

## STATUS OF THE AMATEUR-PROFESSIONAL COLLABORATIONS

T. Midavaine<sup>1</sup> and F. Herpin<sup>2</sup>

**Abstract.** Amateur-professional collaboration is a very vivid field in astronomy. The Société Astronomique de France (SAF) is very active with dedicated commissions gathering amateurs and professionals in specialized fields. In 2018 we organized a first workshop during the “Journées de la SF2A” to share the status of collaborations. Following the success of this meeting with several proposed actions, SAF and SF2A agreed on the development of a partnership to share the realization of several tasks, including a second workshop during the “Journées de la SF2A 2019”, introduced by this plenary session paper. The vision is to build an array of amateur observers networking with professionals proposing topics and/or targets for campaign survey. Thus we are able to review the latest results of such collaborations, the new projects to be launched and the means (hardware, software, web sites, and organizations) required to support and develop such projects. Furthermore SAF and SF2A are working on the implementation of an annual dedicated prize awarding best practices in pro-am collaborations. A review of recommendations are shared to be implemented in the coming year.

Keywords: citizen science, amateur-professionnal, pro-am collaborations, astronomy

### 1 Introduction

Thanks to the very successful workshop hold during the “Journées de la SF2A 2018” in Bordeaux, SF2A and SAF decided to build a partnership. A dedicated group in SAF was created in September 2018 to develop several tasks proposed during the first workshop. A meeting between SF2A and SAF allowed to agreed on several decisions. One of them was to prepare a second workshop and a talk for the plenary session during the *Journées de la SF2A 2019* organized in Nice 14-17 May 2019 synthesized in this paper.

### 2 SAF and SF2A strength for this partnership

SAF is a 132 years old Society, funded by Camille Flammarion, gathering more than 2000 members and *L’Astronomie* magazine\* subscribers. Within the Society, twelve commissions are supporting dedicated fields, with member and observer coordination, organizing meetings and publications: Astronautic and Space Technologies, Comets, Cosmology, Double Stars, History, Instruments, Meteors, Planet Observations, Planetology, Radioastronomy, Sun, Sundials.

SAF edits several publications: *L’Astronomie* (monthly), *Observations & Travaux*<sup>†</sup> (twice a year), Ephemerides Astronomiques<sup>‡</sup> (annual), astronomical books, and *SAF On Line Web*<sup>§</sup> site with a Pro-Am dedicated field introduced last year. Lectures, conferences, astronomical tutorials, are organized all the year long. Every year in May or June, Astronomical prizes and Medals, Janssen Prize are awarded with the annual national meeting of the commissions reporting their related activities. Astronomical event gatherings (Eclipse, Day of the Sun, abroad travels) are coordinated, and “Astrociel” a two weeks star party is organized every year in August at

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\*Mensual magazine published by Société Astronomique de France, Patrick Baradeau Head of Publications, Fabrice Mottez succeeded to Janet Borg Editor

<sup>†</sup>ISSN 0004-6302, technical review of the SAF Commissions, Patrick Baradeau Head of Publications, Pierre Durand Editor.

<sup>‡</sup>an annual publication realized by Jean Meeus

<sup>§</sup>[https://saf-astronomie.fr/collaboration\\_pro\\_am/](https://saf-astronomie.fr/collaboration_pro_am/)

Valdrome in the Alps. Three observatories (Sorbonne, Juvisy, Belesa) are managed both for public observations and amateur projects. SF2A is a 40 years old Society gathering more than 400 professional members and 1400 newsletter subscribers. SF2A is organizing an annual event, “Journées de la SF2A”, gathering the French professional community, and including some foreign participants, in 4 days dedicated to french astronomical research with plenary sessions and 16 parallel workshops. The Prize of the young researcher, and best PhD are awarded every year. On behalf the Académie des Sciences, SF2A is the French interface to IAU.



