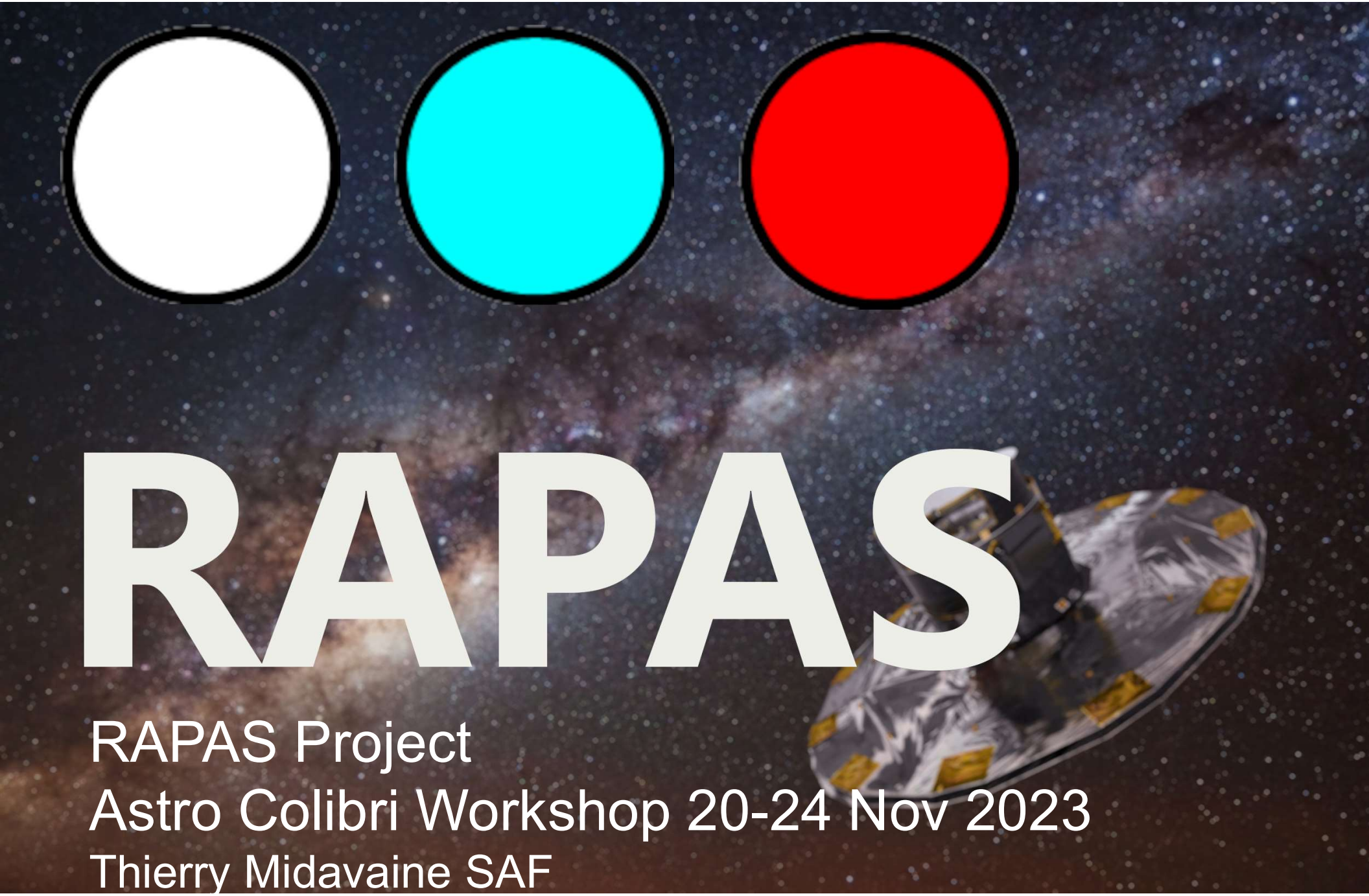
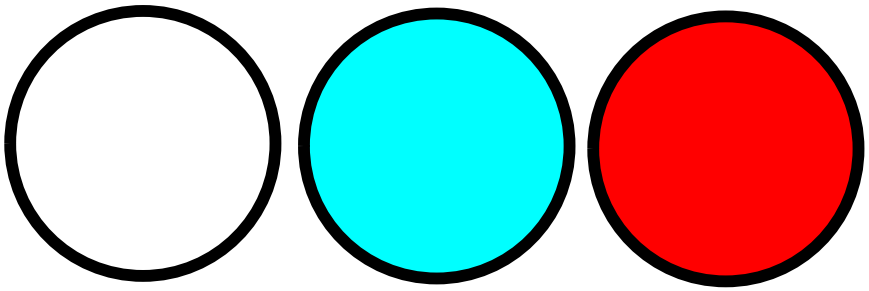
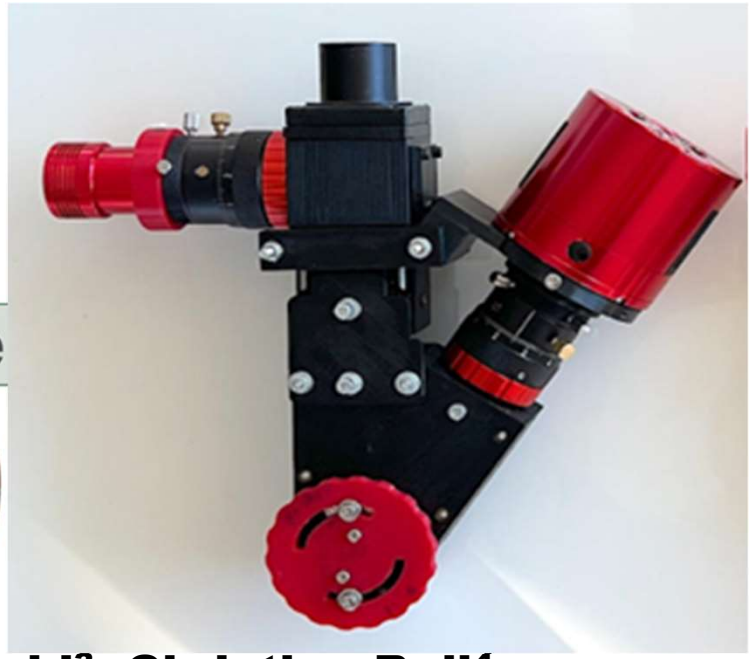


RAPAS Project
Astro Colibri Workshop 20-24 Nov 2023

Thierry Midavaine SAF
thierrymidavaine@sfr.fr

RAPAS : Réseau Amateur Professionnel pour les Alertes Scientifiques
a Pro-Am project





Thierry Midavaine[1], William Thuillot[2], Michel Dennefeld[3], Christian Buil[4], Stéphane Neveu[1], Marc Serrau[1 5 10], Éric Barbotin[13], Pierre Barroy[10], Yannick Delisle[10], Philippe Dupouy[6], Arnaud Leroy[7,10], Jean-Marie Lopez[14], Florent Losse[15], Elisabeth Maris[12], Patrick Martinez[1 8], Christian Pantacchini[11], Anaël Wünsche[9]

[1] Société astronomique de France
[2] Observatoire de Paris IMCCE PSL univ
[3] IAP
[4] ARAS AUDE
[5] Dauban Grappa
[6] Observatoire de Dax
[7] Uranoscope de l'Ile de France
[8] Adagio Observatoire de Belesta
[9] Observatoire des Baronnies Provençales
[10] TJMS Buthiers CPS Planète Sciences
[11] Observatoire de Benayes
[12] CEPHEE73
[13] Astroclub Charantais
[14] Observatoire des Pises
[15] Observatoire de Saint Pardon

Introduction : AIProAm

2022 call
by the ProAm Incentive Multi-Year Action
of the Paris Observatory

January 10, 2022

1. Call by the ProAm Incentive Multi-Year Action

The ProAm Incentive Mutli-Year Action (ProAm IMYA) of the Paris Observatory calls for proposals for scientific actions in the frame of Professional-Amateurs collaborations. The goal is to promote collaborations between professional and amateurs astronomers on any astronomical topic and with any technique.

Eligibility criteria are the following :

- the project must be a **collaboration between professional and amateur astronomers, including at least one member of the Paris Observatory.** This includes members of GEPI, IMCCE, LERMA, LESIA, LUTH, SYRTE, USN, UFE as well as the laboratories for which the Paris Observatory is a secondary administrative supervisor (APC, LPP, OSUC). Professional and amateur astronomers from any institute and country are welcome in the proposing team.
- the project must be an **astronomical research project**. This includes direct scientific collaborations as well as citizen science.

The present call concerns funding for 2022, although scientific projects can extend over several years. If the ProAm IMYA office selects a project for 2022 and additional funding is required the following years for the same project, a new proposal will have to be submitted every year showing the results already obtained. The selection of a project in 2022 does not guarantee its selection in future years. **The yearly budget of the ProAm IMYA is of the order of 25000 euros.**

Scientific Council of Paris Observatory : API (Pluri Annual Initiative) Action Incitative ProAm
RAPAS :

The Scientific Council of Paris Observatory launched a call for proposal for three years : AIP (Action Incitative ProAm) 2022 – 2023 – 2024

- RAPAS project selected in 2022 and 2023
- 2022 funding of the first step :
  - the manufacturing of 25 filters sets
  - Kick off workshop and foundation of the RAPAS network 8-9 octobre 2022
- 2023 funding of the second step :
  - realisation of 2 spectrograph prototypes meeting low dispersion and high limiting mag
  - Workshop 2, photometric test feedbacks, spectro design, toward 2024 (25-26 nov 2023)
- 2024 propose a third step bidding

- The French RAPAS network on the way to answer to alerts
- On the way to an international network ?

Astronomical alerts : rising waves, tsunamis on the way

There is an increasing number of programs delivering astronomical alerts.
These are related to

- Solar System Objects (up to mag 20 the three nights following an alerts)
- Galactic objects
- extra-Galactic events
  - Either Gaia alerts (GaiaFUNSSO)
  - Optical alerts : strong photometric variation http://gsaweb.ast.cam.ac.uk/alerts/
  - Non optical alerts

- Space mission Gaia, first source of alert generation

- but other providers of optical alerts could be concerned (Atlas, PTF-ZTF, PS1/PS2, Black Gem, LSST, ASSAS-SN, ATLAS, CRTS …)

- Multi messenger alerts : gamma, X, Radio burst, Neutrinos, GW

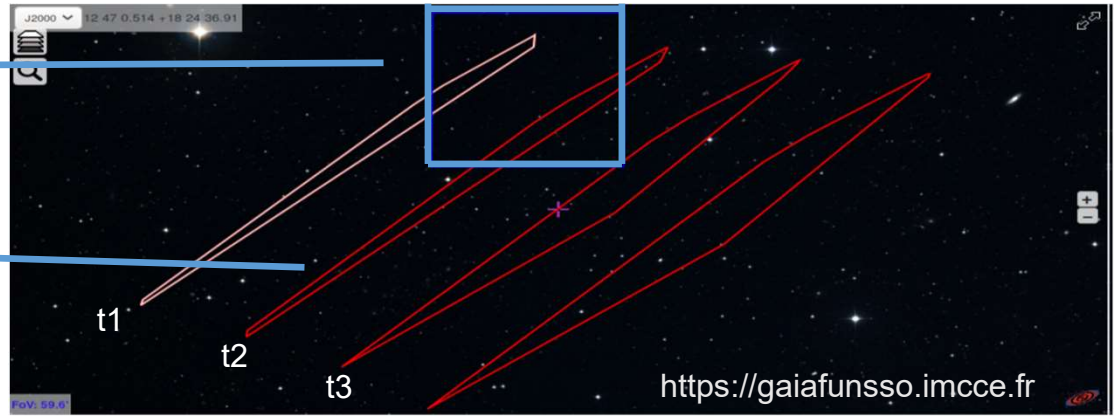
With designation basket > $1^{\circ 2}$

Gaia-FUN SSO

- Gaia Follow-up Network for Solar System Objects
  - New moving source : data ~daily published at https://gaiafunsso.imcce.fr
    - Statistical ranging applied to define sky map and ephemerides
      - Operating since end 2016

https://gaiafunsso.imcce.fr

Most favourable Area with user's telescope FOV (12 arcmin here)



Research area

- New object validation
  - Feed the MPC data base
- Update of the reference catalog currently used by Gaia

A new ProAm collaboration :

Le Réseau Amateurs Professionnels pour les Alertes Scientifiques (RAPAS)
Amateurs-Professionnals Network for Scientific Alerts

- RAPAS project is aiming to build an amateur network to answer to a selected list of alerts

- We are inviting amateurs to register in this network with preliminary data related to their observatory facility on the Gemini portal.
- https://proam-gemini.fr/rapas/
- Get access to tutorials and data
- More than 50 registered telescopes

http://rapas.imcce.fr/

- We will deliver to observers a set of 3 filters to unify the photometric data.
- We designed 2 new low resolution spectrographs

- Then the purpose is to assess the photometric accuracy of the network for the end of the year 2023.
- In 2024 connect the network to alert programs and release data

Needs

Set up of an amateur network interested by science alerts by using: astrometry, photometry or spectroscopy

The angular designation often requires a large FOV and deep magnitude search mode with limited exposure. The telescope Figure Of Merit in a search mode could be :

telescope FOM = f(upper lim mag) . FOV square degree / exposure mn

Amateurs with their respective observatory spread over wide longitude and latitude ranges and behind independant cloud coverage conditions provide optical search mode to deliver AD and Dec localisation of optical candidates with a classification to allow then photometric or even spectrometric monitoring function. The purpose is then pass the confirmed and characterized alerts to fitted large telescope instruments.

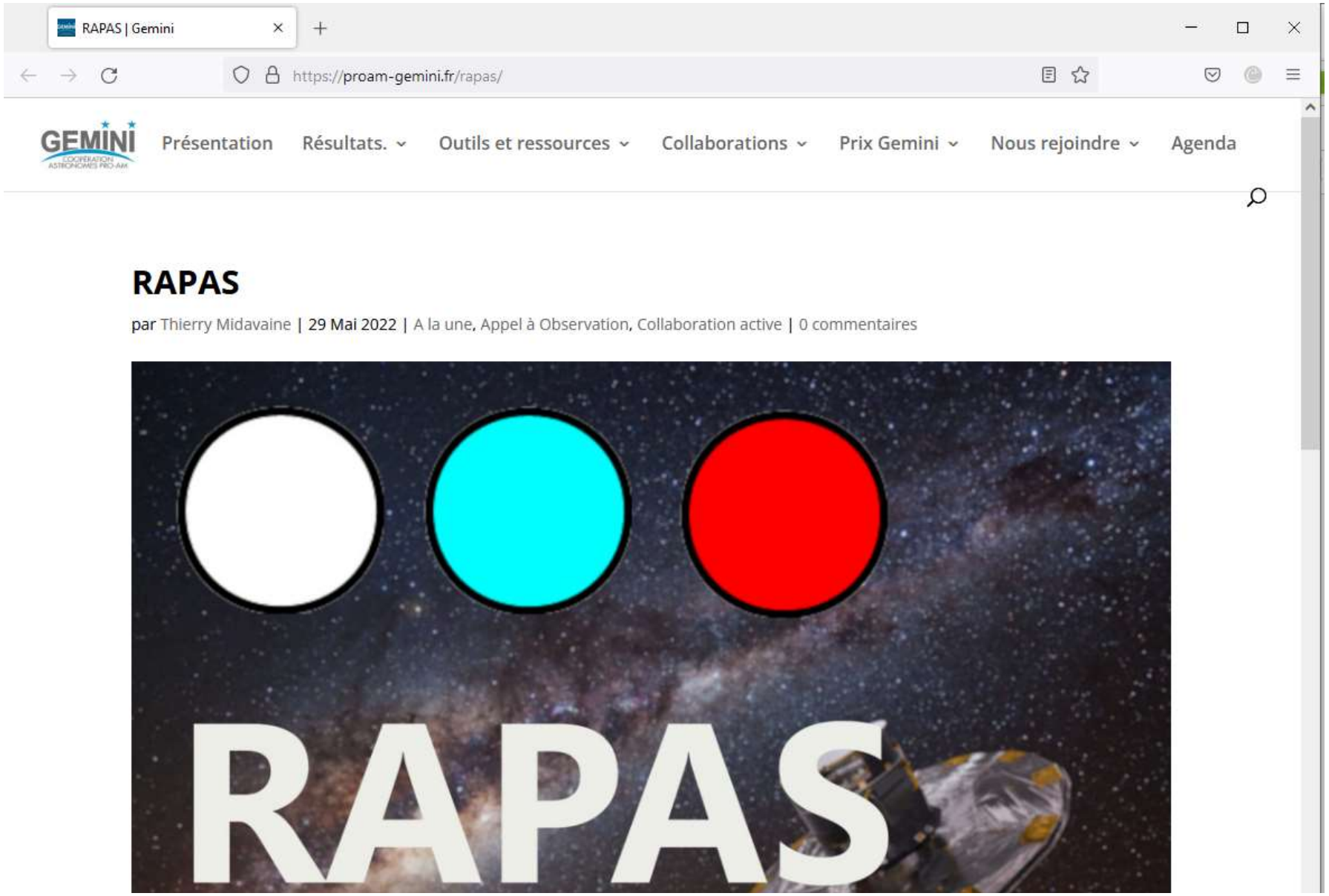
The needs could be summarised in :

- An array of instruments spread over large territory
- Wide Field Of View Instruments 1°² and above
- High magnitude detection limit >20 in 1min exposure or assessed lim mag vs exposure
- Unified methodology and uniform photometric data deliveries and low latency to up load data

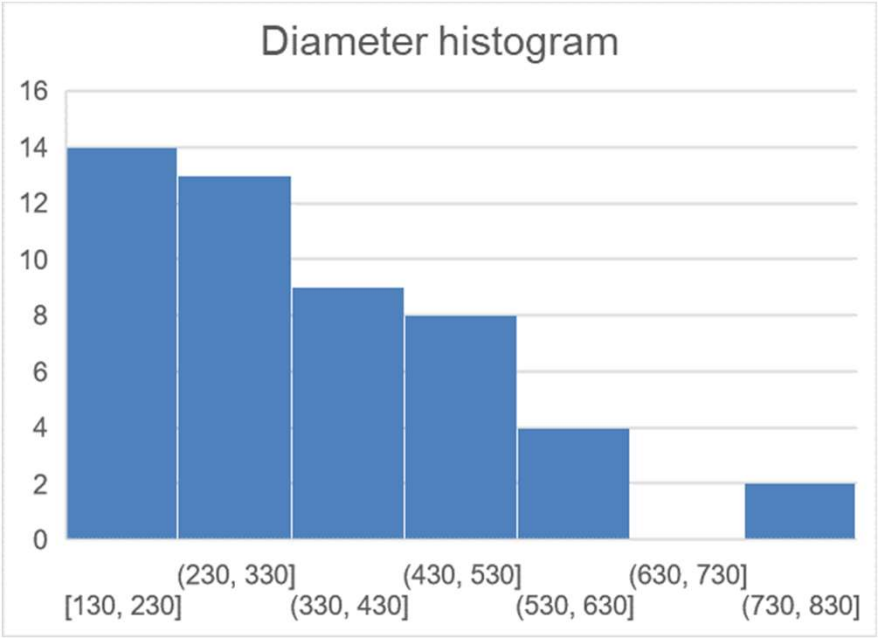
This could provide an amateur network meeting several alerts prgm requirements

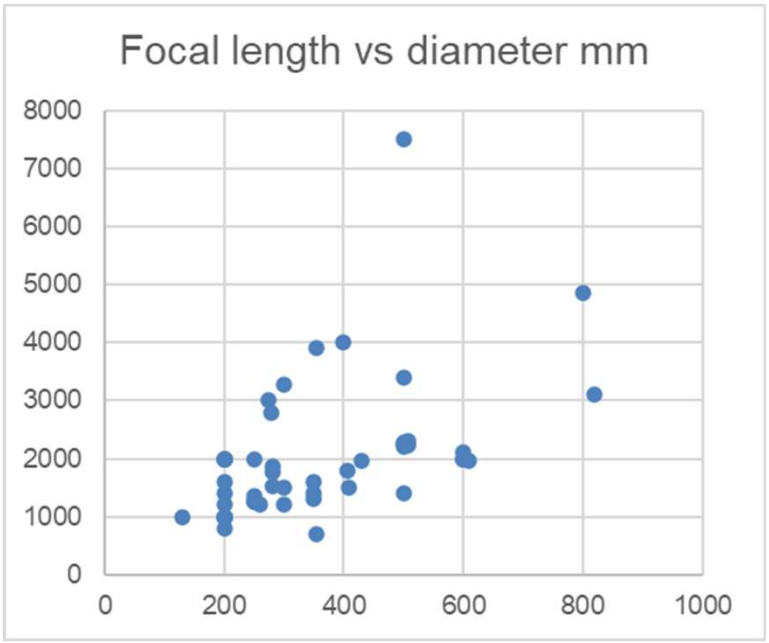
Registration to the RAPAS network

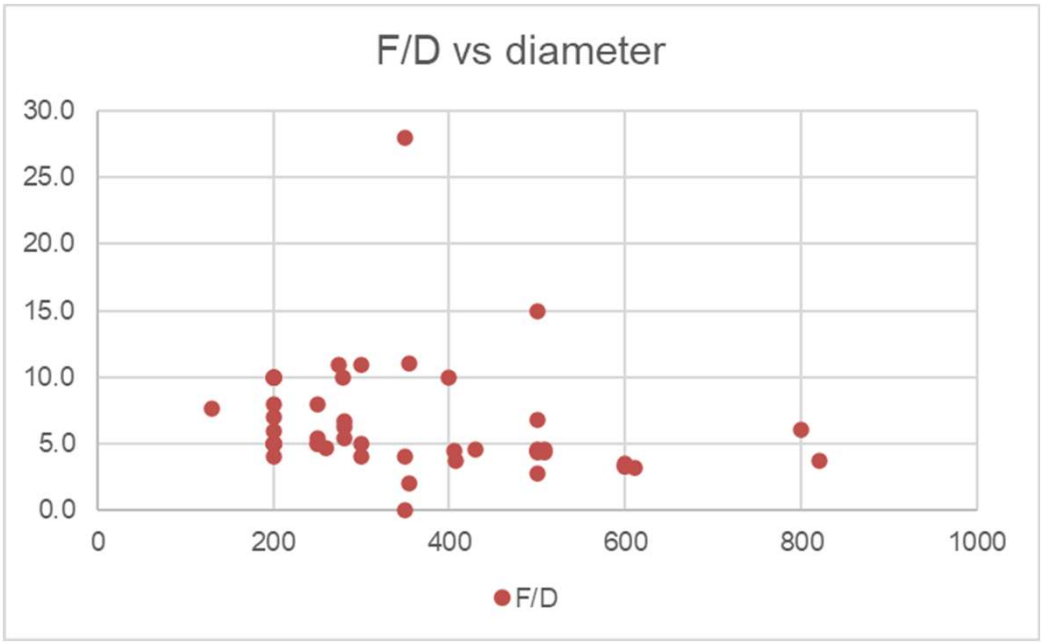
- Web Gemini: https://proam-gemini.fr/rapas/



