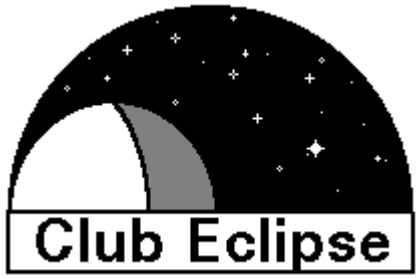
ESOP
B3 Session Francophone
Introduction

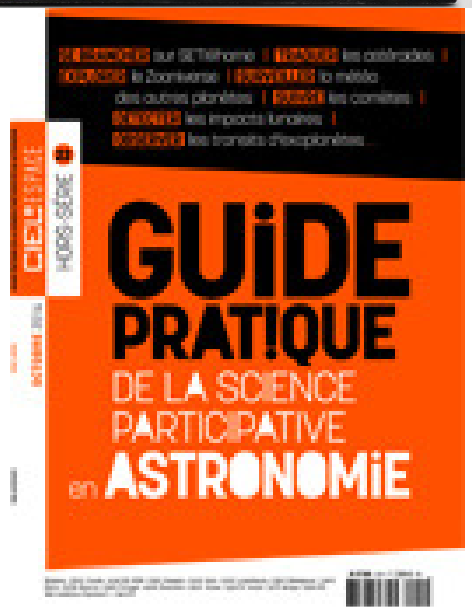
The french delegation

Thierry Midavaine



Pro Am collaborations

- This is a very active topic in most of all amateur astronomer meeting
- Astronomical topics are among the oldest example of Citizen Science Projects
- An up-dated table gathering all the projects…
- Published in l'Astronomie in 2009 and still up dated.



28-30/3/14 WETO 2014 campagne PheMu

- 4eme Week-end Technique Occultations
- Club Eclipse - IMCCE
- Observatoire de Paris


La production des phénomènes
Prédire les phénomènes mutuels nécessite de très bonnes éphémérides
Il faut éviter de prédire des phénomènes qui ne se produiront pas!


Thierry Midavaine
Gerald Mauboussin
Emmanuel Brochard
Didier Lanoiselée
Patrick Sogorb
Débora Berjol
Pascal André
Martine Castet
Jean-Marie Vugnon
Bernard Christophe
Felipe Braga Ribas
Nicolas Thouvenin
Jean-Paul Godard
Cesar Valencia
Pierre Barroy
Eleonore Saquet
Nathan Vais
Laurent Vais
Arnaud Leroy
Sopharith Teb
Guy Brabant
Emmanuel Milcent
Emmanuel Conseil
Jean-Jacques Broussat
Vincent Robert
Christian Drillaud
Jean-Eudes Arlot
Thierry Aussourd
Eberhard Bredner
Patrick Baroni
Ddaniel Verilhac
Pierre Traverse

What's new : Time accy

- 1 ms absolute time stamping is achieved
- 100µs could be achievable, it is today a software limitation
- Standard GPS may bring 10µs accuracy. Is it usefull ?
- For which sensor ? Which application ?
- Required a qualification test for the complete acquisition chain (WETO or a bench)
- A time ref source in the sky ?
  - Jupiter satellite, Phemu
  - a Pulsar,
  - a beacon on a geostationary satellite ?
- A Post Gaia topic ?

CMOS arrays world wide dissemination

- RS cameras
- GS cameras

- Does a smart phone could be the receiver ?

AT60, T62AQ, TJMS,...

