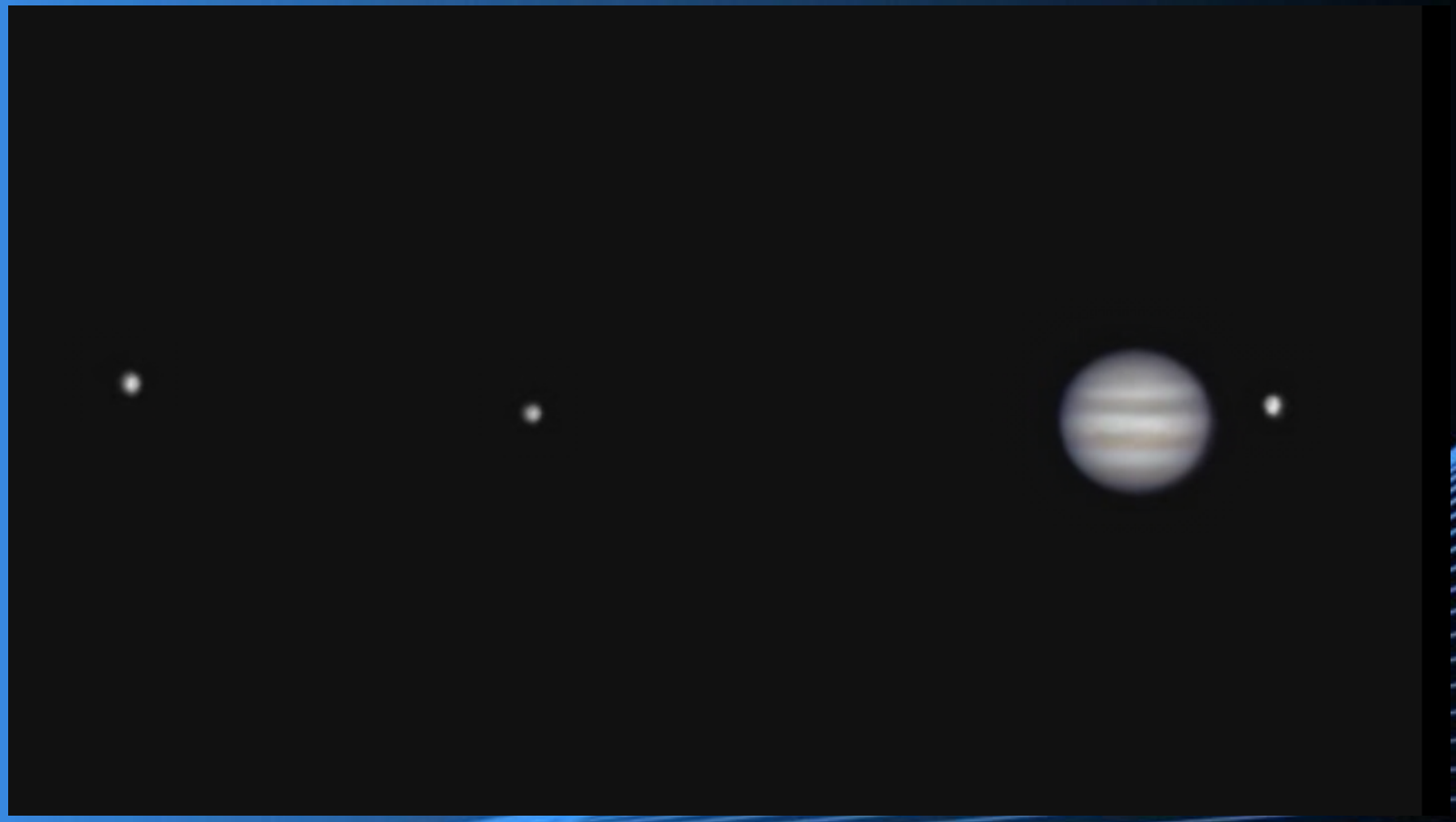
High resolution imaging of mutual events of the Galilean moons 2014/2015

John Sussenbach and Willem Kivits



Willem Kivits

18 October 1951 - 23 February 2016

Siebengewald (NL)

Mercurius 2006

Mutual occultations and eclipses

Every 5.93 years the Earth moves through the equatorial plane of the Jovian system

This leads to mutual occultations and eclipses of the Galilean moons

1.Equipment

-Telescopes: C14 f/25 - f/40 (JS en WK)

- Camera's: QHY5LII (CMOS)
DMK618 (Sony ICX618 chip)