5/30/2022 8:50:20	Thierry	Midavaine	thierrymidavaine@sfr.fr	Observatoire Salvia	-0.5	48	i73	500	1400	2.8	36	2 pouces		
6/2/2022 9:43:42	Pierre	Barroy	yorrab@hotmail.com	Planète Sciences, obser	2.438028	48.29175	199	600	2100	3.5	17,96 x 13,52 mm		36	TJMS
6/2/2022 16:35:03	Patrick	Baroni	patrickbaroni14@gmail.cor	Eclipse	2	49	non	200	1000	5.0	10		40	Décédé 01/12/2022
6/2/2022 22:16:20	Jean-françois	Coliac	jfcoliac@gmail.com	OABAC	5	43		200	800	4.0	183mm pro	31.7		Pas dispo en 2022
6/3/2022 23:00:44	Yannic	Delisle	delislehatte@yahoo.fr	CPS TJMS Buthiers	2.438028	48.29178	199	600	2000	3.3	17,96 x 13,52 mm		36	TJMS cf ci-dessus
6/5/2022 21:34:07	Jean-Louis	Dumont	jld37@sfr.fr	Société Astronomique de	0.83	47.22	non	400	4000	10.0	13,9 x 8,9	2"		Pas dispo en 2022
6/6/2022 8:23:52	Christian	Pantacchini	christ.panta@gmail.com	Observatoire de BENAYE	1.45	45.48333	non	250	1358	5.4	25.1X17.64	néant		Nom obs AAVSO : PCH
6/21/2022 17:53:48	Anaël	Wünsche	anael.wunsche@obs-bp.fr	Observatoire des Baronn	5.5	44.4	B10	800	4860	6.1	30x30	2", 2" = 50mm		La duplication des répon
6/21/2022 17:53:48	Anaël	Wünsche	anael.wunsche@obs-bp.fr	Observatoire des Baronn	5.5	44.4		430	1970	4.6	36x24	2"		
6/26/2022 23:01:30	Olivier	Dechambre	olivierdechambre42@gmail	Club Eclipse	2.014444	48.765	non	300	1200	4.0	13.8x9.2	31.7		
6/28/2022 14:34:58	Matthieu	Conjat	mconjat@free.fr	Aquila / Observatoire de	7.2997	43.725	020	500	7500	15.0	22.5	31.75		Autre instrument dispon
7/2/2022 11:42:13	Arnaud	Leroy	uranoscopeidf@gmail.com	Uranoscope de l'Ile de Fr	2.7422	48.7422	A07	355	710	2.0	11.25*7.03	2 pouces montée		porte filtres manuel -
7/4/2022 15:30:23	Patrick	Martinez	patrick.martinez264@oran	SAF - ADAGIO - Observa	1.81629	43.44424	A05	820	3100	3.8	36x36		50	
7/15/2022 0:12:09	Gerald	Mauboussin	gerald.mauboussin@gmail	Observatoire de la Billett	1.0223	48.51	non	200	2000	10.0	13		50.8	
8/16/2022 15:10:58	Jean Marie	Lopez	skyciel34@gmail.com	SAM- Observatoire des F	3.503611	44.03917	122	500	2200	4.4	27.65x18.48 mm	50mm		Capteur CCD Kaf 6303 3
8/23/2022 17:54:57	Patrick	Wullaert	wullaert_chatillon@hotmail	SAF, Astro-Club d'Ouzou	2.7401	47.588	non	200	1000	5.0	11.25 x 7	31.75		Mon club possède un D
9/1/2022 15:26:47	Observatoire Frar	Bagnoud	info@ofxb.ch	Observatoire François-Xa	7.613	46.227	175	300	1500	5.0	17,7 * 13,4		31	Pas dispo 2023-Nous al
9/6/2022 16:19:15	Jean-Baptiste	Marquette	jean-baptiste.marquette@u	LAB	0.3911	44.2616	non	200	1000	5.0	13,19 x 8,81	31.75		Pas dispo 2022-Il manqu
9/19/2022 18:40:59	Marc	Serrau	marc.serrau2@free.fr	SAF & Planète-Sciences	5.6475	43.9997	A77	300	3270	10.9	28.3		36	Taille capteur = diagona
9/20/2022 17:05:52	Hadrien	Dupuis	observatoire-jbt@upsinspa	Observatoire Jocelyn Bel	1.4685	43.5632		500	2279	4.6	37x37mm	50x50mm		3454mm (ou 2279mm a
9/27/2022 2:30:31	GUY	COPIN	guycopin@orange.fr	GAP 47	0.983333	44.48333	Non	250	1250	5.0	23.2	2"		Très interressé par les fi
10/2/2022 17:51:13	Fabian	Schussler	fabian.schussler@cea.fr	Astro-COLIBRI							0	0		
10/5/2022 2:43:32	Philippe	Dupouy	obsdax@orange.fr	Observatoire de Dax			958	200	1410	7.1	CCD 8.8x6.3 mm ,	31 mm		Possibilité d'équiper ces
10/5/2022 2:43:32	Philippe	Dupouy	obsdax@orange.fr	Observatoire de Dax				500	2250	4.5	CMOS 17.7 x 13.4 mm			
10/5/2022 14:12:17	Florent	LOSSE	florent_losse@yahoo.fr	St Pardon de Conques (c	-0.203056	44.5588	l93	408	1500	3.7	23.5 x 15.7 cmos	36mm non monté		Très actif sur les confirm
10/5/2022 22:22:29	Jonathan	Kobs	joko@ovni-nightvision.com	OVNI Night Vision	-1.062222	45°39'0"		200	1200	6.0	7,9x11,8	50,8mm		J'utiliserai un oculaire in
10/6/2022 11:00:07	Jérôme	Paufique	jpaufiqu@eso.org	ESO							variable	variable		
10/10/2022 17:49:04	Philippe	Morel	Morel.Philippe@wanadoo.f	Observatoire Charles Feh	3.77607346	50.0848398025446		355	3910	11.0	24X36	2"		
10/17/2022 22:39:09	Paulo	Cacella	paulo.cacella@gmail.com	DogsHeaven Observatory	-47.9	-15.9	X87	508	2230	4.4	31		31	Other 5 telescopes, LHI
10/25/2022 21:39:06	Marc	Serrau	marc.serrau2@free.fr	Planète-Sciences	5.6475	44.00	B24 et A	275	3000	10.9	23.9x16		36	
10/27/2022 0:51:25	Jean-Marie	Vugnon	jm-v@sfr.fr	club eclipse	-0.017717	46.81107		260	1220	4.7	Plusieurs : 24x36, 25x1	50mm, 31.75mm		
10/28/2022 0:51:25	Jean-Marie	Vugnon	jm-v@sfr.fr	club eclipse	-0.017717	46.81107		200	1000	5.0				
11/13/2022 23:25:35	Serge	Vasseur	hipparcos.astro@outlook.fi	SAF, GAAC	02°13'14"	50°39'09"	Non	406	1800	4.4	11,25 x 7,03		50.8	
11/14/2022 20:25:33	Patrick	Sogorb	patrick.sogorb@gmail.com	Club Luberon Sud Astro,	Bastidan observatory		D11	280	1530	5.5	16	31.75		
11/16/2022 17:56:42	Roger	Hellot	roger.hellot.astro@gmail.c	Observatoire Rosheim-TF	7.45937	48.48995	Non	279	2790	10.0	12x9		31.75	
11/17/2022 10:30:03	Emmanuel	Thiers	emmanuel.thiers@orange.	Astronomade	1 42 22.7	44 26 21.93		280	1860	6.6	3.8	36mm		
11/22/2022 9:21:29	Lisa	Maris	elisabeth.maris.froelich@g	CEPHEE73	+5 54 38	453341	No	200	2000	10.0	15.2x15.3 mm	1.25"		(avec réducteur de focal
11/22/2022 9:21:29	Lisa	Maris	elisabeth.maris.froelich@g	CEPHEE73	+5 54 38	453341	No	280	1764	6.3				
12/16/2022 13:00:32	Éric	Barbotin	ebarbotin@sfr.fr	Astroclub charentais	0	45.5	Non	500	3400	6.8	24x36		50	
3/11/2023 9:07:41	jean-luc	Martin	jluc06.martin@gmail.com	GAPRA Antibes	6°50	43°42'	non	250	2000	8.0	19,05 mm x 12,70 mm	36 mm		comment peut on se pro
3/18/2023 8:59:50	Gérard	Arlic	gerard.arlic@gmail.com	Bommes Observatory	-0° 21' 26"	44° 32' 59"	non	200	1000	5.0	17.6 * 13.52		50	T 400 sous coupole en p
3/21/2023 12:47:57	Christian	Buil	christian.buil@wanadoo.fr	AUDE	7°05'14"	43°35'32"	Non	250	1250	5.0	24x36	NA		
4/6/2023 21:44:19	Jean-Christophe	Dalouzy	jc.astro@orange.fr	Observatoire de Rouen	-1.348	49.468		350	1400	4.0	12.5x10	31.75		
5/6/2023 14:59:35	Guillaume	Biesse	guillaume.biesse@protonm	SAF				200	1600	8.0	15,2x15,3		31.75	Une Moravian G2-4000 e
5/30/2023 0:56:17	Etienne	Joseph-Reinette	astramazonie@gmail.com	ASTRAMAZONIE	4.93549	-52.30532		130	1000	7.7	31.75		31.75	
6/1/2023 17:48:37	Michel	Rieutord	michel.rieutord@irap.omp.	Observatoire Midi-Pyréné	+00:08:41:5	+42:56:13:00		508	2299	4.5	24x36	50.8		C'est le T50 du Pic-d-Mi
7/9/2023 3:22:59	Fred	Denjean	f4eop.33@gmail.com	Astronomie Gironde 33	-0.4845	44.8592	Non	200	2000	10.0	13x19.1	1'1/4 et 2'		
7/20/2023 16:48:53	Yoann	Degot Longhi	yoanndegotlonghi@gmail.c	Observatoire de Haute Pi	5°42' 44"	43°55'44"	511	600	2000	3.3	24x36	50mm		
8/28/2023 10:02:15	Fred	Denjean	f4eop.33@gmail.com	Astronomie Gironde 33 (A	-0.4845	44.8592	non	200	2000	10.0	4.6	1,25 et 2"		
9/6/2023 10:58:02	Damien	Lachat	damien.lachat@jura-obser	SJA- Observatoire astron	7.4206	47.3518	185	610	1963	3.2	19.2 x 13.1	50.8		
10/8/2023 18:01:22	thierry	garrel	gabalou@gmail.com	Observatoire de Fontcau	3.4	4.3		350	1300	28	50			ZWO 2600
10/10/2023 12:02:44	jean-Sébastien	Devaux	js.devaux@wanadoo.fr	OAV	43°28'14"	3°20'33"	non	350	1600	13.2	8.8	31.75		


Diameter histogram
16
14
12
10
8
6
4
2
0
[130, 230]
(230, 330]
(330, 430]
(430, 530]
(530, 630]
(630, 730]
(730, 830]


Focal length vs diameter mm
8000
7000
6000
5000
4000
3000
2000
1000
0
0
200
400
600
800
1000


F/D vs diameter
30.0
25.0
20.0
15.0
10.0
5.0
0.0
0
200
400
600
800
1000
F/D

The Gaia induced idea :

Gaia mission delivers alerts :

- https://gaiafunsso.imcce.fr/
- http://gsaweb.ast.cam.ac.uk/alerts/home

In addition Gaia provides an updated photometric catalog up to 20-21 magnitude in three wide spectral bands for more than 1.5 Giga objects spread on whole sky. This photometric system may enhance SNR and limiting magnitude of amateur telescopes and allows data reduction with this catalog.

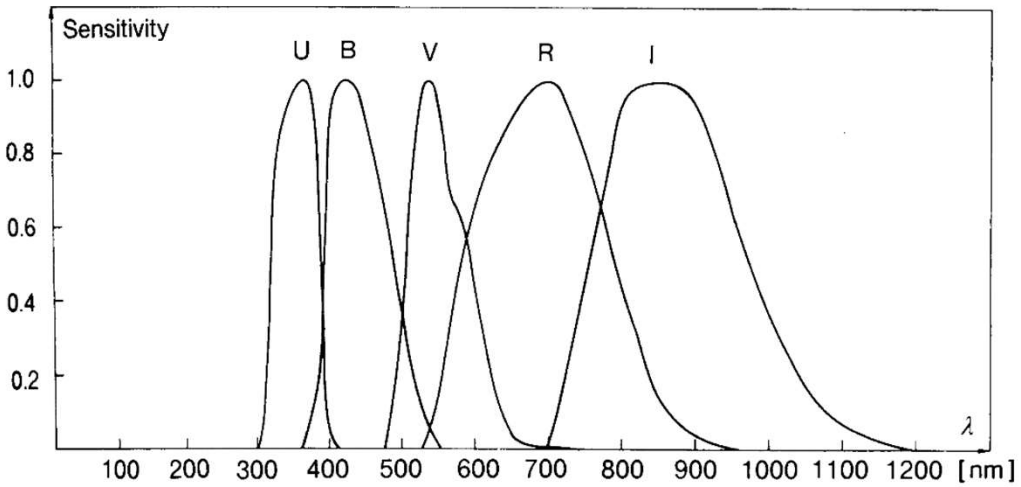
Gaia EDR3 then DR3 are released on June the 13th 2022

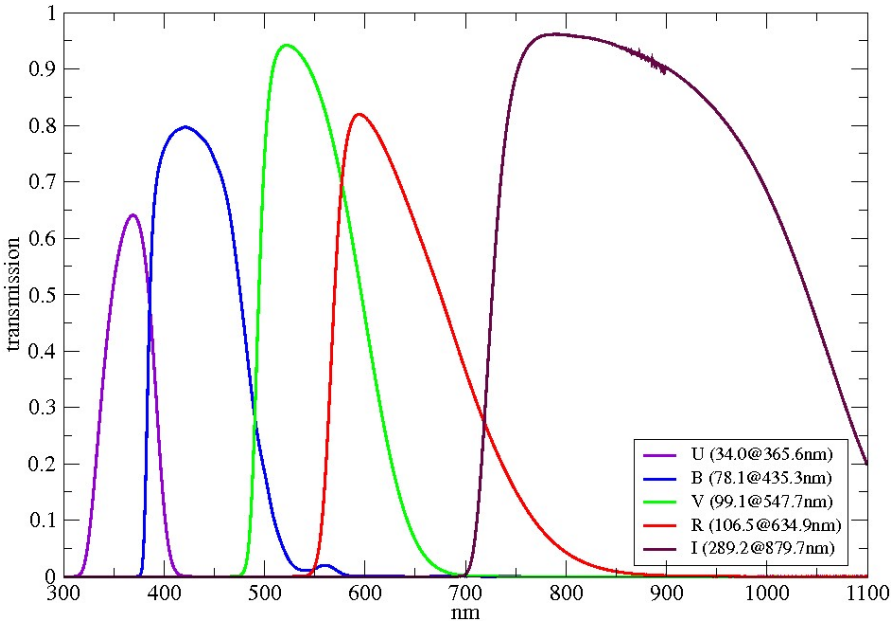
Photometric reduction process is made either with :

- Prism V11 with Grappa (EDR3 extracted catalog) and star fitting process Marc Serrau
- Muniwin
- AstroImage J and Gaia EDR3 via Vizier

Discrepancies between photometric systems

- From Johnson and Cousins U B V R I J K L M N...





er Letter	Effective Wavelength Midpoint λ_{eff} For Standard Filter[2]	Full Width Half Maximum[2] (Bandwidth $\Delta\lambda$)	Variant(s)	Description
aviolet				
	365 nm	66 nm	u, u', u*	"U" stands for ultraviolet.
ble				
	445 nm	94 nm	b	"B" stands for blue.
	551 nm	88 nm	v, v'	"V" stands for visual.
			g, g'	"G" stands for green (visual).
	658 nm	138 nm	r, r', R', R_c, R_e, R_j	"R" stands for red.
Near-Infrared				
I	806 nm	149 nm	i, i', I_c, I_e, I_j	"I" stands for infrared.
Z	900 nm[3]		z, z'	
Y	1020 nm	120 nm	y	
J	1220 nm	213 nm	J', J_s	
H	1630 nm	307 nm		
K	2190 nm	390 nm	K Continuum, K', K_s, K_{long}, K^8, nbK	
L	3450 nm	472 nm	L', nbL'	
Mid-Infrared				
M	4750 nm	460 nm	M', nbM	
N	10500 nm	2500 nm		
Q	21000 nm[4]	5800 nm[4]	Q'	

Set of filters used by Am observers

- UBVRI Johnson Cousins, Bessel, Sloan, RGB

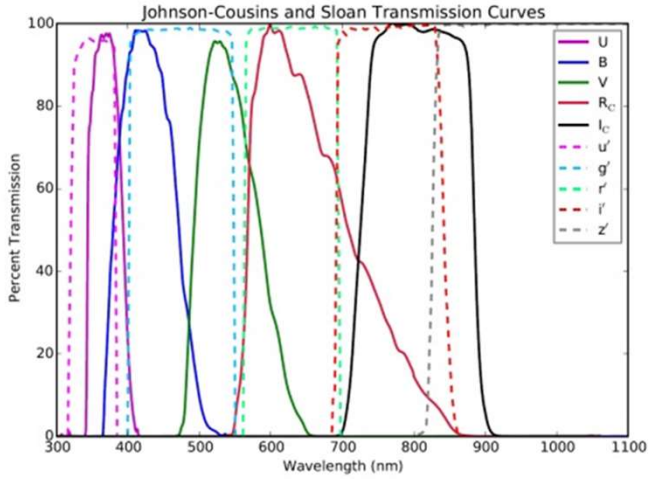
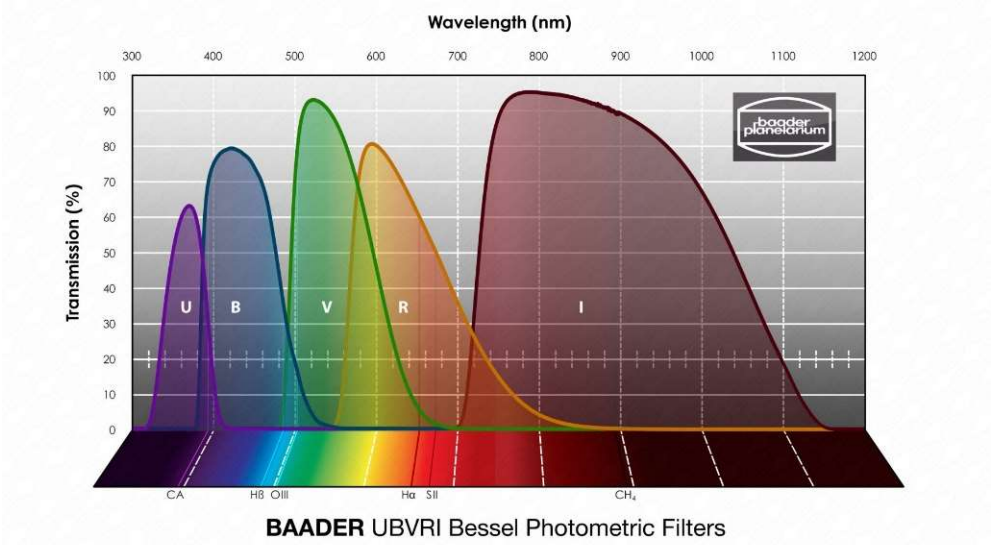
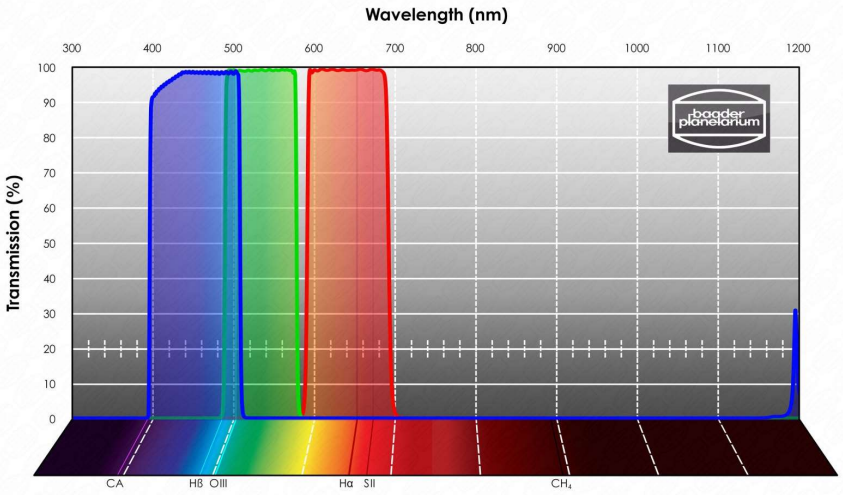


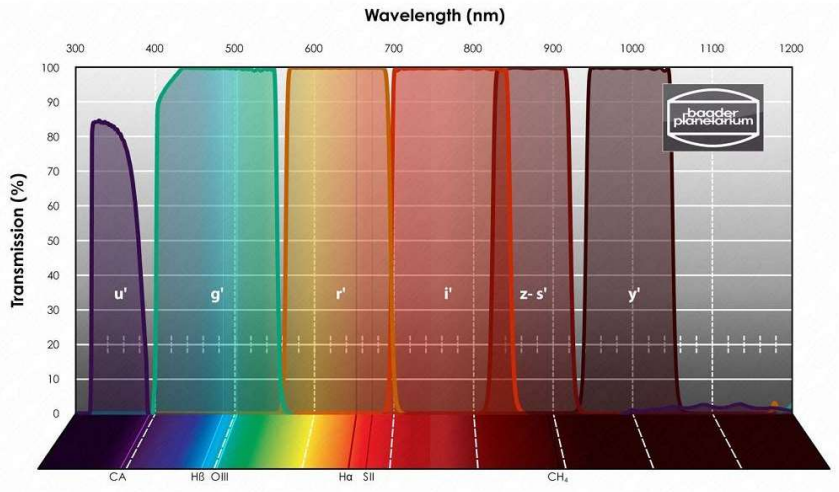
Fig. 4. Astrodon transmission curves for the Johnson-Cousins ($UBVR_CI_C$) and the Sloan ($u'g'r'i'z'$) photometric systems.