**Fig. 1.** Covers of L’Astronomie (mai 2009) and Ciel & Espace Hors Serie (octobre 2014) issues left and right respectively

### 3 Pro-Am Collaborations

These collaborations are very active and produce papers and lectures spread over a large number of meetings and conferences. This is one of the oldest field of citizen science and one of the pillars of history of science. L’Astronomie and Ciel et Espace published in 2009 and 2014 respectively (cf. Fig.1) dedicated issues reviewing the most active topics in France. In addition, amateur-professional collaboration is very active to maintain and promote legacy instruments either for the above activities and to allow public and school access to astronomical heritage. Some amateur astronomers are retired industry technicians or engineers able to maintain old instruments relying on previous generation technologies (old telescopes, electro-mechanics, old computers, refurbished equipments $\bar{E}$ ). In addition, new instrument and software developments involve such Am-Pro collaborations too (sensitive CMOS cameras, spectrograph, image processing suite, etc).

### 4 The Amateur-Professional Topics Table

Fiveteen years ago T. Midavaine consolidated a database in an Excel file gathering the panorama of astronomical topics for amateurs willing to do science. It was first published on the Club Eclipse web site ([http://astrosurf.com/club\\_eclipse](http://astrosurf.com/club_eclipse)). This data base classifies amateur activities breakdown in five headlines:

- object discovery: the most fascinating task for amateurs is the ability to discover new objects,
- object surveillance: one amateur strength, thanks to the number of observers spread over all the longitudes,
- observation campaign : mobilization of observers on astronomical events for data acquisition,
- data gathering: thanks to methodologies, digital imaging and processing, amateurs can provide reliable metrological data in astrometry, photometry, polarimetry, spectroscopy, time and datation,
- exploitation of data base: this is a growing up field, thanks to dedicated web site gathering the overwhelming data collected by robotic instruments or space probes.