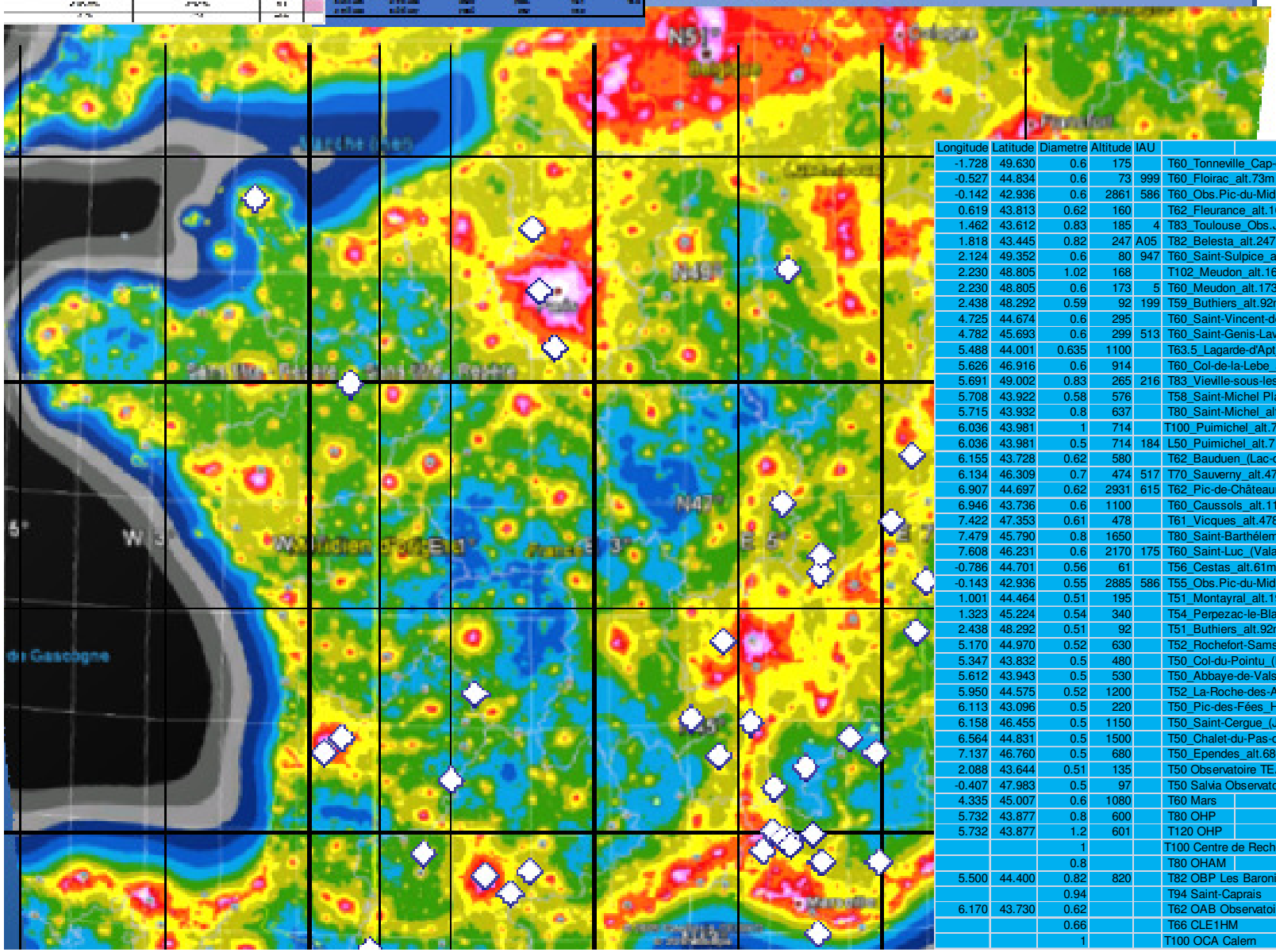
Carte de France des télescopes > 50cm

Fond de carte : Atlas de la Pollution Lumineuse Fabio Falchi et all 2016

http://dmd.wsl.ch/potsdam.de/content/NewWorldAtlas_ArtificialSkyBrightness.kmz

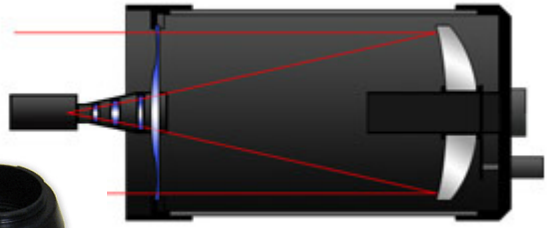
http://advances.sciencemag.org/content/2/6/e1600377

http://www.starlight2007.net/index.php?option=com_content&view=article&id=397%3Athe-new-atlas&catid=59%3Anews-features&lang=en



