



The November 14th, 2014 Stellar Occultation by the TNO 2007 UK₁₂₆

Benedetti-Rossi, G.¹; Sicardy, B.²; Buie, M.³; Braga-Ribas, F.⁴; Vieira-Martins, R.^{1,5};
Camargo, J.I.B.¹; Assafin, M.⁵; Ortiz, J.L.⁶; Desmars, J.^{1,7}; Dias-Oliveira, A.¹
& collaborators

¹ Observatório Nacional, ON/MCTI, Rio de Janeiro – Brazil;

² LESIA, Observatoire de Paris, CNRS UMR 8109, Université Pierre et Marie Curie,
Université Paris-Diderot, Meudon – France;

³ South Western Research Institute, SwRI, Boulder – USA;

⁴ Universidade Tecnológica Federal do Paraná, UTFPR, Curitiba – Brazil;

⁵ Observatório do Valongo, OV/UFRJ, Rio de Janeiro – Brazil;

⁶ Instituto de Astrofísica de Andalucía, CSIC, Granada – Spain;

⁷ IMCCE, Observatoire de Paris, CNRS UMR 8028, Paris – France



Summary

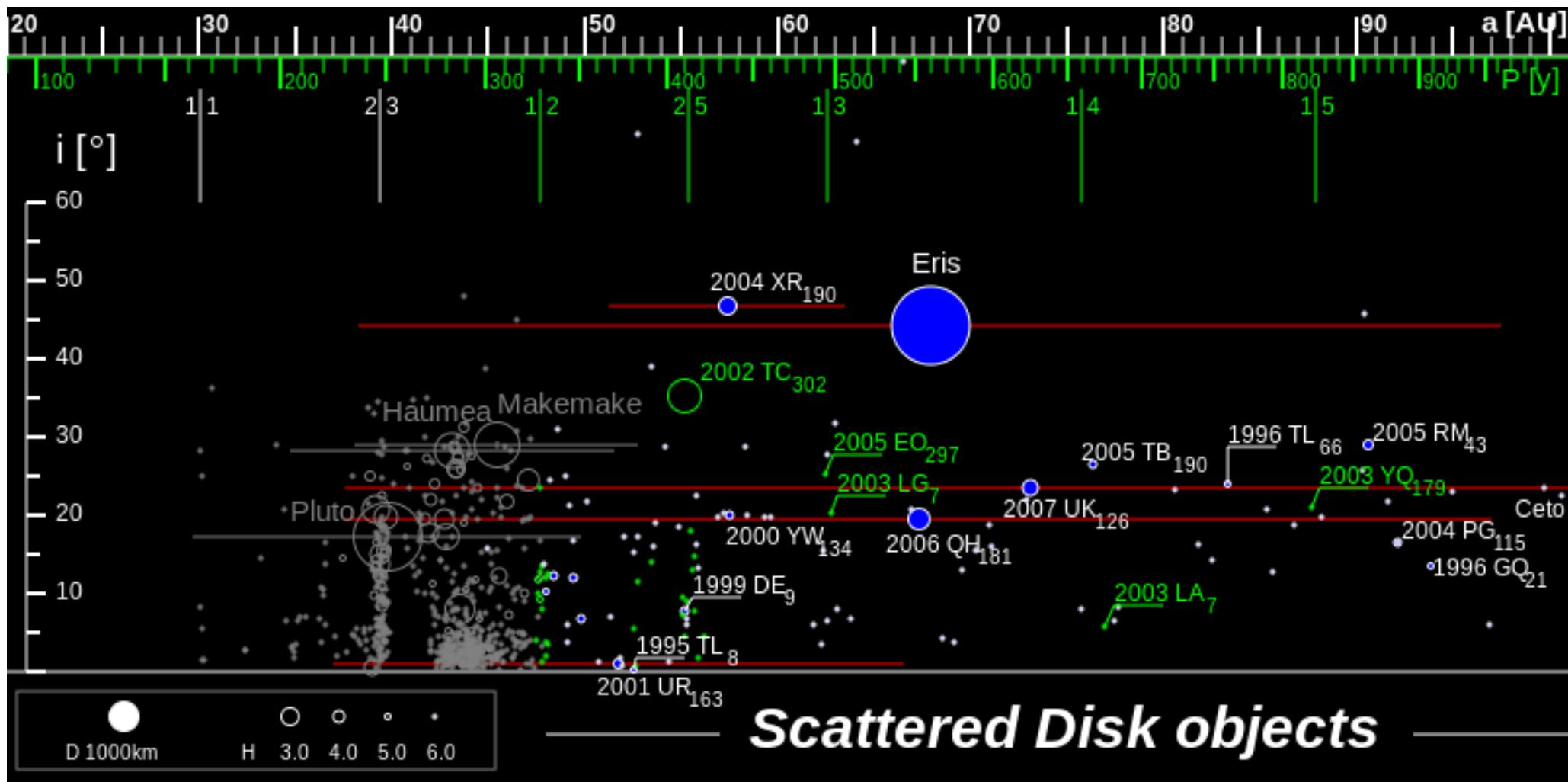
- Introduction
- Occultation (Prediction and Observation)
- Reduction and analysis
- Results
- Conclusion



