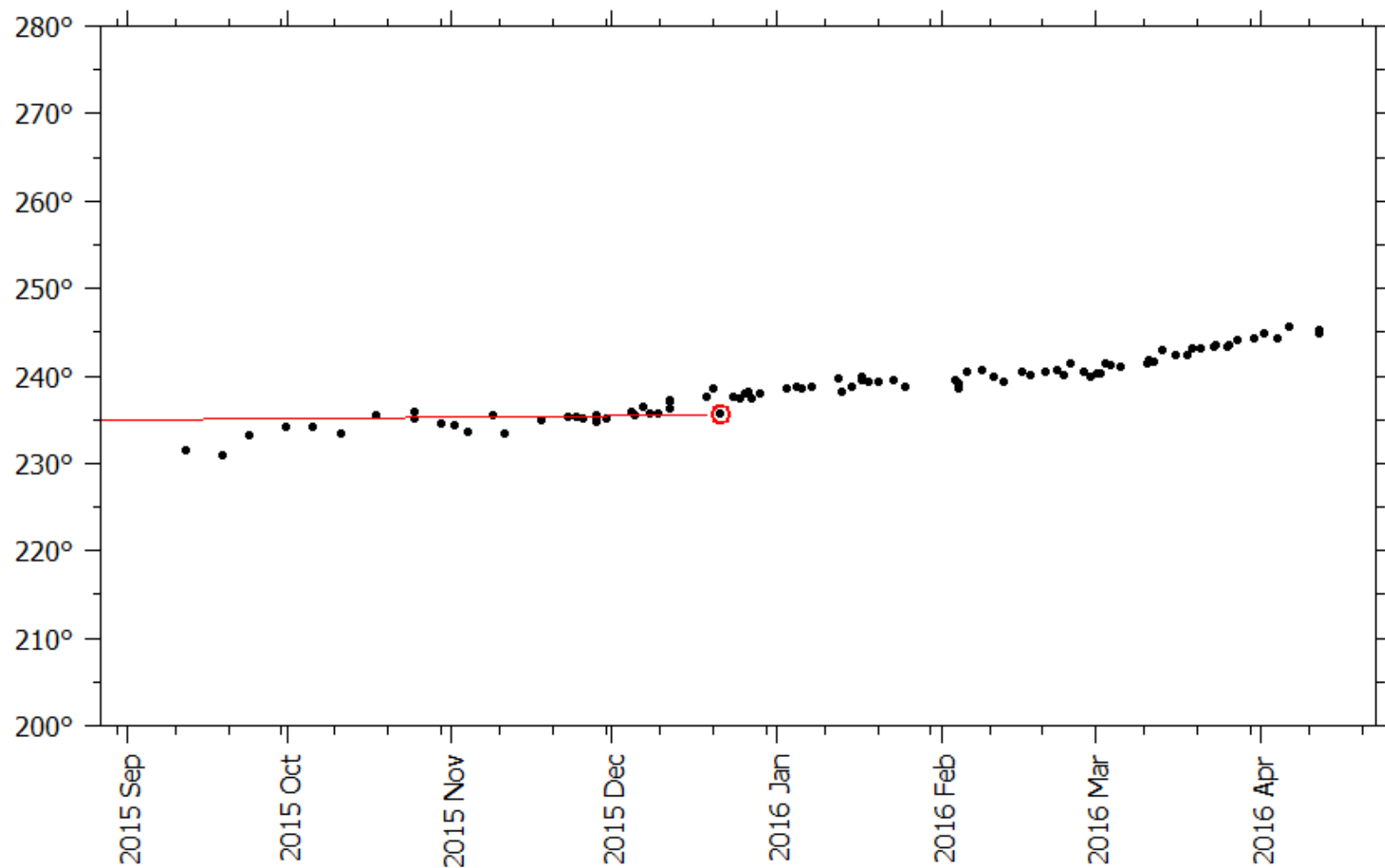
Close

Help

☒ Draw cross-wires (Space)