Longitude	Latitude	Diametre	Altitude	IAU	
-1.728	49.630	0.6	175		T60_Tonneville_Cap-de-La-Hague_alt.175m (LUDIVER)
-0.527	44.834	0.6	73	999	T60_Floirac_alt.73m (Obs.de Bordeaux) UAI999
-0.142	42.936	0.6	2861	586	T60_Obs.Pic-du-Midi_alt.2874m (AT60)
0.619	43.813	0.62	160		T62_Fleurance_alt.160m (Hameau des Etoiles)
1.462	43.612	0.83	185	4	T83_Toulouse_Obs.Jolimont_alt.185m (SAP) UAI004
1.818	43.445	0.82	247	A05	T82_Belesta_alt.247m (ADAGIO) UAIA05
2.124	49.352	0.6	80	947	T60_Saint-Sulpice_alt.80m (B.Christophe) UAI947
2.230	48.805	1.02	168		T102_Meudon_alt.168m (Observatoire de Paris)
2.230	48.805	0.6	173	5	T60_Meudon_alt.173m (Observatoire de Paris) UAI005
2.438	48.292	0.59	92	199	T59_Buthiers_alt.92m (Obs.J.M.Salomon ANSTJ)
4.725	44.674	0.6	295		T60_Saint-Vincent-de-Barrès_alt.295m (M.Peyro)
4.782	45.693	0.6	299	513	T60_Saint-Genis-Laval_Obs.Lyon_alt.299m (Soc.Astron. Lyon) UAI5
5.488	44.001	0.635	1100		T63.5_Lagarde-d'Apt_alt.1100m (SIRENE)
5.626	46.916	0.6	914		T60_Col-de-la-Lebe_alt.914m (Club 'Astro-Nature' du Valromey)
5.691	49.002	0.83	265	216	T83_Vieville-sous-les-Côtes_alt.265m (Obs. Côtes-de-Meuse) UAI21
5.708	43.922	0.58	576		T58_Saint-Michel Plateau-du-Moulin alt.576m (Centre d'Astronomie)
5.715	43.932	0.8	637		T80_Saint-Michel_alt.637m (CNRS Obs.Haute-Provence) UAI511
6.036	43.981	1	714		T100_Puimichel_alt.714m (VALMECA)
6.036	43.981	0.5	714	184	L50_Puimichel_alt.714m (VALMECA) UAI184
6.155	43.728	0.62	580		T62_Bauduen_(Lac-de-Sainte-Croix)_alt580m (Assoc.'Astro-Terre')
6.134	46.309	0.7	474	517	T70_Sauverny_alt.474m (Obs. Genève) UAI517
6.907	44.697	0.62	2931	615	T62_Pic-de-Châteaurenard_Saint-Véran_alt.2931m (Astroqueyras) U
6.946	43.736	0.6	1100		T60_Caussols_alt.1100m (Assoc.'Science pour tous')
7.422	47.353	0.61	478		T61_Vicques_alt.478m (Soc. Jurassienne d'Astronomie)
7.479	45.790	0.8	1650		T80_Saint-Barthélemy_alt.1650m (Astron. Vallée d'Aoste)
7.608	46.231	0.6	2170	175	T60_Saint-Luc_(Valais)_alt.2170m (Obs.F.X.Bagnoud) UAI175
-0.786	44.701	0.56	61		T56_Cestas_alt.61m (Assoc. Astronomie-Espace-Découverte)
-0.143	42.936	0.55	2885	586	T55_Obs.Pic-du-Midi_alt.2885m (OMP) UAI586
1.001	44.464	0.51	195		T51_Montayral_alt.195m (Obs. Groupe d'Astron. Populaire 'GAP47')
1.323	45.224	0.54	340		T54_Perpezac-le-Blanc_alt340m (Assoc. Astron. du Limousin)
2.438	48.292	0.51	92		T51_Buthiers_alt.92m (Obs.J.M.Salomon ANSTJ)
5.170	44.970	0.52	630		T52_Rochefort-Samson_(Vercors)_alt.630m (Club 'Alpha Centaure')
5.347	43.832	0.5	480		T50_Col-du-Pointu_(Luberon)_alt.480m (??)
5.612	43.943	0.5	530		T50_Abbaye-de-Valsaintes_Simiane-la-Rotonde _alt.530 m (??)
5.950	44.575	0.52	1200		T52_La-Roche-des-Arnauds_alt.1200m (Assoc.'Copernic' Gap)
6.113	43.096	0.5	220		T50_Pic-des-Fées_Hyères_alt.220m (Obs. du Pic des Fées)
6.158	46.455	0.5	1150		T50_Saint-Cergue_(Jura)_alt.1150m (Soc.Astron. de Genève)
6.564	44.831	0.5	1500		T50_Chalet-du-Pas-du-Loup__alt.1500m (Centre d'Astron. du Briançc
7.137	46.760	0.5	680		T50_Ependes_alt.680m (Fondation et Obs. Robert-A.Naef)
2.088	43.644	0.51	135		T50 Observatoire TEAM's Cuq Les Vielmur
-0.407	47.983	0.5	97		T50 Salvia Observatory
4.335	45.007	0.6	1080		T60 Mars
5.732	43.877	0.8	600		T80 OHP
5.732	43.877	1.2	601		T120 OHP
		1			T100 Centre de Recherche Astronomique de Lyon
		0.8			T80 OHAM
5.500	44.400	0.82	820		T82 OBP Les Baronies
		0.94			T94 Saint-Caprais
6.170	43.730	0.62			T62 OAB Observatoire Astronomique de Bauduen
		0.66			T66 CLE1HM
		1			T100 OCA Calern