BAADER UBVRI Bessel Photometric Filters



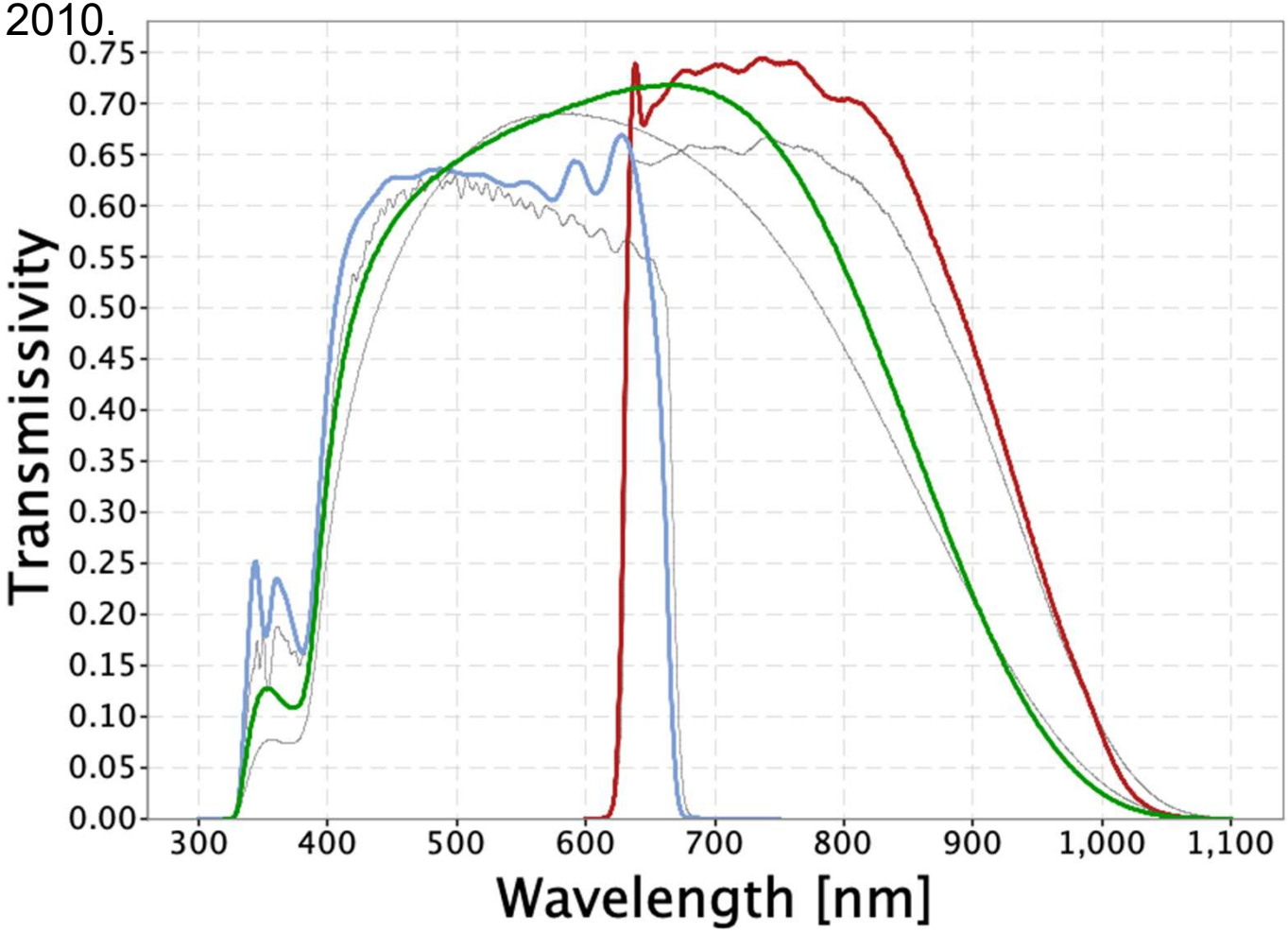
BAADER RGB CMOS Filter – *CMOS-optimized*



BAADER SLOAN/SDSS (ugriz') Photometric Filters

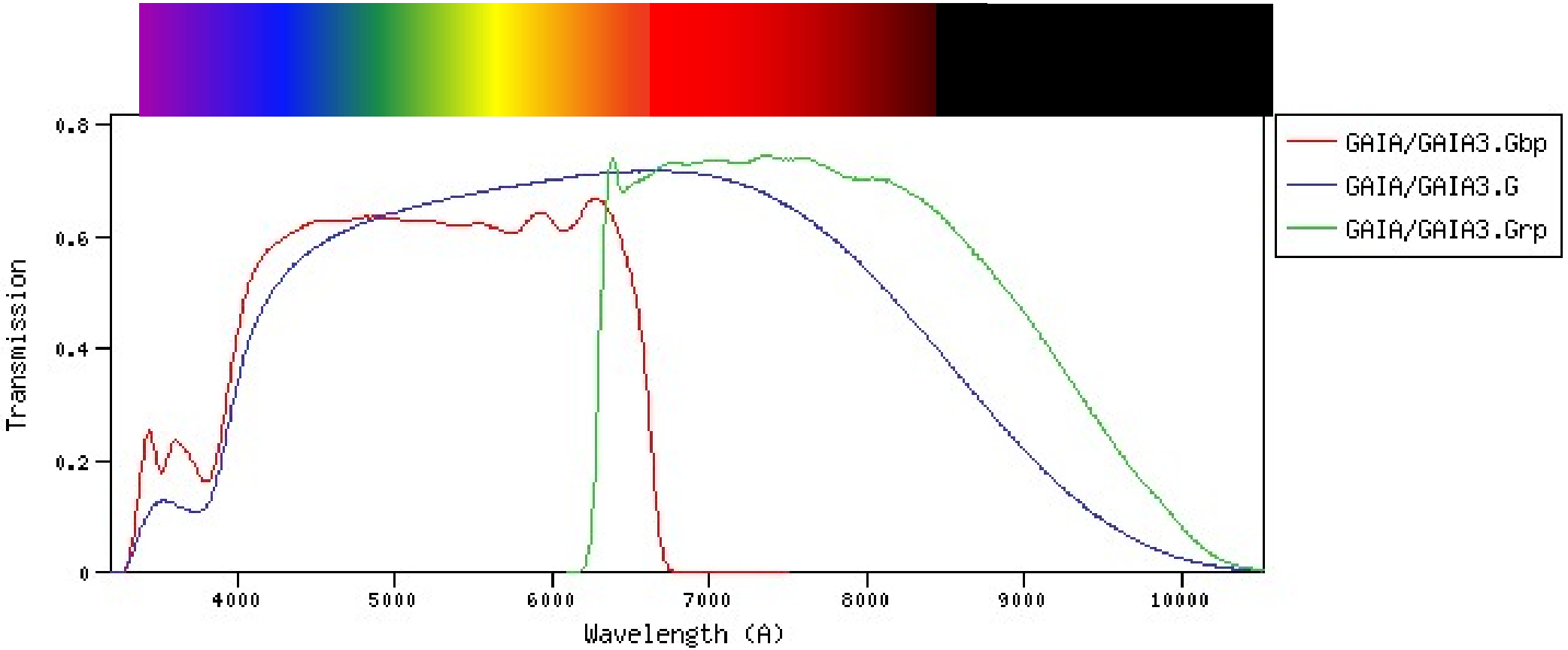
The 3 Gaia photometric bands : G, Gbp et Grp

A more comprehensive description of the photometric and spectral external calibrations will be published in Riello et al. (2020, the paper presenting the EDR3 photometry) and Montegriffo et al. (in preparation, a paper entirely dedicated to the external calibration of the BP/RP spectra). The passbands are shown in the figure above as green, blue, and red solid lines for the G, G_BP, and G_RP bands, respectively. The thin grey lines show the nominal, pre-launch passbands published in Jordi et al. 2010.



(Crédits ESA/Gaia/DPAC, P.Montegriffo, F. de Angeli, C. Cacciari)

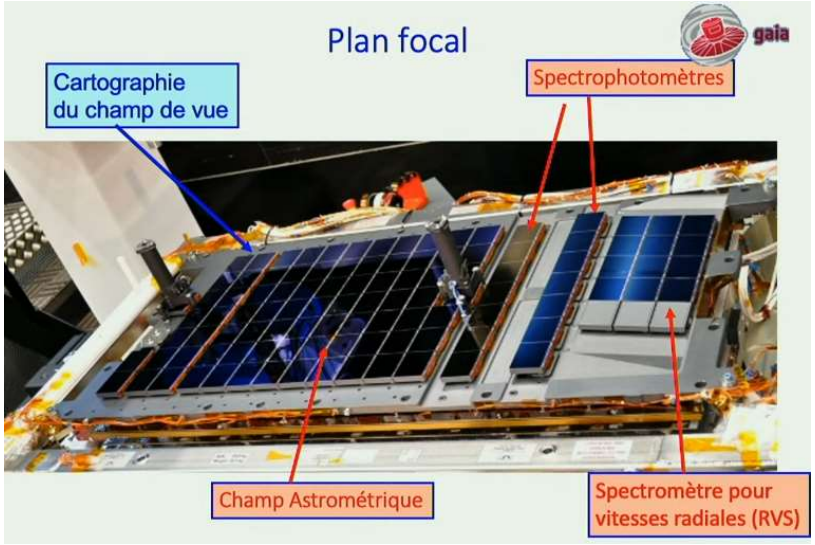
Promote the harmonization of the photometric data with high mag upper limit

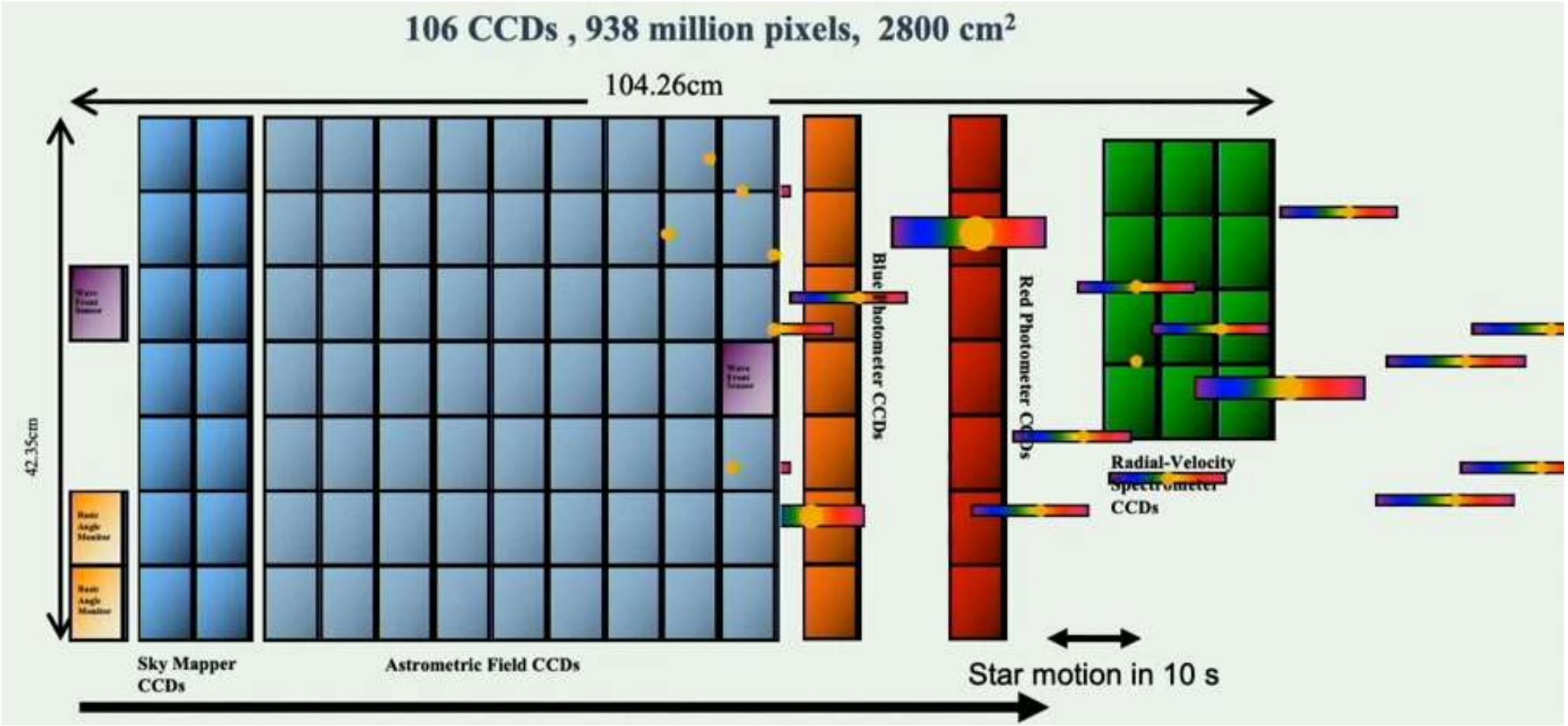


Filter ID		λref	λmean	λeff	λmin	λmax	Weff	ZPv	ZPλ .
GAIA/GAIA3.Gbp	DR3	5109.71	5319.87	5035.75	3292.83	6738.11	2157.50	3552.01	4.08e-9
GAIA/GAIA3.G	DR3	6217.59	6719.55	5822.39	3294.02	10301.96	4052.97	3228.75	2.5e-9
GAIA/GAIA3.Grp		7769.02	7939.10	7619.96	6196.05	10422.96	2924.44	2554.95	1.27e-9

Gaia focal plan array

no filters in front of the fpa
Gbp and Grp are defined by prisms





the Gaia photometric catalog

- Gaia DR3 will be released on June 13, 2022 - info from : https://www.cosmos.esa.int/web/gaia/data-release-3
- 1,46 E9 sources complete astrometry up to mag G 21
- 1,806 E9 sources with G photometry
- 1,54 et 1,55 E9 sources with GBP and GRP bands.

- cross reference with other catalogues :
- Hipparcos-2, Tycho-2 + TDSC merged,
- 2MASS PSC (2MASS XSC merged),
- **SDSS DR13**,
- Pan-STARRS1 DR1, SkyMapper DR2, GSC 2.3, APASS DR9, RAVE DR5, allWISE, URAT-1, et RAVE DR6

- Marc Serrau released Grappa 2 version extract of Gaia EDR3 ready to be plug in Prismv11, CDC, ...

Gaia DR3 catalog accy

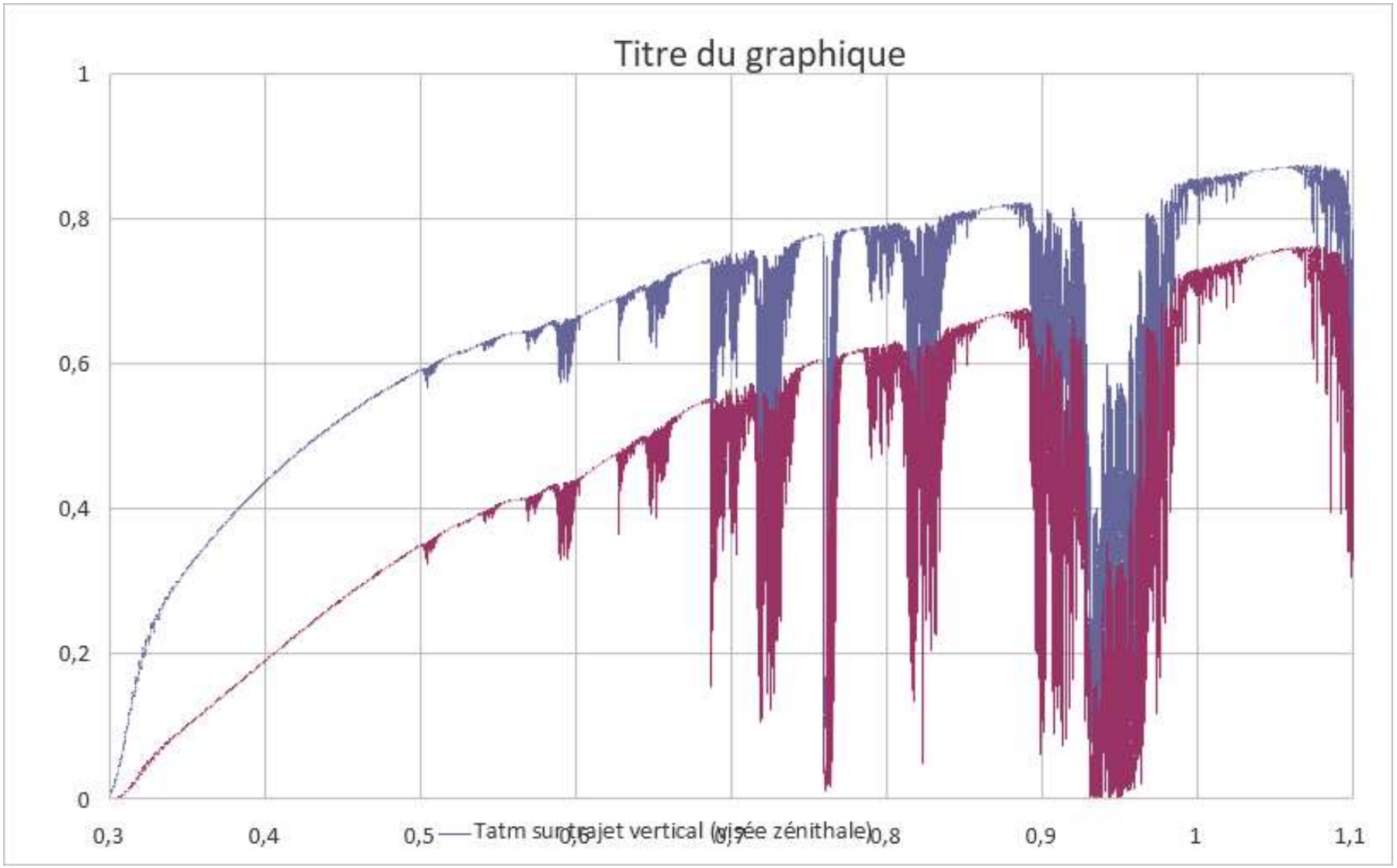
- Photometry (G, GBP, and GRP published as part of Gaia EDR3, OTHER DATA ARE NEW IN GAIA DR3)

- The G-band photometric uncertainties are ~0.3 mmag for G<13, 1 mmag at G=17, and 6 mmag at G=20 mag.
- The GBP-band photometric uncertainties are ~0.9 mmag for G<13, 12 mmag at G=17, and 108 mmag at G=20 mag.
- The GRP-band photometric uncertainties are ~0.6 mmag for G<13, 6 mmag at G=17, and 52 mmag at G=20 mag.
- More information on the properties and limitations of the BP/RP spectra will be published closer to the release of Gaia DR3.

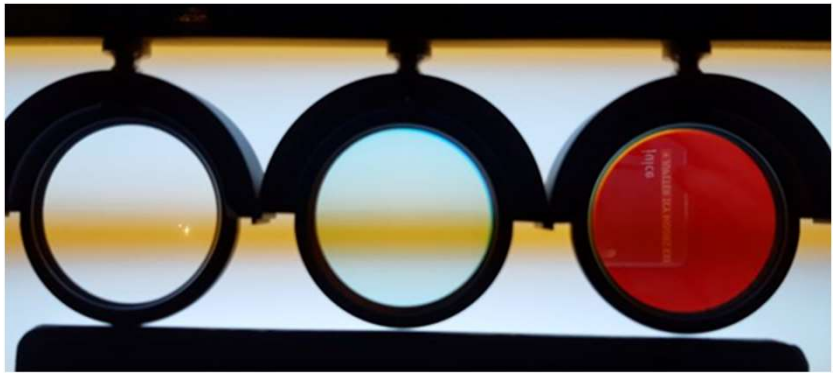
RAPAS filters specs

- Gaia bands are defined outside atmosphere
- Therefore we have to adapt the filter spectral bands to be less sensitive to air mass
- And reduced the QE diversity of CCD and CMOS arrays in the near IR window

Atmospheric transmission 1 and 2 air mass



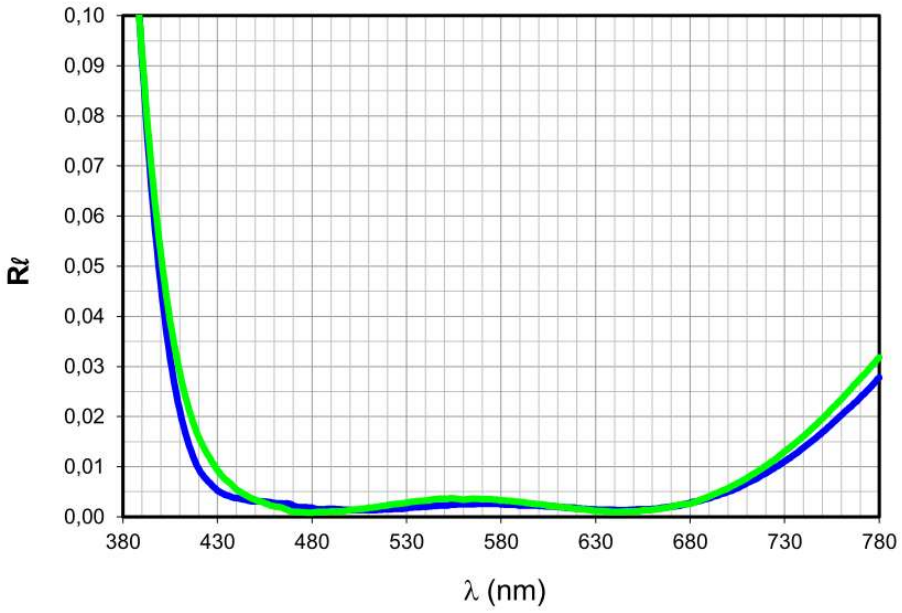
The three RAPAS filters : A, B, C

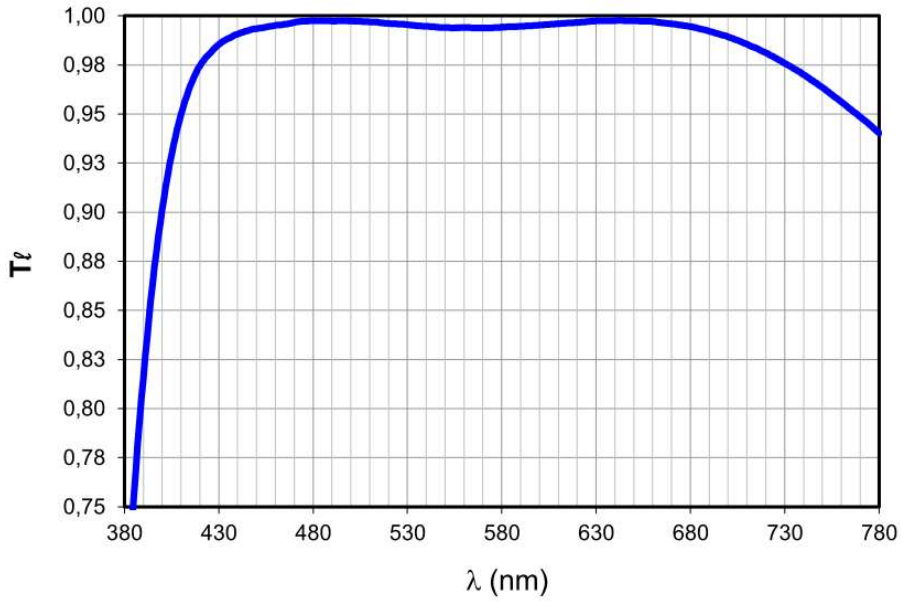


Pictures of the three filters A, B, C set : in 2022 a first batch of 25 filters set was released 50mm diameter 2 mm thickness

- Packing
- Normal transmission
- Aspect angle transmission
- Reflexion

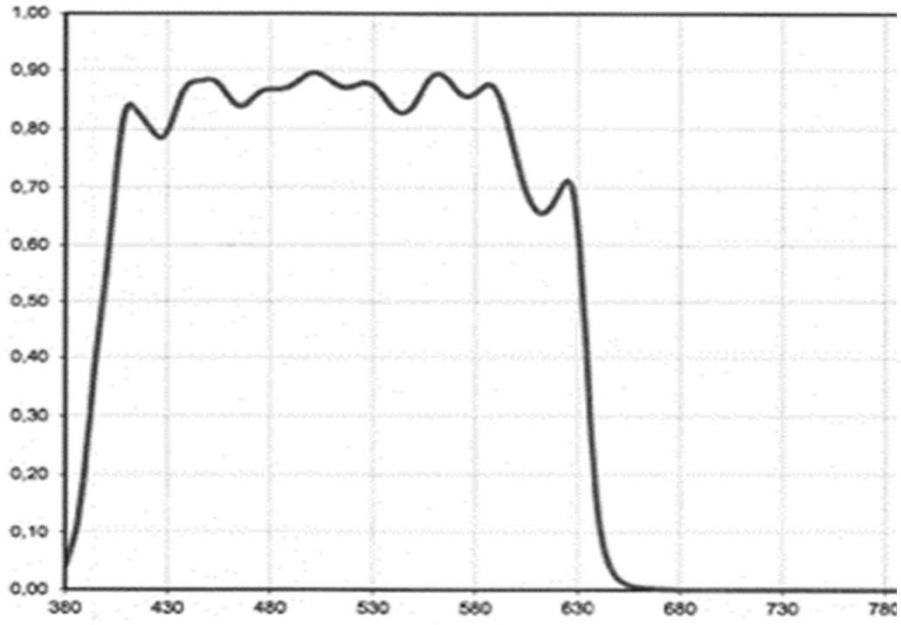
A Filter (G like)