- IR filter: 685 nm

2. Processing of frames

Problems: - dynamic processes -> few frames/time unit
- low signal/noise ratio
- sometimes poor seeing -> distortion

- center with PIPP (https:// sites.google.com/site/astropipp)

- preprocessing with Photoshop (0.6 pixel blur)

- sometimes hand selection

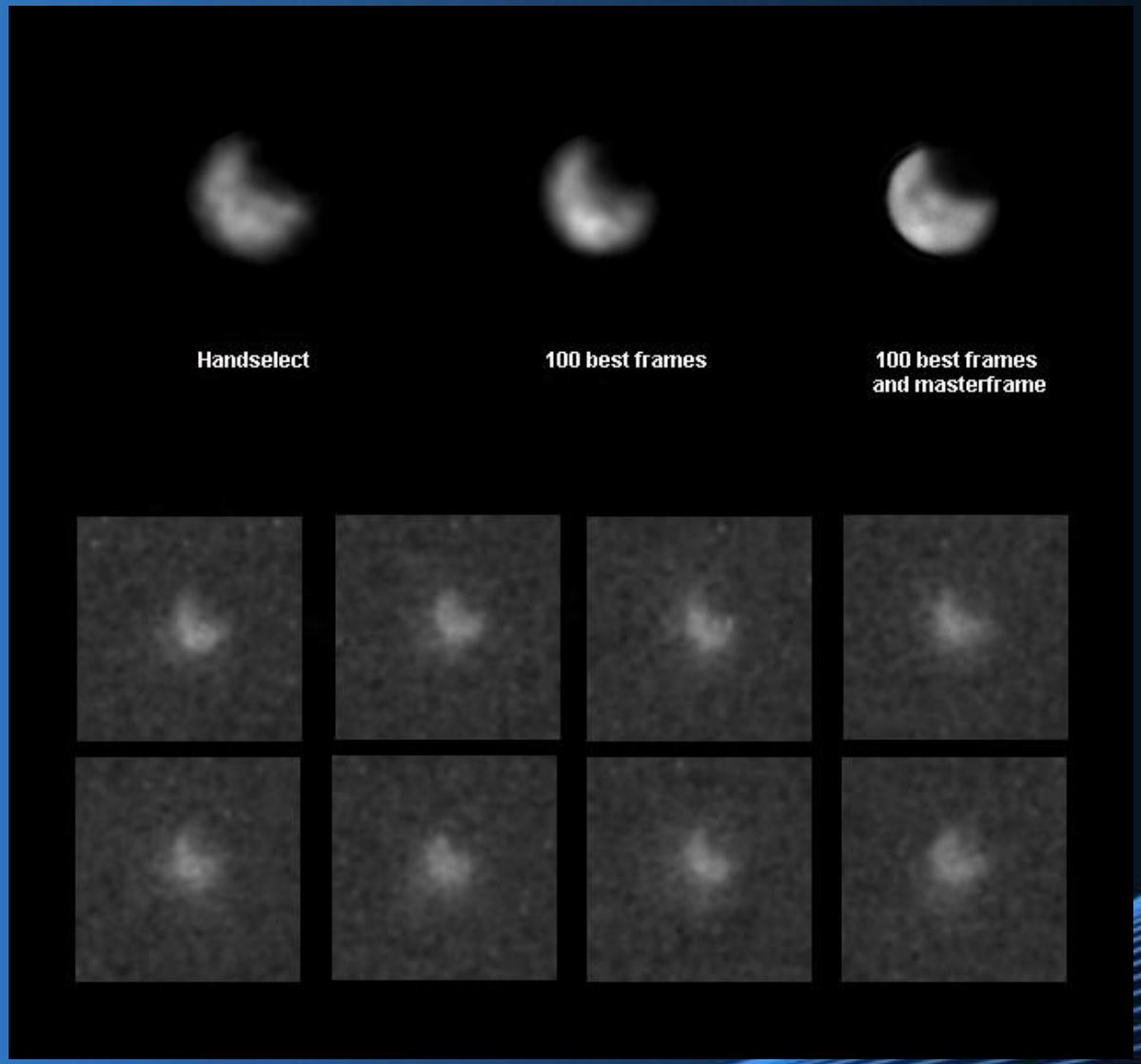
- final processing with Autostakkert!2 and Photoshop