The Amateur-Professional Topics Table Version X, updated in 2019 following this workshop, is shown in Fig.2 Through the lines in column A, you have a review of all the potential topics from the closest like shooting stars, up to the farthest related to quasars or even cosmology! The columns are organized according to the above activity breakdown. It covers all the topics spread over a large range of required skillness from the beginners to start to do science up to the amateur experts, including the thema for amateur professional collaborations from data acquisition, up to scientific publishing. Here are some comments on the column contents:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Objets	Découverte	Survi	Evénement	Métrologie	Astrométrie	Photométrie	Polarisation	Spectroscopie	Rés Tempore	Exploitation	Point Focal	Organisation	site web	e mail	Conférence		
Littés	Mag min				arcsec	Précision	Taux de Pois P	Résolution	secondes	sur Internet							
Météorites		Vigie Ciel									Brigitte Zanda	Fripon	<a href="https://www.fripon.org/">https://www.fripon.org/</a>		Commission des météores SAF		
Météores	4	Fripon	Préparation	Orbite, Impact	60				1		Karl Antier	REFORME	<a href="http://www.boan.fr/">www.boan.fr/</a>	<a href="mailto:reformemeteor.net">reformemeteor.net</a>	International Meteor Conference		
Essaims d'étoiles filantes		Orbite	Scénario	Orb. Impact	250				60		J. Vaccaroni	IMO	<a href="http://www.imo.net/">www.imo.net/</a>		International Meteor Conference		
Cratères d'impact terrestre											David Baratoux		Google Earth	<a href="mailto:wagner@univ-pisa.de">wagner@univ-pisa.de</a>			
Aurores Boréales													<a href="http://www.spaceweather.com">www.spaceweather.com</a>				
Night Sky																	
Sprint																	
Royens Cosmiques																	
Lune			HLP	Occultation	Resante		0,1	10	0,1	Moon zoo		ALPO, IOTA	<a href="mailto:users.eber.sc.afio.01@ip.tlm.fr">users.eber.sc.afio.01@ip.tlm.fr</a>				
Impacts sur la Lune			Flash									IMCOE	<a href="http://lunarscope.free.fr">http://lunarscope.free.fr</a>				
Lumière Zodiacale											Sylvain Bouley						
Lumière Zodiacale											Luc Arnold						
Planètes		Métrologie	Tempéto. Occultation						100	1	SAF commission des planètes	ALPO	<a href="http://www.astrosurf.com/planetes/saf/">www.astrosurf.com/planetes/saf/</a>	<a href="mailto:delcroix_marc@free.fr">delcroix_marc@free.fr</a>	European Planetary Science Congress		
Venus		Métrologie	Tempéto. Impact								Christophe Peller	ISMO	<a href="http://www.mars.dti.ne.jp/~cmo/ISMO.html">http://www.mars.dti.ne.jp/~cmo/ISMO.html</a>	<a href="mailto:caudat@astrosurf.com">caudat@astrosurf.com</a>	European Planetary Science Congress		
Mars		Métrologie	Tempéto. Impact							planet four	Christophe Peller	IMCOE	<a href="http://www.mars.dti.ne.jp/~cmo/ISMO.html">http://www.mars.dti.ne.jp/~cmo/ISMO.html</a>	<a href="mailto:delcroix_marc@free.fr">delcroix_marc@free.fr</a>	European Planetary Science Congress		
Jupiter		Junocam	Impact							missionjuno.swi.edu	Marc Delcroix	SAF	<a href="http://www.missionjuno.swi.edu/junocam/">www.missionjuno.swi.edu/junocam/</a>	<a href="mailto:delcroix_marc@free.fr">delcroix_marc@free.fr</a>	Commission des observations planétaires SAF		
Jupiter		Métrologie	évolutions formations atmosphériques								Christophe Peller	Jupos, IOPW	<a href="mailto:cpcl@netnet.fr">cpcl@netnet.fr</a>	<a href="mailto:delcroix_marc@free.fr">delcroix_marc@free.fr</a>	European Planetary Science Congress		
Saturne		Métrologie	Tempéto.								Marc Delcroix	SAF, IOPW	<a href="http://www.jupitersaturne.com/">http://www.jupitersaturne.com/</a>	<a href="mailto:delcroix_marc@free.fr">delcroix_marc@free.fr</a>	European Planetary Science Congress		