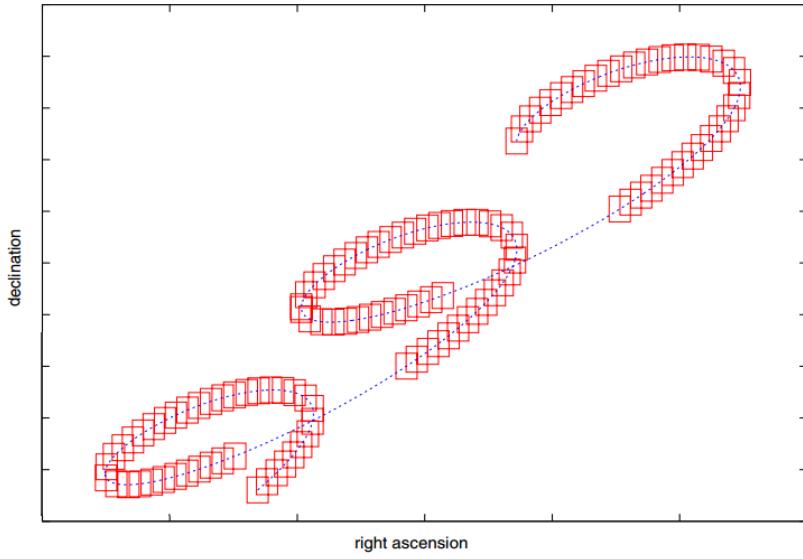
Introduction – Why 2007 UK₁₂₆ ?

- Discovered in oct/2007;
- Belongs to the “scattered disc”;
- Classified as “highly likely” to be a dwarf planet (Mike Brown);
- One of the biggest TNO's up to date;
- Just a few articles about the body...

Introduction – Why 2007 UK₁₂₆?



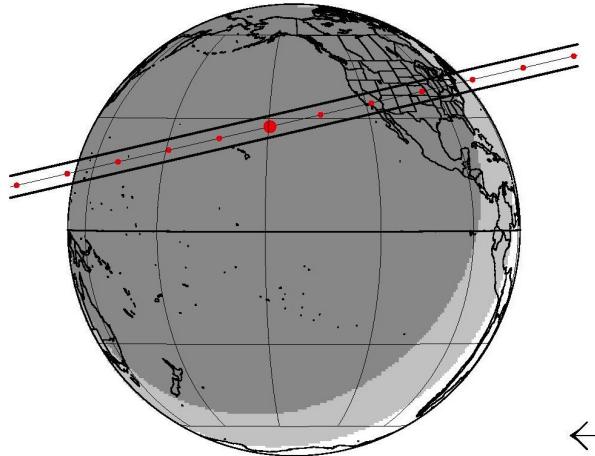
Occultation Prediction



Assafin, M. et al, 2012
Candidate stellar occultations by large trans-
Neptunian objects up to 2015

Camargo, J.I.B. et al, 2014
Candidate stellar occultations by Centaurs and
TNO's up to 2014