Eclipses of the Jovian moons

Occultation of Io by Callisto
7 January 2015

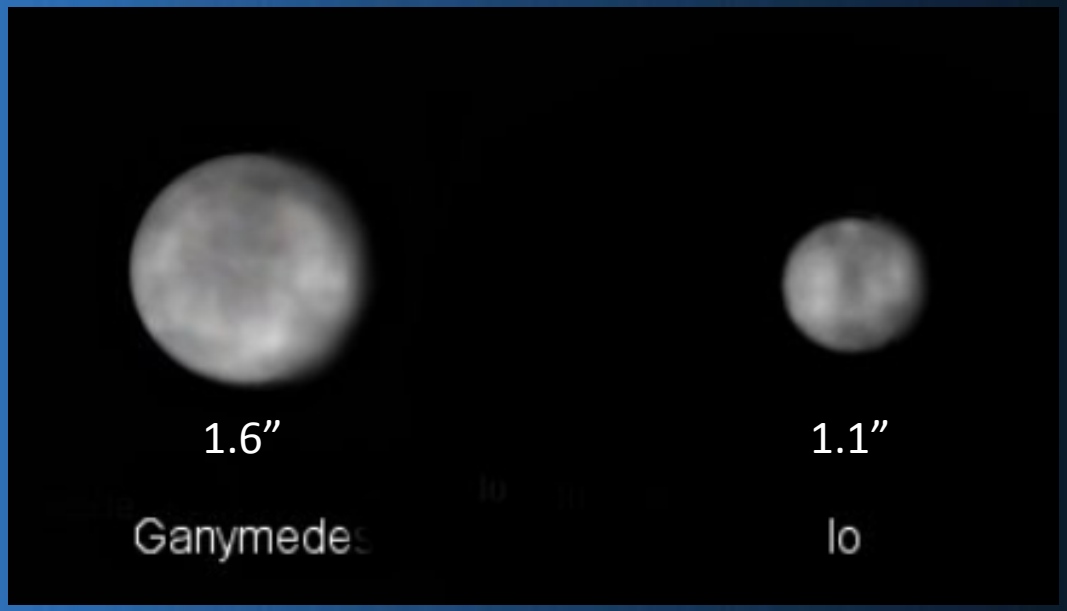
Occultation of Ganymede by Io 12 February 2015