Uranus, Neptune		Métrologie	Tempéto.								Marc Delcroix	SAF, IOPW	<a href="http://www.jupitersaturne.com/">http://www.jupitersaturne.com/</a>	<a href="mailto:delcroix_marc@free.fr">delcroix_marc@free.fr</a>	European Planetary Science Congress		
Impacts sur les Planètes géantes			Impacts								Kévin Ballie	IMCOE	<a href="http://www.imcoe.fr/recherche/campagnes/">http://www.imcoe.fr/recherche/campagnes/</a>	<a href="mailto:kevin.ballie@obs-erabondaparc.cea.fr">kevin.ballie@obs-erabondaparc.cea.fr</a>	European Planetary Science Congress		
Satellites de Planètes	21		Occultation								Jean-Louis Arist, Bruno Sicardy	IMCOE	<a href="http://www.imcoe.fr/planets/">http://www.imcoe.fr/planets/</a>	<a href="mailto:Jean-Louis.Arist@obspm.fr">Jean-Louis.Arist@obspm.fr</a>	European Planetary Science Congress		
Astéroïdes (orbites)	19	Proxima	Occultation	Planète	0,04	0,1			0,1	<a href="http://www.asteroide.com/">http://www.asteroide.com/</a>	Jerome Berthier	IMCOE	<a href="http://www.imcoe.fr/recherche/campagnes/">http://www.imcoe.fr/recherche/campagnes/</a>	<a href="mailto:kevin.ballie@obs-erabondaparc.cea.fr">kevin.ballie@obs-erabondaparc.cea.fr</a>	European Planetary Science Congress		
Astéroïdes (objets)		ORF	Occultation		0,05	0,1			10	0,1	Asteroïdes@home	IMCOE	<a href="http://www.imcoe.fr/recherche/campagnes/">http://www.imcoe.fr/recherche/campagnes/</a>	<a href="mailto:kevin.ballie@obs-erabondaparc.cea.fr">kevin.ballie@obs-erabondaparc.cea.fr</a>	European Planetary Science Congress		
Astéroïdes (longues périodes)		ORF	Occultation		0,1	0,1			10	10		IMCOE	<a href="http://www.imcoe.fr/recherche/campagnes/">http://www.imcoe.fr/recherche/campagnes/</a>	<a href="mailto:kevin.ballie@obs-erabondaparc.cea.fr">kevin.ballie@obs-erabondaparc.cea.fr</a>	European Planetary Science Congress		
Satellites d'Astéroïdes		ORF ou Occult	Occultation		0,01	0,1			0,1	0,1	Rouf Behrend	IMCOE	<a href="http://www.imcoe.fr/recherche/campagnes/">http://www.imcoe.fr/recherche/campagnes/</a>	<a href="mailto:kevin.ballie@obs-erabondaparc.cea.fr">kevin.ballie@obs-erabondaparc.cea.fr</a>	European Planetary Science Congress		
Geocroiseurs AAA	19		Orbites	Impact					10	0,1	orbit@home	IMCOE	<a href="http://www.imcoe.fr/recherche/campagnes/">http://www.imcoe.fr/recherche/campagnes/</a>	<a href="mailto:kevin.ballie@obs-erabondaparc.cea.fr">kevin.ballie@obs-erabondaparc.cea.fr</a>	European Planetary Science Congress		
Objets Trans Neptuniens	20		Lucky Star		0,2	0,2			10	10	Mérel Birhan	EURONEAR	<a href="http://www.euronear.com/">http://www.euronear.com/</a>	<a href="mailto:me@euronear.com">me@euronear.com</a>	European Planetary Science Congress		
Objets de la bande de Kuiper	20		Lucky Star		0,2	0,2			10	10	Bruno Sicardy	LESIA	<a href="http://www.obspm.fr/kuiper/startractions/">http://www.obspm.fr/kuiper/startractions/</a>	<a href="mailto:bruno.sicardy@obspm.fr">bruno.sicardy@obspm.fr</a>	European Planetary Science Congress		
Planètes 9											Françoise Rogee						
Comètes 67P Tchouri	14		Synodal	Préparation	0,2	0,2			100	1	Sho	CBAT	<a href="http://www.cfa.harvard.edu/au/imp.html">www.cfa.harvard.edu/au/imp.html</a>	<a href="mailto:cbatiau@post.harvard.edu">cbatiau@post.harvard.edu</a>	Commission Comètes SAF		
Soleil Taches		Nbro Wolf							0,05	1000	Délier Favre	GEFOS	<a href="http://www.soleil.tachess.free.fr/">http://www.soleil.tachess.free.fr/</a>		Commission du Soleil SAF		
Soleil Protuberances			Orbites	Impact	0,05	1000	0,1	Solar stormwatch			Delier Favre	GEFOS	<a href="http://www.soleil.tachess.free.fr/">http://www.soleil.tachess.free.fr/</a>		Commission du Soleil SAF		
Soleil Couronne			Orbites	Impact	0,05	1000	0,1	Solar stormwatch			Delier Favre	GEFOS	<a href="http://www.soleil.tachess.free.fr/">http://www.soleil.tachess.free.fr/</a>		Commission du Soleil SAF		