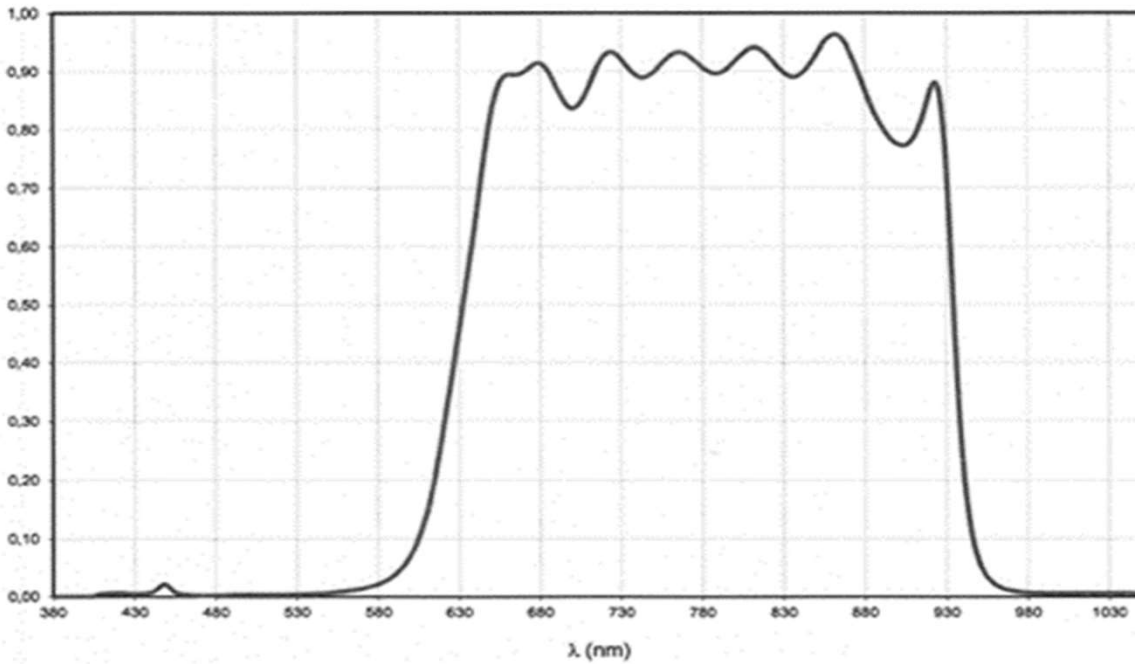


Courbe spectrale i = 5° mesure témoin n=1.51

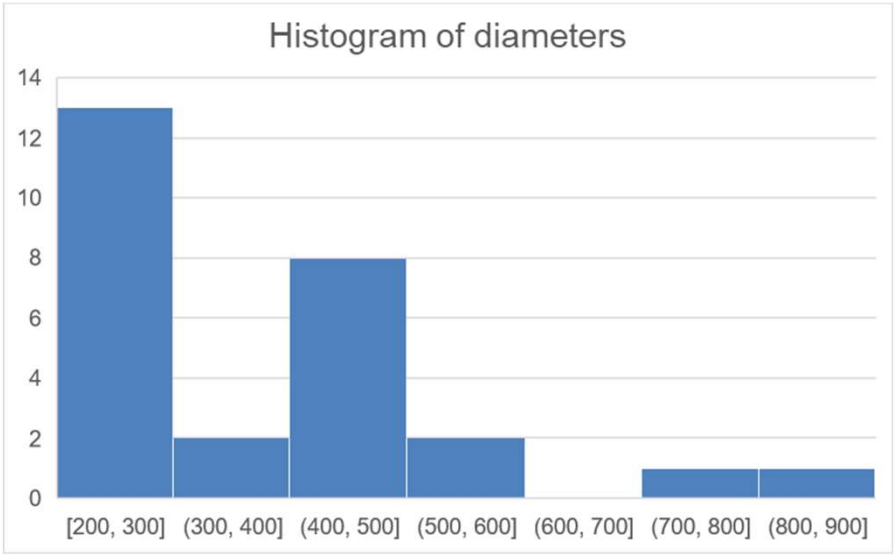
B Filter (Gbp like)

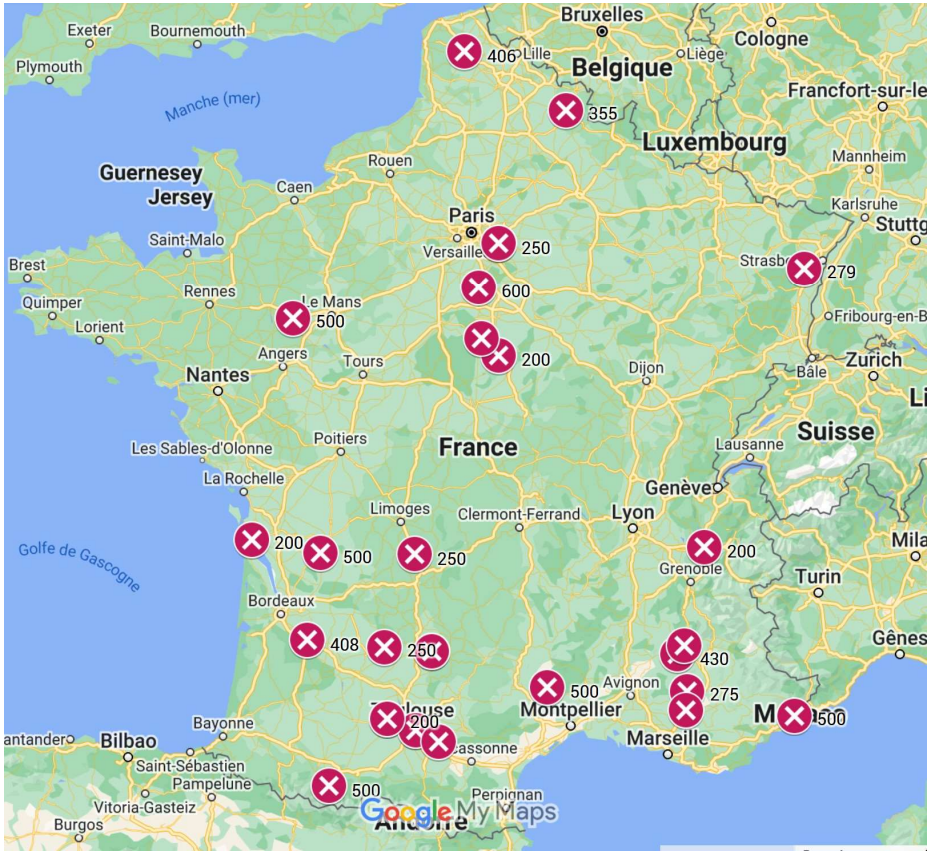


C filter (Grp like)



The 25 amateur observatories equiped with the RAPAS filter set





Horodateur	Prénom	Nom	e-mail	Club, affiliation ou observatoire	Longitude d	Latitude de	Dispos	Diamètı	Surface	Focale i	f/D	Camera	Capteur	Taille H	V	pixel µm	Champ °²	F Guidag	D filtres	Logiciels	Commentai	N° du j	Date de livrais	SA51 exp
7/4/2022 15:30:23	Patrick	Martinez	patrick.martinez264@or	SAF - ADAGIO - Observatoire d	1.81629	43.44424	A05	820		3100	3.8	Moravian C:	CMOS	36	36	9	0.4427177		50			12	11/11/2022	
6/22/2022 17:53:48	Anaël	Wünsche	anael.wunsche@obs-bp.fr		5.6	44.5		800		4860	6.1			30	30		0.1250879		50					
6/3/2022 23:00:44	Yannic	Delisle	delislehatte@yahoo.fr	CPS TJMS Buthiers	2.438028	48.291778	199	600		2100	3.5	QHY268MM	IMX571	23.5	15.7	3.76	0.1834873		36			5	09/10/2022	
6/1/2023 17:48:37	Michel	Rieutord	michel.rieutord@irap.or	Observatoire Midi-Pyrénées	+00:08:41:9	+42:56:13:00		508		2299	24x36	50.8	C'est le T50 du Pic-d-Midi, CDK Planewave de 20", remplaçant le vieux T60 transféré au n									19	26/06/2023	
5/30/2022 8:50:20	Thierry	Midavaine	thierrymidavaine@sfr.fr	Observatoire Salvia	-0.4075	47.9825	i73	500		1400	2.8	ASI6200MM	IMX455	36	24	3.76	0.9647431	0	50			1	31/10/2022	600
8/16/2022 15:10:58	Jean-Marie	Lopez	skyciel34@gmail.com	SAM- Observatoire des Pises	3.5036111	44.039167	122	500		2200	4.4	ASI6200MM	IMX455	36	24	3.76	0.3906811		50	Prism		14	13/11/2022	
10/6/2022 2:43:32	Philippe	Dupouy	obsdax@orange.fr	Observatoire de Dax				500		2250	4.5			17.7	13.4		0.1164367		36			22		60
9/20/2022 17:05:52	Hadrien	Dupuis	observatoire-jbt@upsins	Observatoire Jocelyn Bell de Tou	1.4685°	43.5632°		500		2279	4.6			37	37		0.8652868		50			6	12/11/2022	mars-24
12/16/2022 13:00:32	Éric	Barbotin	ebarbotin@sfr.fr	Astroclub charentais	0	45.5	Non	500		3400	6.8			36	24		0.1635724		50			16	01/05/2023	revision mor
6/28/2022 14:34:58	Matthieu	Conjat	mconjat@free.fr	Aquila / Observatoire de la Côte	7.2997	43.725	020	500		7500	15.0			22.5	22.5		0.0295453		31.75		Autre instru	10	12/11/2022	nov-23
6/21/2022 17:53:48	Anaël	Wünsche	anael.wunsche@obs-bp	Observatoire des Baronnies Pro	5.5	44.4	B10	430		1970	4.6			36	24		0.4872314		50			8	11/11/2022	120
10/5/2022 14:12:17	Florent	Losse	florent_losse@yahoo.fr	St Pardon de Conques (observa	-0.203056	+44.5588	I93	408		1500	3.7	ASI2600MM	IMX	23.5	15.7	3.76	0.3596351		36		Très actif su	23	13/11/2022	60
7/2/2022 11:42:13	Arnaud	Leroy	uranoscopeidf@gmail.c	Uranoscope de l'Ile de France	2.7422	48.7422	A07	355		710	2.0			11.25	7.03		0.3218394		50		porte filtes r	11	11/11/2022	
10/10/2022 17:49:04	Philippe	Morel	Morel.Philippe@wanadc	Observatoire Charles Fehrenbac	3.77607346	50.0848398025446		355		3910	11.0			24	36		0.2782895		50.8			2	13/11/2022	Vega
9/19/2022 18:40:59	Marc	Serrau	marc.serrau2@free.fr	SAF & Planète-Sciences	5.6475	43.9997	B24 et	300		3270	10.9	QHY268M	IMX571	23.5	15.7	3.76	0.0756744		36		Taille capte	18	13/11/2022	600
11/14/2022 20:25:33	Patrick	Sogorb	patrick.sogorb@gmail.c	Club Luberon Sud Astro, Bastidan observatory			D11	280		1530	5.5			16			0		31.75			17		retour des fi
11/23/2022 9:21:29	Lisa	Maris	elisabeth.maris.froelich@gmail.com					280		1764	6.3	ATIK4000	KAI 04022	16.67	16.05	7.4	0.2717679					25		1200
11/16/2022 17:56:42	Roger	Hellot	roger.hellot@gmail.fr	Observatoire Rosheim-TRBL	7.45937	48.489954	Non	279		2790	10.0			12	9		0.0341603		31.75			4		nov-23
10/27/2022 0:51:25	Jean-Marie	Vugnon	jm-v@sfr.fr	club eclipse	-0.017717	46.811067		260		1220	4.7			36	24		1.2704222		50			21	13/11/2022	
10/28/2022 0:51:25	Jean-Marie	Vugnon	jm-v@sfr.fr	club eclipse	-0.017717	46.811067		200		1000	5.0													
9/6/2022 16:19:15	Jean-Baptist	Marquette	jean-baptiste.marquette	LAB	0.3911	44.2616	N/A	250		1000	4.0			13.19	8.81		0.2547986		31.75		Il manque le	reporté	Non pour le m	dec 2023
9/27/2022 2:30:31	Guy	Copin	guycopin@orange.fr	GAP 47	44.48333	0.983333	Non	250		1250	5.0			23.2			0		50		Très interes	20	Poste	
6/6/2022 8:23:52	Christian	Pantacchini	christ.panta@gmail.con	Observatoire de BENAYES	1°27'	45°29'	non	250		1358	5.4			25.1	17.64		0.5539147		néant		Nom obs A/	7	13/11/2022	
7/3/2022 11:42:13	Arnaud	Leroy	uranoscopeidf@gmail.c	Uranoscope de l'Ile de France				250			0.0						#DIV/0!							720
8/23/2022 17:54:57	Patrick	Wullaert	wullaert_chatillon@hotn	SAF, Astro-Club d'Ouzouer sur l	2.7401	47.588	non	200		1000	5.0			11.25	7		0.1608575		31.75		Mon club p	15	11/11/2022	nov-23
10/5/2022 2:43:32	Philippe	Dupouy	obsdax@orange.fr	Observatoire de Dax			958	200		1410	7.1			8.8	6.3		0.0655372		31		Possibilité	22	13/11/2022	1
11/22/2022 9:21:29	Lisa	Maris	elisabeth.maris.froelich(	CEPHEE73	+5 54 38	453341	No	200		2000	10.0			15.3	15.2		0.1896149		31.75				13/11/2022	

Selected areas to assess magnitude upper limit
Edgar Everhart Sky&Telescope Jan 1984

Finding Your Telescope's Magnitude Limit

EDGAR EVERHART, *Chamberlin Observatory, University of Denver*

HOW FAINT will it reach? This is a question that often comes to mind when considering a telescope or camera to be turned toward the heavens. While there are numerous tables that cite the limiting stellar magnitude for a given telescope aperture (see, for example, page 193 of the March, 1980, issue), in practice this limit is affected by many factors.

The condition and number of optical surfaces in a system will affect performance, as will light pollution and other atmospheric effects. For the observer, the physical condition of the eye is important, while photographers must consider such factors as film, filters, exposure times, and developing methods.

Therefore, in order to determine the limiting magnitude of a particular instrument, it is best to observe or photograph the sky directly. This calls for some type of star atlas or chart showing the magnitudes of selected stars. But herein lies problem: Even binoculars and short exposures with small cameras will reveal stars fainter than those plotted in Wil Tirion's *Sky Atlas 2000.0* (limiting magnitude 8 or *The AAVSO Variable Star Atlas* (limiting about 9.0).

For fainter magnitudes there are Vehrenberg *Atlas of the Selected Areas* and charts for certain variable stars prepared by the American Association of Variable Star Observers. Both include stars to about 16th magnitude — adequate for visual observers working with instruments up to nearly 30-inch aperture. But photographers can reach even fainter stars with surprisingly modest equipment.

Sixty years ago, the famous 16-inch (0.4-meter) Metcalf camera at Harvard Observatory was recording stars to magnitude 16. Today, however, advances in emulsions and hypersensitizing techniques make it possible for the same size telescope to photograph stars of 21st magnitude. Smaller telescopes can easily reach beyond the 16th-magnitude limit of the charts mentioned above.

Large observatories have special methods for calibrating photographic plates and determining the magnitudes of faint stars on them. The photographs described and reproduced here will be useful for smaller observatories and advanced amateurs, as they contain accurate star brightnesses down to 21st magnitude.

The magnitudes marked on the photographs are from a paper by L.-T. G. Chiu published in the *Astrophysical Journal Supplement* for September, 1980. Chiu was studying the structure of our galaxy as determined by proper motions of stars. For this work he used numerous photographs made in blue, yellow, and red light with the giant reflectors at Lick, Kitt Peak, and Palomar observatories. Chiu credits I. R. King and co-workers at the University of California, Berkeley, for the photovisual magnitudes of the stars. They used an iris photometer calibrated with photoelectric sequences. Photovisual magnitudes do not correspond exactly with what the eye sees but are reasonably close.

Chiu studied stars in Selected Areas (SA) 51, 57, and 68, each nearly centered on an 8th- or 9th-magnitude star listed in the Smithsonian Astrophysical Observatory *Star Catalog*. These areas are fairly well distributed in right ascension, and at least one field is accessible on most nights in the Northern Hemisphere.

Although the magnitudes listed in Chiu's tables are quite accurate, he did not include charts. I remedied this by photographing all three areas with the 16-inch f/5.5 astrographic reflector at Chamberlin Observatory's Dick Mountain Field Station near Bailey, Colorado. The exposures, made between December, 1980, and July, 1981, were 75 to 100 minutes in duration on nights of good seeing. I used Kodak's Technical Pan Film 2415, which was hypersensitized before exposure by soaking in forming gas (8 percent hydrogen, 92 percent nitrogen) at atmospheric pressure for five hours at 60° C. The 4 x 5 film sheets were processed in D-19 developer for five minutes at 21° C.

My negatives were enlarged 24 times and made into reverse prints (black stars on a white background). The exact scale as reproduced here can be found from the line 400 arc seconds long on the right side of each print.

Within the borders of the photograph of SA 51, Chiu's list contains 235 stars to photovisual magnitude 20.5. Of these, seven stars are covered by the image of a brighter one. Six of magnitude 20.5 are shown on the photograph, but another of the same brightness is not.

For the photograph of SA 57, Chiu's list contains 65 stars. Of these, two were covered by other images and three were not found. Among the 60 stars marked are five with magnitudes from 21.0 to 21.2

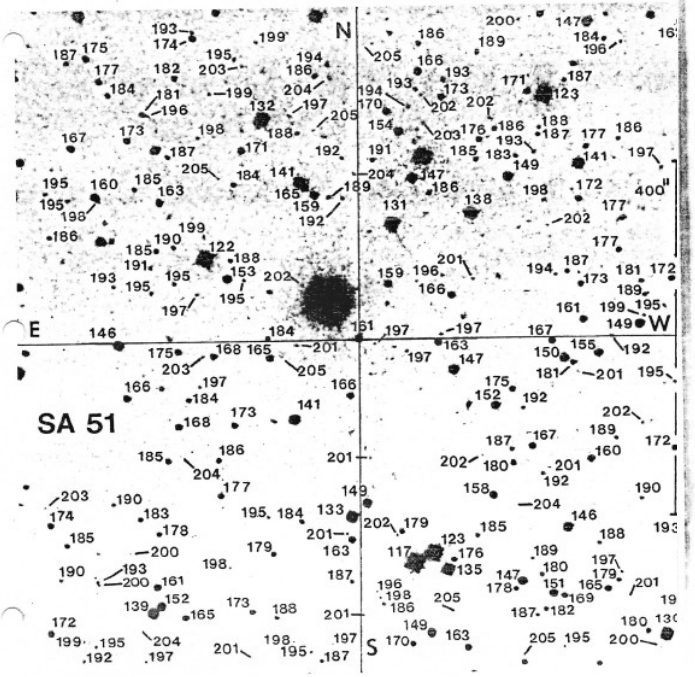
(the basis for my earlier statement
day a 16-inch telescope can rea
magnitude stars). The photograp
68 should contain 89 stars from Ch
but one was not found. The remai
some as faint as magnitude 20.5
visible.

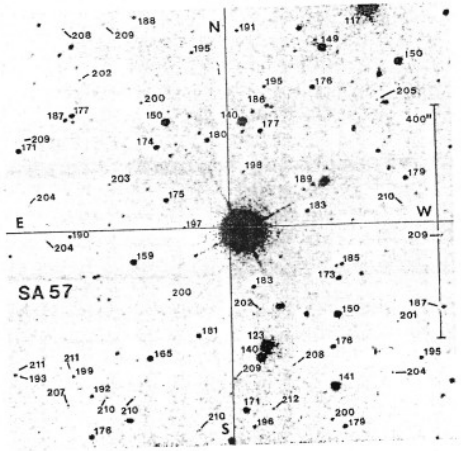
I wish to thank Elizabeth Roem
University of Arizona for calling n
tion to Chiu's original paper, and
Hoag at Lowell Observatory for his
and suggestions while I was work
on this project.

*Edgar Everhart is the director of t
lin Observatory at the University of
where he teaches physics and astronom
currently active in astrometry, particu
determination of accurate positions of*

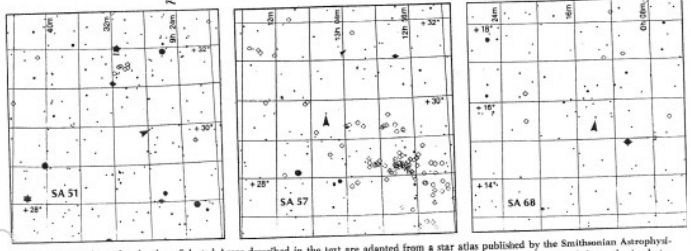
PRIMARY STAR IN EACH SELECTED AREA

Area	Star	Mag.	1950.0	2000.0
SA 51	SAO 79445	9.1	7h 27.5m, +29° 56′	7h 30.6m, +29° 50′
SA 57	SAO 82672	8.1	13h 6.3m, +29° 39′	13h 8.6m, +29° 23′
SA 68	SAO 91810	8.2	0h 14.0m, +15° 34′	0h 16.6m, +15° 50′

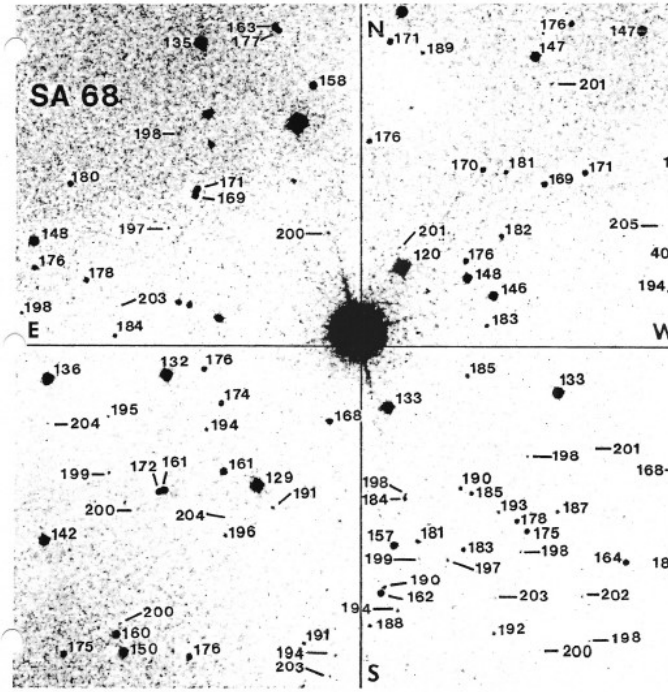




The photographic charts with this article were prepared by the author and are more fully described in the text. Each is nearly centered on a bright star listed in the table on page 30, while finder charts for the fields are below. Photovisual magnitudes are shown for selected stars with decimal points omitted (for example, 184 indicates a star of magnitude 18.4). All photographs have north up, and each field is about ¼° wide.