Low F/Number Assy



F/2 -F/3

- SC Hyperstar
  - C14 Hyperstar

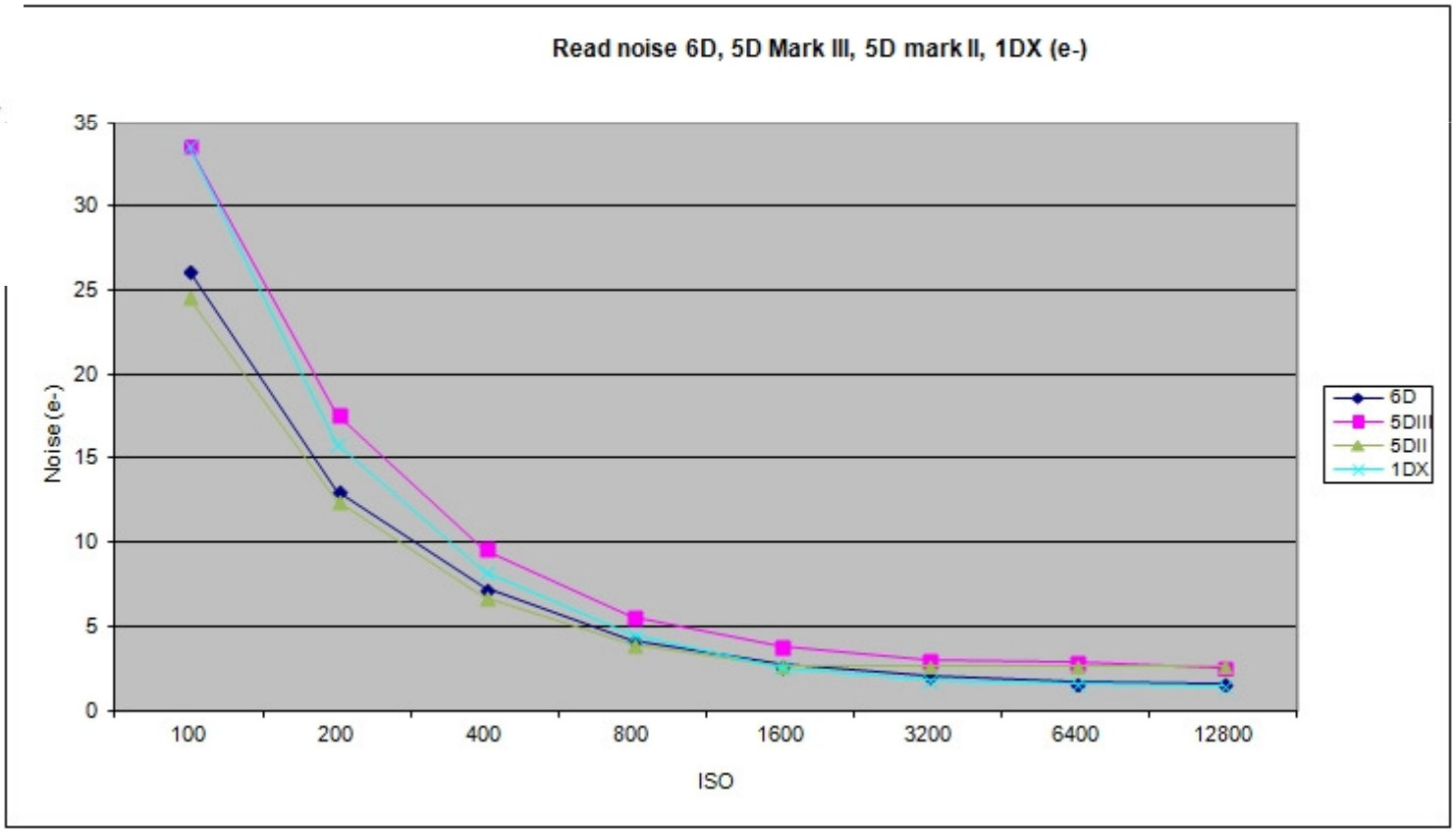
- Newton corrector at prime focus
  - Claudine Rinner Michel Ory