Etoiles à record	9		Orbites	Impact	0,1	0,1			10	10000	CDS Vizier	SDS	<a href="http://cdsportal.u-strasbg.fr/">http://cdsportal.u-strasbg.fr/</a>				
Jumelles du Soleil	9								10	10000	D. Gray	modèle des atmosphères					
Etoiles doubles	12				0,1	0,1			10	10000	David Valls Gabaud	WDS UNO	<a href="http://wds.uno.navy.mil/wds/">http://wds.uno.navy.mil/wds/</a>		Commission des étoiles doubles SAF		
Binaires Spectroscopiques	12				0,01	0,1	0,1	10000	1000	10000	Daniel Bonnaie	AAVSO/VX	<a href="http://www.aavso.org/vx/">http://www.aavso.org/vx/</a>	<a href="mailto:astro.laucor@orange.fr">astro.laucor@orange.fr</a>			
Binaires à éclipses EA EW	12		Phénoménologie		0,01	0,1	0,1	10000	1000	10000	Laurent Cop	AAVSO/VX	<a href="http://www.aavso.org/vx/">http://www.aavso.org/vx/</a>	<a href="mailto:astro.laucor@orange.fr">astro.laucor@orange.fr</a>			
Etoiles Variables	10	CC	0	Maxima minima	Spectres	0,1			10000	300-300	Dominique Proust	AFDEV	<a href="http://www.afdev.org/">http://www.afdev.org/</a>	<a href="mailto:afdev@astro.u-strasbg.fr">afdev@astro.u-strasbg.fr</a>			
Céphéïdes	14	GRS	0	Maxima minima	Spectres	0,1			10000	300-300	Denis Gillet, Philippe Mathias	GRPR	<a href="http://www.aavso.org/vx/">http://www.aavso.org/vx/</a>	<a href="mailto:Philippe.Mathias@cea.fr">Philippe.Mathias@cea.fr</a>			
RR Lyrae	14	GRS	0	Maxima minima	Spectres	0,1			10000	300-300	Jean-François Leborgne	GEOS	<a href="http://www.jfr-leborgne.com/">http://www.jfr-leborgne.com/</a>	<a href="mailto:leborgne@posteo.net">leborgne@posteo.net</a>	Workshop annuel à l'OPH		
Delta Scuti					0,1	0,1			1000	10000	Coralie Néner	ARAS	<a href="http://www.observatoiredeparis.fr/">http://www.observatoiredeparis.fr/</a>	<a href="mailto:coralie.nener@obspm.fr">coralie.nener@obspm.fr</a>	Stages Spectro OHP/Aud		
Etoiles de type S					0,1	0,1			1000	10000	Christian Bull	ARAS	<a href="http://www.observatoiredeparis.fr/">http://www.observatoiredeparis.fr/</a>	<a href="mailto:christian.bull@obspm.fr">christian.bull@obspm.fr</a>	Stages Spectro OHP/Aud		
Etoiles OB actives					0,1	0,1			1000	10000	Elisane Mavelle	ARAS	<a href="http://www.observatoiredeparis.fr/">http://www.observatoiredeparis.fr/</a>	<a href="mailto:elisane.mavelle@obspm.fr">elisane.mavelle@obspm.fr</a>	Stages Spectro OHP/Aud		
Etoiles Cataclismiques					0,1	0,1			1000	10000	François Teysseier	AAVSO	<a href="http://www.aavso.org/vx/">http://www.aavso.org/vx/</a>	<a href="mailto:francois.teysseier@gmail.com">francois.teysseier@gmail.com</a>			
Etoiles Symbiotiques					0,001	100			100	100	Denis Gillet	GRE	<a href="http://www.gre-astro.com/">http://www.gre-astro.com/</a>	<a href="mailto:denis.gillet@cevytheas.fr">denis.gillet@cevytheas.fr</a>			
Nouvelles classes variables					0,1	100			100	100	Fabrice Mottez		<a href="http://www.fabricemotez.com/">http://www.fabricemotez.com/</a>	<a href="mailto:fabrice.motez@obspm.fr">fabrice.motez@obspm.fr</a>	OHP		
Pulsars	10				0,1	100			100	100	Alexandre Santeme	satellite WISE	<a href="http://www.wisepulsars.com/">http://www.wisepulsars.com/</a>	<a href="mailto:alexandre.santeme@obspm.fr">alexandre.santeme@obspm.fr</a>			
Trous Noirs Galactiques					0,1	100			100	100	Jean-Philippe Beaulieu	transitsearch	<a href="http://www.transitsearch.com/">http://www.transitsearch.com/</a>	<a href="mailto:jean-philippe.beaulieu@obspm.fr">jean-philippe.beaulieu@obspm.fr</a>			
Disques Stellaires					0,01	10000			10000	10000	Jean Schneider, David Kipping	SETI	<a href="http://www.seti.org/">http://www.seti.org/</a>	<a href="mailto:jean.schneider@obspm.fr">jean.schneider@obspm.fr</a>			