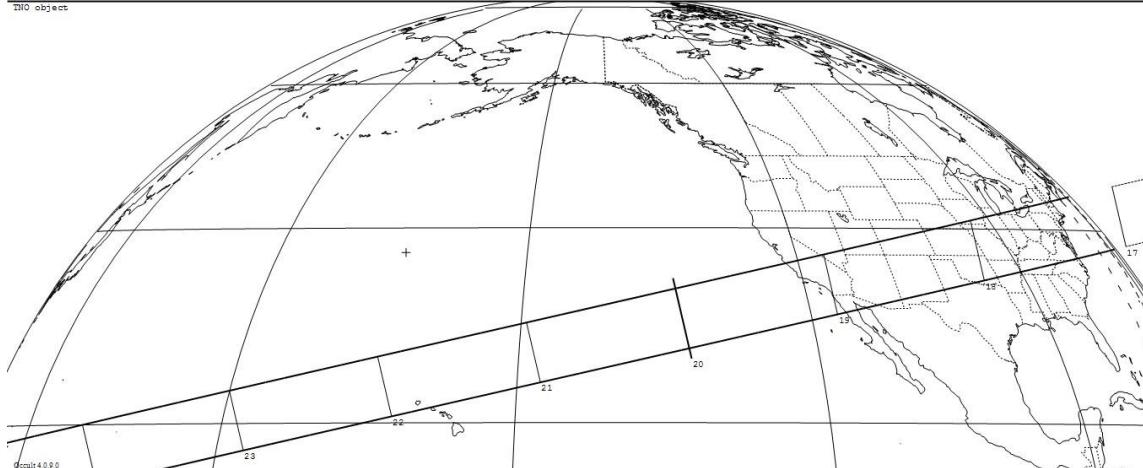
$$\text{Mag R} = 15.74 - \text{Mag B} = 16.22 - \text{Mag V} = 15.60$$



| d | m | year | h:m:s UT | ra | dec | J2000_candidate | C/A | P/A | vel | Delta | R* | K* | long |
|----|----|------|-----------|---------------|-------------|-----------------|--------|--------|-------|-------|------|----|-------|
| 15 | 11 | 2014 | 10 22 37. | 04 29 30.6121 | 0 28 20.905 | 0.097 | 346.92 | -24.45 | 42.57 | 15.8 | 13.9 | | -143. |

0 2007 UK126 occults UK126-star on 2014 Nov 15 from 10h 16m to 10h 26m UT
 Star:
 Mag = 15.6 Mrp = 15.6 Mrv = 15.6
 RA = 4 29 30.62685 (J2000)
 Dec = 0 28 20.742
 (10 days earlier occultation = 0 26 23)
 Prediction of 2014 Nov 3.0

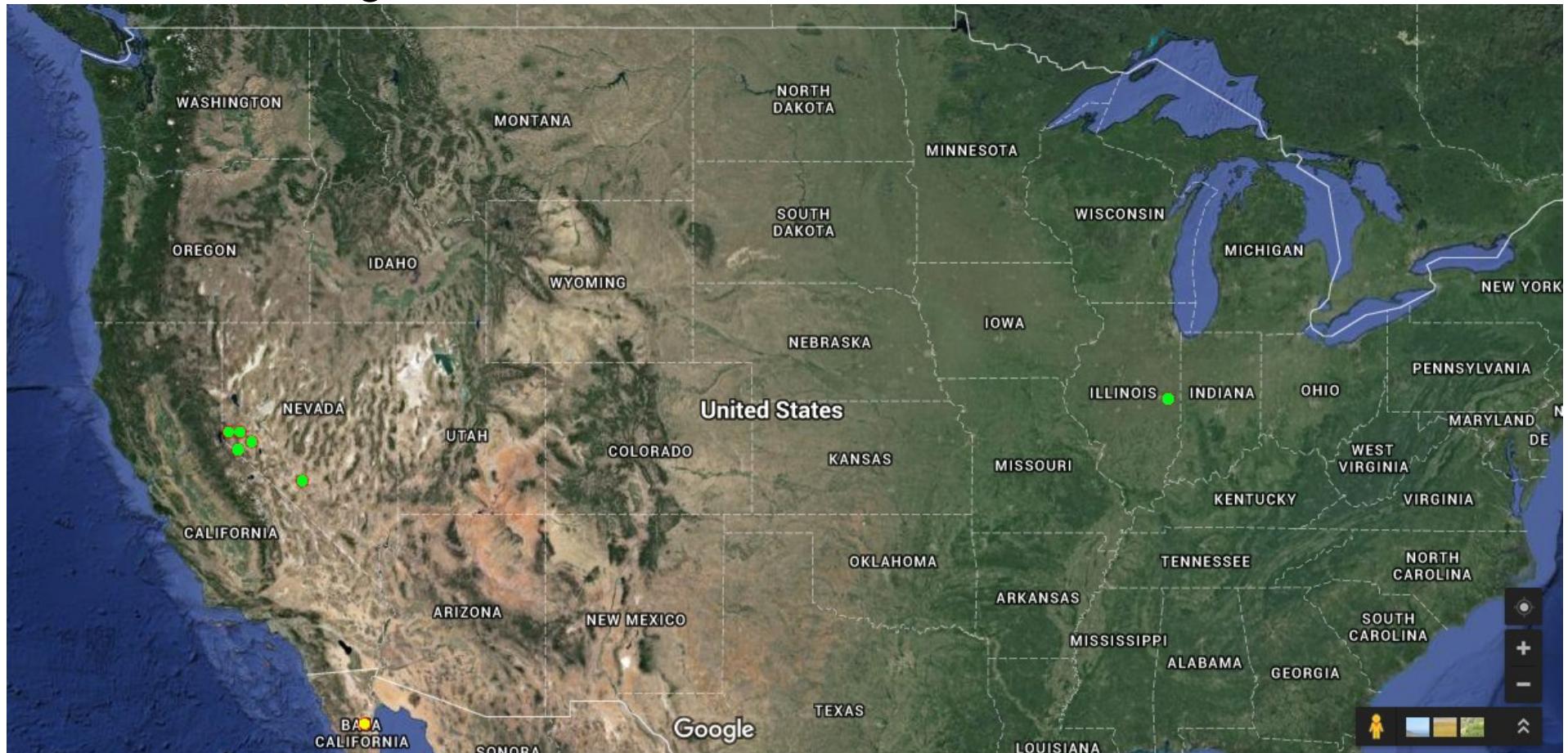
Asteroid:
 Mag = 19.7
 Dist = 5893m, 0.019°
 Parallax = 0.200m
 Hourly dMag = 0.159
 dDec = -0.64°





