

SVOM Science Workshop  
2019 May 18 – Gaochun (Jiangsu province)

# SVOM and the O3 campaign

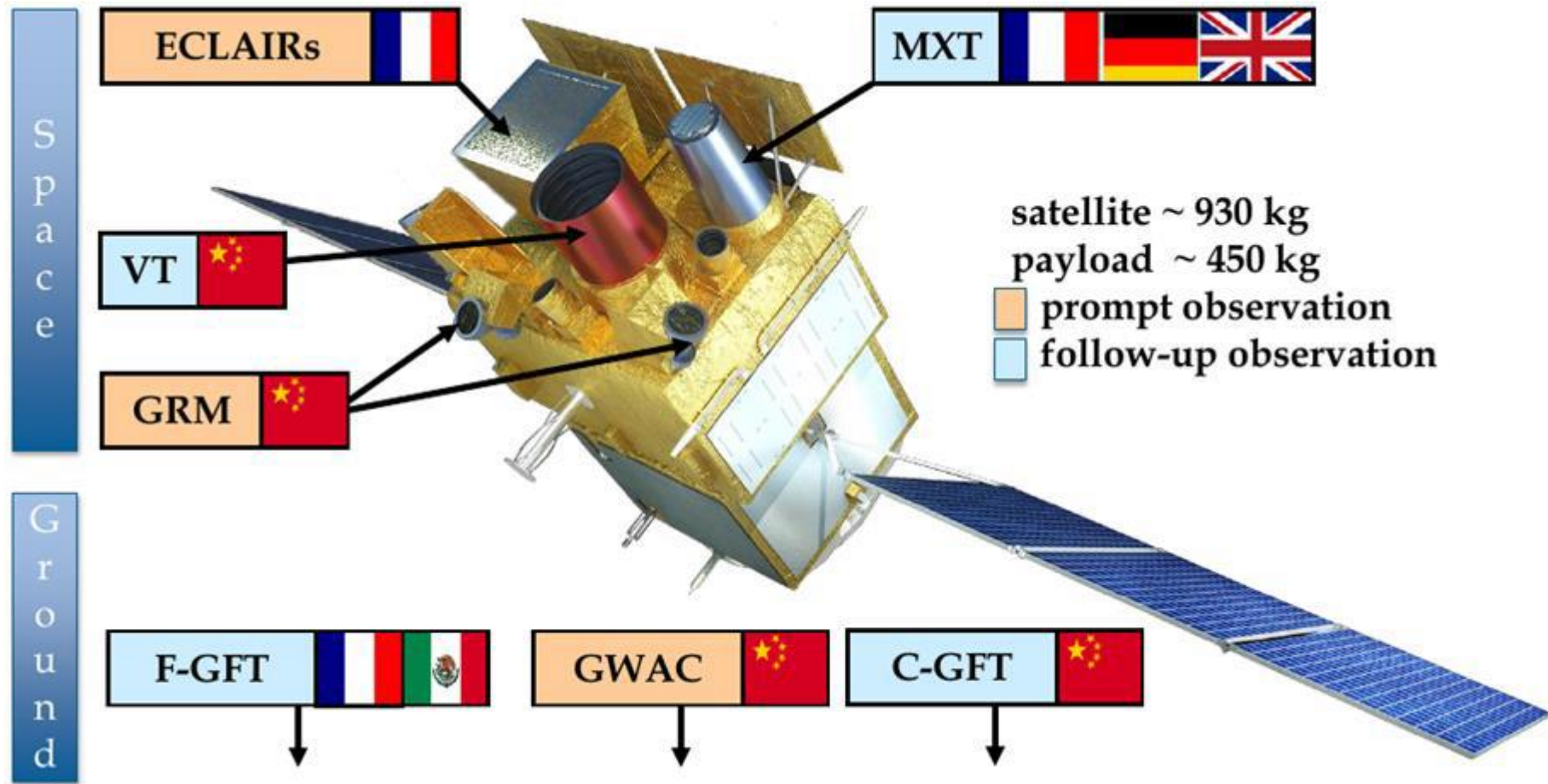
Transient Sky 2020 III, 25/26-09, Paris

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*On behalf the SVOM MMA and GWAC teams*



# The SVOM instruments



A multi wavelength mission with space based and ground based instruments

# Open Questions

## GRB studies

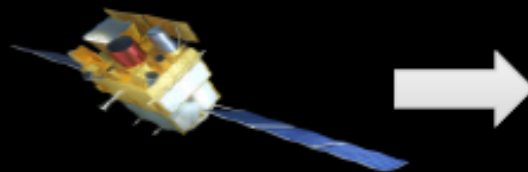
- Progenitors and central engines
- The physics of the relativistic ejecta
- Multi-messenger emission

## Using GRBs as a tool for cosmology

- Spectroscopy of the line of sight
- Host galaxies
- Very distant GRBs : first stars/reionization of the intergalactic medium ?