Planètes Extra Solaire		Vibéscop	Orbite	Transit	0,01	10000			10000	10000	Alexandre Santeme	satellite WISE	<a href="http://www.wisepulsars.com/">http://www.wisepulsars.com/</a>	<a href="mailto:alexandre.santeme@obspm.fr">alexandre.santeme@obspm.fr</a>			
Super-Terres					0,01	10000			10000	10000	Jean-Philippe Beaulieu	transitsearch	<a href="http://www.transitsearch.com/">http://www.transitsearch.com/</a>	<a href="mailto:jean-philippe.beaulieu@obspm.fr">jean-philippe.beaulieu@obspm.fr</a>			
Satellites de Planètes Extra Solaire					0,01	10000			10000	10000	Jean Schneider, David Kipping	SETI	<a href="http://www.seti.org/">http://www.seti.org/</a>	<a href="mailto:jean.schneider@obspm.fr">jean.schneider@obspm.fr</a>			
Vie extraterrestre					0,01	10000			10000	10000	Jean Schneider, David Kipping	SETI	<a href="http://www.seti.org/">http://www.seti.org/</a>	<a href="mailto:jean.schneider@obspm.fr">jean.schneider@obspm.fr</a>			
Nova de la Voie Lactée	6,2				0,05	10000			10000	10000	Emmanuel Cômeil	CBAT	<a href="http://www.cbats.org/">http://www.cbats.org/</a>	<a href="mailto:cbatiau@post.harvard.edu">cbatiau@post.harvard.edu</a>			
Supernova Voie Lactée	0	ASAS-SN			0,1	1000			10000	10000	Agnes Acker	SKYBOX	<a href="http://www.skybox.com/">http://www.skybox.com/</a>	<a href="mailto:skypbox.com@supernovance.com">skypbox.com@supernovance.com</a>			
Ruissellements de SN	16				0,1	600			10000	10000	Emmanuel Cômeil	CBAT	<a href="http://www.cbats.org/">http://www.cbats.org/</a>	<a href="mailto:cbatiau@post.harvard.edu">cbatiau@post.harvard.edu</a>			
Nébuleuses Planétaires	16				0,1	600			10000	10000	Emmanuel Cômeil	CBAT	<a href="http://www.cbats.org/">http://www.cbats.org/</a>	<a href="mailto:cbatiau@post.harvard.edu">cbatiau@post.harvard.edu</a>			
Nébuleuse de Wolf-Rayet	16				0,1	600			10000	10000	Emmanuel Cômeil	CBAT	<a href="http://www.cbats.org/">http://www.cbats.org/</a>	<a href="mailto:cbatiau@post.harvard.edu">cbatiau@post.harvard.edu</a>			
Nébuleuses					0,1	1000			1000	1000	Emmanuel Cômeil	CBAT	<a href="http://www.cbats.org/">http://www.cbats.org/</a>	<a href="mailto:cbatiau@post.harvard.edu">cbatiau@post.harvard.edu</a>			
Bulles cosmiques					0,1	1000			1000	1000	Emmanuel Cômeil	CBAT	<a href="http://www.cbats.org/">http://www.cbats.org/</a>	<a href="mailto:cbatiau@post.harvard.edu">cbatiau@post.harvard.edu</a>			
Amas d'étoiles et astéroïdes	9				0,01	10			10	10	Jose Peña Institut d'Astronomie Mexico		<a href="http://www.milkywayproject.org/">http://www.milkywayproject.org/</a>				
Amas Globulaires					0,01	10			10	10	Jose Peña Institut d'Astronomie Mexico		<a href="http://www.milkywayproject.org/">http://www.milkywayproject.org/</a>				
Voie Lactée					0,01	10			10	10	Jose Peña Institut d'Astronomie Mexico		<a href="http://www.milkywayproject.org/">http://www.milkywayproject.org/</a>				
Galaxies naines					0,01	10			10	10	Jose Peña Institut d'Astronomie Mexico		<a href="http://www.milkywayproject.org/">http://www.milkywayproject.org/</a>				
Galaxie d'Andromède	Novae				0,1	0,1			10	10	Jose Peña Institut d'Astronomie Mexico		<a href="http://www.milkywayproject.org/">http://www.milkywayproject.org/</a>				
Novae galaxies voisines	16				0,1	0,1			10	10	Jose Peña Institut d'Astronomie Mexico		<a href="http://www.milkywayproject.org/">http://www.milkywayproject.org/</a>				
Amas d'étoiles galaxies voisines	16				0,1	0,1			10	10	Jose Peña Institut d'Astronomie Mexico		<a href="http://www.milkywayproject.org/">http://www.milkywayproject.org/</a>				
Galaxies					0,1	0,1			10	10	Jose Peña Institut d'Astronomie Mexico		<a href="http://www.milkywayproject.org/">http://www.milkywayproject.org/</a>				
Galaxies à noyaux actifs					0,1	0,1			10	10	Jose Peña Institut d'Astronomie Mexico		<a href="http://www.milkywayproject.org/">http://www.milkywayproject.org/</a>				
Micro Quas																	