Measurements file

# GRS longitude



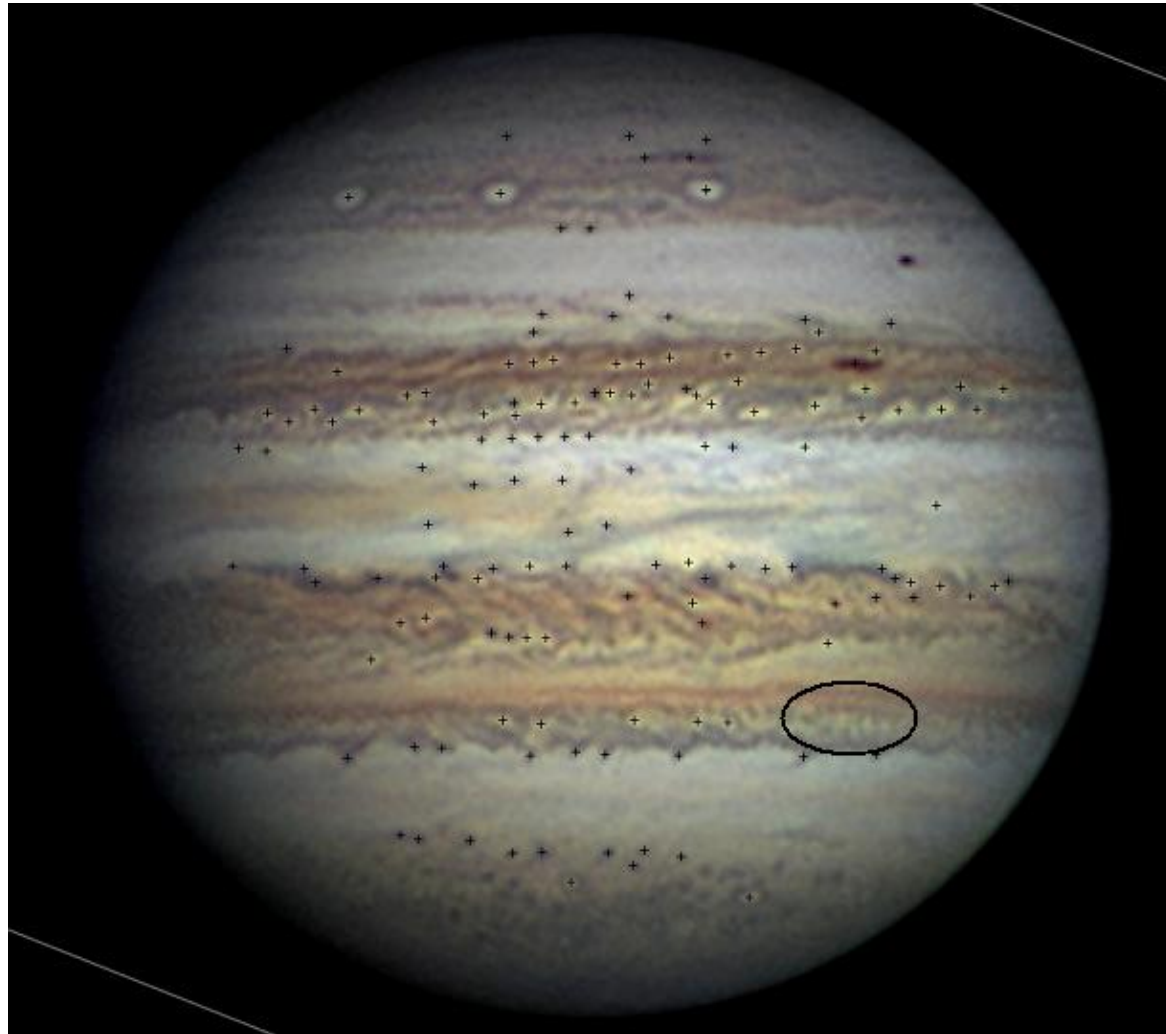
# Measurements

What to leave aside?