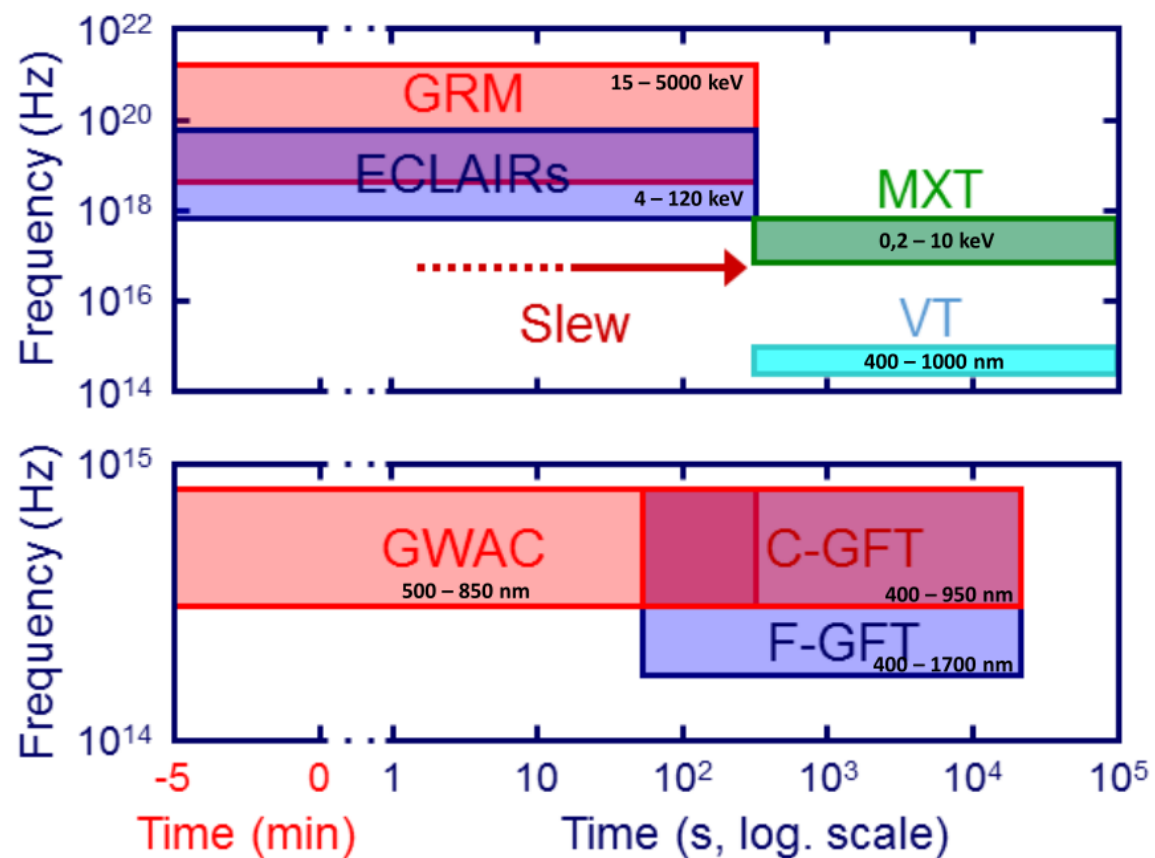


- Fermi : short GRBs and excellent coverage of the prompt emission
- Swift : study of the afterglow and measurement of the redshift



Build a homogeneous sample of GRBs  
with a good time and spectral coverage  
With redshift measurement