- Column L : name of the active focal point in France or abroad.
- Column M: name of an organisation or Society coordinating the topic.
- Column N: web site dedicated to the topic.
- Column O: e-mail address, this is often the e-mail address of the focal point or of the organisation.
- Column P: name of the conference gathering the actors on the field.

This table could be used in several ways. One of the purposes is to allow amateur astronomers, amateur observatories, amateur societies and scholarship projects to choose a topic and to define the fitted instrument setup. Colors of the table cells allow a quick access to the project: blue for the easiest topics for the beginner with small instrument, green for topics relying on a dedicated process methodology, orange for topics requiring large telescope 500mm aperture class with sensitive and accurate instruments, purple for very challenging topics requiring heavy hardware. The known amateur-professional collaborations are quoted in this table. Some topics meet strong interest without professional involvement for its historical perspective or pedagogic purpose.

Another way to use this table is to take empty cells to wonder whether it could become a new active topic. Thanks to the papers and lectures, from the communities, given all along the years, the file is updated at least once a year. An English worldwide version could be prepared through multi-country partnerships and with IAU as it was proposed in Bruxelles during the Amateur day of the 100th year IAU Symposium<sup>¶</sup>.

## 5 Workshop program

A large number of oral and poster proposals have been received for the two workshops in 2018 and this year in 2019, (see <http://sf2a.eu/semaine-sf2a/2019/index.php?lang=fr>). More than 70 people registered for the workshop well balanced between the amateur and professional communities, giving one of the largest attendances to the “Journées SF2A” workshops.

The two workshops conclude with a round table and a debate with some of the key actors of such collaborations and to allow attendance to give feedbacks and proposals for the future. The purposes are to review the action proposals for new collaborations and to develop this field of activities. The involvement of the attendance including the involvement of SF2A and SAF in a partnership process are welcome. The major actions decided are presented below.

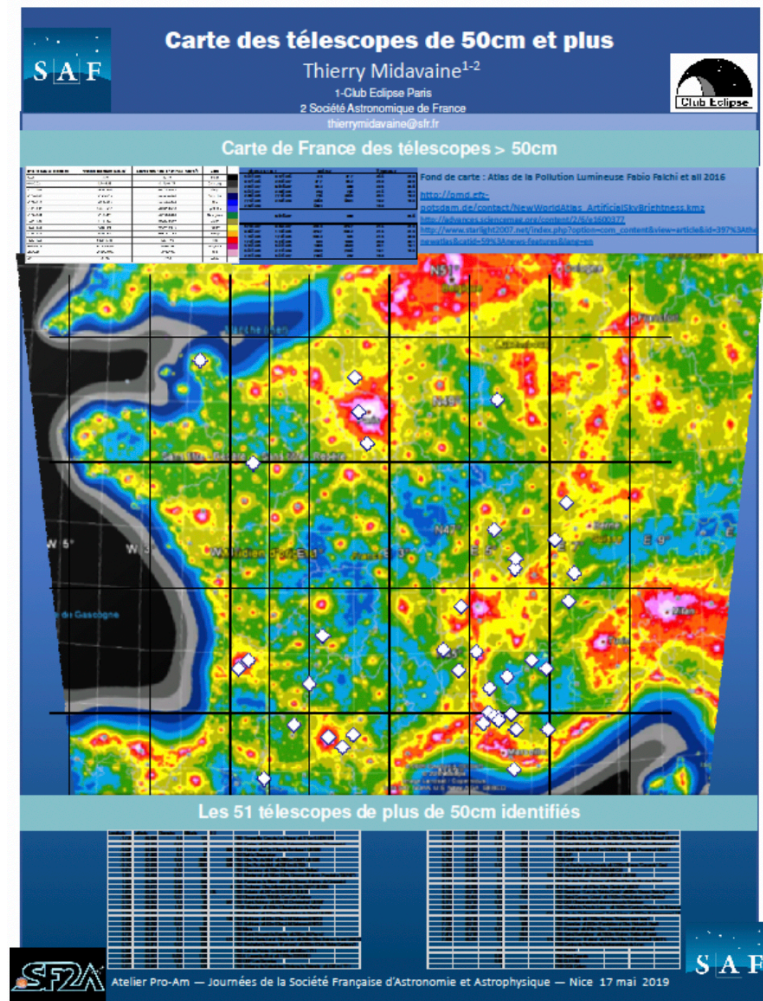
## 6 Creation of a web portal

As a first step Maria Curlin created end of 2018 a new webpage in SAF website to promote astronomical event observations. The first events were: November December 2018 Comet Wirtanen campaign, January 2019 the Antiope (double asteroid) star occultation, January February 2019 Eros close opposition, May 2019 the Quaoar TNO star occultation.