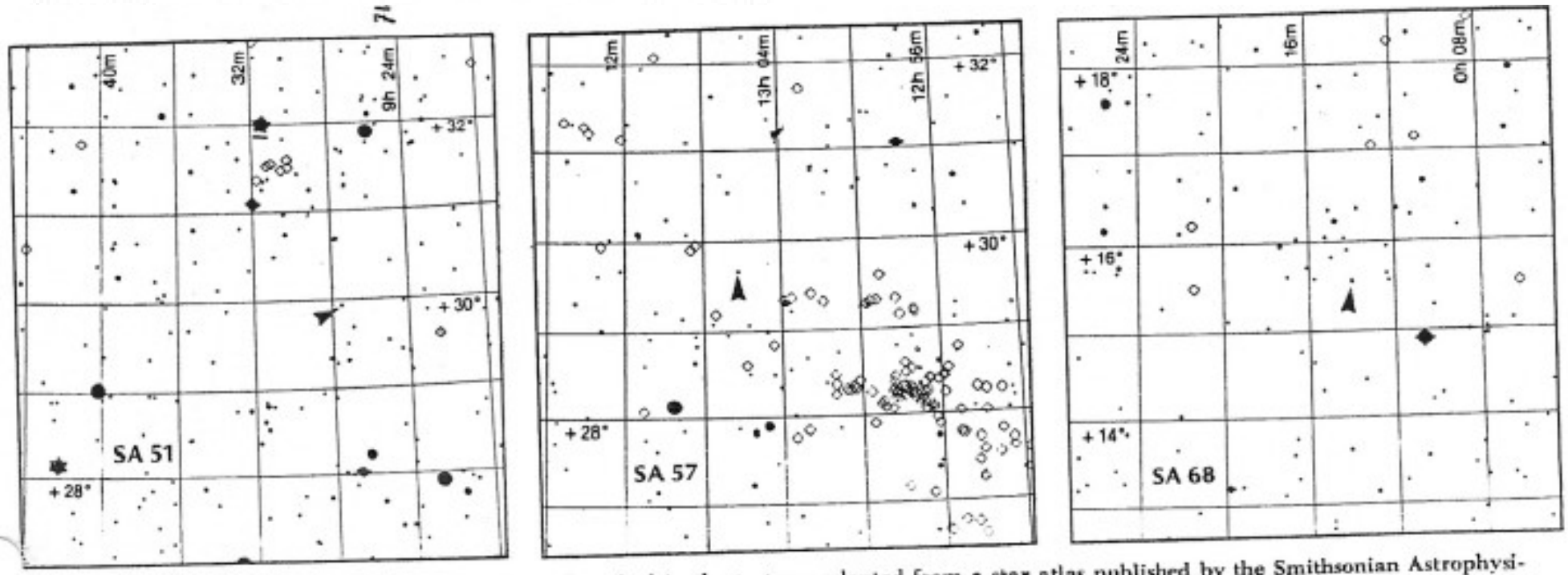


These finder charts for the three Selected Areas described in the text are adapted from a star atlas published by the Smithsonian Astrophysical Observatory. North is up, and each field is 5° square. Arrows denote the bright star near the center of each of the author's photographs. The finder chart for SA 51 contains Gemini's bright stars Castor at top center and Pollux at lower left. The brightest star in the SA 57 finder is 4th-magnitude Beta Comae Berenices at lower left. SA 68 is located just northeast of 3rd-magnitude Gamma Pegasi.



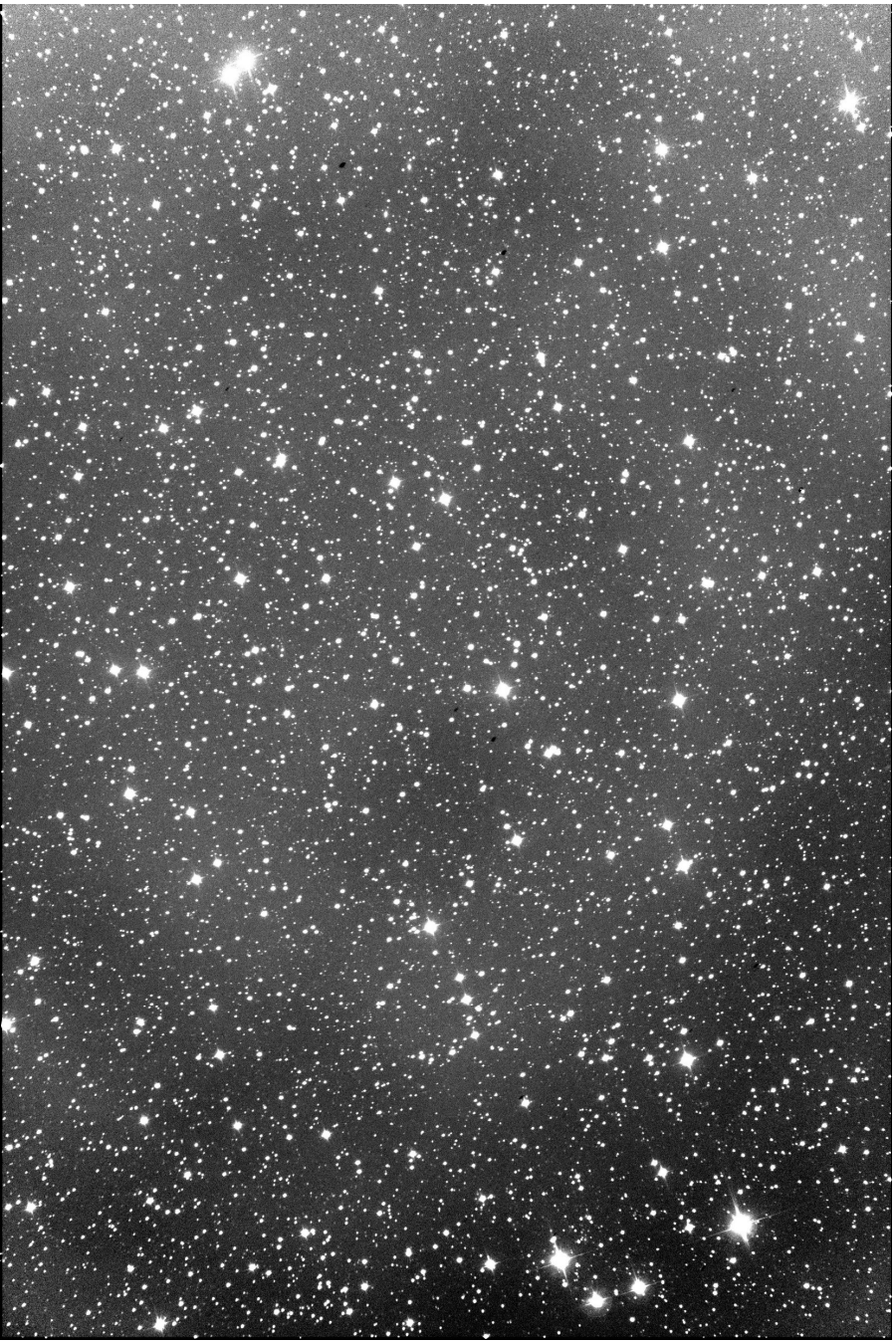
PRIMARY STAR IN EACH SELECTED AREA

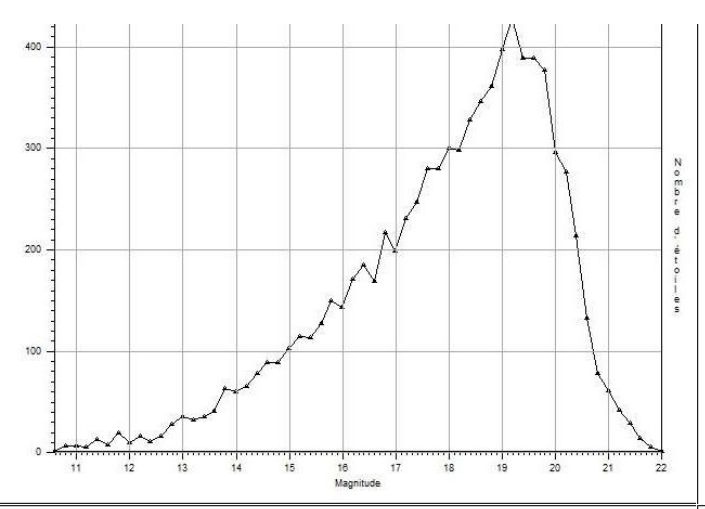
Area	*Star*	*Mag.*	*1950.0*	*2000.0*
SA 51	SAO 79445	9.1	7h 27.5m, +29° 56′	7h 30.6m, +29° 50′
SA 57	SAO 82672	8.1	13h 6.3m, +29° 39′	13h 8.6m, +29° 23′
SA 68	SAO 91810	8.2	0h 14.0m, +15° 34′	0h 16.6m, +15° 50′

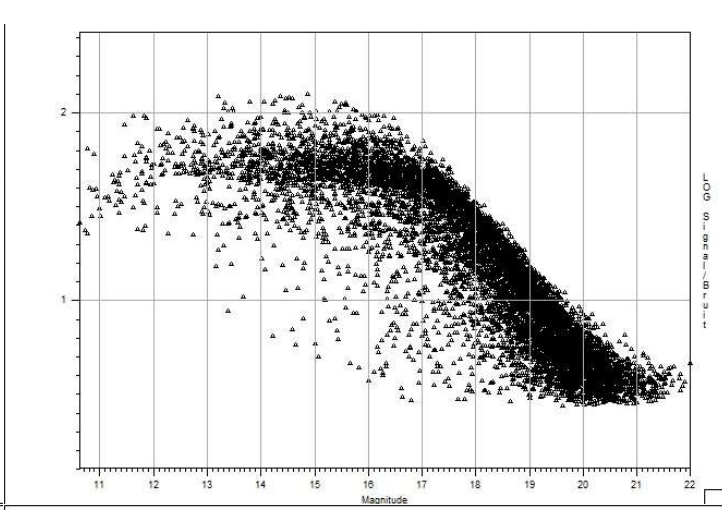


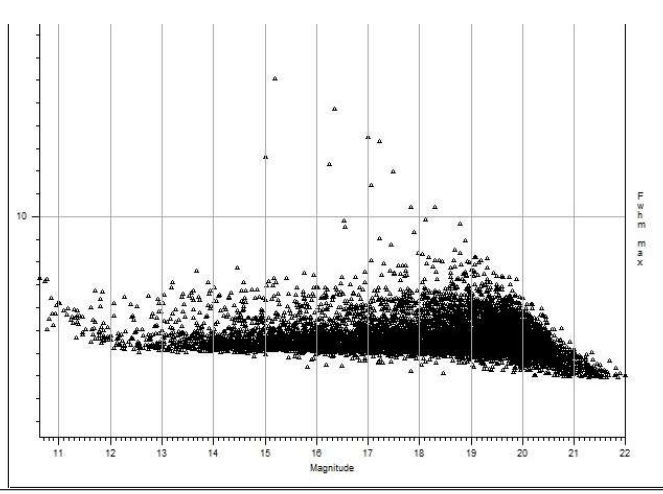
These finder charts for the three Selected Areas described in the text are adapted from a star atlas published by the Smithsonian Astrophysical Observatory. North is up, and each field is 5° square. Arrows denote the bright star near the center of each of the author's photographs. The finder chart for SA 51 contains Gemini's bright stars Castor at top center and Pollux at lower left. The brightest star in the SA 57 finder is 4th-magnitude Beta Comae Berenices at lower left. SA 68 is located just northeast of 3rd-magnitude Gamma ~~Persei~~ Pegasi.

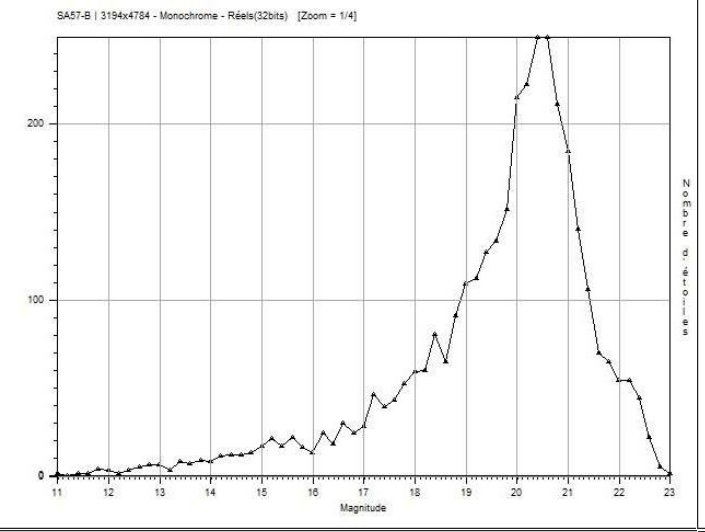
Thierry SA51 10x60s G

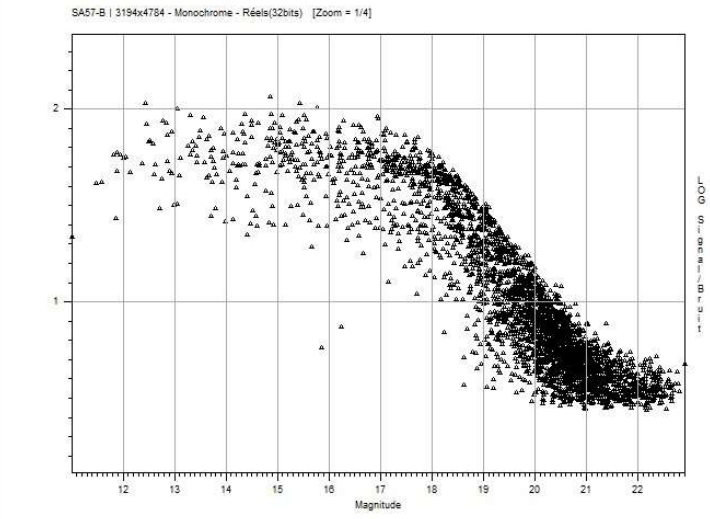


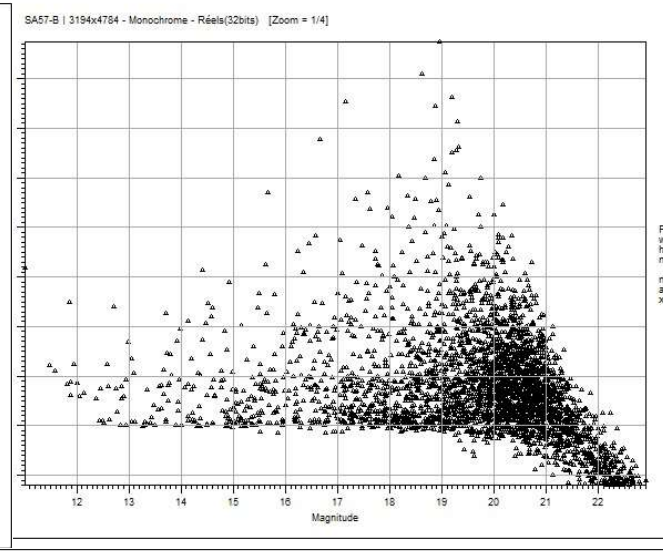

Nombre d'étoiles
Magnitude

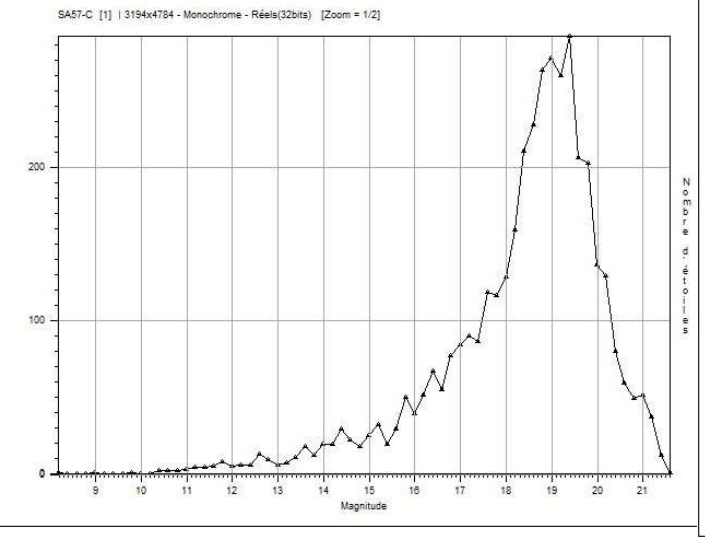

LOG Signal/Bruit
Magnitude

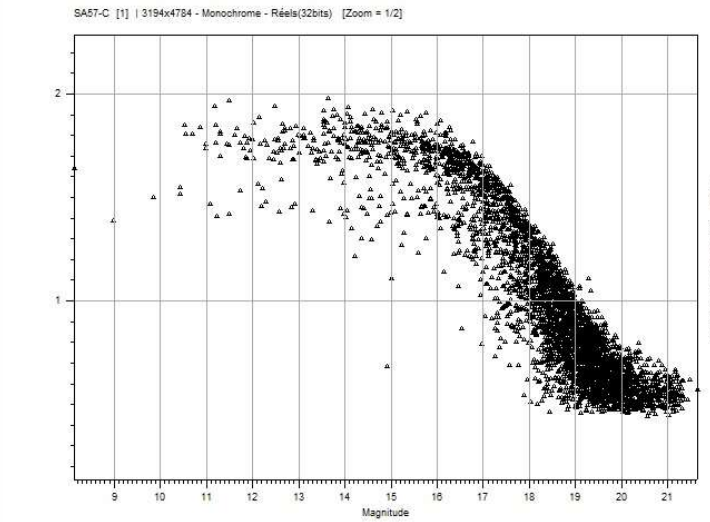

Fwhm max
Magnitude

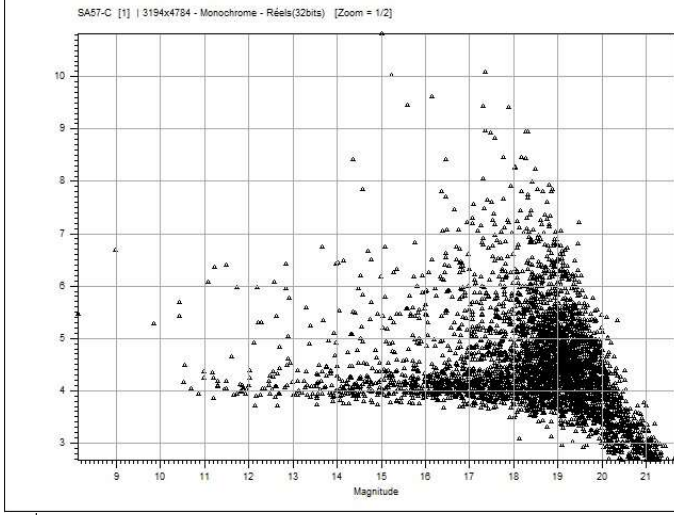

SA57-B | 3194x4784 - Monochrome - Réels(32bits) [Zoom = 1/4]
Nombre d'étoiles
Magnitude


SA57-B | 3194x4784 - Monochrome - Réels(32bits) [Zoom = 1/4]
LOG Signal/Bruit
Magnitude

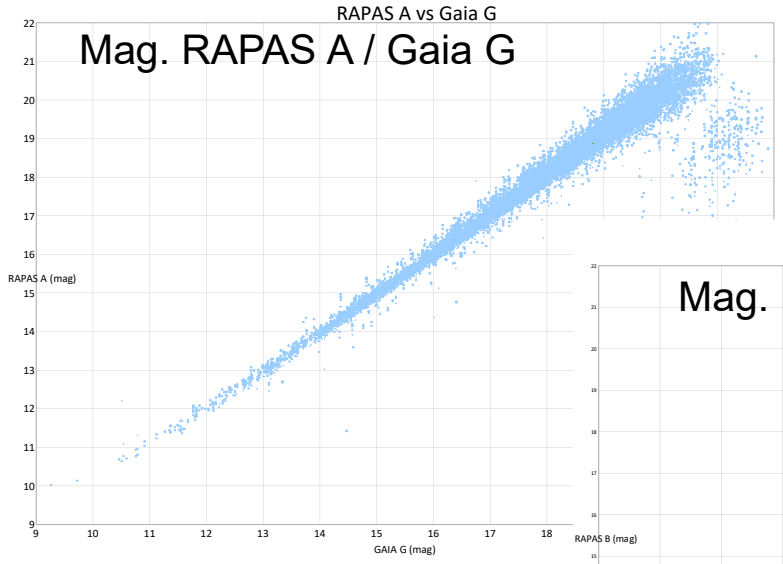

SA57-B | 3194x4784 - Monochrome - Réels(32bits) [Zoom = 1/4]
Magnitude

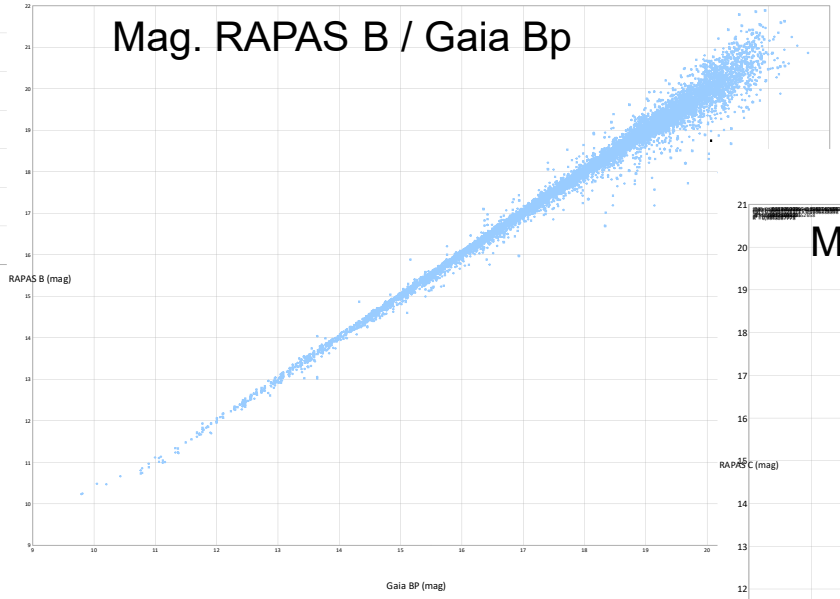

SA57-C [1] | 3194x4784 - Monochrome - Réels(32bits) [Zoom = 1/2]
Nombre d'étoiles
Magnitude