Unclear small features sometimes suspected  
to be artefacts from the processing

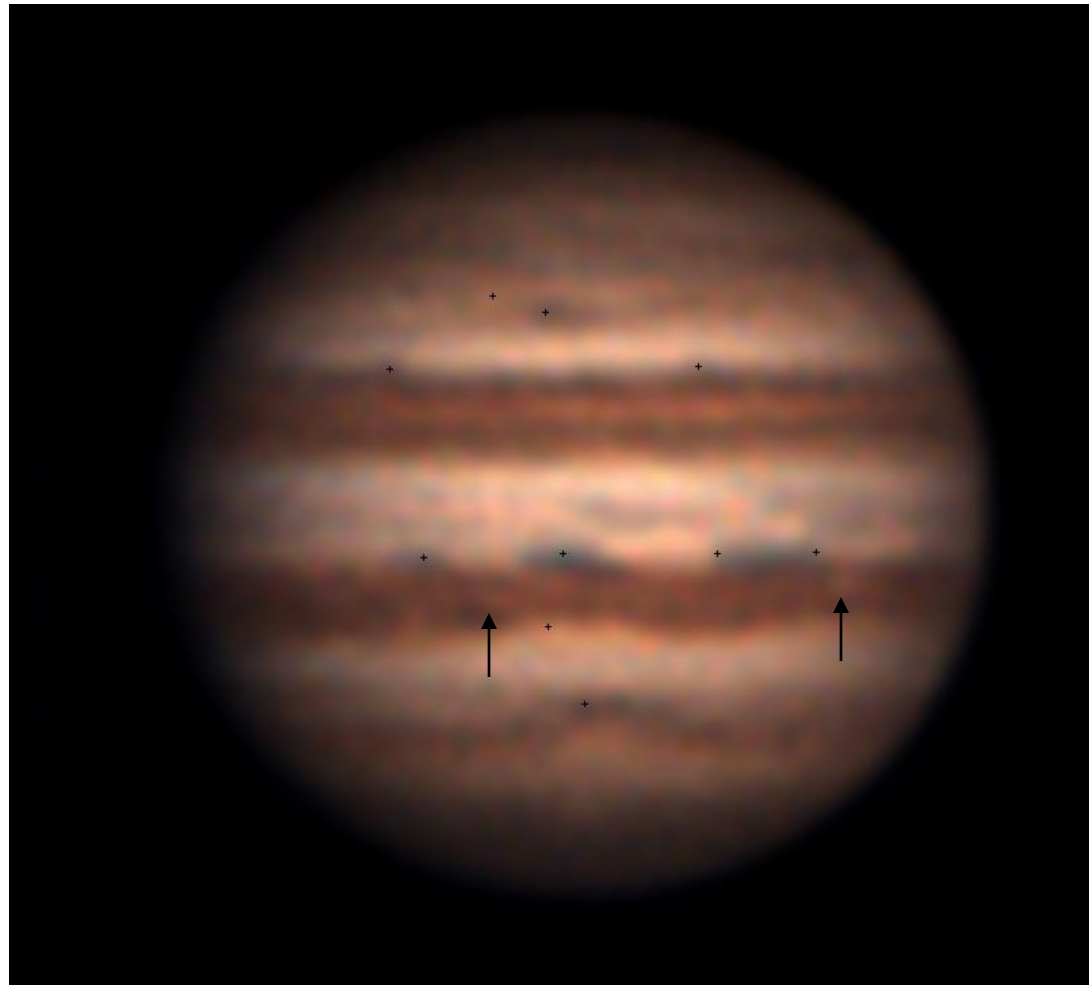


# Small transient objects in very high