Beyond this first step, a SAF working group gathering Maria Curlin, Patrick Duchemin, Roger Ferlet, Jean Guerard, Anica Lekic, Thierry Midavaine and Stéphane Neveu, is preparing a web portal allowing, on one side, the registration of amateur describing their observation means and skills and, on the other side, the link with professionals introducing projects or astronomical targets for campaigns. The purpose is to embed an engine to allow the smart interface between amateur observers and professionals. The process may include, if required, an amateur observer obligation to act under a non disclosing agreement to keep the covertness of astronomical targets and collected data, up to the publication. It ends with publications made with contributing observers as coauthors. Several other tools are scheduled to allow quick mobilization of observatories fitted to the event. The fitting assessment of the instrument to the campaign is given by the following criteria : limiting magnitude of the instrumental set up, magnitude/as<sup>2</sup> darkness of the sky, Long Lat Alt of the locations, SNR for a given target magnitude and sampling rate, Seeing and other key requirements coming from the collaboration topics.

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<sup>¶</sup>Th. Midavaine, F. Herpin : Status of the Amateur Professional Collaborations. IAU 100 Years, Amateur Day, April 14th 2019 Bruxelles Belgium.



**Fig. 3.** 2019 consolidated map of the location of 500mm and above class telescopes (white losanges) in front of the 2016 ISTIL Fabio Falchi zenithal sky luminance map for France ((Falchi F, Cinzano P, et al, Sci Adv 2016 jun 10, 2(6)).

## 7 The French map of the observatories networking

One of the key function to propose to professionals is to give them an access to the network of observers including the most sensitive observatories. As a first step a poster presented this year during the workshop shows the more than 50cm diameter telescopes available in France (Fig. 3). This first map is not exhaustive and gathered about 51 observatories. Thanks to this workshop 64 telescopes are today identified. We may assume about 100 instruments available in France or in the neighbourhood, and much more in gathering smaller telescopes which may bring in addition nomad flexibilities. Collecting the location of the observers and amateur accessible telescopes is an important input for several projects where several parallel and independent collected data is worth for multi longitudes, latitudes or altitudes and to deal with cloud coverage and sky pollution background. Moreover, some projects, like asteroid occulting star events, require the identification of observer locations and to propose to nomad observers useful tactical additional locations (<http://www.iota-es.de/>). In addition the millisecond class (or even better) accurate time sampling and stamping of data brings by GPS receivers, allows intelligent data processing of synchronized multi recordings.





**Fig. 4.** Participant to the Photometry School hold the 17th-19th of may 2019 at Nice Observatory.

## 8 Campaign Calendars and Meetings

An important output of the workshop is to share and update our calendars. The first agenda is dedicated to coming astronomical events and campaigns. The second calendar is dedicated to symposium and meetings about amateur professional collaboration topics. These two calendars will be updated and share on the web site ([https://saf-astronomie.fr/collaboration\\_pro\\_am/](https://saf-astronomie.fr/collaboration_pro_am/)) and then on the coming portal.

## 9 Photometry School

During the 2018 workshop we agreed on the necessity for several collaboration programs to held a dedicated school to photometry. This have been organized by Benoit Carry at Nice Observatory with the support of Raoul Behrend, Stephane Fauvaud, Romain Montaigu and CALA members to give talks and tutorials on software processings. Two topics was retained for this 1st school : Rotation Curves on asteroids and Exoplanet transit.

## 10 Conclusions

The SAF SF2A partnership is now on the way. For the coming years the following tasks have been retained:

- to organise the Prize award of the best Amateur Professional Collaboration through a call for candidates for the end of 2019,
- to develop the V1 of the collaboration web portal,
- to propose a third Amateur Professional Workshop during the next Journées de la SF2A in June 2020 in Paris,
- to prepare a second Photometry School.

We thank Christian Buil, Benoit Carry, Pierre Farissier, Eric Lagadec, Alexandre Santerne accepting to join the Scientific Organizing Committee and their contributions to the success of this 2nd workshop. Patrick Baradeau, Maria Curlin, Patrick Duchemin, Roger Ferlet, Jean Guérard, Anica Lekic, Stéphane Neveu, joining The Société Astronomique de France amateur professional working group for their active contributions.