Occultation Observation

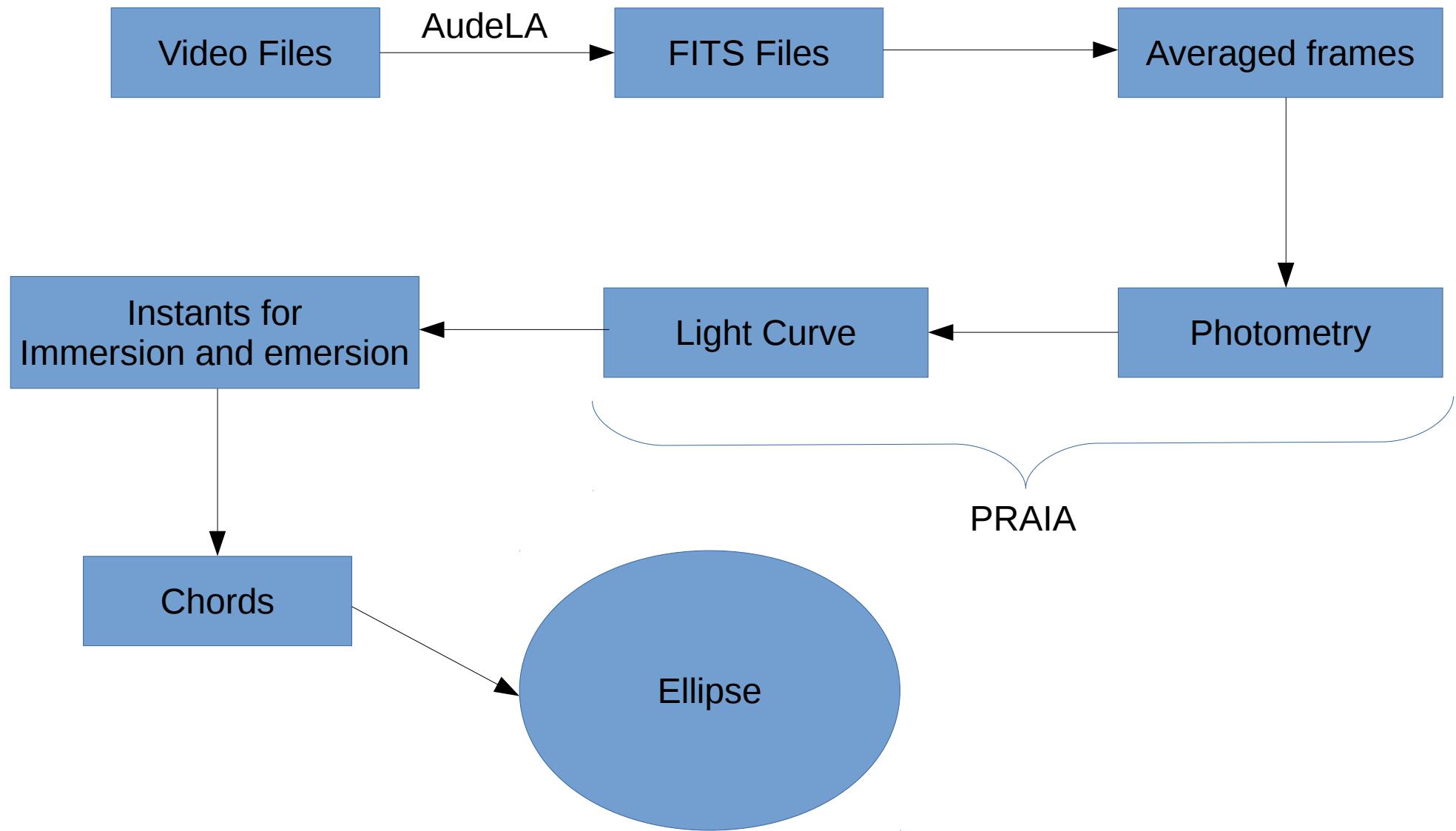
- 14 different sites:
 - 6 → bad weather conditions;
 - 1 → technical problems;
 - 6 → positive detections;
 - 1 → 2 negative detections;



