Eléments utilisés

Astro-COLIBRI

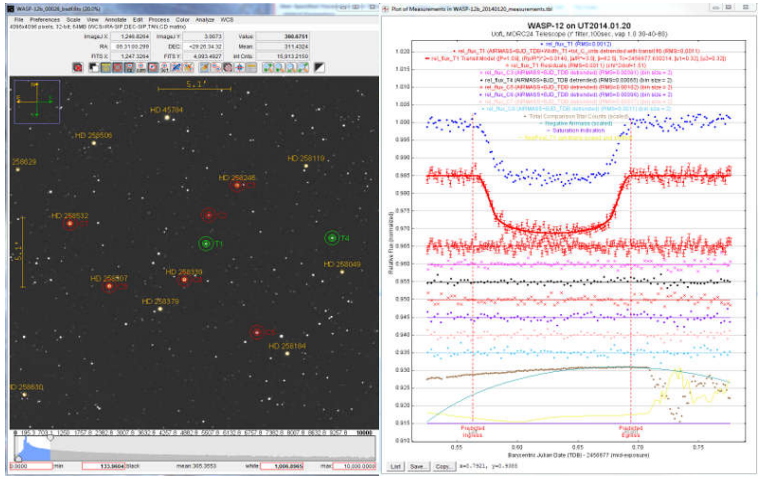
https://astro-colibri.com/

https://aladin.cds.unistra.fr/

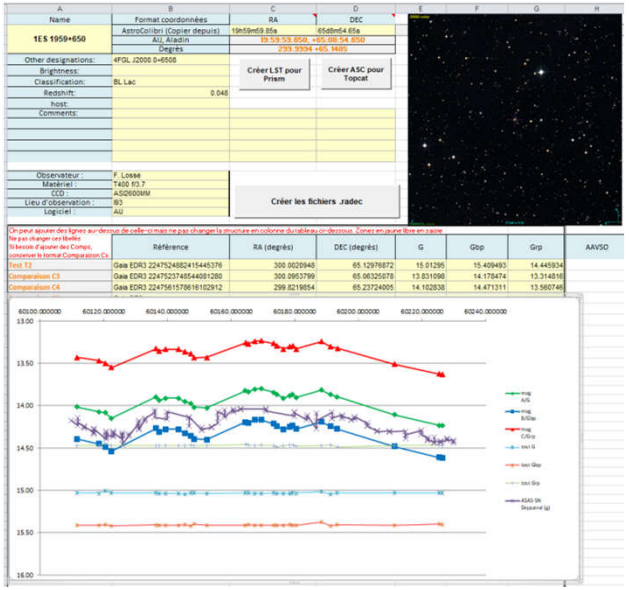
TOPCAT

Tool for OPerations on Catalogues And Tables

https://www.star.bris.ac.uk/~mbt/topcat/



https://www.astro.louisville.edu/software/astroimagej/



Feuille de calcul Excel

PREPA

Réception de l'alerte

Initialisation template à partir des éléments de Colibri, insertion d'une image DSS

Création fichier LST pour Prism et fichier ascii pour TopCat

Acquisition de la première série d'images

Identification cible, sélection des étoiles de comparaison, étoiles tests ...

Création des fichiers RaDec pour chaque filtre

SUIVI

Réduction dans AIJ

Injection dans template

Màj feuille RAPAS

Acquisition nuits suivantes

Identification cible, sélection des étoiles de comparaison, étoiles tests ...

TOPCAT

Tool for OPerations on Catalogues And Tables

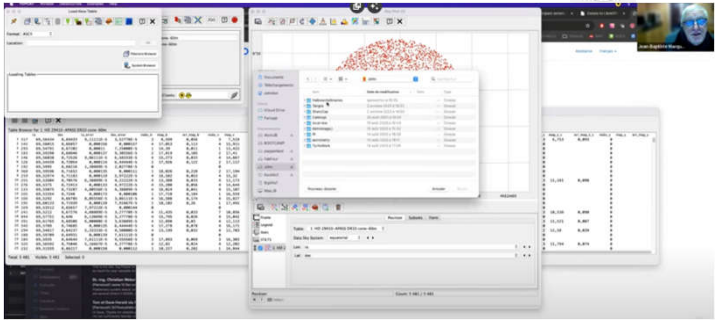
SAMP

Ciblage cone search et critères numériques
Elimination variables connues

Vérification visuelle avec image locale, DSS, Catalogues...

Création des fichiers RaDec

cf. Masterclass J.B. Marquette



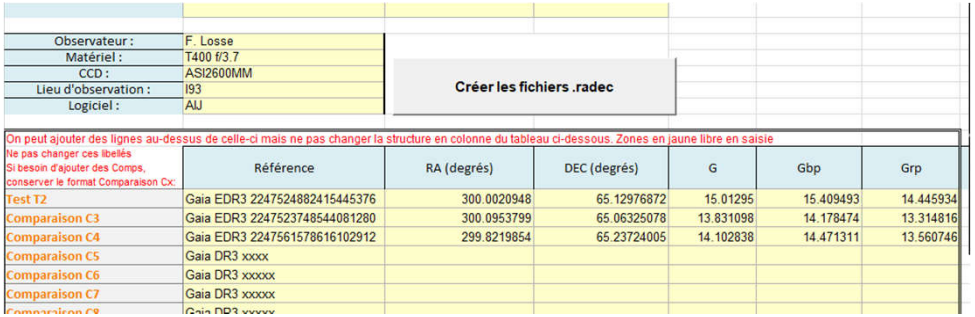
https://www.youtube.com/watch?v=sTwtfDQPV1Y

Démo live + tard si assez de temps

Fichiers RaDec

#RA in decimal or sexagesimal HOURS
#Dec in decimal or sexagesimal DEGREES
#Ref Star=0,1,missing (0=target star, 1=ref star, missing->first ap=target, others=ref)
#Centroid=0,1,missing (0=do not centroid, 1=centroid, missing=centroid)
#Apparent Magnitude or missing (value = apparent magnitude, or value > 99 or missing = no mag info)
#Add one comma separated line per aperture in the following format:
#RA, Dec, Ref Star, Centroid, Magnitude