# Spectral coverage

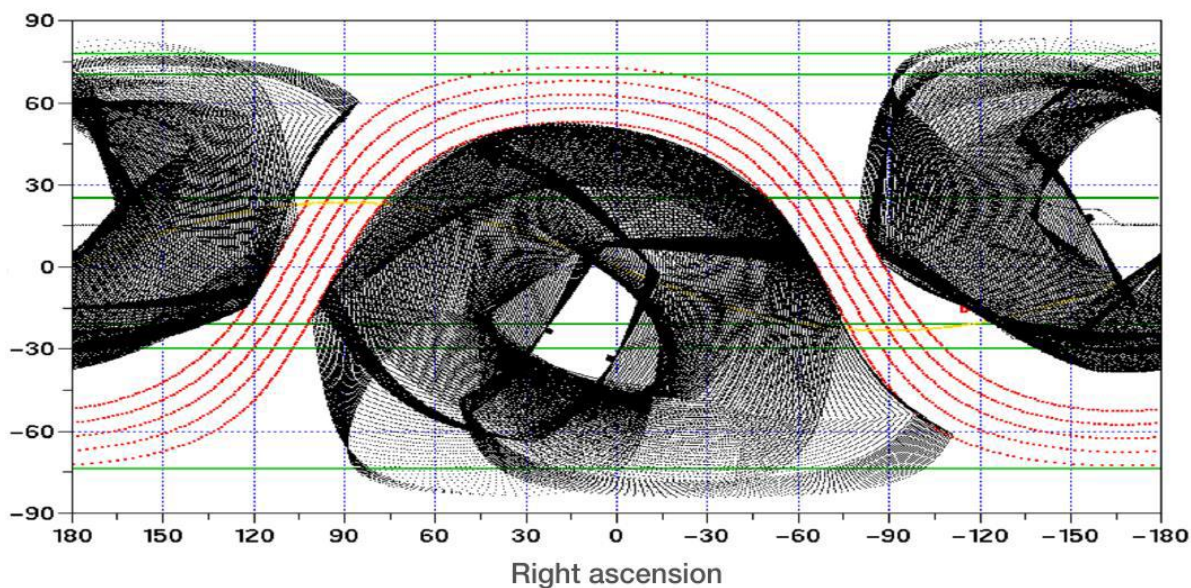


# Scientific programs

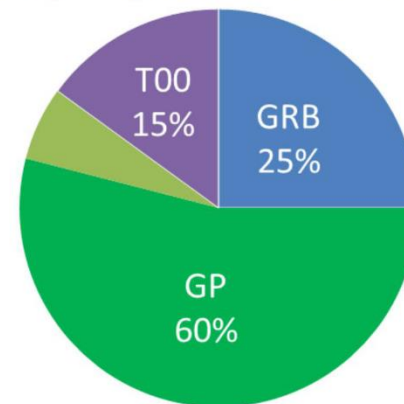
**General Program (GP):** astrophysical targets of interest mostly compliant with the B1 law (satellite attitude law).

**Core Program (CP):** autonomous GRB detection by ECLAIRs.

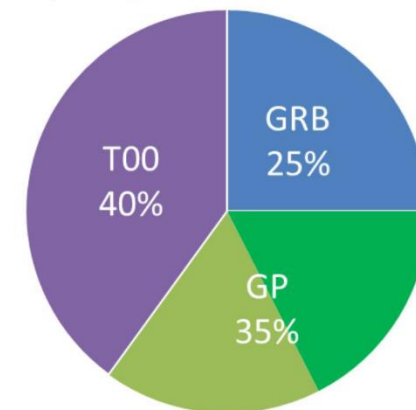
B1 law: avoids galactic plane + Sco X-1 region.