More about the RECON project: **Marc Buie** talk at 11:00 this section!

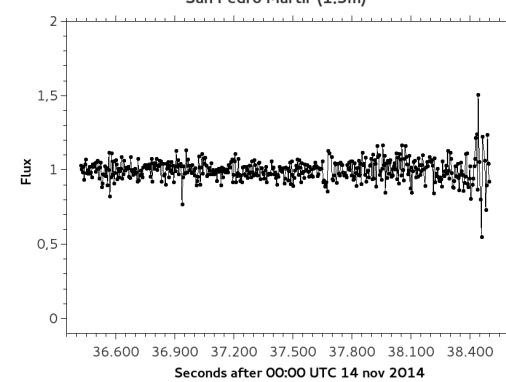
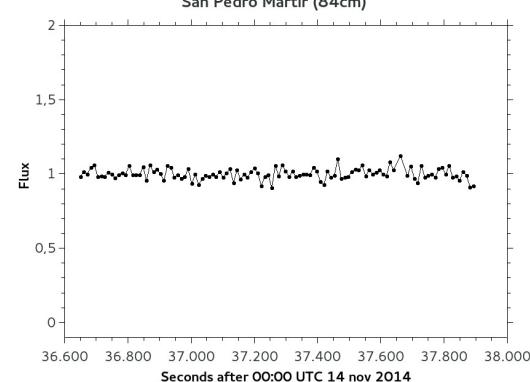
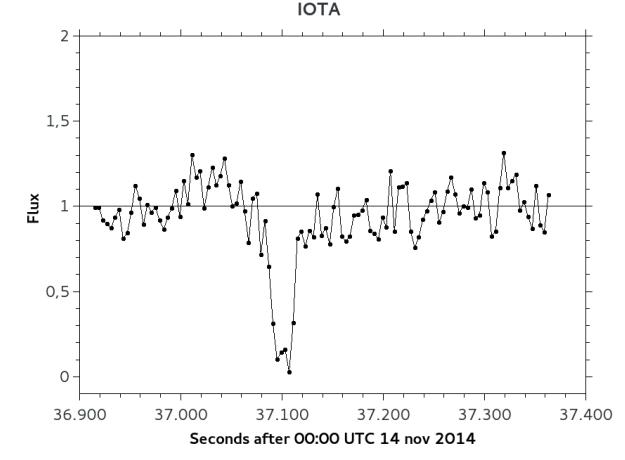