19:59:59.850, +65:08:54.650, 0, 1
20.0001, 65.1298, 0, 1,
20.0064, 65.0633, 1, 1, 13.831
19.9881, 65.2372, 1, 1, 14.103



Observateur :	F. Losse
Matériel :	T400 f/3.7
CCD :	ASI2600MM
Lieu d'observation :	I93
Logiciel :	AIJ

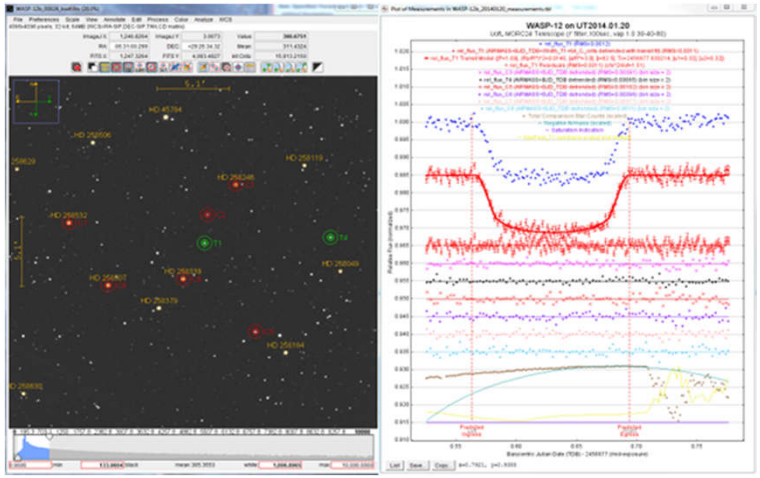
Créer les fichiers .radec

On peut ajouter des lignes au-dessus de celle-ci mais ne pas changer la structure en colonne du tableau ci-dessous. Zones en jaune libre en saisie

Ne pas changer ces libellés Si besoin d'ajouter des Comps, conserver le format Comparaison Cx:	Référence	RA (degrés)	DEC (degrés)	G	Gbp	Grp
Test T2	Gaia EDR3 2247524882415445376	300.0020948	65.12976872	15.01295	15.409493	14.445934
Comparaison C3	Gaia EDR3 2247523748544081280	300.0953799	65.06325078	13.831098	14.178474	13.314816
Comparaison C4	Gaia EDR3 2247561578616102912	299.8219854	65.23724005	14.102838	14.471311	13.560746
Comparaison C5	Gaia DR3 xxxx					
Comparaison C6	Gaia DR3 xxxxx					
Comparaison C7	Gaia DR3 xxxxx					

On peut les créer de multiples façons:
- Interactivement dans AIJ
- Editeur de texte
- ...

AstroImageJ



Karen A. Collins, John F. Kielkopf, Keivan G. Stassun, and Frederic V. Hessman

THE ASTRONOMICAL JOURNAL
https://iopscience.iop.org/article/10.3847/1538-3881/153/2/77

Site
https://www.astro.louisville.edu/software/astroimagej/

User Guide
https://www.astro.louisville.edu/software/astroimagej/guide/AstroImageJ_User_Guide.pdf

Forum
http://astroimagej.170.s1.nabble.com/

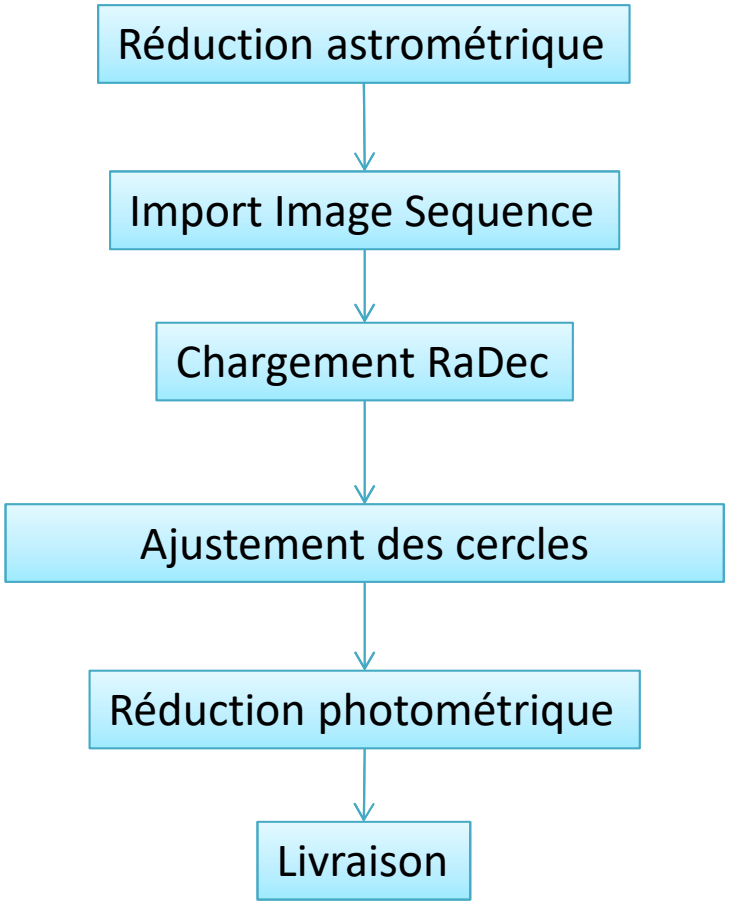
Releases régulières (dernier build hier)
https://www.astro.louisville.edu/software/astroimagej/installation_packages