- RC with corrector at prime focus
  - Astrosib

Meaningfull with pixel shrinking

Focal plane arrays : the end of CCD ?

- Why CMOS arrays ?
  - 4T give lower noise, parallel column ADCs give high speed and high frame rate, random access to the pixel or ROI at higher subframe rate, RS with CDS
  - 5T for global shutter, 7T global shutter with CDS
  - Canon 6D is a 4T CMOS 1.7 e rms noise at 6400 ISO (Thierry Legault)



Astronomy & Astrophysics manuscript no. phemu15
January 24, 2017

The PHEMU15 catalog and astrometric results of the Jupiter's Galilean satellite mutual occultation and eclipse observations made in 2014-2015.⋆,⋆⋆

E. Saquet[1,2], N. Emelyanov[3,2], V. Robert[1,2], J.-E. Arlot[2], P. Anbazhagan[4], J. Bardecker[5], A.A. Berezhnoy[3], M. Bretton[6], C. Calderon[7], F. Campos[8], L. Capannoli[9], B. Carry[2], M. Castet[10], Y. Charbonnier[11], M.M. Chernikov[12], A. Christou[13], F. Colas[2], J.-F. Coliac[14], G. Dangl[15], O. Dechambre[16], M. Delcroix[17], A. Dias-Oliveira[18], C. Drillaud[16], Y. Duchemin[2], R. Dunford[19], P. Dupouy[20], C. Ellington[21], P. Fabre[11], V.A. Filippov[22], J. Finnegan[13], S. Foglia[23], D. Font[6], B. Gaillard[10], G. Galli[23], J. Garlitz[23], A. Gasmi[9], D. Gault[25], K. Gazeas[26], T. George[27], S.Y. Gorda[28], D.L. Gorshanov[29], C. Gualdoni[30], K. Guhl[31], K. Halir[32], W. Hanna[33], X. Henry[11], D. Herald[34], G. Houdin[35], Y. Ito[36], I.S. Izmailov[29], J. Jacobsen[37], A. Jones[38], S. Kamoun[39], E. Kardasis[40], A.M. Karimo[22], M.Y. Khovritchev[29], A.M. Kulikova[29], J. Laborde[20], V. Lainey[2], M. Lavayssiere[20], P. Le Guen[11], A. Leroy[10], B. Loader[33], A.Y. Lyashenko[29], P.G. Lyssenko[22], N. Maigurova[41], J. Manek[42], A. Marchini[43], T. Midavaine[44], J. Montier[45], K.N. Naumov[29], A. Nedelcu[46], J. Newman[47], J.M. Ohlert[48], A. Oksanen[49], H. Pavlov[50], E. Petrescu[51], A. Pomazan[41], M. Popescu[46], A. Pratt[52], V.N. Raskhozhev[12], J.-M. Resch[11], D. Robilliard[45], E. Roschina[29], E. Rothenberg[53], M. Rottenborn[54], S.A. Rusov[29], F. Saby[11], L.F. Saya[9], G. Selvakumar[4], F. Signoret[55], V.Y. Slesarenko[29], E.N. Sokov[29], J. Soldateschi[42], A. Sonka[45], G. Soulie[20], J. Talbot[56], V.G. Tejfel[21], W. Thuillot[2], B. Timerson[57], R. Toma[13], S. Torsellini[9], P. Traverse[58], M. Unwin[59], T. Vagelis[60], F. Van Den Abbeel[61], H. Vandenbruaene[62], R. Vasundhara[4], Y.I. Velikodsky[63], A. Vienne[64], J. Vilar[65], J.-M. Vugnon[66], N. Wuensche[67], and P. Zeleny[68]