Eclipses of the Jovian moons

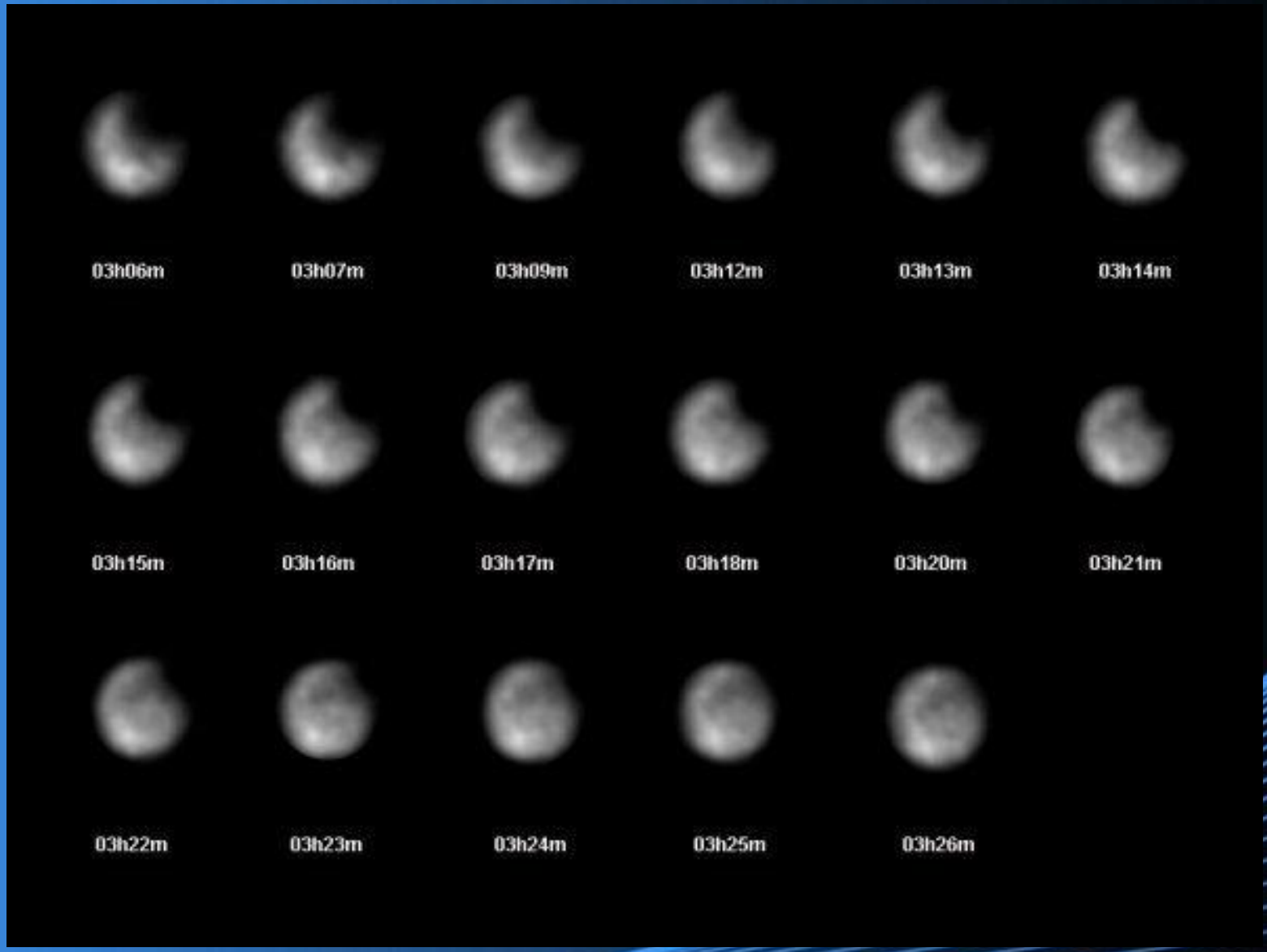


Eclipse of Callisto by Ganymede 25 November 2014