Nombreux plugins
Options de personnalisation

Runs on Linux, Windows and Mac OS
Provides an interactive interface similar to ds9
Reads and writes FITS images with standard headers
Allows FITS header viewing and editing
Plate solves and adds WCS to images seamlessly using the Astrometry.net web interface
Displays astronomical coordinates for images with WCS
Provides object identification via an embedded SIMBAD interface
Aligns image sequences using WCS headers or by using apertures to correlate stars
Image calibration including bias, dark, flat, and non-linearity correction with option to run in real-time
Interactive time-series differential photometry interface with option to run in real-time
Allows comparison star ensemble changes without re-running differential photometry
Provides an interactive multi-curve plotting tool streamlined for plotting light curves
Includes an interactive light curve fitting interface with simultaneous detrending
Allows non-destructive object annotations/labels using FITS header keywords
Provides a time and coordinate converter tool with capability to update/enhance FITS header content (AIRMASS, BJD, etc.)
Exports analyses formatted as spreadsheets
Creates color images and with native ImageJ processing power
Optionally enter reference star apparent magnitudes to calculate target star magnitudes automatically
Optionally create Minor Planet Center (MPC) format for direct submission of data to the MPC
Recently added when you update to the daily build after installation --
Nearby eclipsing binary star identification from expected depth versus light curve RMS table for TESS follow-up
Delta-magnitude versus RMS plot
Enhanced contrast controls
Annotations are retained when placing apertures
FITS header search feature
...

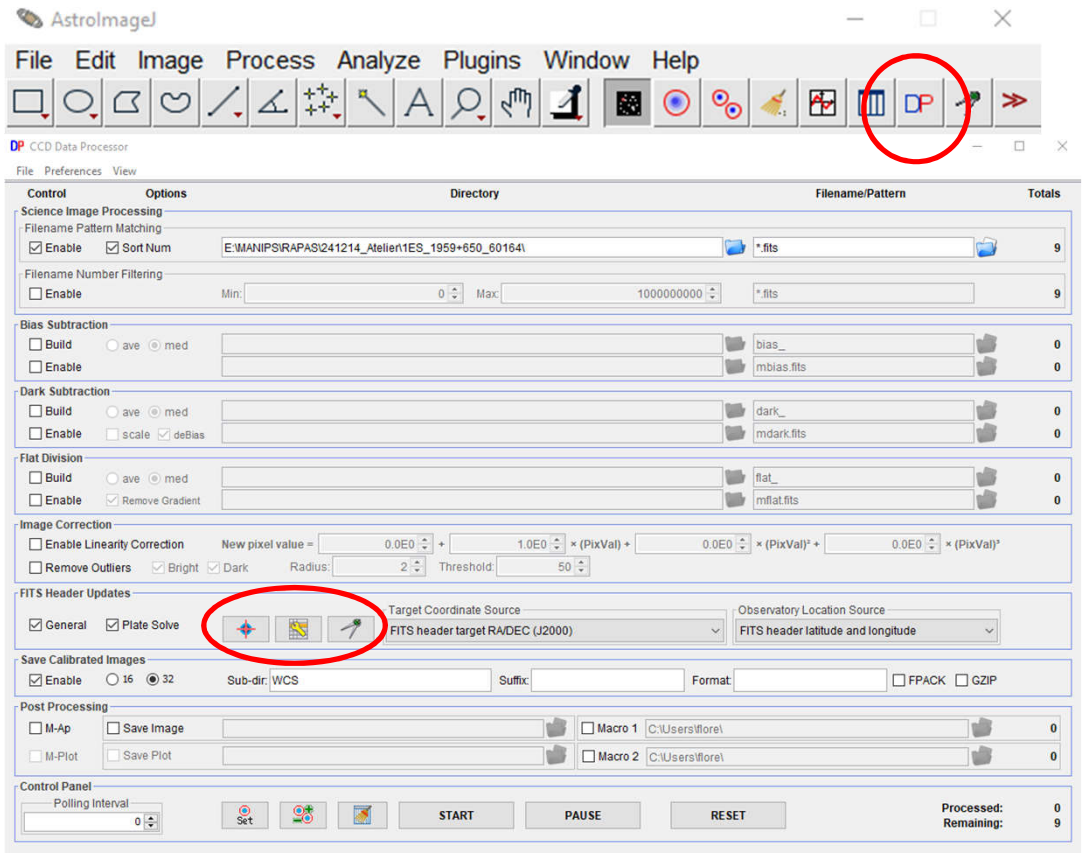
LIVE OPERATIONS SOUS AIJ
démo réduction d'une longue série

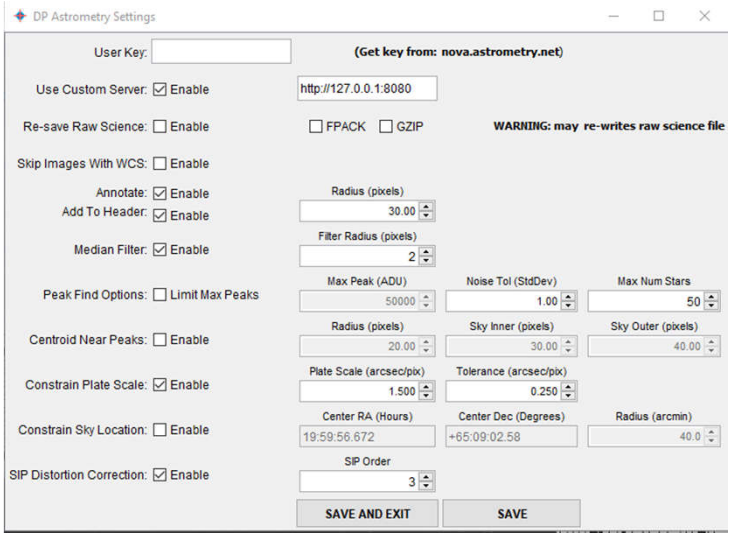
LIVE OPERATIONS SOUS AIJ
séquence typique