resolution images



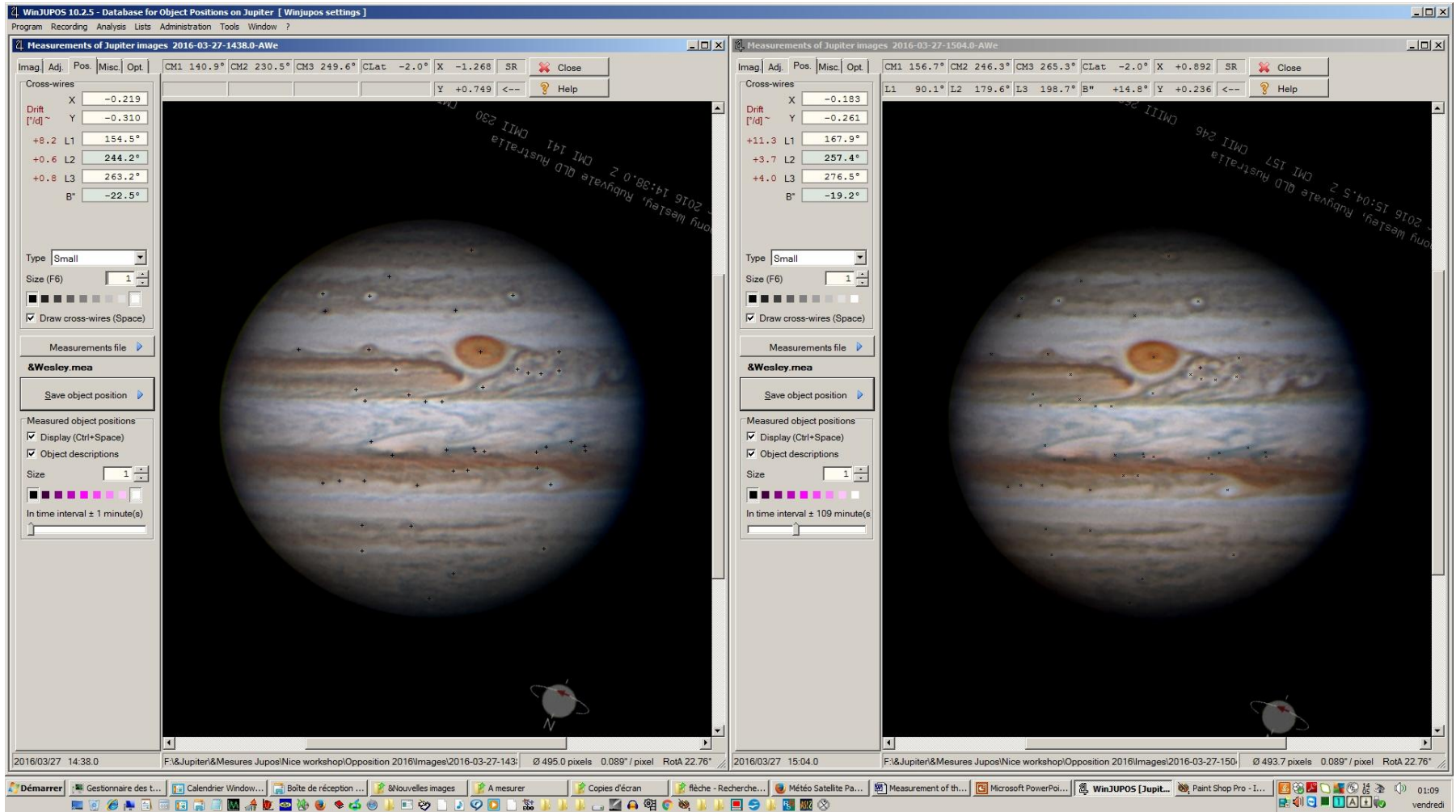


# Ill defined features in bad quality images

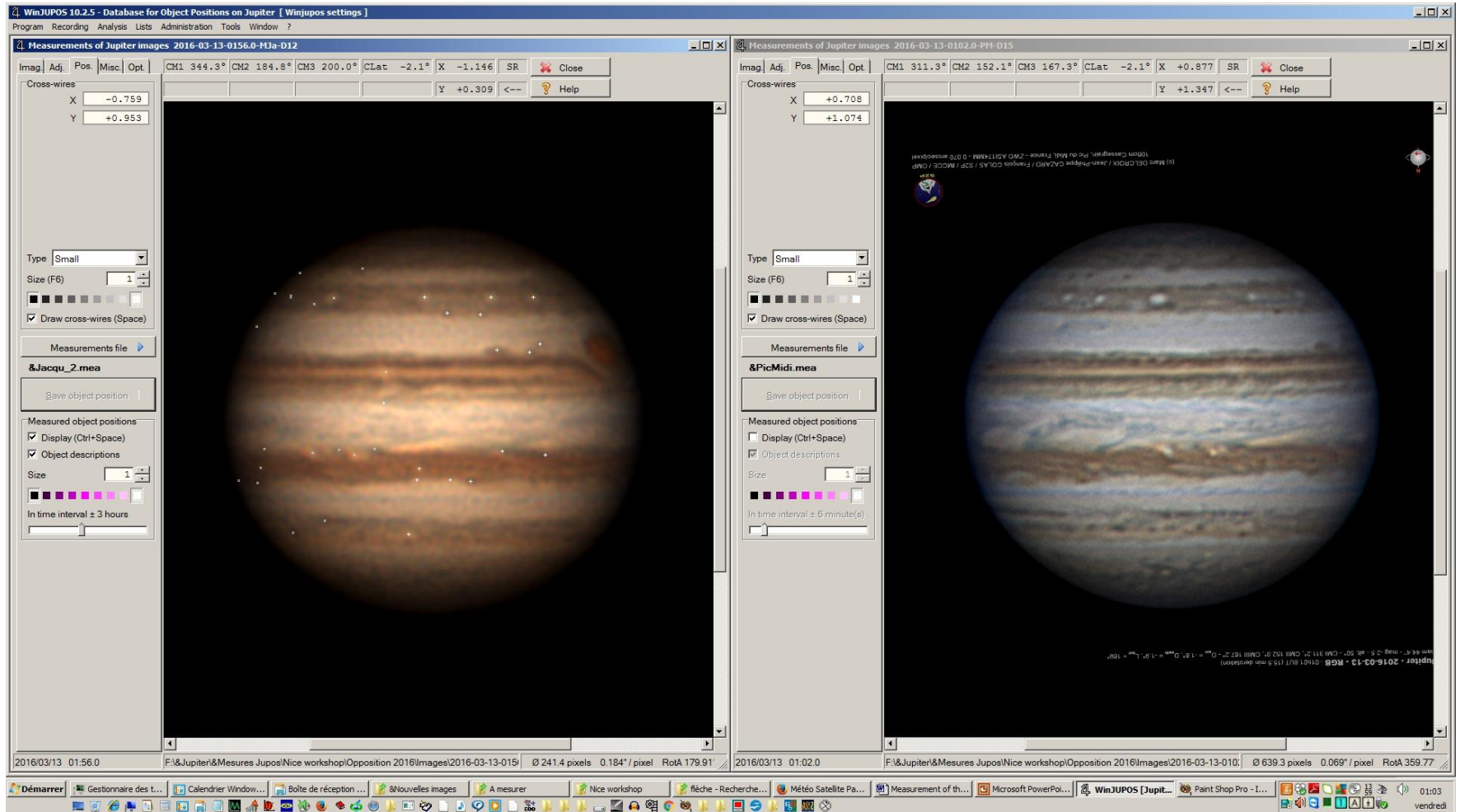