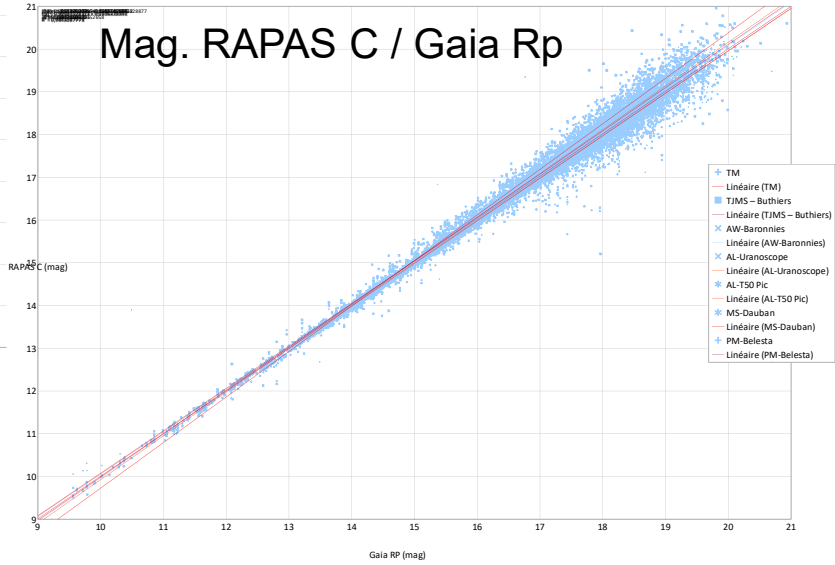

SA57-C [1] | 3194x4784 - Monochrome - Réels(32bits) [Zoom = 1/2]
LOG Signal/Bruit
Magnitude

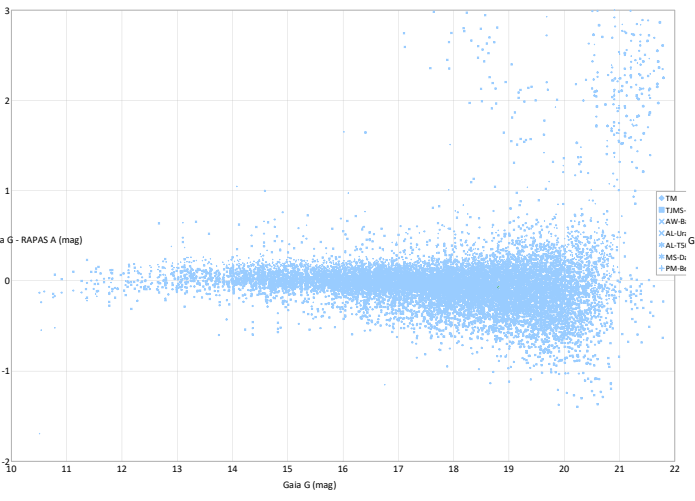

SA57-C [1] | 3194x4784 - Monochrome - Réels(32bits) [Zoom = 1/2]
Magnitude

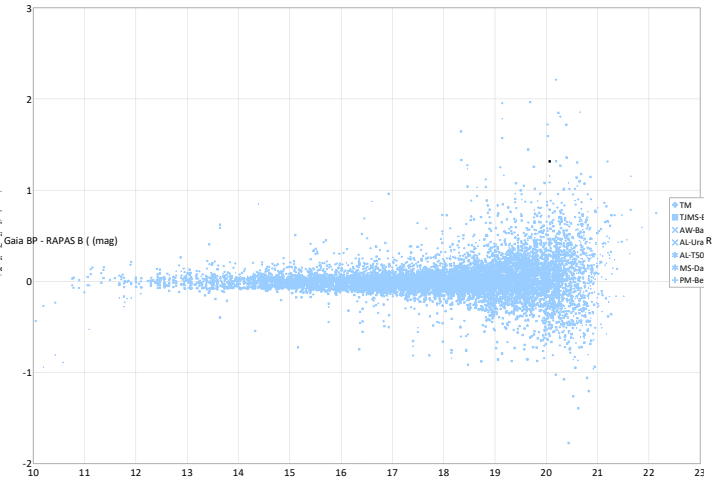
Première synthèse des réponses et dispersions Préparées par Marc Serrau

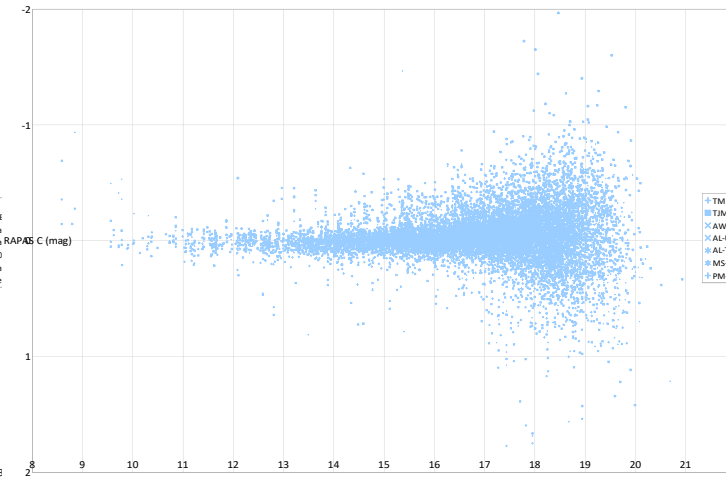


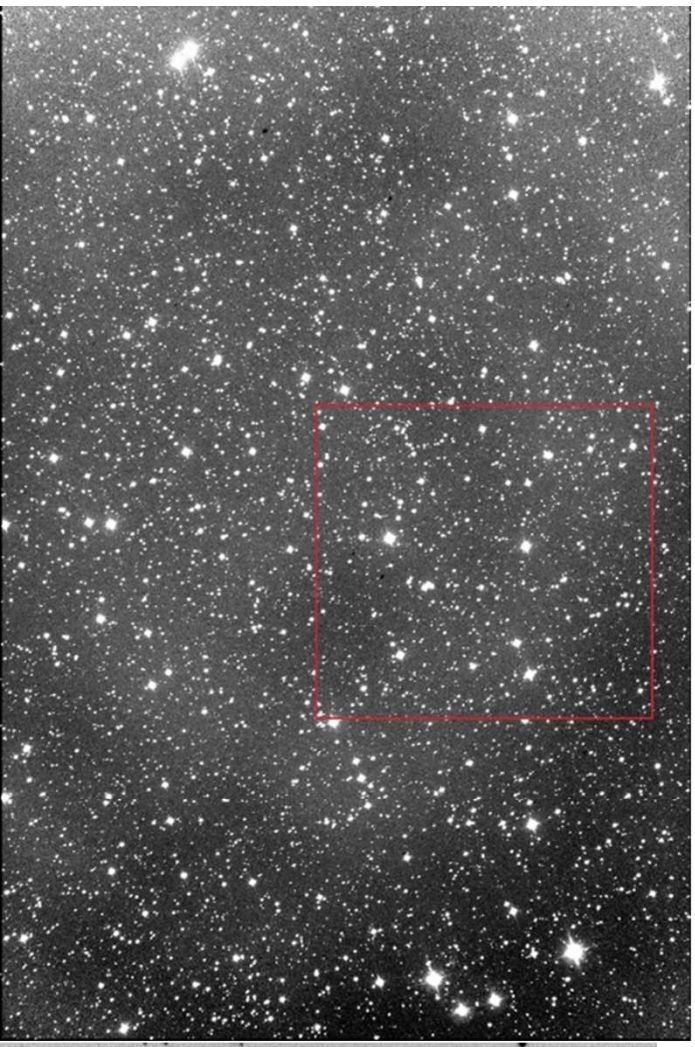






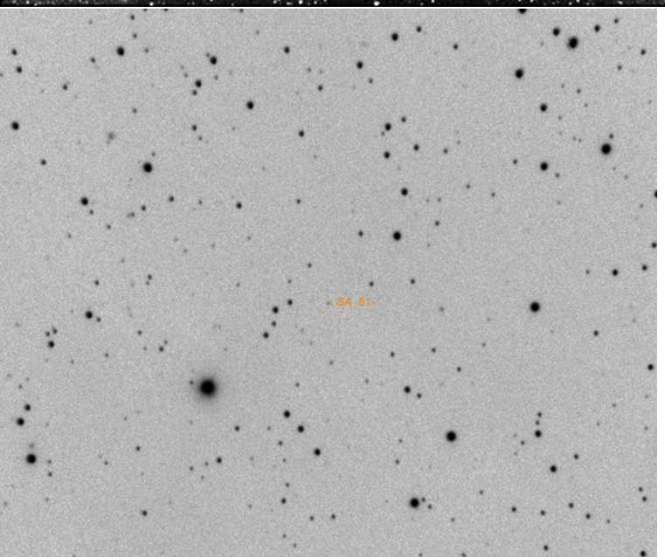


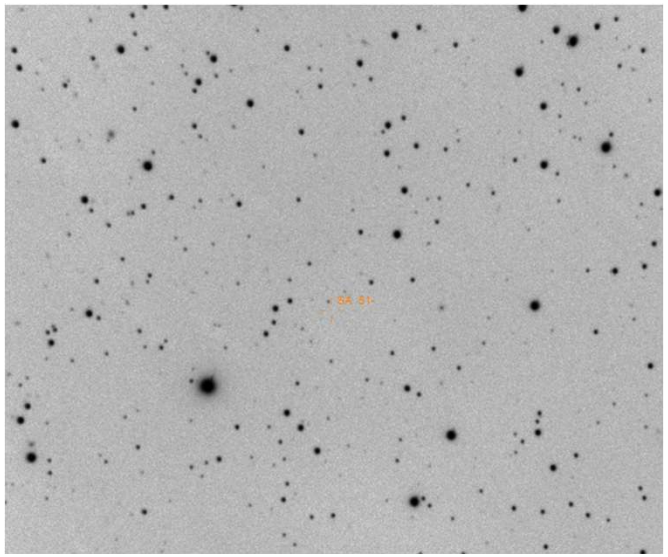


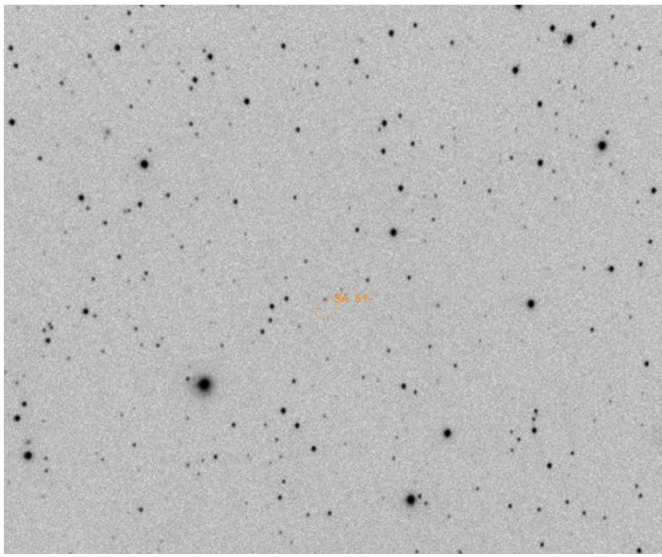


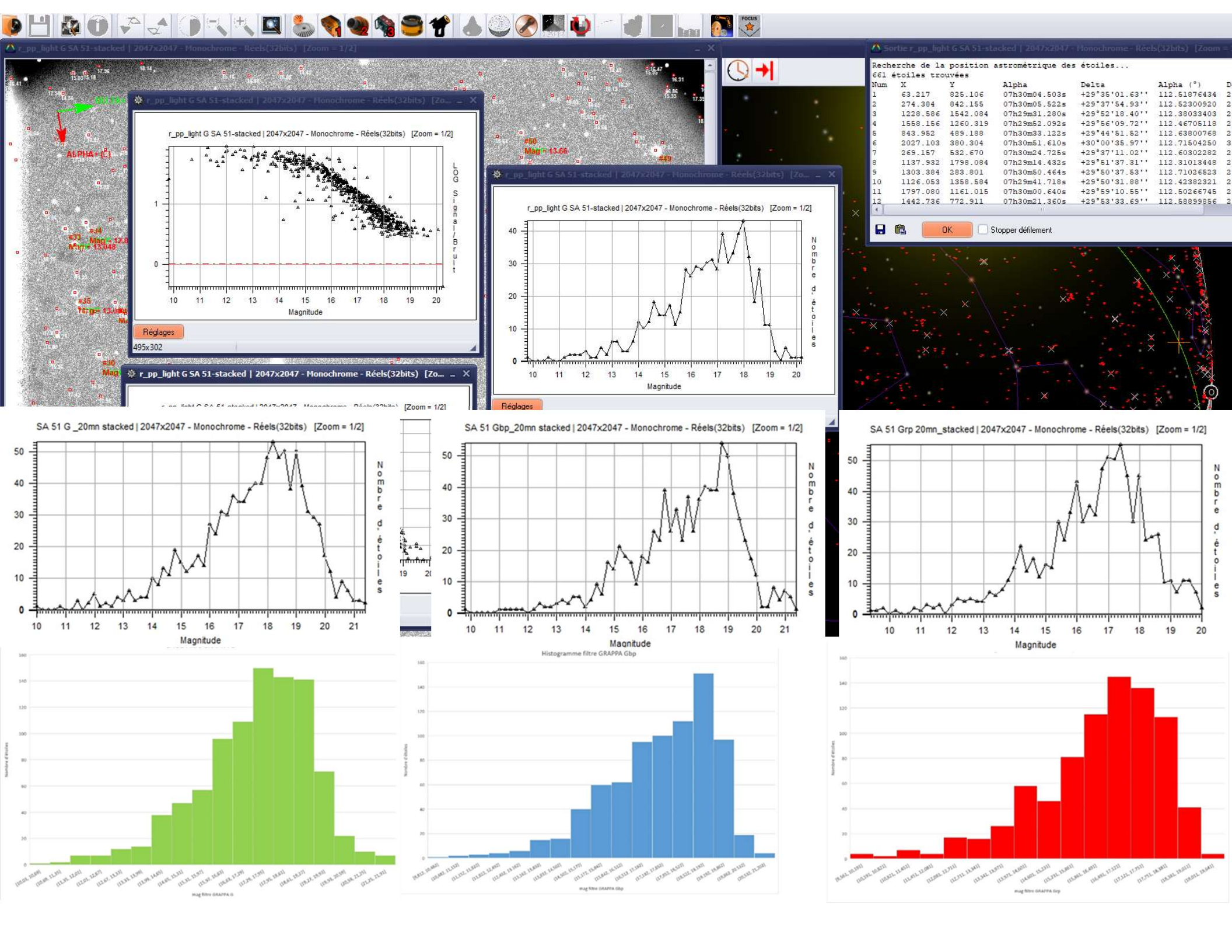
Lisa Maris : Champ d'étoiles SA 51

- Station Atlas Chambéry Savoie
- Télescope C11, D=0,280m, f=1,764m,
- CCD ATIK 4000, capteur CCD - Kodak KAI 04022, dimensions 16.67mm x 16.05mm, pixels 7.4 µm, refroidie Δ=-20 T_{ext}=0°C
- Acquisitions: pose 60s, nb x20
- logiciel pilotage et acquisition KSTAR
- 3 Filtres RAPAS ABC
- Traitement photo: SIRIL
- Traitement astrométrique et photométrique: PRISM
- Application du catalogue GRAPPA Gaia EDR3 G, Gbp, Grp

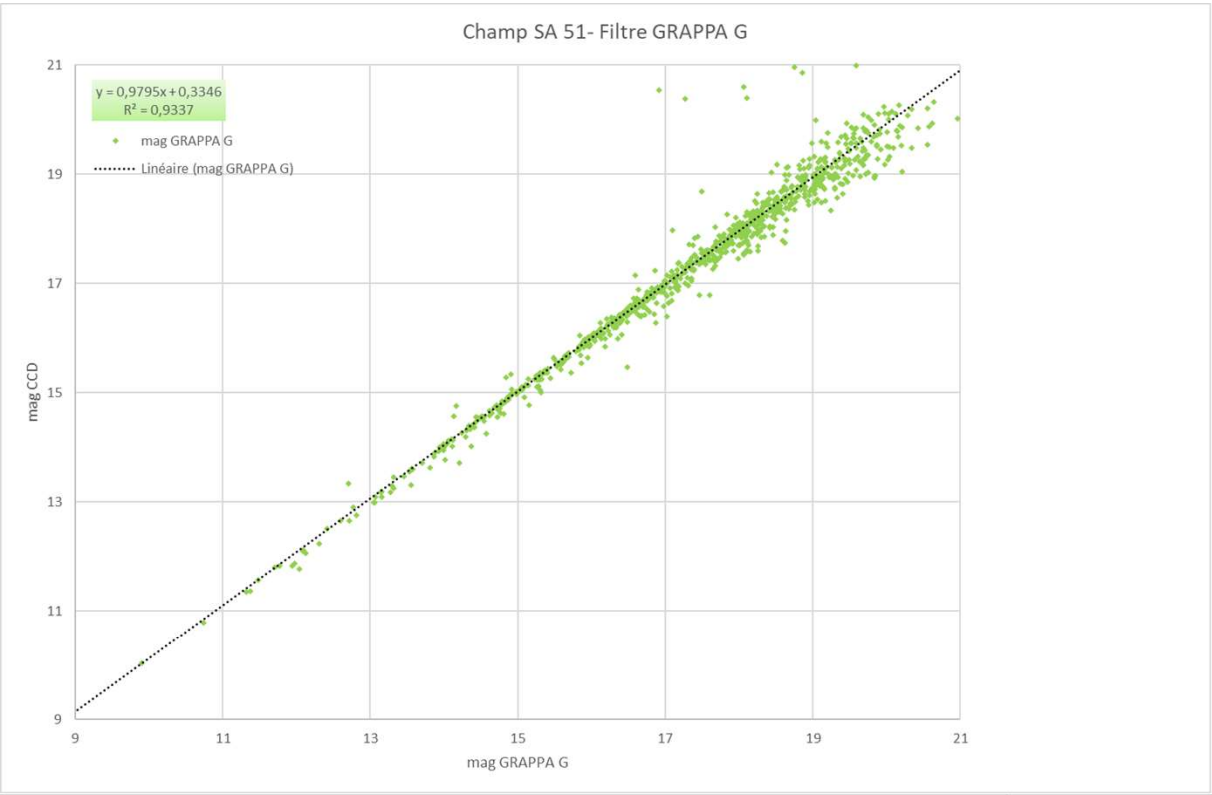


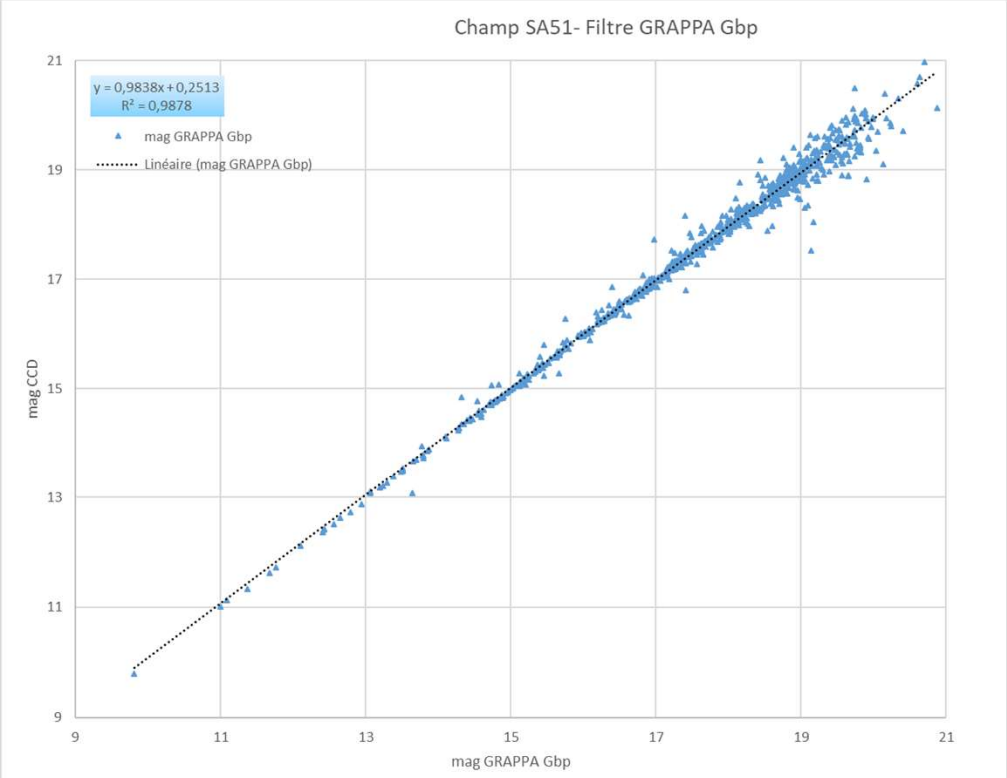


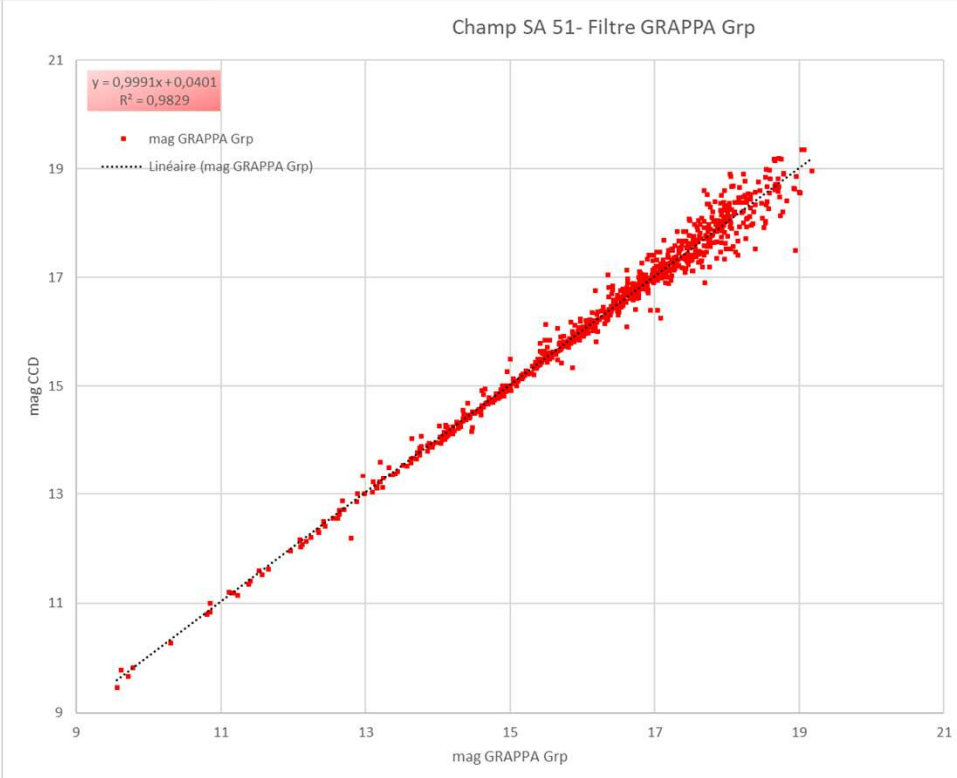



r_pp_light G SA 51-stacked | 2047x2047 - Monochrome - Réels(32bits) [Zoom = 1/2]
LOG Signal/Bruit
Magnitude
Réglages
495x302
Nombre d'étoiles
Sortie r_pp_light G SA 51-stacked | 2047x2047 - Monochrome - Réels(32bits) [Zoom =
Recherche de la position astrométrique des étoiles...
661 étoiles trouvées
Num X Y Alpha Delta Alpha (°) D
1 63.217 825.106 07h30m04.503s +29°35'01.63'' 112.51876434 2
2 274.384 842.155 07h30m05.522s +29°37'54.93'' 112.52300920 2
3 1228.586 1542.084 07h29m31.280s +29°52'18.40'' 112.38033403 2
4 1558.156 1260.315 07h29m52.092s +29°56'09.72'' 112.46705118 2
5 843.952 489.188 07h30m33.122s +29°44'51.52'' 112.63800768 2
6 2027.103 380.304 07h30m51.610s +30°00'35.97'' 112.71504250 3
7 269.157 532.670 07h30m24.725s +29°37'11.02'' 112.60302282 2
8 1137.932 1798.084 07h29m14.432s +29°51'37.31'' 112.31013448 2
9 1303.384 283.801 07h30m50.464s +29°50'37.53'' 112.71026523 2
10 1126.053 1358.584 07h29m41.718s +29°50'31.88'' 112.42382321 2
11 1797.080 1161.015 07h30m00.640s +29°59'10.55'' 112.50266745 2
12 1442.736 772.911 07h30m21.360s +29°53'33.69'' 112.58899856 2
OK
Stopper défilement
SA 51 G _20mn stacked | 2047x2047 - Monochrome - Réels(32bits) [Zoom = 1/2]
SA 51 Gbp_20mn stacked | 2047x2047 - Monochrome - Réels(32bits) [Zoom = 1/2]
SA 51 Grp 20mn_stacked | 2047x2047 - Monochrome - Réels(32bits) [Zoom = 1/2]
Histogramme filtre GRAPPA Gbp