ATELIER 14 et 15 décembre 2024 - Workflow réductions avec AstroImageJ

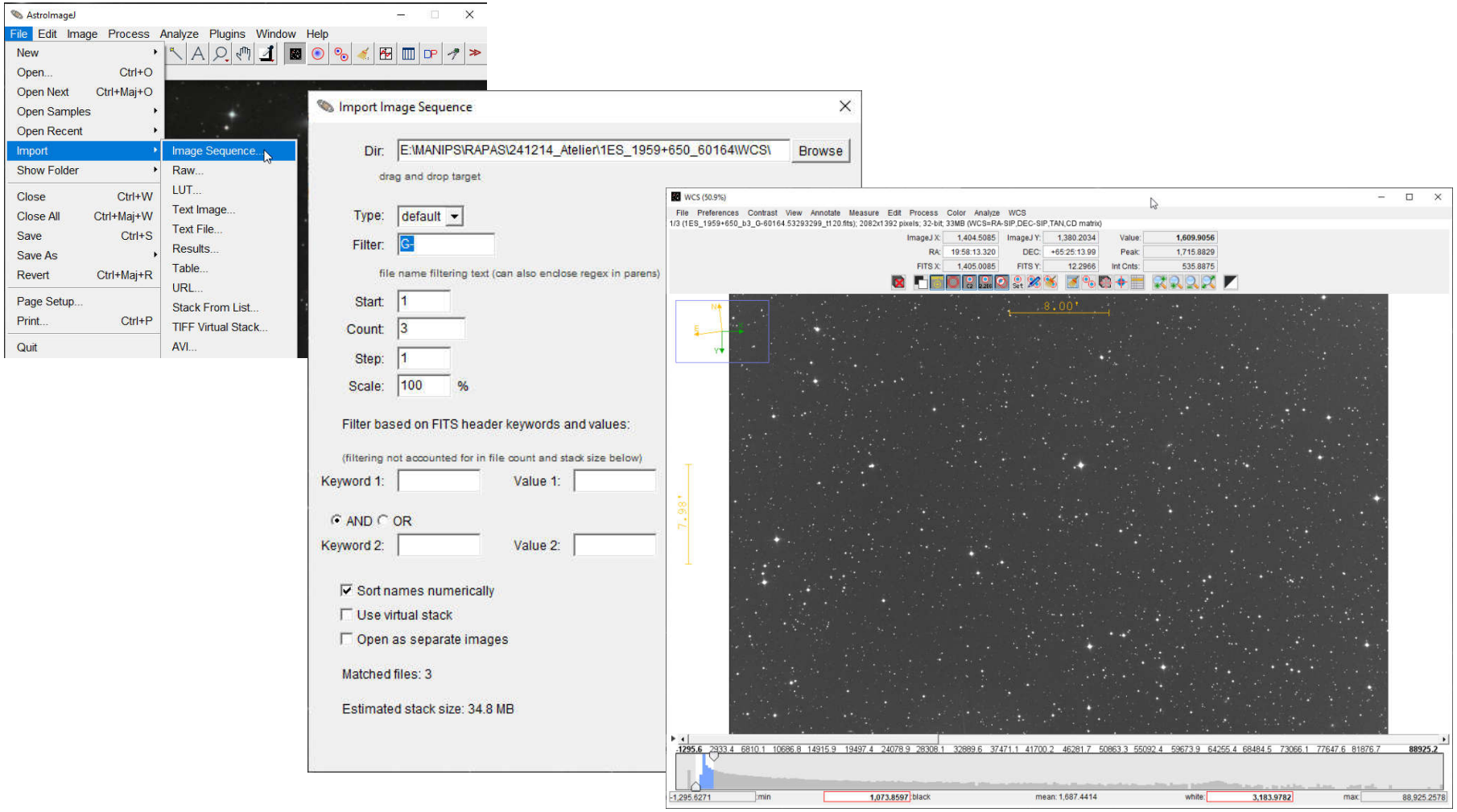
Réduction astrométrique



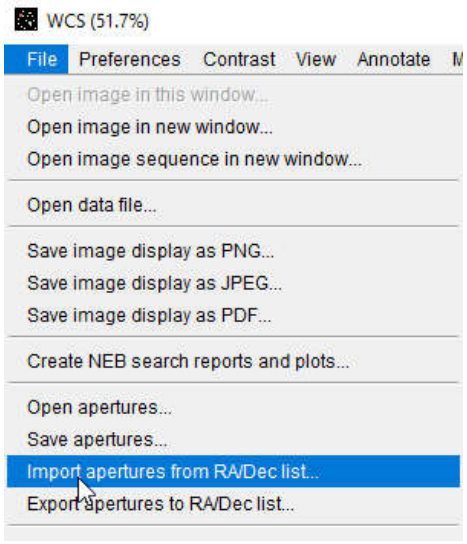


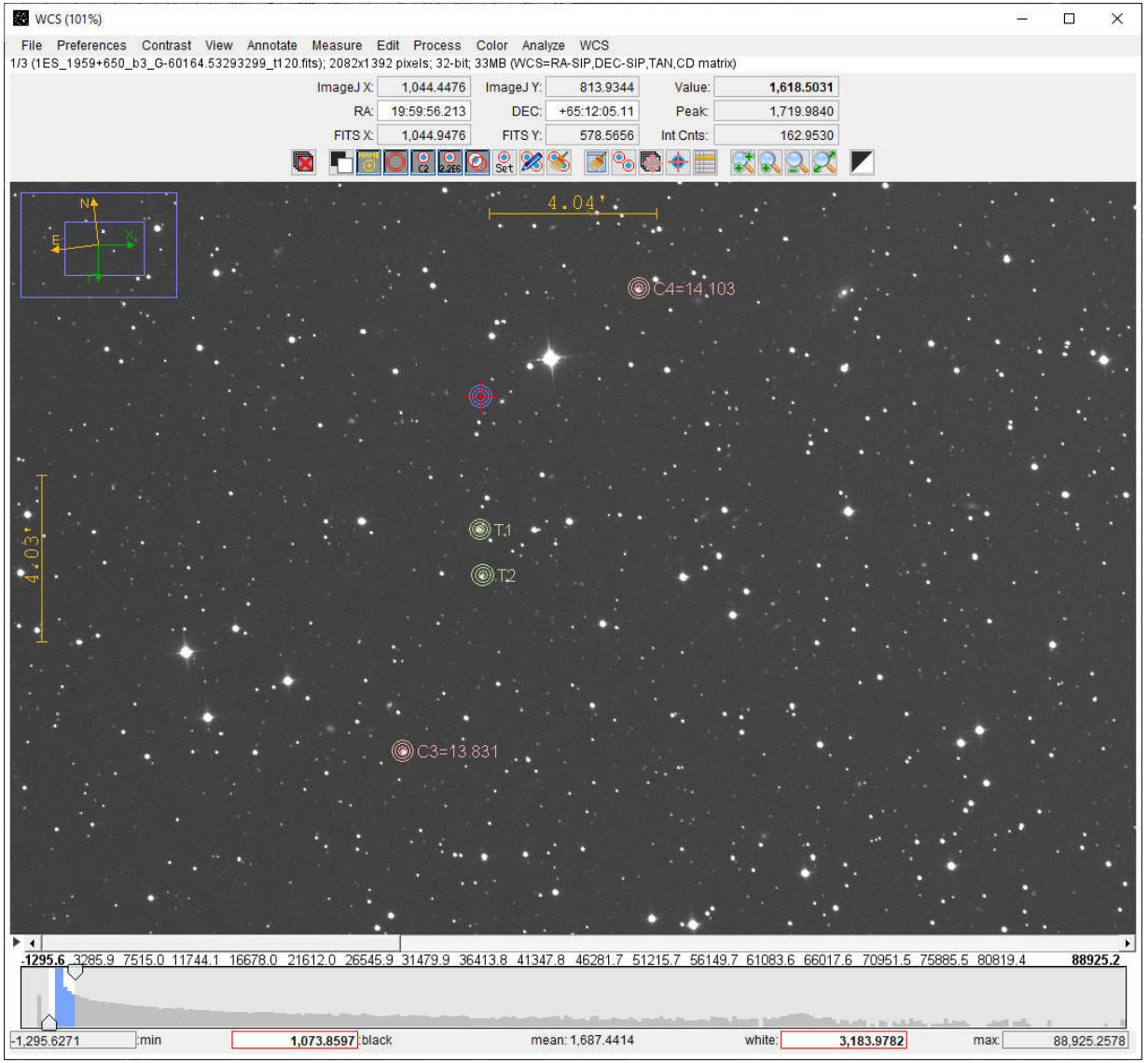

```
#HISTORY  Previous Filename = 1ES_1959+650_b3_G-60164.53293299_t120.fits
#HISTORY  WCS created by AIJ link to Astronomy.net website
#HISTORY  WCS created on 2024-12-12T17:27:33.827
#CSAXES =                    2
-TYPE1  = 'RA---TAN-SIP'
-TYPE2  = 'DEC--TAN-SIP'
-UNIT1  = 'deg     '
-UNIT2  = 'deg     '
EQUINOX =                2000.0
LONPOLE =                 180.0
LATPOLE =                   0.0
-RVAL1  =         300.0006270370
-RVAL2  =          65.1518322832
-RPIX1  =                  1042
-RPIX2  =                   697
-CD1_1  =  -0.000421079186906
-CD1_2  =   4.76162859178E-05
-CD2_1  =  -4.79332078505E-05
-CD2_2  =  -0.000420013722268
IMAGEW  =                  2082
IMAGEH  =                  1392
A_ORDER =                     3
B_ORDER =                     3