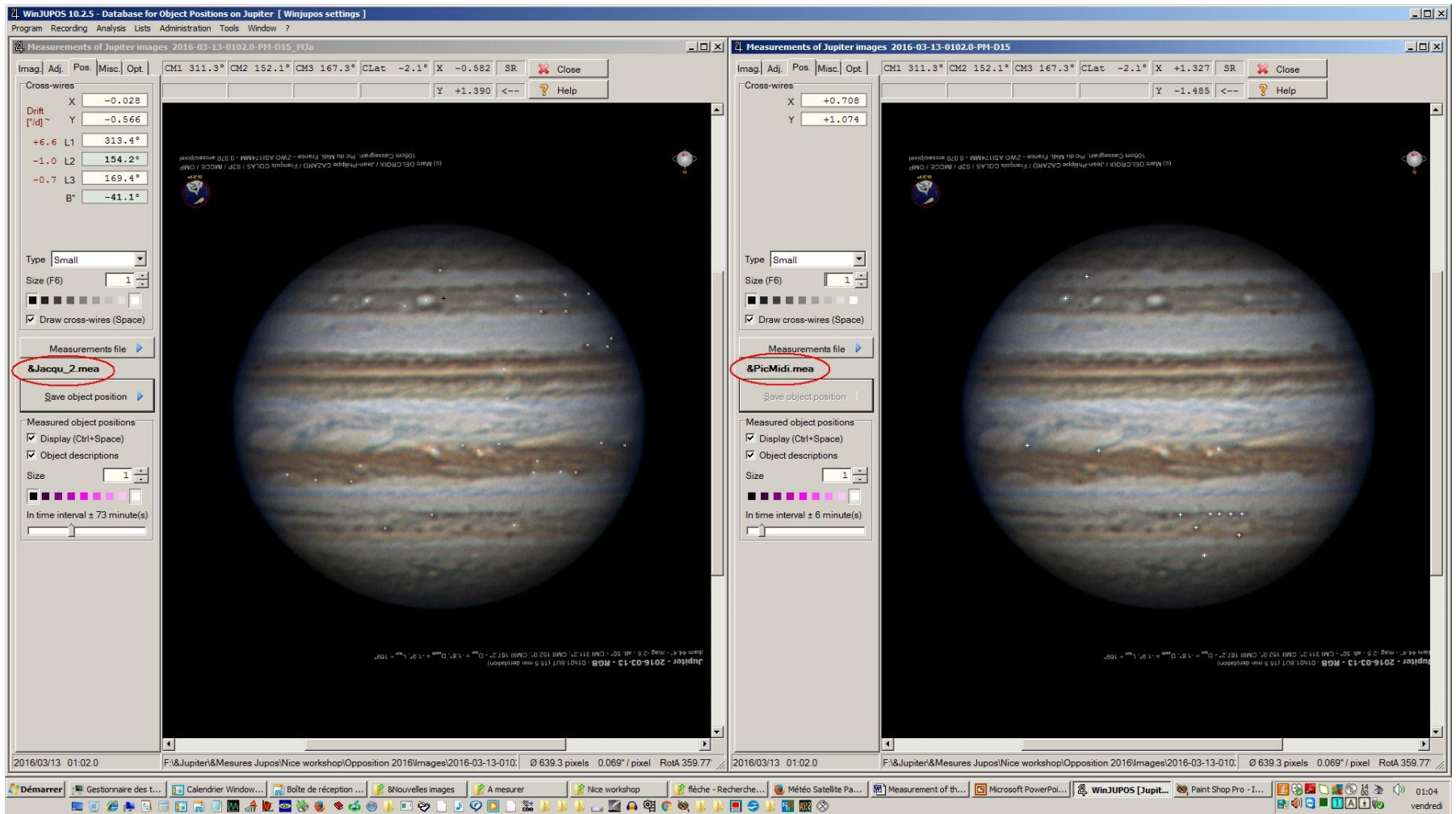
# Objects already measured during the same rotation

2 images made by the same observer



## 2 images made by different observer





# Conclusion

Measuring Jupiter images is sometimes a tricky operation including personal judgement

However, the 3 JUPOS measurers try hard to harmonize their measurements