(Affiliations can be found after the references)

Received XX Xxxx 2017 / Accepted XX Xxxx 2017

ABSTRACT

Aims. During the 2014-2015 mutual events season, the IMCCE, Paris France, and the Sternberg Astronomical Institute, Moscou Russia, lead an international observation campaign to record ground-based photometric observations of Galilean moon mutual occultations and eclipses. We focused on processing the complete photometric observations database to compute new accurate astrometric positions.
Methods. We used our method to derive astrometric positions from the lightcurves of the events. We developed an accurate photometric model of mutual occultations and eclipses, while correcting for the satellite albedos, Hapke's light scattering law, the phase effect and the limb darkening.
Results. We processed 607 lightcurves and we compared the observed positions of the satellites with the theoretical positions from IMCCE NOE-5-2010-GAL satellite ephemerides and INPOP13c planetary ephemeris. The internal precision in equatorial positions is 24 mas, or 75 km at Jupiter. The rms (O-C) in equatorial positions is ±50 mas, or 150 km at Jupiter.

Key words. astronomical databases: miscellaneous – techniques: photometric – planets and satellites: individual: Io – planets and satellites: individual: Europa – planets and satellites: individual: Ganymede – planets and satellites: individual: Callisto – occultations – eclipses – ephemerides

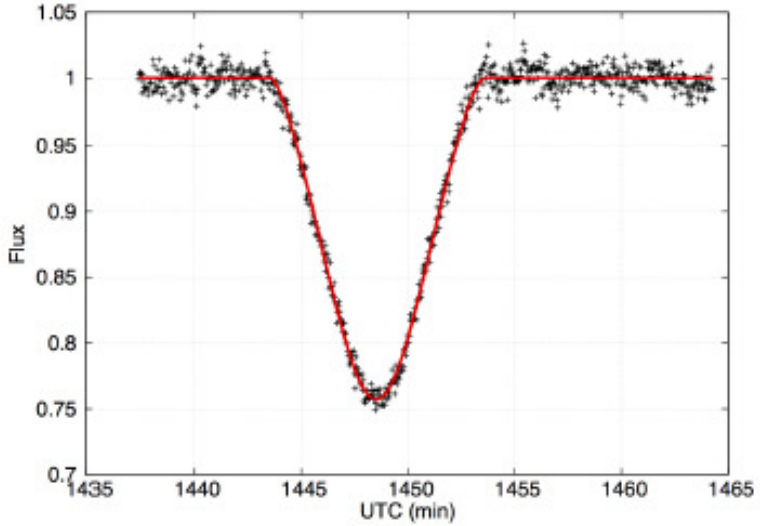


Fig. 2. Europa occults Io on 06 January 2015. Dots denote observational data, line denotes the model adjustment. The lightcurve is perfectly modeled and the observation is not noisy.