AP_ORDER=                     3
BP_ORDER=                     3
A_0_2   =   1.87393153761E-07
A_0_3   =  -2.86583592362E-09
A_1_1   =   5.30526211489E-07
A_1_2   =  -5.84134994503E-09
A_2_0   =  -9.72202629685E-08
A_2_1   =   7.88053993539E-10
A_3_0   =  -6.14855003975E-09
B_0_2   =   2.31792102965E-06
B_0_3   =  -1.92350964452E-09
B_1_1   =   3.94376711425E-08
B_1_2   =   3.75277026738E-10
B_2_0   =  -4.23897917894E-07
B_2_1   =  -3.32806722823E-09
B_3_0   =  -3.97582509349E-10
AP_0_1  =  -6.85979253998E-06
AP_0_2  =  -1.96285510244E-07
AP_0_3  =   2.90955801214E-09
AP_1_0  =  -5.82802743158E-05
AP_1_1  =  -5.56315417079E-07
AP_1_2  =   5.99458376822E-09
AP_2_0  =   1.00162926063E-07
AP_2_1  =  -7.90916924534E-10
AP_3_0  =   6.32577231062E-09
BP_0_1  =  -1.43301261225E-05
BP_0_2  =  -2.33303892373E-06
BP_0_3  =   1.96642415601E-09
BP_1_0  =  -2.75445519177E-06
BP_1_1  =  -4.04516296352E-08
BP_1_2  =  -3.70526421105E-10
BP_2_0  =   4.28102775413E-07
BP_2_1  =   3.39695304242E-09
BP_3_0  =   4.08378085838E-10
END
```