Masterframes

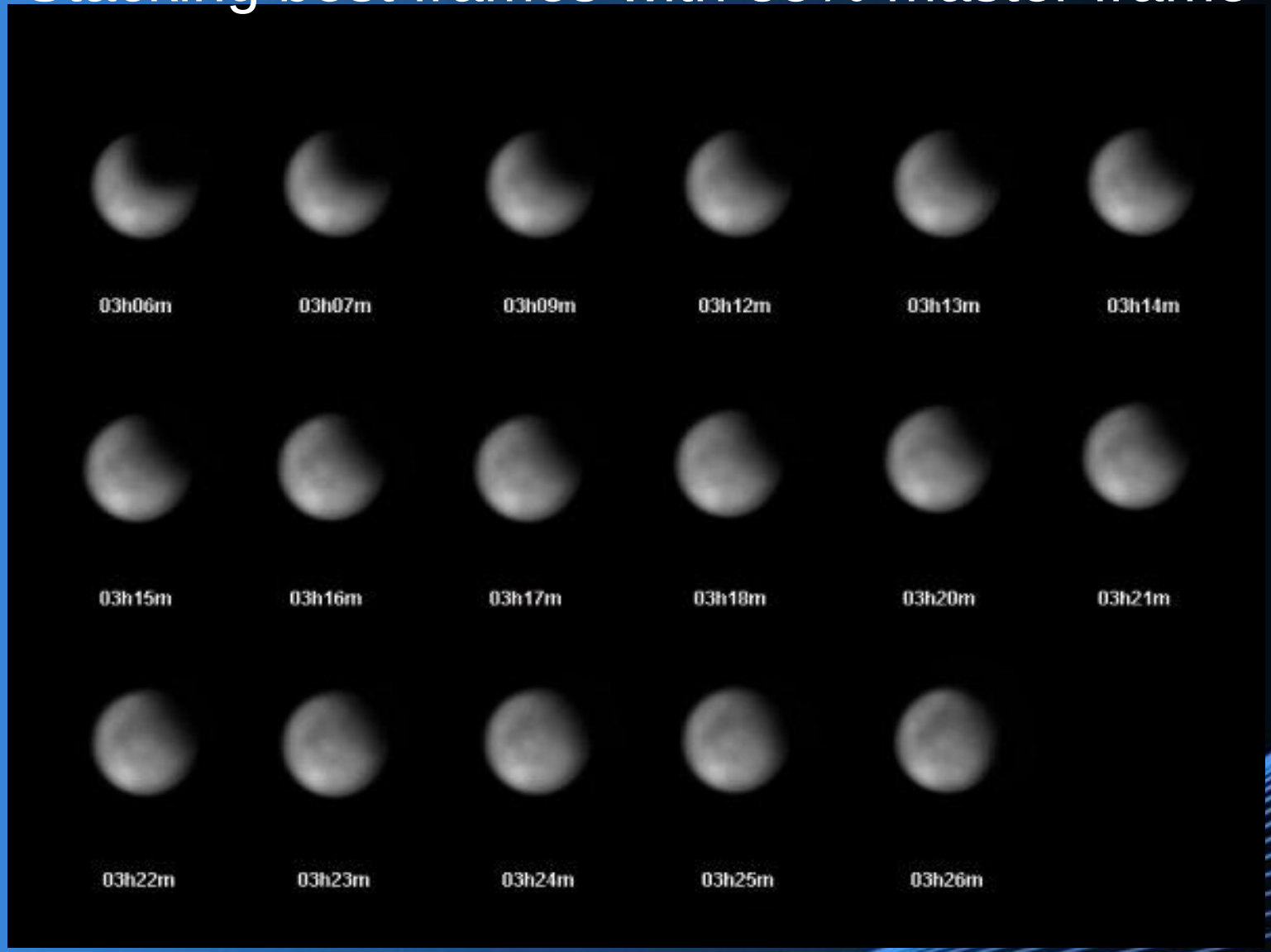


Stacking 100 best frames (hand selection)