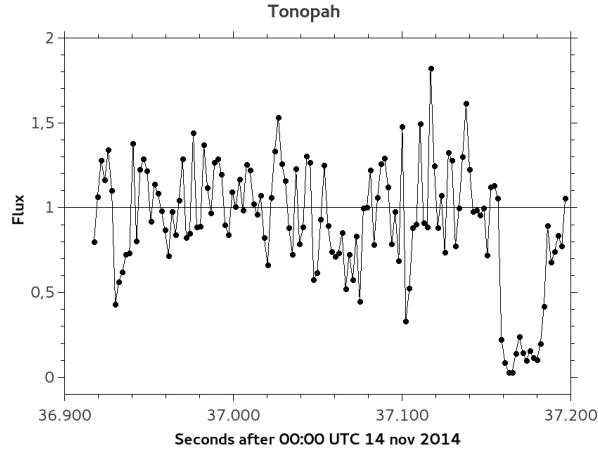
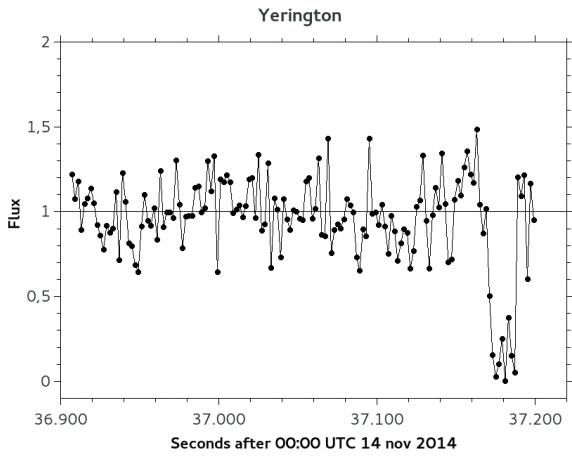
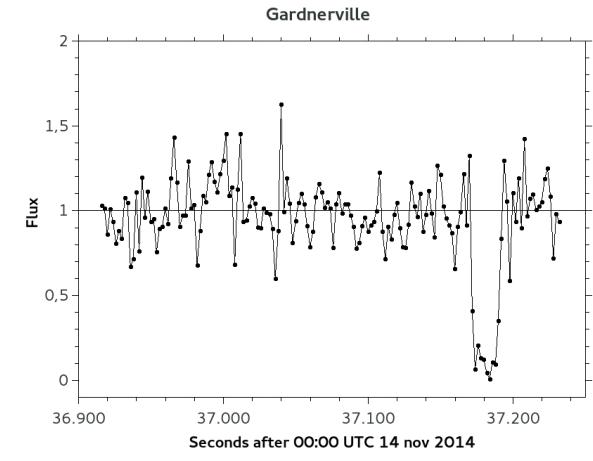
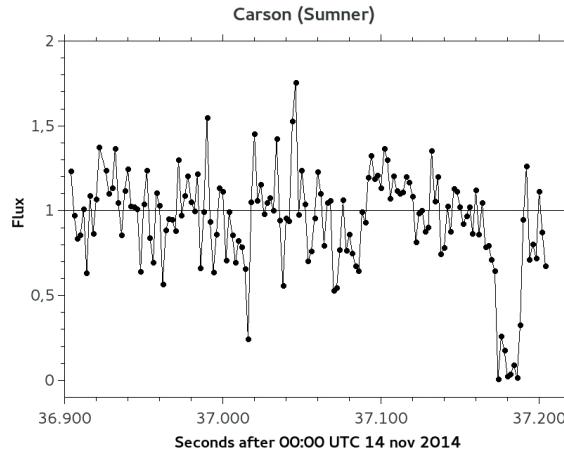
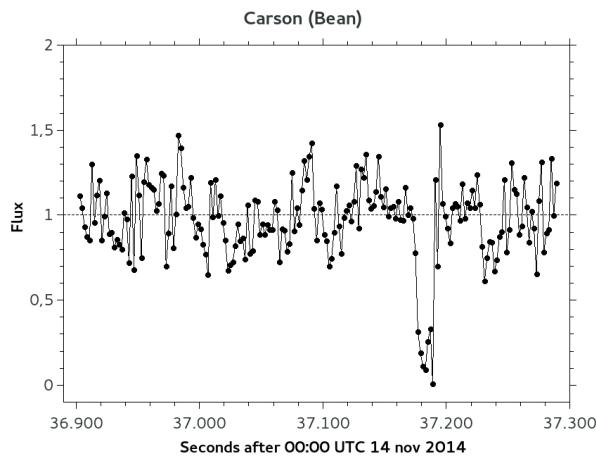