Import Image Sequence



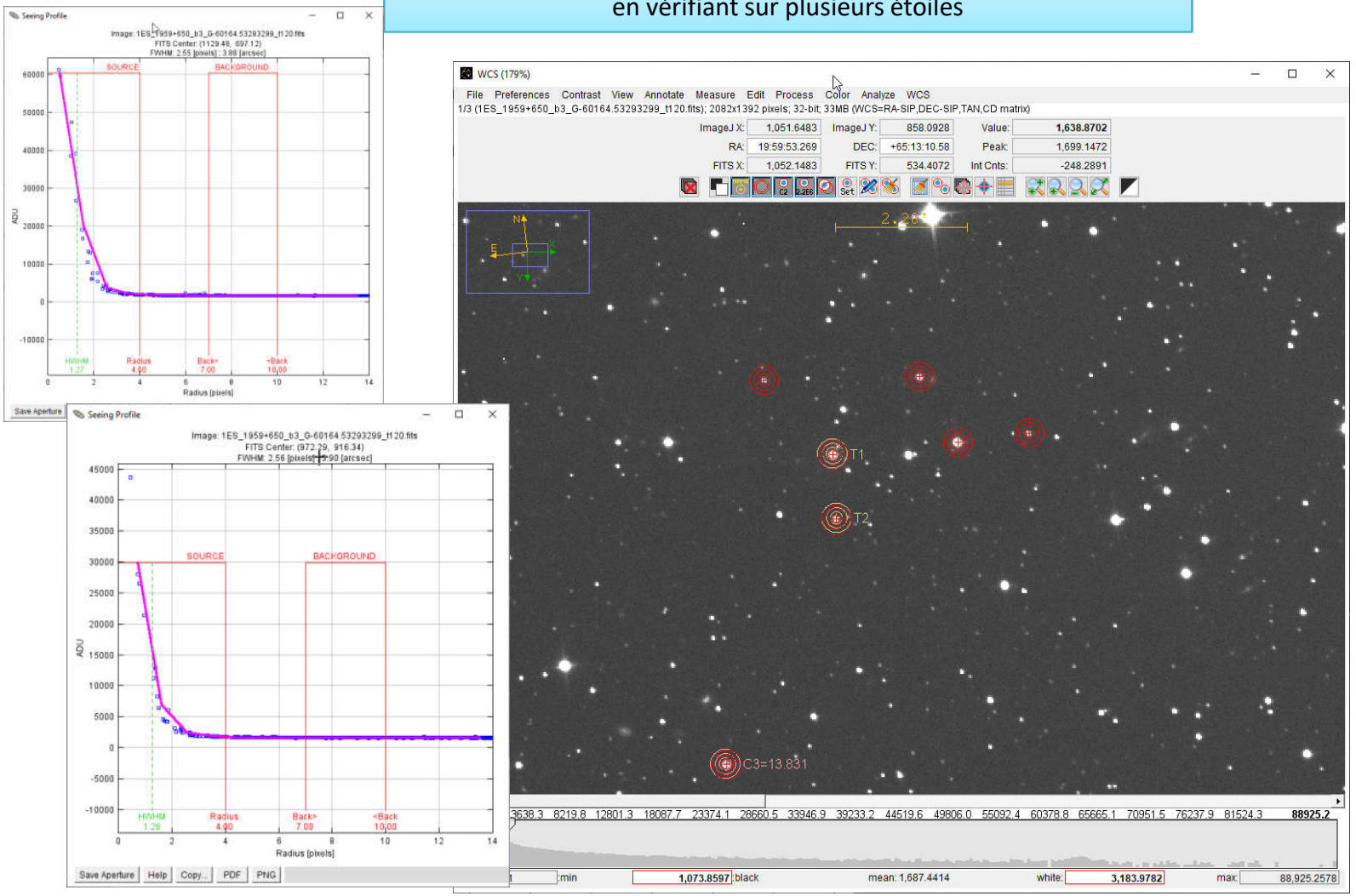
Chargement RaDec



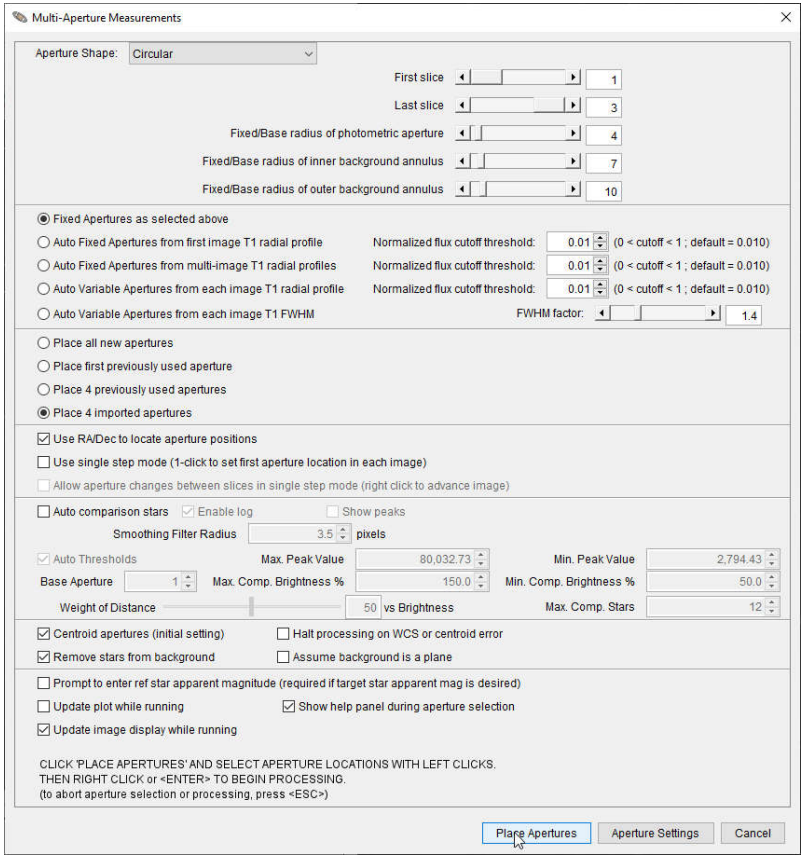


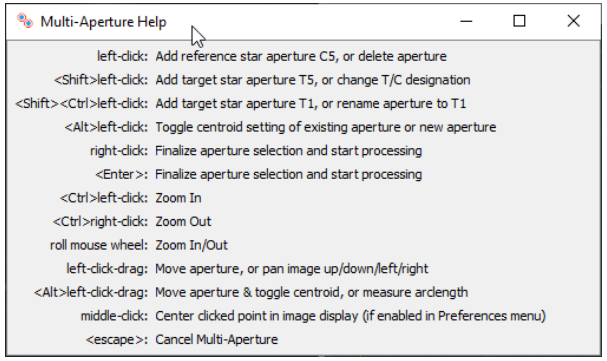
Ajustement des cercles (Alt clic)

en vérifiant sur plusieurs étoiles



Réduction photométrique





Measurements

File Edit Font Results Filter

	Label	slice	Saturated	J.D.-2400000	JD_UTC	Source_Radius	Sky_Rad(min)	Sky_Rad(max)	RA_T1	DEC_T1	Source-Sky_T1	N_Src_Pixels_T1	Source_Error_T1
1	1ES_1959+650_b3_G-60164.53293299_t120.fits	1	0.0	60164.53362743044	2460164.5336274...	4.0	7.0	10.0	19.99993955837039	65.14814712576684	176188.3284896167	50.26548245743...	1080.790972854391
2	1ES_1959+650_b3_G-60164.53435359_t120.fits	2	0.0	60164.535048021	2460164.535048021	4.0	7.0	10.0	19.999927909717...	65.14818492381433	174746.9570556091	50.2654824574367	1080.733589857140
3	1ES_1959+650_b3_G-60164.53576644_t120.fits	3	0.0	60164.53646086808	2460164.536460868	4.0	7.0	10.0	19.99993613553959	65.14822082548758	173886.80170804088	50.2654824574367	1077.298868810951