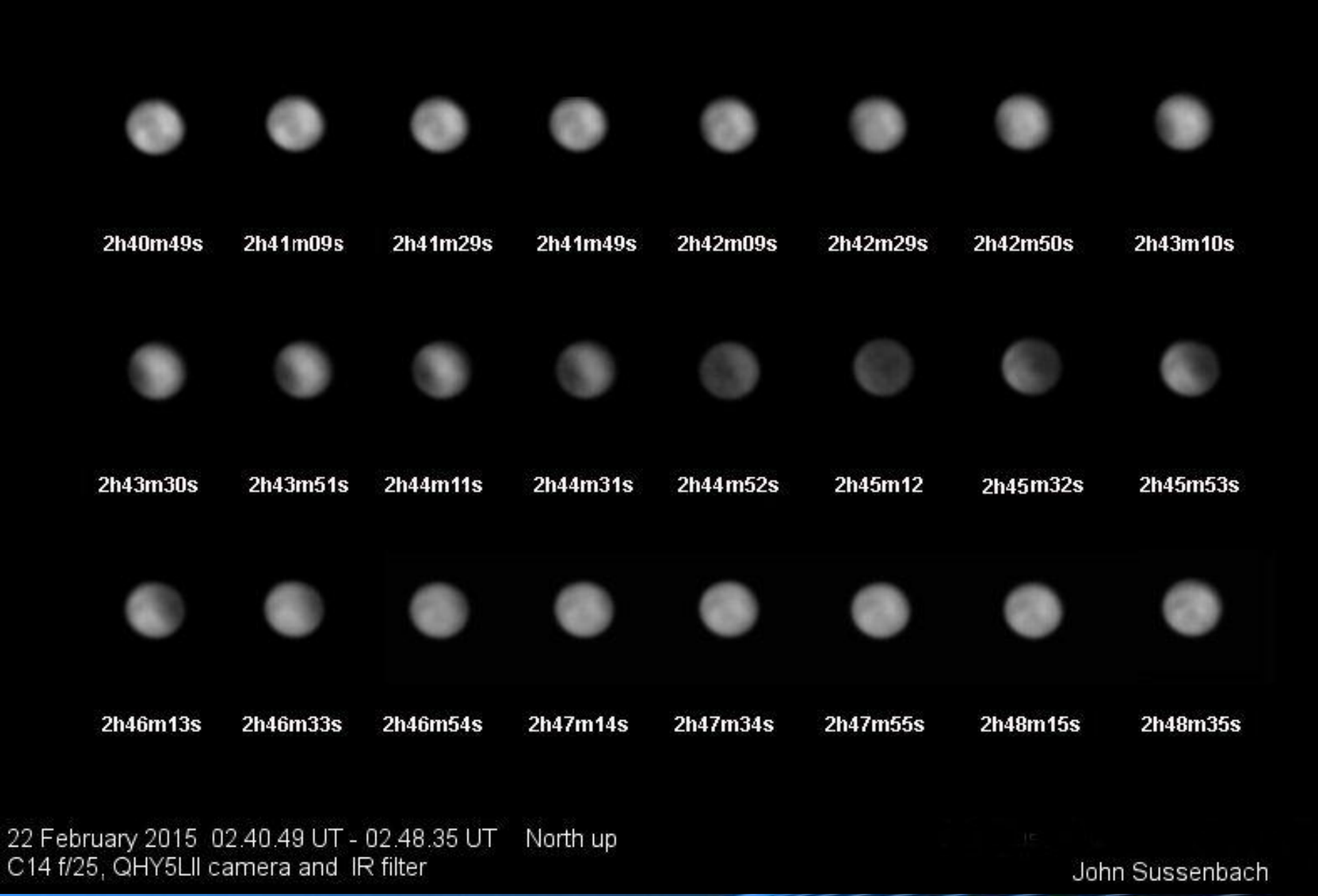


Ganymede eclipses Callisto 25 November 2014

Stacking best frames with 35% master frame



Ganymede eclipses Callisto 25 November 2014



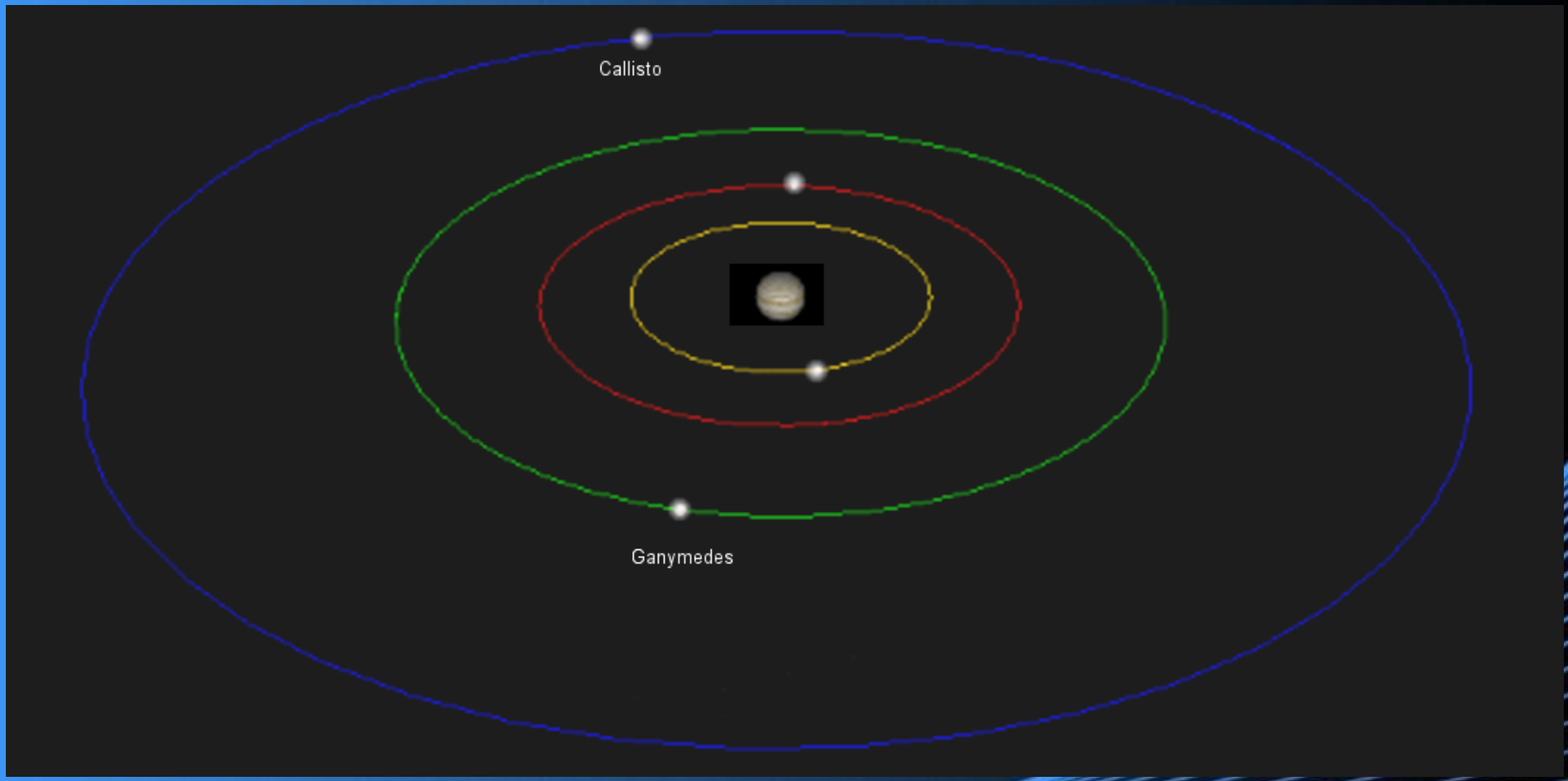