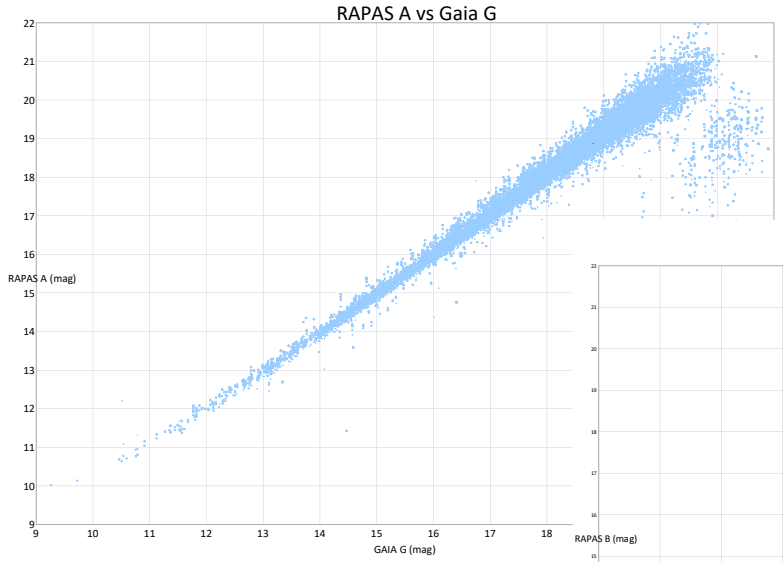
Synthèse des résultat SA 51- Filtres GRAPPA- Station Atlas Chambéry Lisa Maris

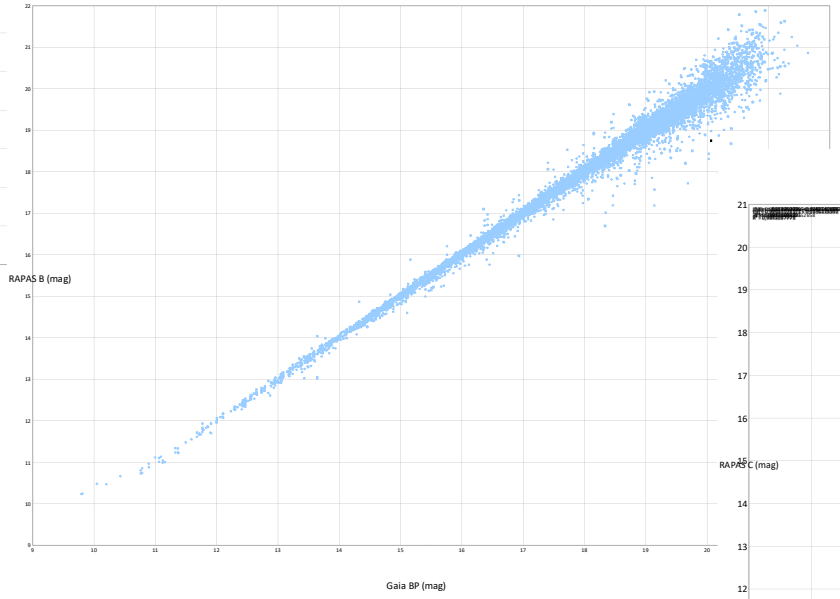


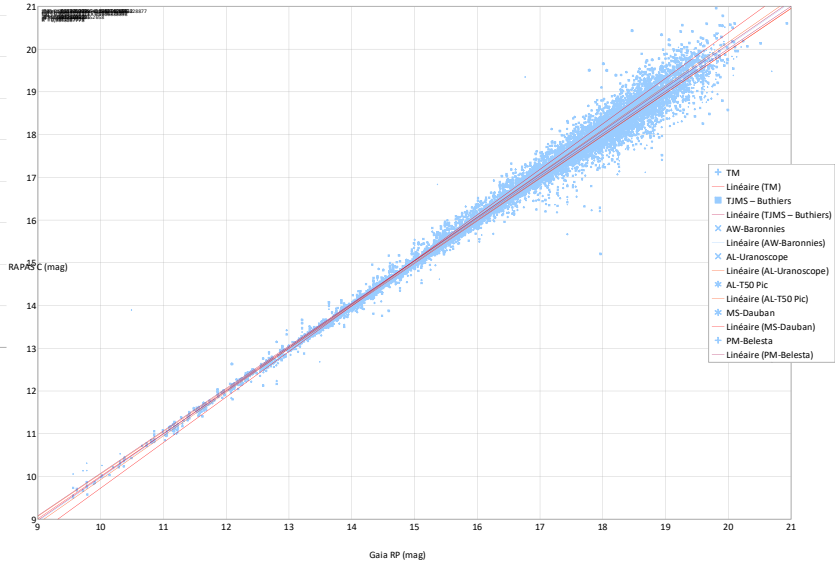


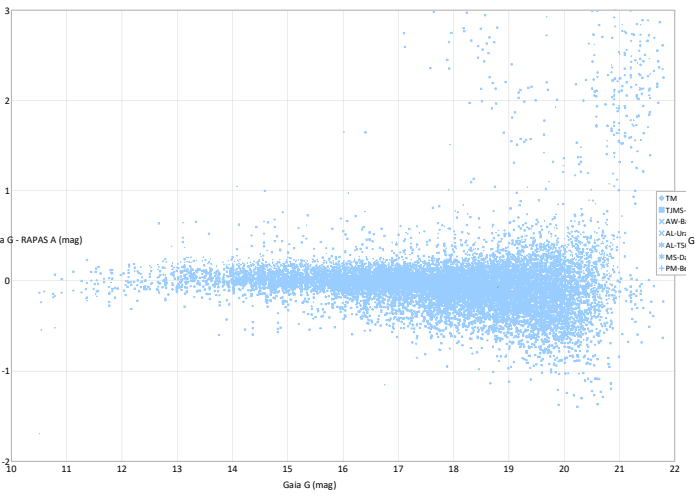


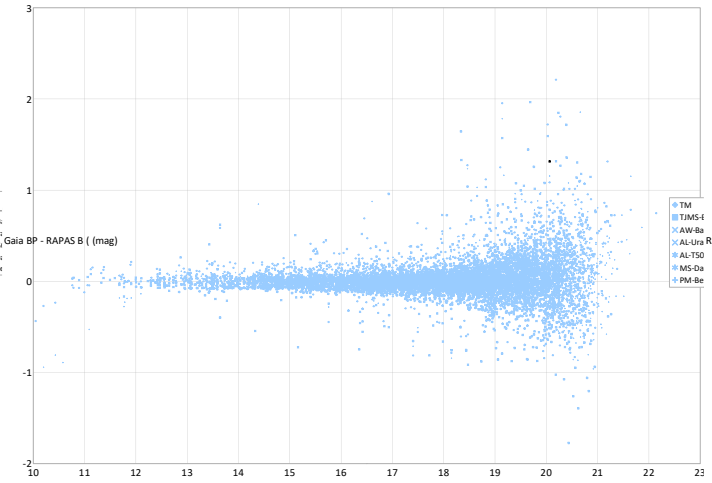
Première synthèse des réponses et dispersions Préparées par Marc Serrau

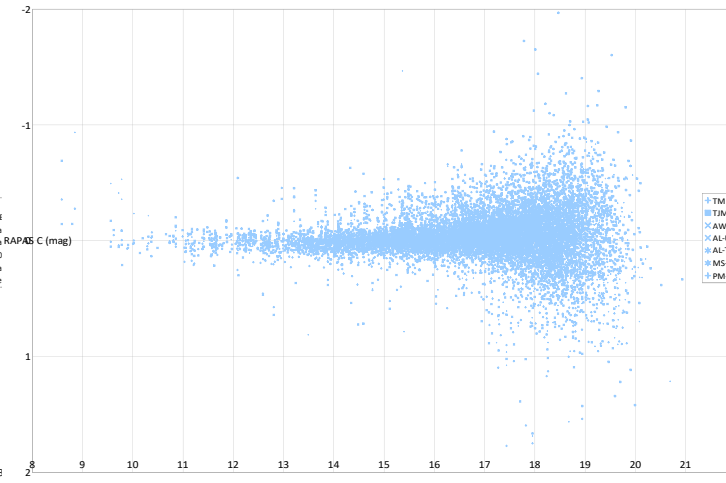












RAPAS step 2 : Spectrograph to release alert SED

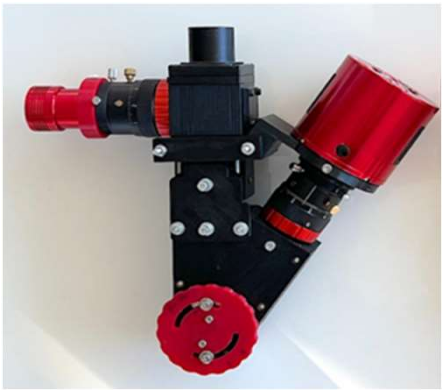
Following the candidate detection, localisation and G, Gbp and Grp magnitudes, caracterise the alarm with its spectral energy distribution :

- Reject false alarm
- Classify alert
- Release the SED :

  - Detect continuum black body like distribution and equivalent Temperature
  - Detect continuum not fitted to one black body
  - Detect temperature variation
  - Detect emission lines : H, …
  - Detect broad absortion bands
  - Detect Balmer or Lyman spectral break and measure z shift.
  - …

Design high luminosity very low dispersion spectrograph able to meet high upper limit magnitude (20 targeted) with >400mm diameter telescopes with 1 hour exposure.

Realisation then test on 2 spectrograph prototypes



- Alpy 200

Fitted with a 200g/mm transmittive grating haute efficacité qui remplace le grism de 600t/mm et doté d'une fente à deux ouvertures

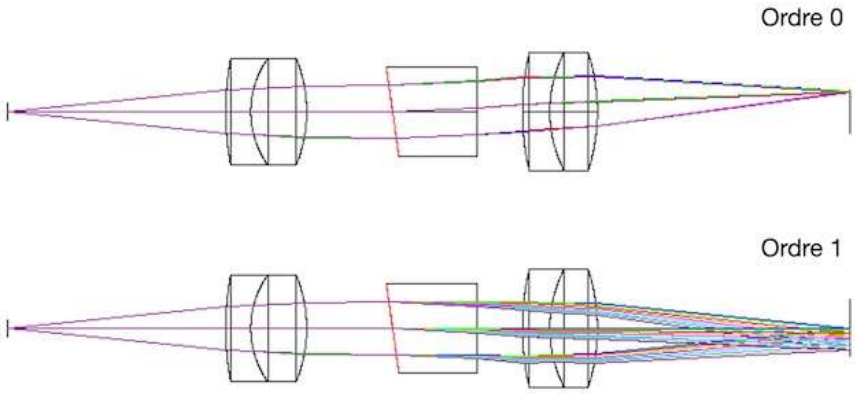
- Réalisation d'un Star'Ex VLR (Very Low Resolution)

Doté d'un réseau 150 t/mm avec une analyse de la réduction de la focale objectif de 80mm à 40mm

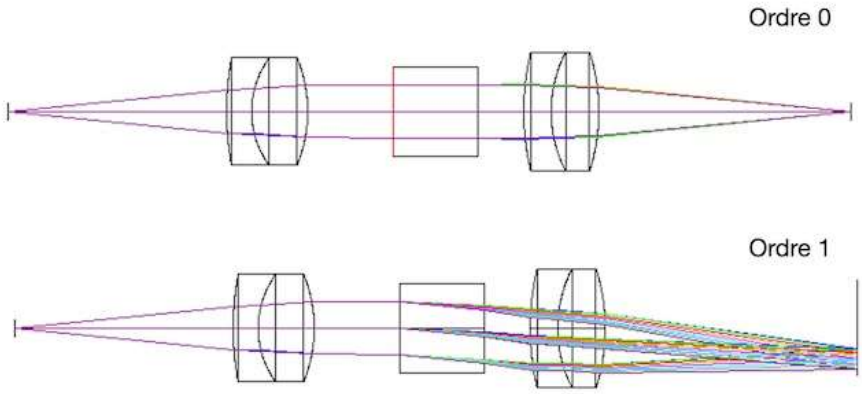
Prêt en rotation des spectro aux utilisateurs de l'Alpy 600 ou du StarEx vers des télescopes de classe 400mm et plus, dotés d'un moyen de guidage de la classe 1h pour valider la magnitude limite atteinte et la résolution

Alpy200 - étude RAPAS (C. Buil - 24 / 04 / 2023)

Configuration avec angle de prisme de 8°



Configuration avec angle de prisme de 0°



Pour application SED (distribution spectrale d'énergie)

Analyse Alpy600 transformé avec réseau 200 t/mm :

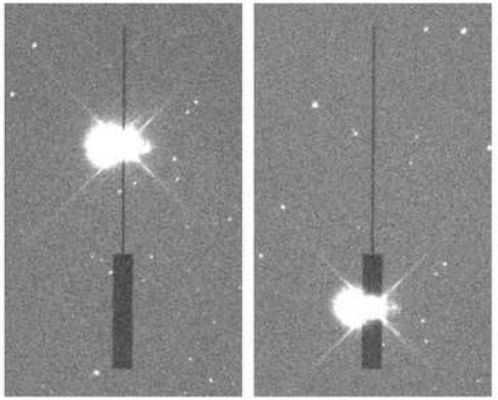
-La taille linéaire du spectre de 380 nm à 750 nm est de 1,800 mm
-Le facteur de plaque est de 2055 A/mm
-Si la caméra est une ASI533MM Pro (pixels de 3,76 microns), la taille du spectre est de 480 pixels, et l'échantillonnage de 7,73 A/pixel
-Taille optique de la PSF : 5 à 10 microns (qualité image)
-Avec une fente de 23 microns (ou seeing équivalent à 23 microns au foyer), le pouvoir de résolution estimé à 550 nm est de R = 110
-Accès à l'ordre 0 : reconnaissance du champ et facilité d'étalonnage spectral (idéalement prévoir fente commutable large/étroite)

Si l'ordre 0 est exploité (ce qui est recommandé avec cette résolution spectrale et compte tenu de la faiblesse des objets), il est fortement suggéré d'utiliser Alpy200 avec une fente photométrique (2 largeurs de fente, comme ci-contre).

Dans un contexte de mesure spectrophométrique, l'usage de cette double fente (dite photométriqiue) est recommandé (besoin scientifique exprimé par Michel D). C'est aussi un outil pour être sur que le l'objet est bien identifié. L'usage du spectrographe est par ailleurs simplifié pour les néophytes.

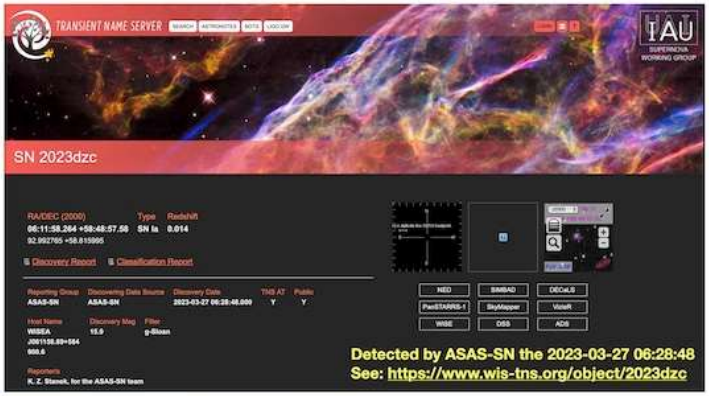
En synthèse des discussions à cette date :

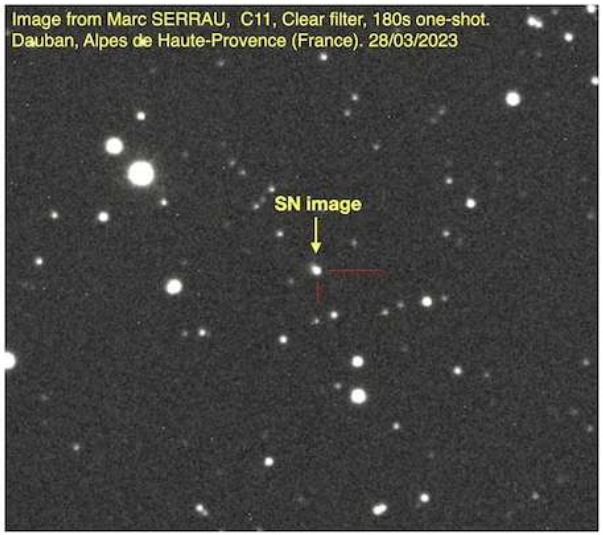
- la configuration Alpy200 (réseau 200 t/mm) avec angle de prisme nul est recommandé pour la très basse résolution spectrale (SED à R = 100)
- L'usage d'une caméra CMOS type ASI533MM Pro est recommandé, et même devrait être un choix imposé aux utilisateurs (coût 1000 euros environ)
- L'adoption d'une fente photométrique est recommandé pour l'application SED. Des largeurs 23 / 500 microns ou 35 / 500 microns est suggérée. Idéalement une fente claire (mais pas absolument indispensable).
- L'étude d'un complément optique pour exploiter Star'Ex en moyenne résolution (R=300) pour exploiter un réseau de 150 traits/mm est suggérée. Cela revient à faire le prototype d'un nouvel objectif de caméra (doublet ou triplet, qui reste à calculer). Cette option permet aussi de mieux exploiter les gros télescopes pour le programme RAPAS spectro, un pouvoir de résolution de R=100 étant jugé non adapté pour certaines analyses de sursaut (identification des raies, saut de Balmer…).



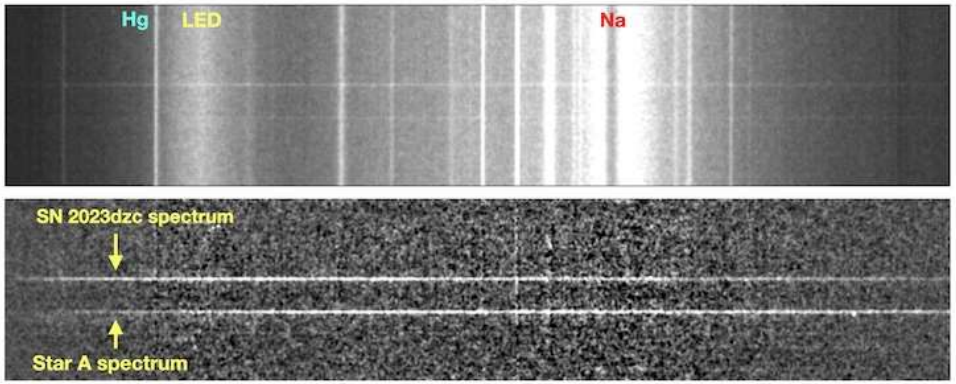
Exemple d'usage d'une fente photométrique : la fente étroite permet de détailler le spectre, la fente large permet d'évaluer le continuum. Cette option peut constituer une vrai originalité du projet.

Spectrum of SN 2023dzc at V=15.9 by using a very small telescope (85-mm aperture) + a 3-D spectrograph (Star'Ex LR) - Christian Buil

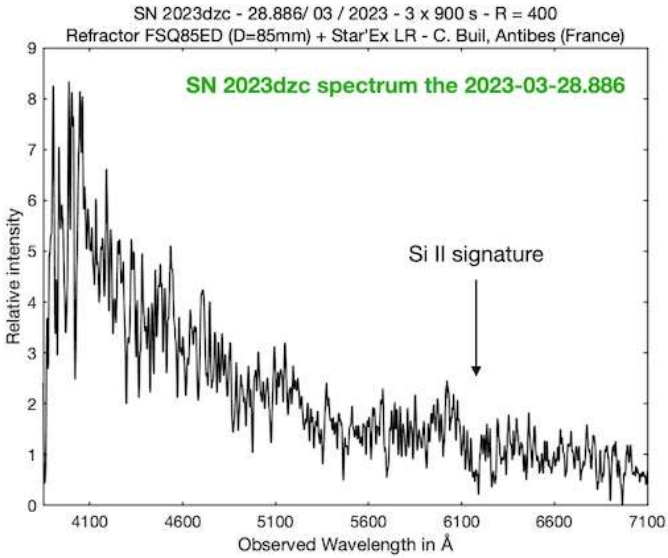




Setup: Takahashi FSQ85ED refractor (D=85mm F/5). Star'Ex LR spectrograph (19 microns slit). Main camera ZWO ASI533MM pro. Mount ZWO AM5. Guiding by using ASIAir system. Prism software for spectra acquisition. Star'Ex project: http://www.astrosurf.com/solex/

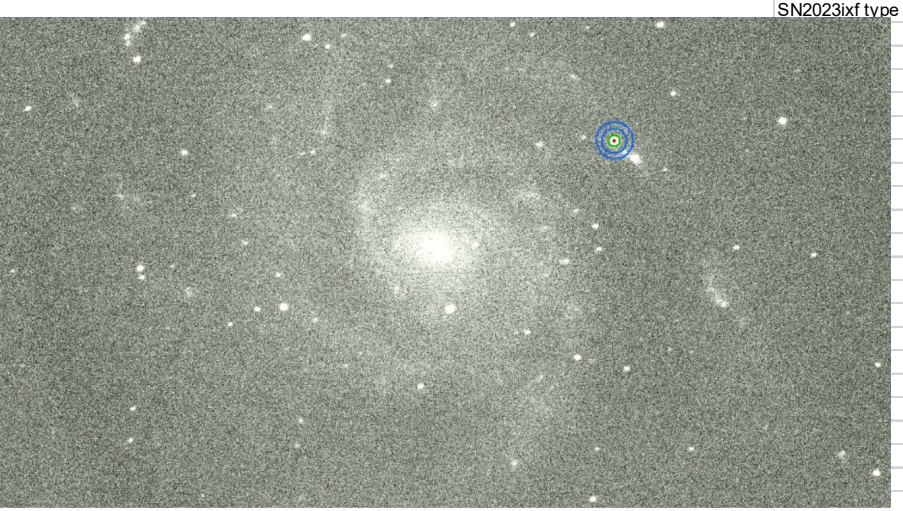


2-D image of the spectrum. Up, before sky removal (very intense compared to SN signal. i.e. Na + LED pollution). Down, after sky removal (specINTI processing). Star A is partially in the 19 microns wide slit.