Data Reduction

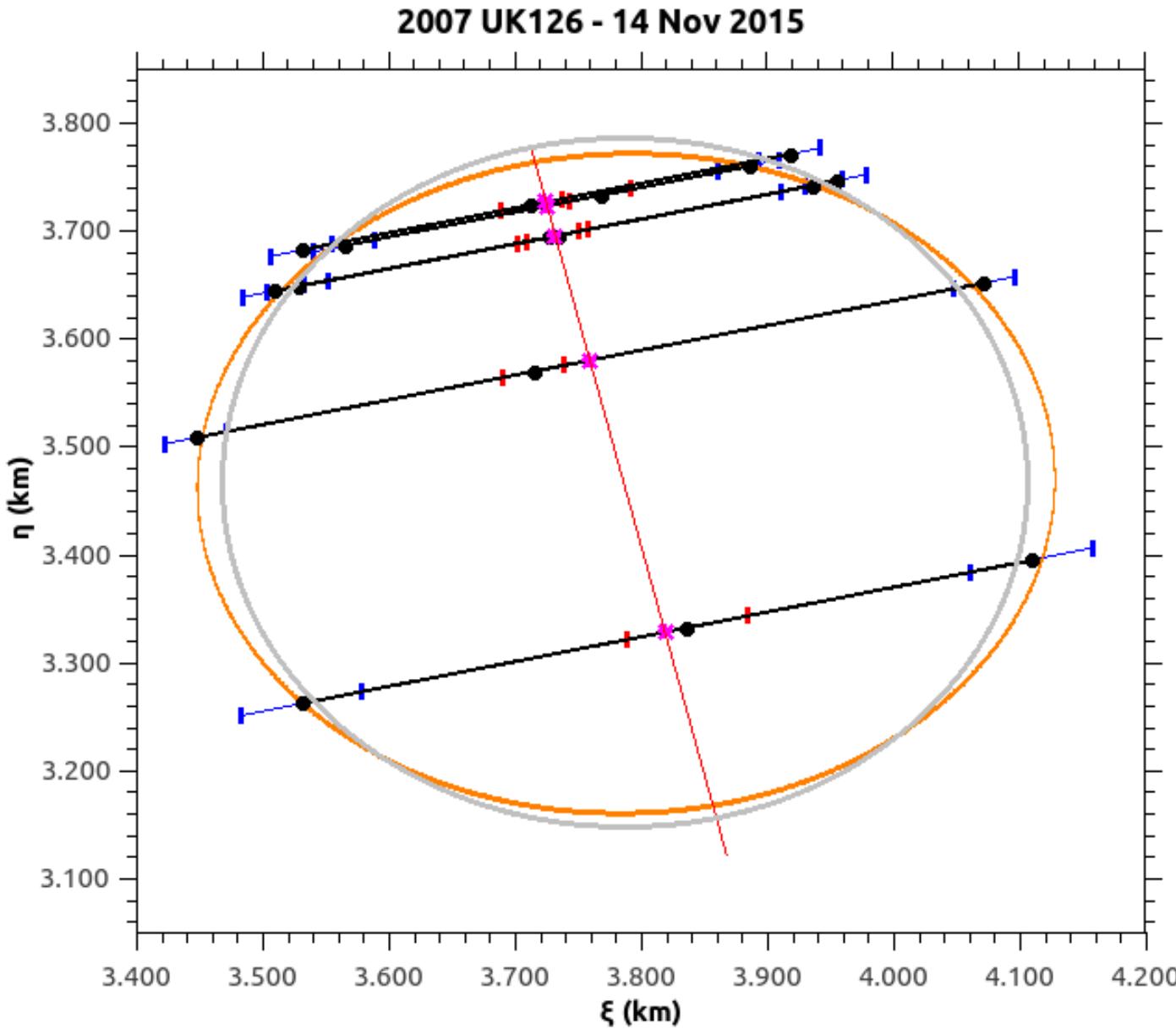




Light Curves



Results



Equatorial Radii:
 305.468 ± 9.023 km

Polar Radii:
 340.551 ± 9.023 km

Flattening:
-0.1149

Position Angle:
9.5408 degrees

Equivalent Radii:
 322.533 ± 9.023 km

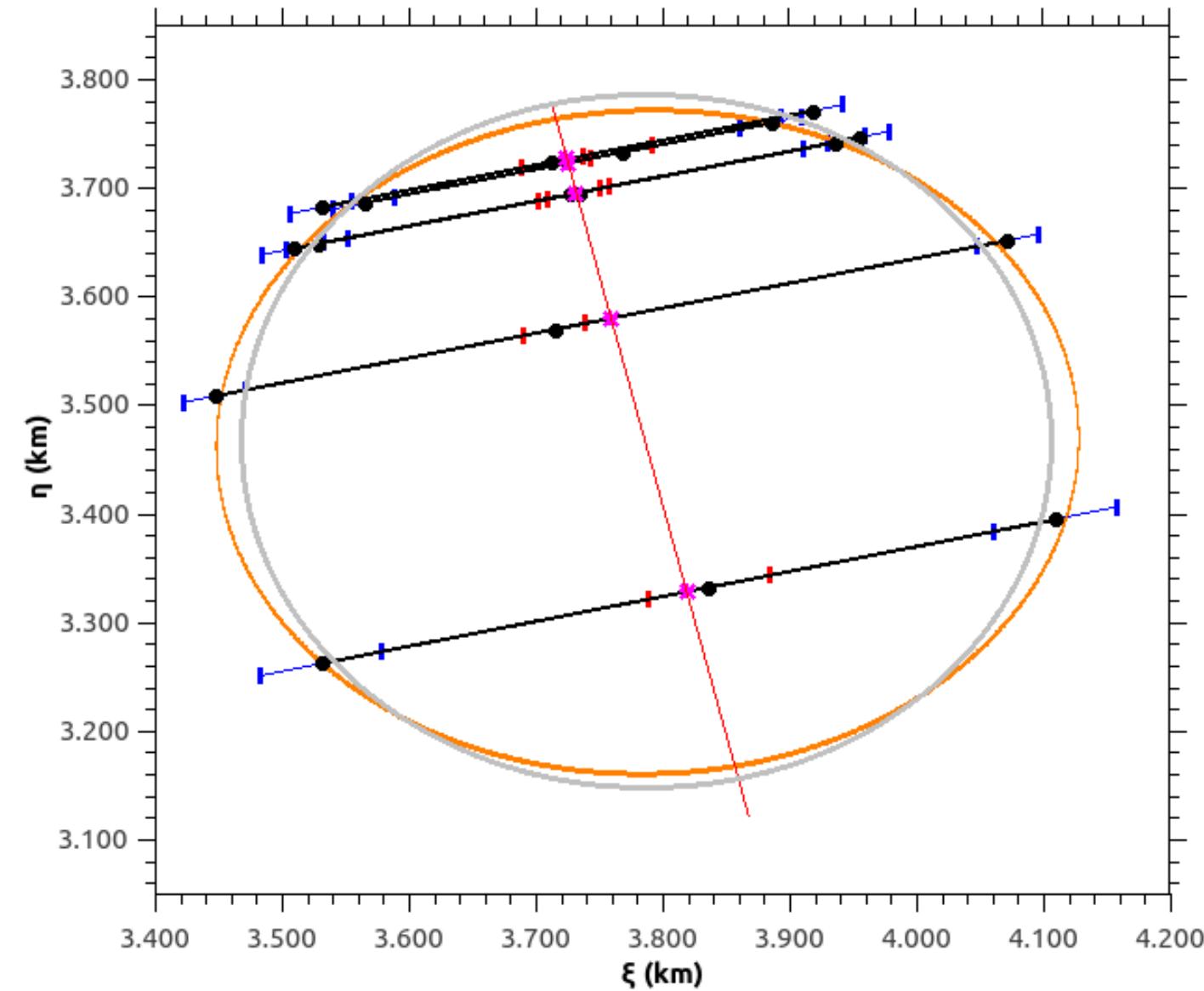
From Literature:

Thirouin, A. et al, 2014
 295 ± 38 km

Santos-Sanz, P. et al 2012
 299.5 ± 38.5

Results

2007 UK126 - 14 Nov 2015



Albedo:

JPL ($H=3.5$)
 0.142 ± 0.01

Santos-Sanz, 2012
($H=3.69$)
 0.169 ± 0.01

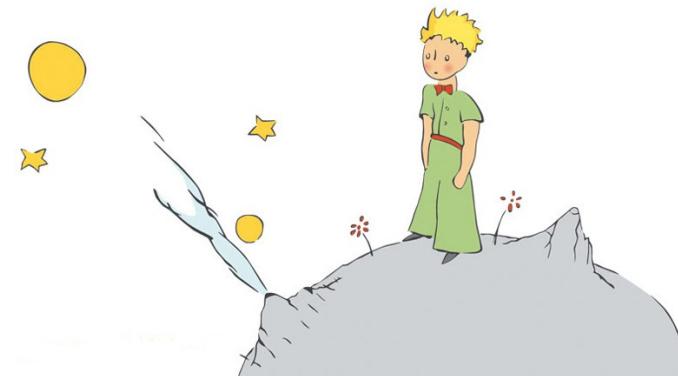
From Literature:

Thirouin, A. et al, 2014
Santos-Sanz, P. et al 2012

$0.167^{+0.058}_{-0.038}$

Conclusion

- Small telescopes (with professional or amateur astronomers) can also provide important data when observing stellar occultations;
- We obtained an equivalent radius of 322.5 km and an Albedo between 0.142 and 0.169 for the TNO 2007 UK₁₂₆;
- The TNO does not show any evidence of having an atmosphere;
- Further detailed analysis can provide its density;
- GAIA: Let's wait for the next occultations!



“What makes the desert beautiful is that it hides a well somewhere...”
Le petit prince – Antoine de Saint Exupéry