Europa eclipses Io 22 February 2015

Io eclipses Ganymede 13 March 2015 WK

23.15-23.43 UT

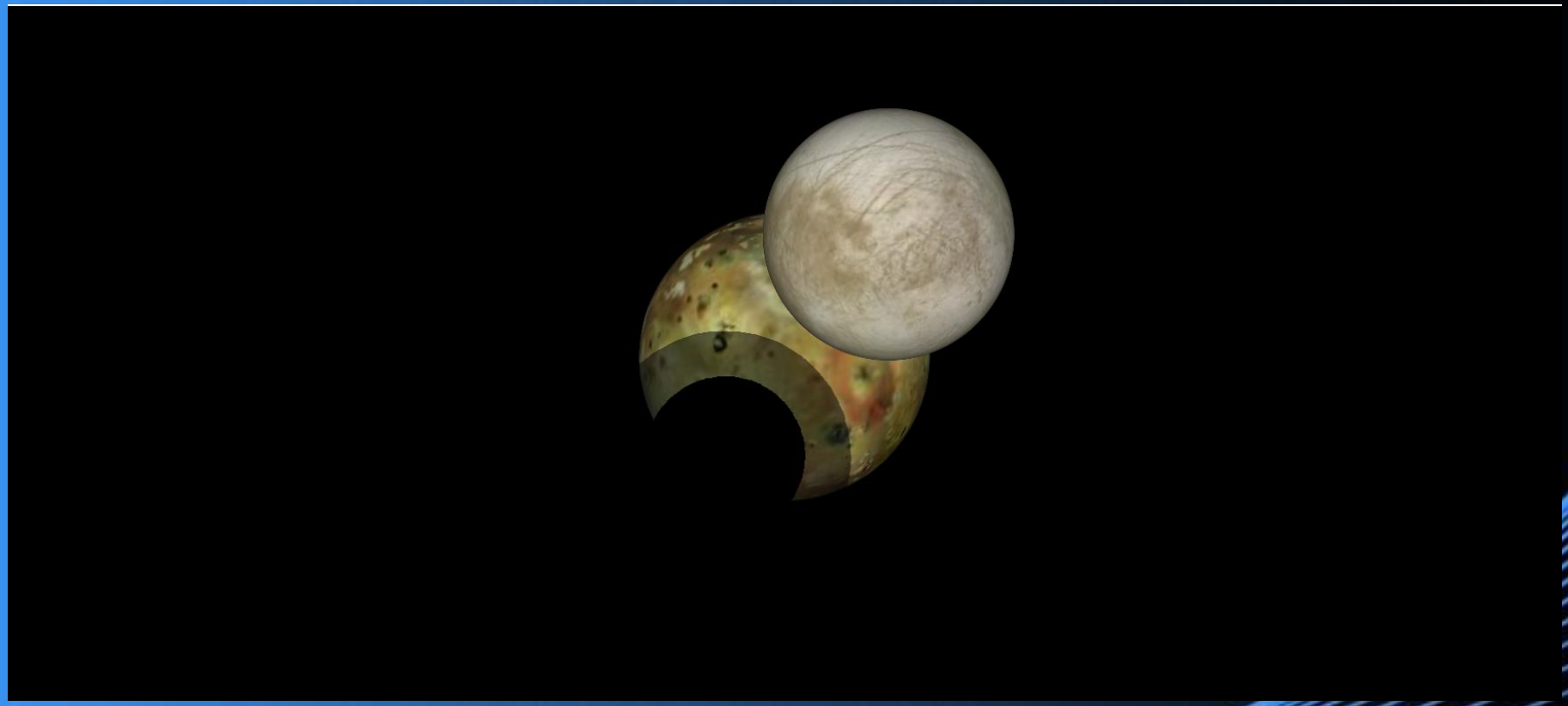
Ganymede eclipses Callisto 2 February 2015 (1)

Ganymede eclipses Callisto 2 February 2015(2)