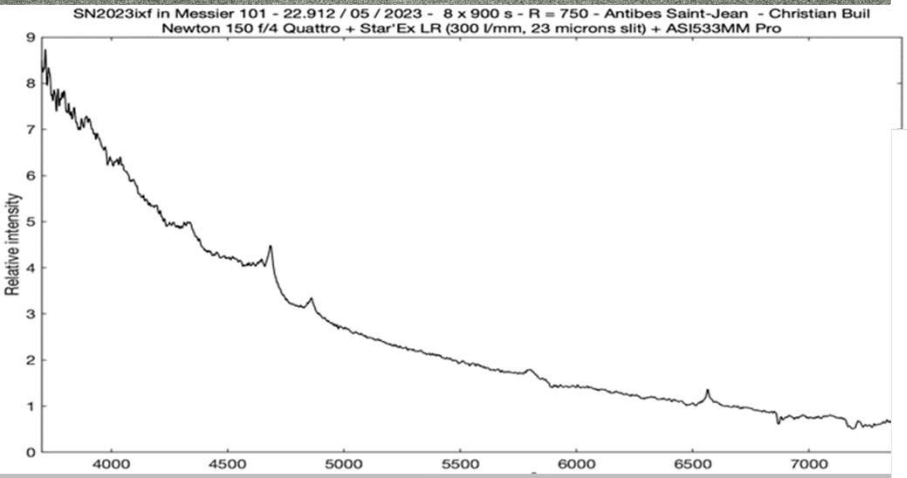


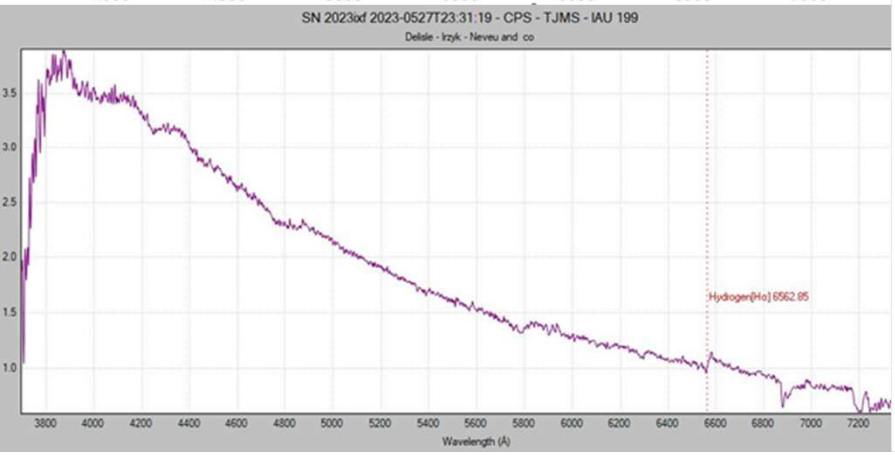
Very bad conditions during observation: moon, city pollution (Antibes + Cannes), cirrus clouds. The estimated effective exposure time is near 35 mn only and naked eye limit magnitude is 2.

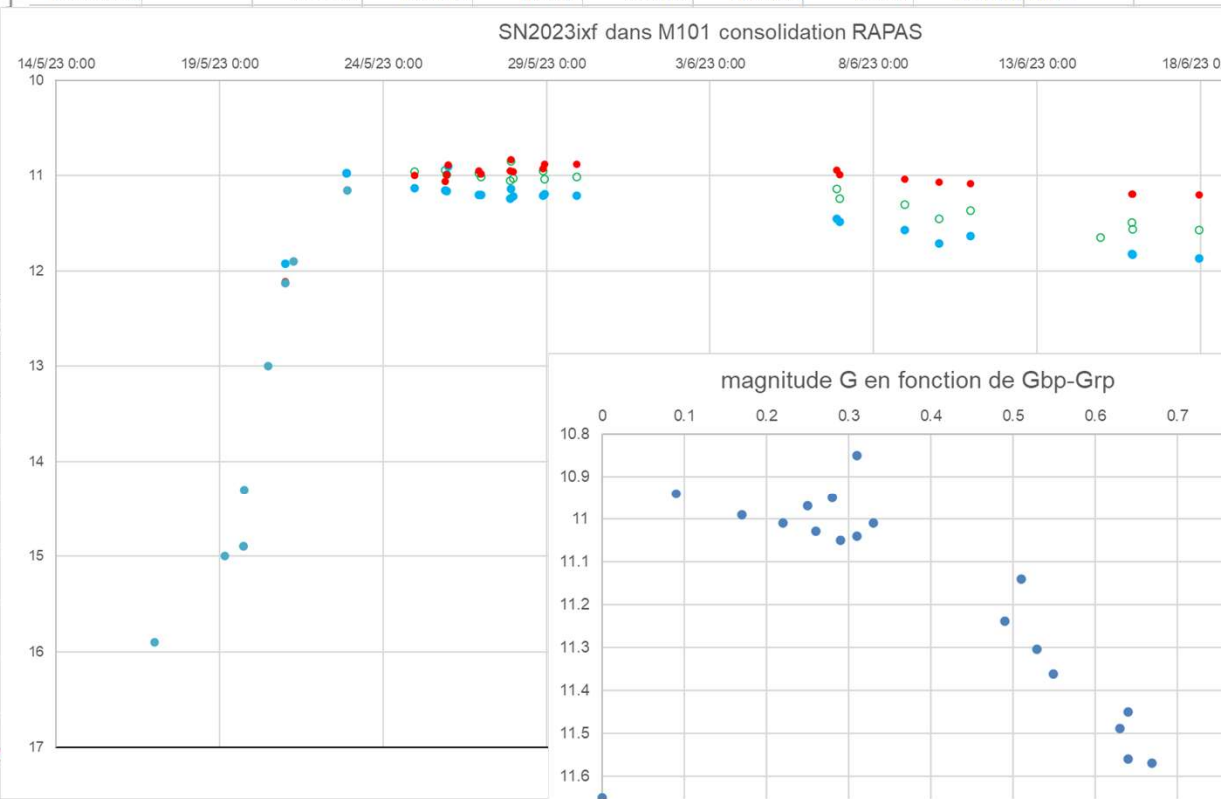
Premiers tests de mobilisation de RAPAS :
SN2023ixf dans M101 découverte le 19 mai 2023 à m=14,90

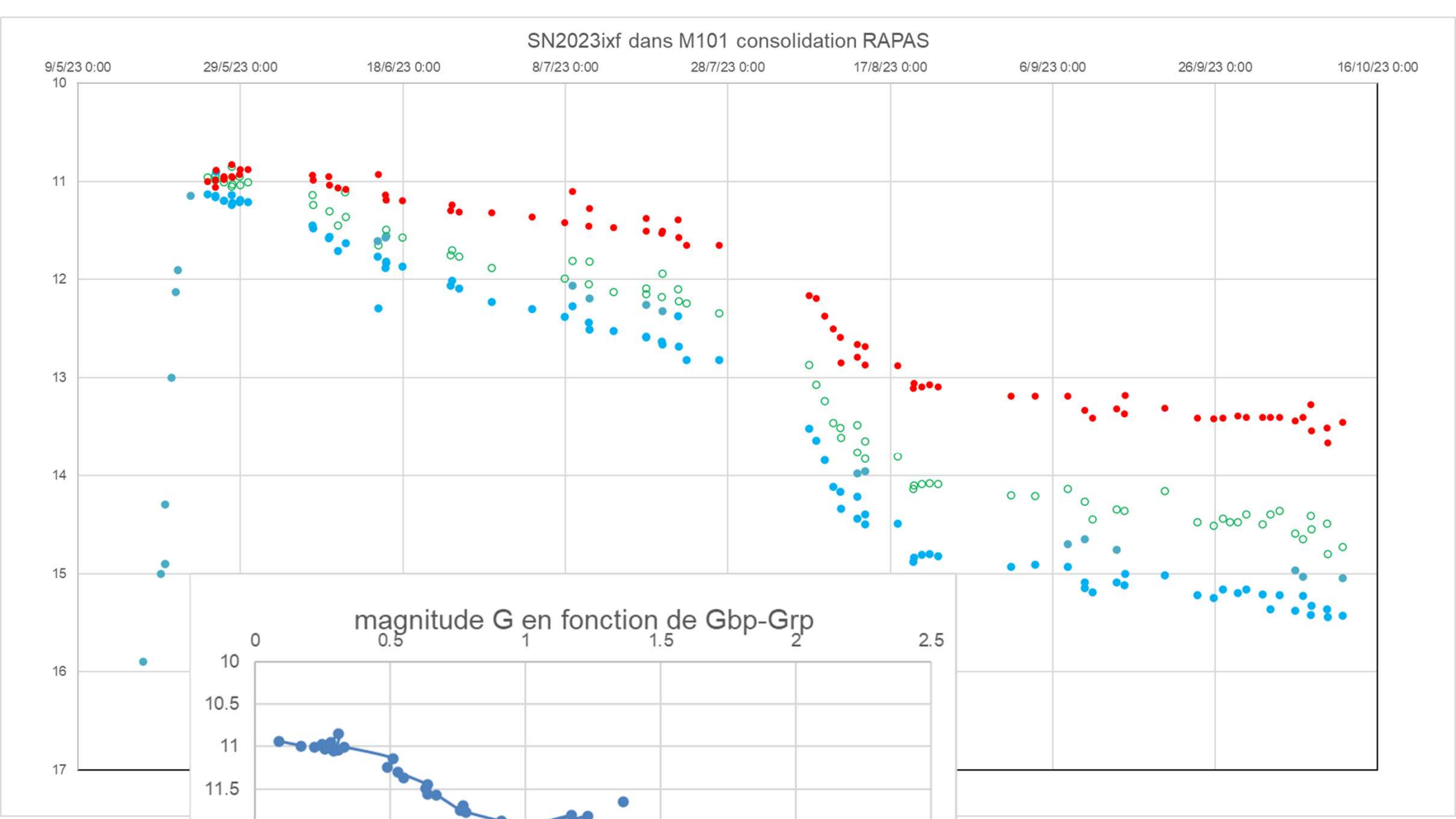


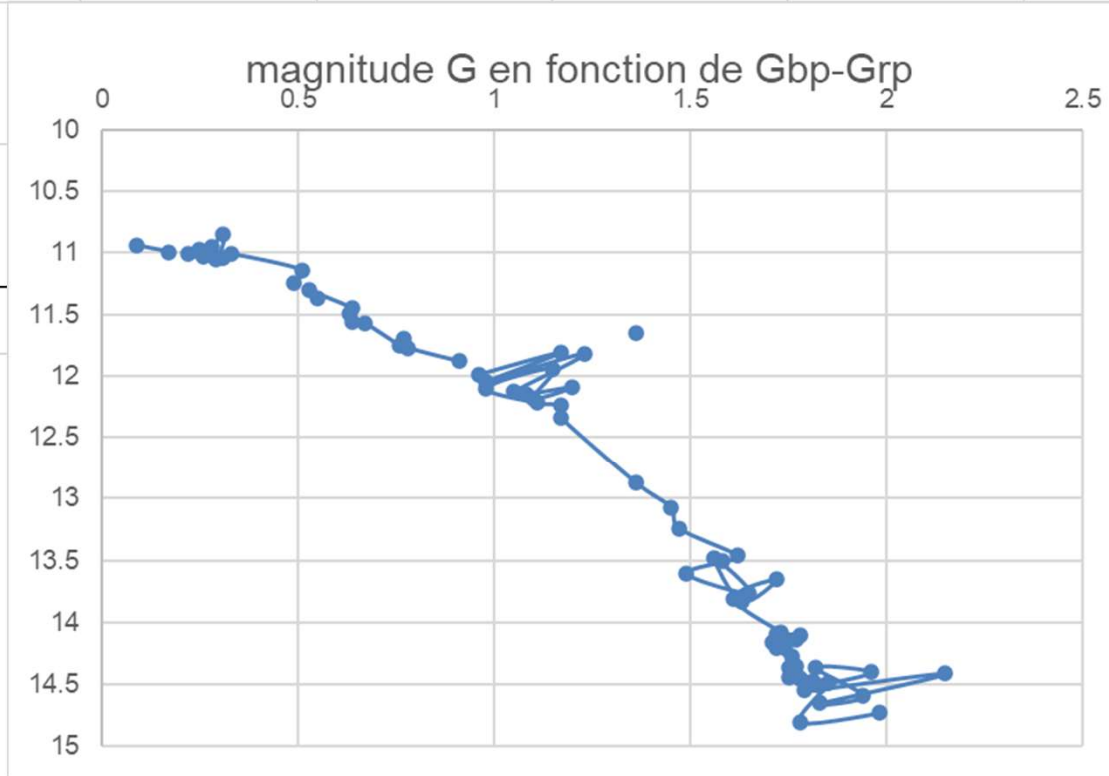
SN2023ixf type II	V	G	delta G	Gbp	delta Gbp	Grp	delta Grp	Gbp-Grp		
2023-05-17	15.9								ZTF	
2023-05-19	15								S. Limeburner	
2023-05-19	14.9								Koichi Itagaki	
2023-05-19	14.9								S. LaRiccia	
2023-05-19	14.3								S. Korotkiy	
2023-05-20	13								Koichi Itagaki	
2023-05-21	*12.13*			*11.92*		12.11			E. Broens	BVR
2023-05-21									Marc	
2023-05-21	11.9								Jean-Claude Merlin	
2023-05-22	*11.15*			*10.98*		*11.15*			E. Broens	BVR
2023-05-23									Anaël	
2023-05-24		10.96	0.02	11.13	0.02	11	0.04		Florent	
2023-05-25		10.94	0.05	11.15	0.06	11.06	0.08	0.09	Arnaud	
2023-05-25		10.99		11.16		10.99		0.17	Florent	
2023-05-26				10.9	0.03	10.89	0.06	0.01	Eric	
2023-05-26		10.97	0.04	11.2	0.04	10.95	0.07	0.25	Arnaud	
2023-05-26		11.01		11.2		10.98		0.22	Florent	
2023-05-27		11.05	0.03	11.24	0.04	10.95	0.04	0.29	Patrick	
2023-05-27		10.85	0.06	11.14	0.06	10.83	0.06	0.31	TJMS Stéphane, Yannic	
2023-05-27		11.03		11.22		10.96		0.26	Florent	
2023-05-28		10.95	0.03	11.21	0.02	10.93	0.02	0.28	Arnaud	
2023-05-28		11.04	0.04	11.19	0.06	10.88	0.04	0.31	Christian	
2023-05-29		11.01	0.04	11.21	0.05	10.88	0.05	0.33	Christian	
2023-06-06		11.14	0.04	11.45	0.02	10.94	0.03	0.51	Arnaud	
2023-06-06		11.24		11.48		10.99		0.49	Florent	
2023-06-08		11.30505	0.00231	11.5681	0.00257	11.03868	0.0039	0.52942	Anaël	

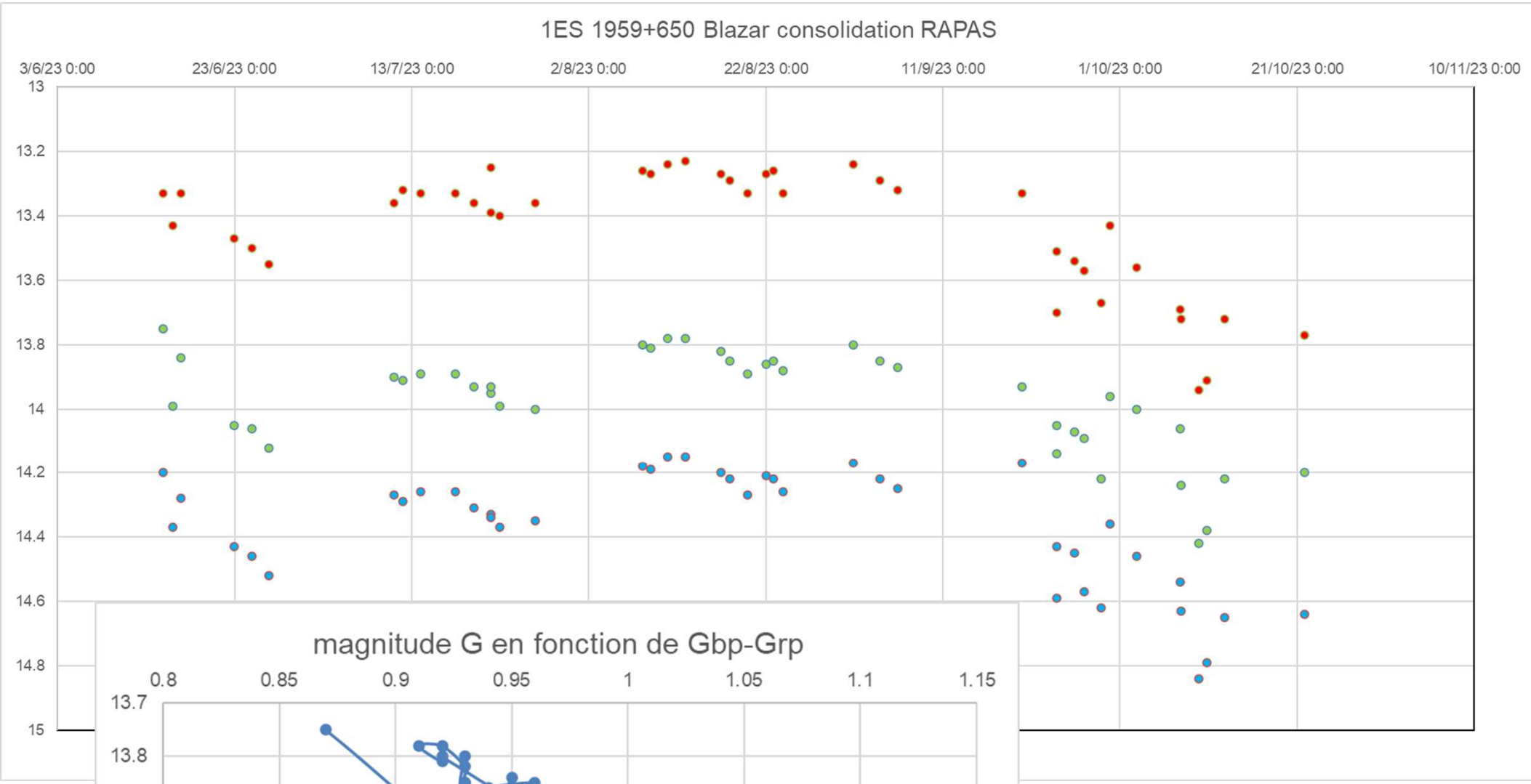


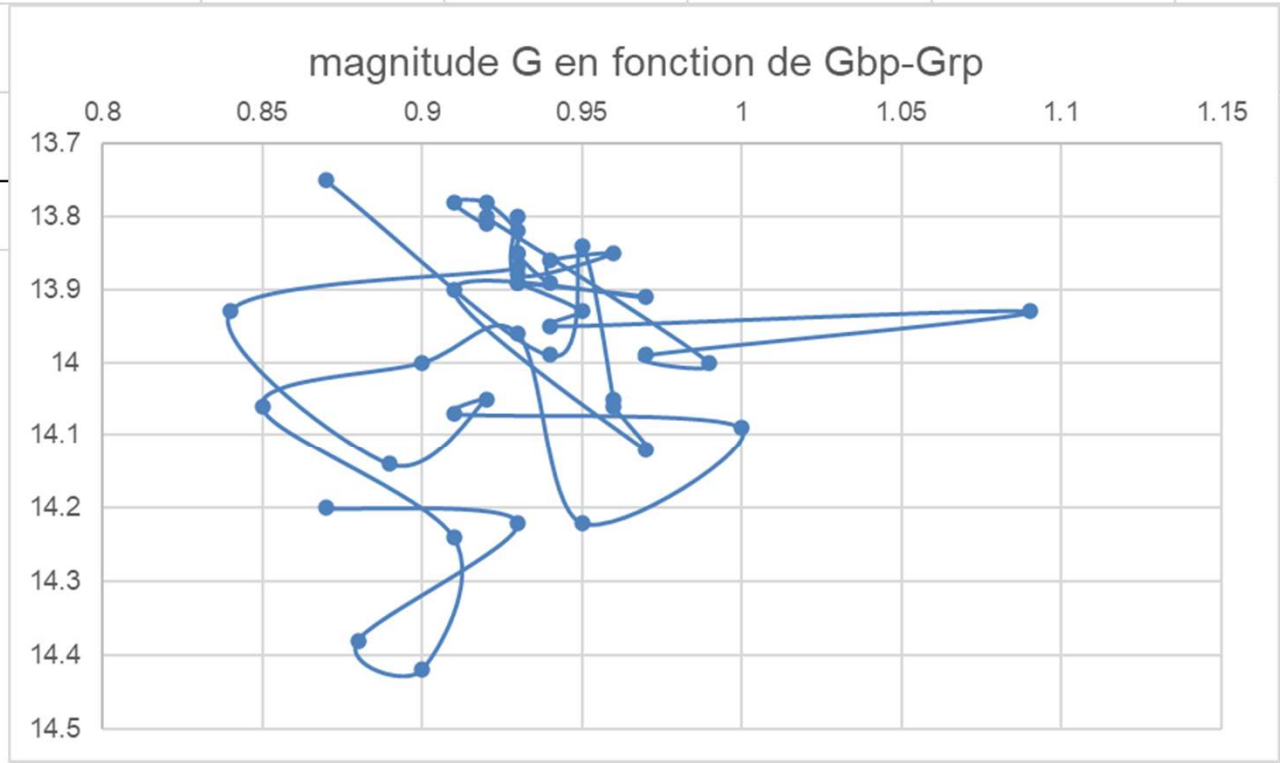





SN2023ixf dans M101 consolidation RAPAS
9/5/23 0:00
29/5/23 0:00
18/6/23 0:00
8/7/23 0:00
28/7/23 0:00
17/8/23 0:00
6/9/23 0:00
26/9/23 0:00
16/10/23 0:00
10
11
12
13
14
15
16
17


magnitude G en fonction de Gbp-Grp
0
0.5
1
1.5
2
2.5
10
10.5
11
11.5
12
12.5
13
13.5
14
14.5
15


1ES 1959+650 Blazar consolidation RAPAS
3/6/23 0:00
23/6/23 0:00
13/7/23 0:00
2/8/23 0:00
22/8/23 0:00
11/9/23 0:00
1/10/23 0:00
21/10/23 0:00
10/11/23 0:00
13
13.2
13.4
13.6
13.8
14
14.2
14.4
14.6
14.8
15


magnitude G en fonction de Gbp-Grp
0.8
0.85
0.9
0.95
1
1.05
1.1
1.15
13.7
13.8
13.9
14
14.1
14.2
14.3
14.4
14.5

Conclusions : toward RAPAS 2024

On nov 25-26 2023 RAPAS Workshop 2 at Paris Observatory

Develop a plug from AstroColibri alerts through a filter fitted to RAPAS capabilities
Deliver data and build the delivery pipeline : Optical localisation of candidates
Magnitude of the alert and colour index
False alert rejection
Alert monitoring

Photometry

- Assess the photometric accuracies of each observers and of the global network
- Publish a RAPAS paper on the network and the photometric assessed accuracy
- Launch photometric monitoring of sources SN M101, Blazar to train RAPAS observers and to check capabilities on each family of objects or events
- Launch GaiaFUN SSO alert retrieval
- Launch optical counter part retrieval on multimessenger alerts
- Deliver the data : Alertes Gaia, Télégrammes, GCN, KNC,… ?

Spectroscopy

- Tests the two spectrograph prototypes mag upper limit and resolution
- Deliver the first SED on detected alerts
- Fix the spectrograph definition

2024 funding proposal

- Produce and deliver a second batch of ABC filters (from a new design ?)
- Enlarge on an international scale the RAPAS network ?
- …