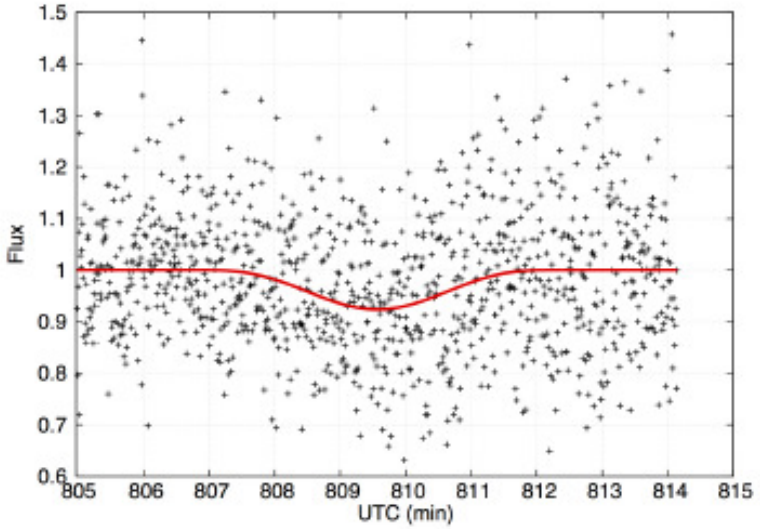


Fig. 3. Io eclipses Ganymede on 21 January 2015. Dots denote observational data, line denotes the model adjustment. This observation shows a grazing event with a small magnitude drop. The signal is noisy and could be improved with a longer integrating time for each point.

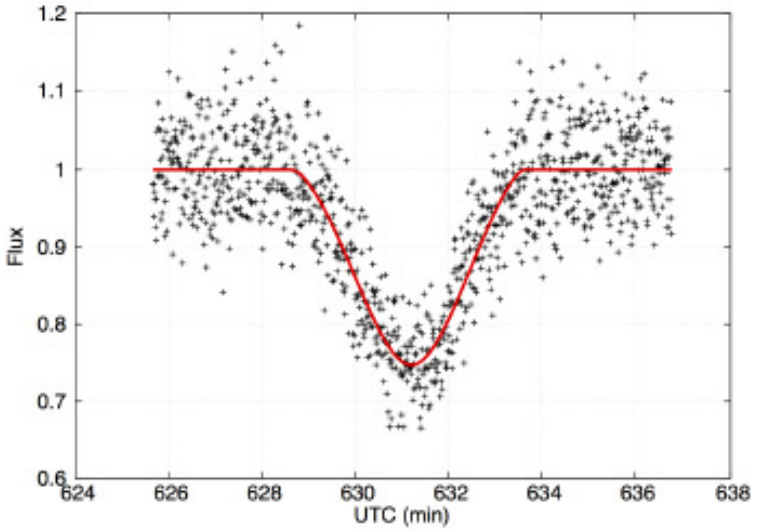


Fig. 4. Europa occults Io on 22 March 2015. Dots denote observational data, line denotes the model adjustment. The observation is noisy.

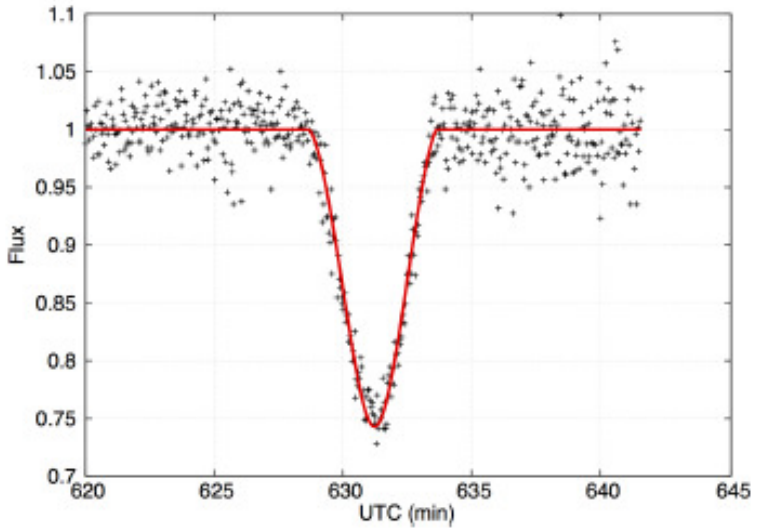


Fig. 5. Europa occults Io on 22 March 2015. Dots denote observational data, line denotes the model adjustment. This is the same event than in Figure 4, but the integration time was different.

Conclusion

Coordinations des Observateurs et Clubs en France

Interface avec IOTA ES ?

Euraster et Eric Frappa

Comment le soutenir ?

Planète Sciences

Référent pour les jeunes ?

Société Astronomique de France et SF2A

- Journées de la SF2A et Week end Technique
- Publications dans l'Astronomie et Observations et Travaux

Un nouveau WETO Club Eclipse ?