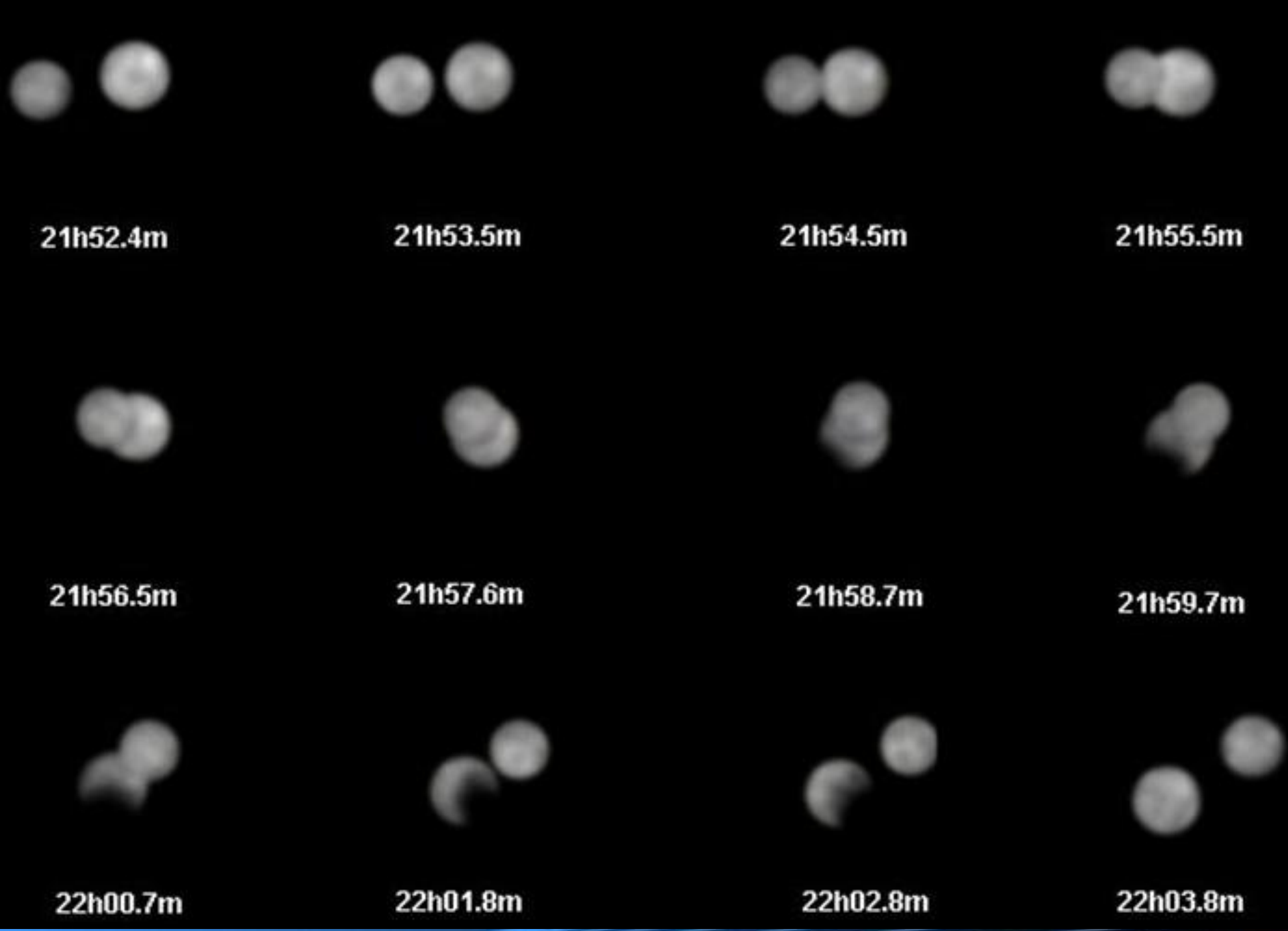


Distance 2.9 million km apart

Europa occults and eclipses Io 7 February 2015

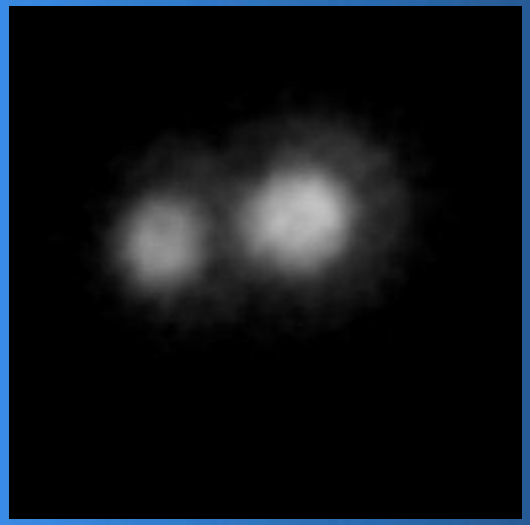


Opposition
6 February 2015 19.00 h UT



Europa occults and eclipses Io 7 February 2015

Europa occults and eclipses Io 7 February 2015



AS2! stack

100 best handpicked

100 best + 35% master

Applications

1. **Precize position/time measurements to improve ephemerides calculations**

   with N. Emelianov (Sternberg Institute, Moscow)

2. **Detection of details on the Galilean moons**

Website: http://www.jsussenbach.nl/New3.htm