ATELIER 14 et 15 décembre 2024 - Workflow réductions avec AstroImageJ

Livraison

Name	Format coordonnées	RA	DEC
1ES 1959+650	AstroColibri (Copier depuis)	19h59m59.85s	65d8m54.65s
	AIJ, Aladin	19:59:59.850, +65:08:54.650	
	Degrés	299.9994 +65.1485	
Other designations:	4FGL J2000.0+6508		
Brightness:			
Classification:	BL Lac		
Redshift:	0.048		
host:			
Comments:			

Créer LST pour Prism

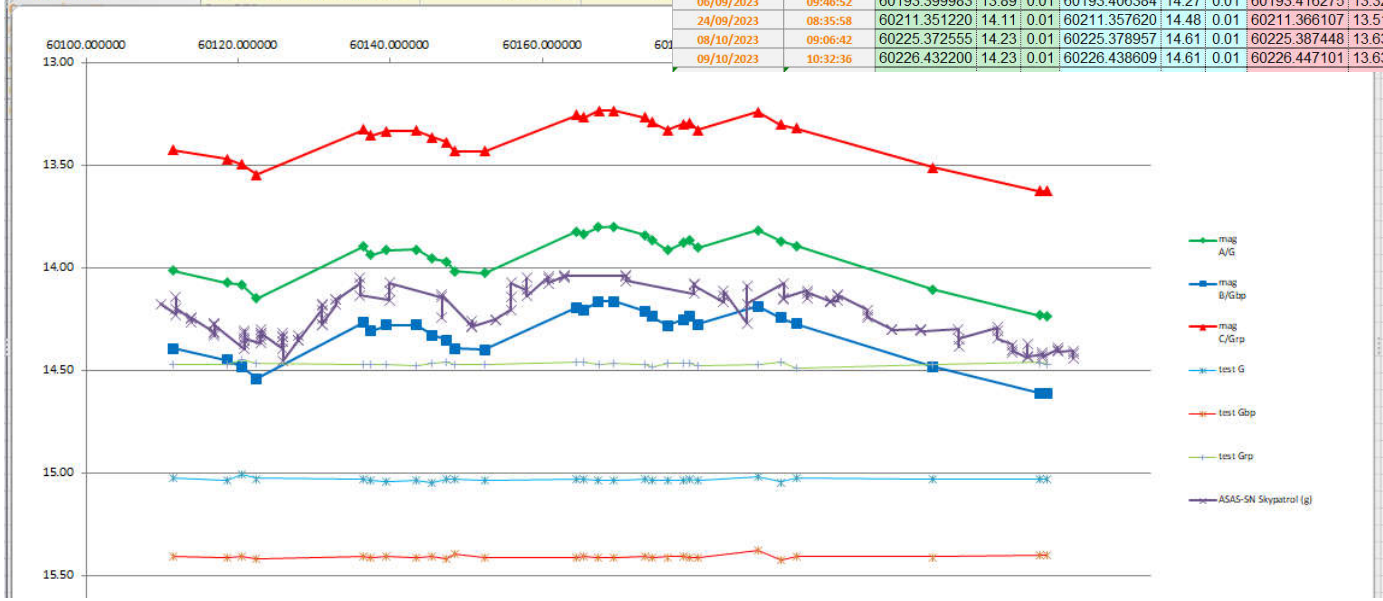
Créer ASC Topca

Observateur :	F. Losse
Matériel :	T400 f/3.7
CCD :	ASI2600
Lieu d'observation :	I93
Logiciel :	AIJ

Créer les fichiers .radec

On peut ajouter des lignes au-dessus de celle-ci mais ne pas changer la structure en colonne du tableau ci-dessous. Zor
Ne pas changer ces libellés
Si besoin d'ajouter des Comps, conserver le format Comparaison Cn:

	Référence	RA (degrés)	DEC (deg
Test T2	Gaia EDR3 2247524882415445376	300.0020948	65.1
Comparaison C3	Gaia EDR3 2247523748544081280	300.0953799	65.0
Comparaison C4	Gaia EDR3 2247561578616102912	299.8219854	65.2



RESULTATS

DATE-OBS image du milieu de la série pour la feuille RAPAS

Note: s'il manque un filtre durant une session, mettre un x dans la case MJD correspondante

													Delta / Test									
JJ/MM/AAAA (pour RAPAS)	HH:MM:SS (pour RAPAS)	MJD A/G	mag A/G	incert A/G	MJD B/Gbp	mag B/Gbp	incert B/Gbp	MJD C/Grp	mag C/Grp	incert C/Grp	indice B-C	test G	+/-	δ	test Gbp	+/-	δ	test Grp	+/-	δ	Warning
16/06/2023	12:07:25	60111.503660	14.01	0.01	60111.505152	14.39	0.01	60111.506644	13.43	0.02	0.97	15.03	0.02	0.01	15.41	0.02	0.00	14.47	0.04	0.03	Ok
23/06/2023	11:48:37	60118.489678	14.07	0.01	60118.491865	14.45	0.01	60118.494746	13.47	0.01	0.98	15.03	0.02	0.02	15.41	0.02	0.00	14.47	0.02	0.03	Ok
25/06/2023	11:05:10	60120.457163	14.08	0.01	60120.461456	14.48	0.01	60120.467139	13.50	0.01	0.99	15.01	0.02	0.00	15.41	0.01	0.00	14.45	0.02	0.00	Ok
27/06/2023	09:45:37	60122.403801	14.15	0.01	60122.406682	14.54	0.02	60122.409562	13.55	0.02	0.99	15.03	0.02	0.02	15.42	0.03	0.01	14.47	0.04	0.02	Ok
11/07/2023	11:01:21	60136.452127	13.90	0.01	60136.459272	14.27	0.01	60136.466412	13.33	0.02	0.94	15.03	0.01	0.02	15.41	0.02	0.00	14.47	0.03	0.03	Ok
12/07/2023	11:28:43	60137.473522	13.94	0.01	60137.477817	14.31	0.01	60137.483498	13.35	0.02	0.95	15.04	0.02	0.02	15.41	0.01	0.00	14.47	0.03	0.02	Ok
14/07/2023	11:35:12	60139.473352	13.91	0.01	60139.481858	14.28	0.01	60139.493140	13.33	0.01	0.95	15.04	0.02	0.03	15.41	0.01	0.00	14.47	0.03	0.03	Ok
18/07/2023	10:55:57	60143.446096	13.91	0.01	60143.454601	14.28	0.01	60143.465881	13.33	0.01	0.95	15.04	0.02	0.03	15.41	0.02	0.00	14.48	0.03	0.03	Ok
20/07/2023	11:52:08	60145.490559	13.96	0.01	60145.494149	14.33	0.01	60145.498897	13.36	0.01	0.96	15.05	0.01	0.03	15.41	0.01	0.00	14.47	0.02	0.02	Ok
22/07/2023	10:35:50	60147.434457	13.97	0.01	60147.440855	14.35	0.01	60147.449336	13.39	0.02	0.97	15.03	0.02	0.02	15.42	0.02	0.01	14.46	0.04	0.02	Ok
23/07/2023	10:39:45	60148.437180	14.02	0.01	60148.443577	14.39	0.01	60148.452058	13.43	0.01	0.96	15.03	0.02	0.02	15.40	0.01	-0.01	14.47	0.02	0.02	Ok
27/07/2023	09:56:05	60152.406862	14.03	0.01	60152.413258	14.40	0.01	60152.421737	13.43	0.01	0.97	15.04	0.02	0.03	15.41	0.01	0.00	14.47	0.02	0.02	Ok
08/08/2023	13:00:41	60164.535045	13.83	0.01	60164.541446	14.20	0.01	60164.549929	13.26	0.01	0.94	15.03	0.02	0.02	15.41	0.02	0.00	14.46	0.02	0.01	Ok
09/08/2023	11:29:43	60165.471873	13.84	0.01	60165.478271	14.21	0.01	60165.486751	13.27	0.01	0.94	15.03	0.01	0.02	15.41	0.01	0.00	14.46	0.02	0.02	Ok
11/08/2023	09:45:58	60167.397489	13.80	0.01	60167.405992	14.17	0.01	60167.417271	13.24	0.01	0.93	15.04	0.01	0.03	15.41	0.01	0.00	14.47	0.02	0.03	Ok
13/08/2023	10:26:42	60169.424816	13.80	0.01	60169.431216	14.17	0.01	60169.449590	13.23	0.01	0.93	15.04	0.02	0.03	15.41	0.01	0.00	14.47	0.02	0.02	Ok
17/08/2023	11:00:00	60173.451236	13.84	0.01	60173.457634	14.21	0.01	60173.466115	13.27	0.01	0.95	15.03	0.02	0.02	15.41	0.02	0.00	14.47	0.02	0.03	Ok
18/08/2023	09:47:04	60174.400589	13.87	0.01	60174.406987	14.24	0.01	60174.415466	13.29	0.02	0.95	15.04	0.02	0.02	15.41	0.03	0.00	14.49	0.04	0.04	Ok
20/08/2023	11:21:33	60176.466211	13.91	0.01	60176.472608	14.28	0.01	60176.481089	13.33	0.01	0.95	15.04	0.01	0.03	15.41	0.01	0.00	14.47	0.02	0.02	Ok
22/08/2023	12:33:09	60178.515925	13.88	0.01	60178.522323	14.25	0.01	60178.530804	13.30	0.01	0.95	15.04	0.01	0.02	15.41	0.01	0.00	14.47	0.02	0.02	Ok
23/08/2023	08:59:44	60179.367729	13.87	0.01	60179.374126	14.24	0.01	60179.382606	13.29	0.01	0.94	15.03	0.02	0.02	15.41	0.02	0.00	14.47	0.02	0.02	Ok
24/08/2023	10:23:24	60180.425824	13.90	0.01	60180.432221	14.28	0.01	60180.440701	13.33	0.01	0.95	15.03	0.02	0.02	15.41	0.01	0.00	14.48	0.02	0.03	Ok
01/09/2023	08:35:21	60188.350322	13.82	0.01	60188.356720	14.19	0.01	60188.366611	13.24	0.01	0.95	15.02	0.02	0.01	15.38	0.02	-0.03	14.47	0.03	0.03	Ok
04/09/2023	08:34:07	60191.352271	13.87	0.01	60191.356565	14.24	0.02	60191.362253	13.30	0.03	0.94	15.05	0.03	0.03	15.42	0.04	0.01	14.46	0.06	0.02	Ok
06/09/2023	09:46:52	60193.399983	13.89	0.01	60193.406384	14.27	0.01	60193.416275	13.32	0.02	0.95	15.03	0.03	0.01	15.41	0.03	0.00	14.49	0.05	0.04	Ok
24/09/2023	08:35:58	60211.351220	14.11	0.01	60211.357620	14.48	0.01	60211.366107	13.51	0.01	0.97	15.03	0.02	0.02	15.41	0.02	0.00	14.47	0.03	0.03	Ok
08/10/2023	09:06:42	60225.372555	14.23	0.01	60225.378957	14.61	0.01	60225.387448	13.63	0.01	0.99	15.03	0.02	0.02	15.40	0.01	-0.01	14.46	0.02	0.02	Ok
09/10/2023	10:32:36	60226.432200	14.23	0.01	60226.438609	14.61	0.01	60226.447101	13.63	0.02	0.99	15.03	0.02	0.02	15.40	0.02	-0.01	14.47	0.03	0.02	Ok