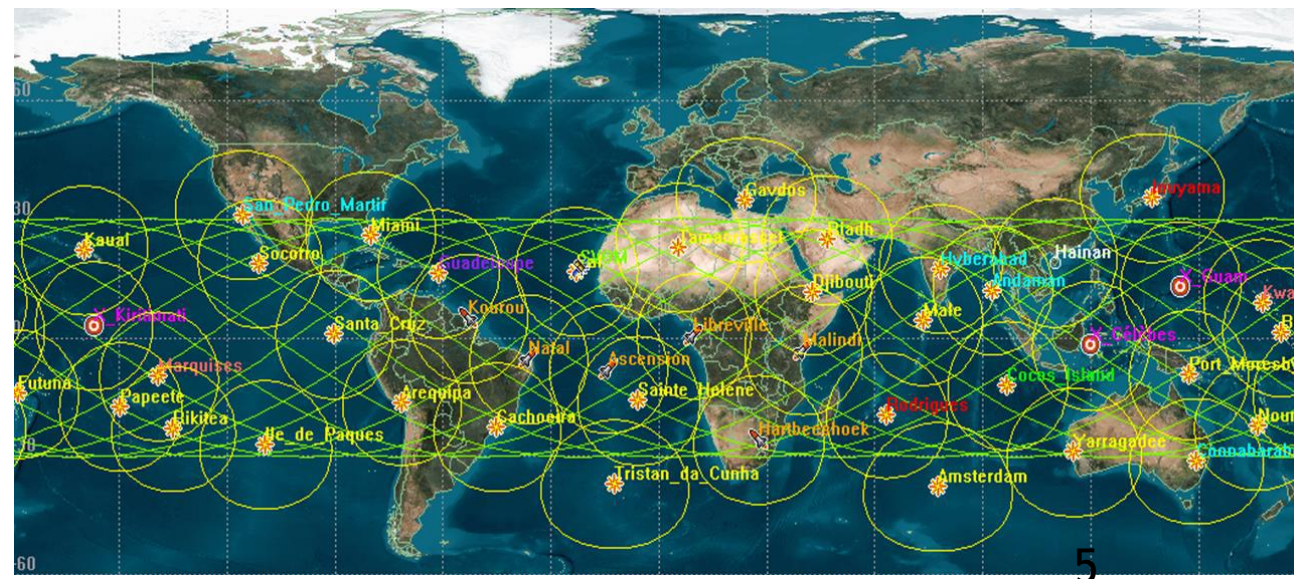
**Nominal mission**  
1 ToO per day, 10% of GP outside B1 law



**Extended mission**  
5 ToOs per day, 50% of GP outside B1 law



Fast alert broadcast to the ground through VHF network.



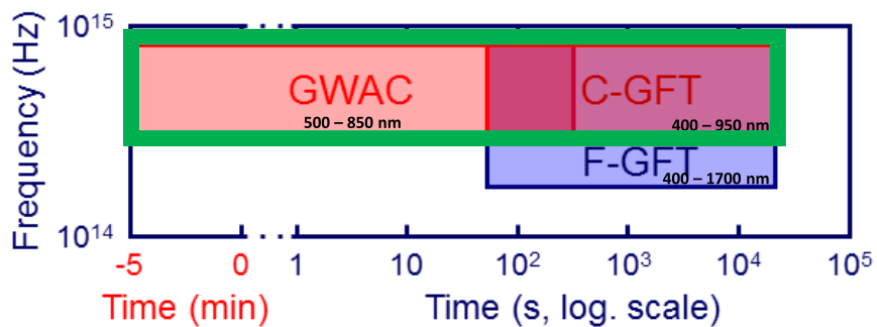
# The SVOM instruments (already in operations)



1.2m C-GFT at Jilin



F60A, F30 and GWAC at Xinglong



# The SVOM BA/MMA training

Main goal : **train our BA system** (and not science) including:

- Face unknown issues since we are the first to do real time operations between France and China
  - Communication with China (may be difficult, eg. Zoom Video Communication does not work since 08/09/19)
  - Follow-up procedure
- ➔ To be ready do to science by 2022, we have to train now.

# The SVOM activities during 03: summary

1 Team of French and Chinese advocates (~ 30 people)

31 “real” alerts received (on 14/10/19):

- 11 were followed with GWAC (and possibly F30/F60)
- 6 were received during GWAC maintenance
- 14 were not observed (bad weather or not visible)
- 12 GCN circulars send (9 alerts)

Observations:

- Errorbox tilling with GWAC
- Galaxy targeting with F30/F60



# The SVOM activities during 03: tools

3 different time scale → 3 different tools (have to be accessible from China)

Slack for the alert reception and chat about the follow-up



Server in China (NAOC) for the follow-up monitoring



Redmine as an archive

+ WeChat

# The SVOM activities during 03: Slack

The screenshot shows a Slack interface for the channel #gwalert. On the left is a sidebar with the channel name SVOM-03 and a list of channels including #gwalert. The main area displays two messages from the 'incoming-webhook' bot. Each message is a 'GW alert' containing technical details such as GW NAME, Trigger Time, Instruments, EventPage, Search, HasRemnant, and Delay since alert. The messages are separated by a horizontal line.

**Channel: #gwalert**  
28 members | 0 themes | Ajouter un thème

Hier

-----  
GW alert  
-----  
GW NAME : S190924h Trigger Time: 2019-09-24T02:18:46.846654  
Instruments: H1,L1,V1  
EventPage: <https://gracedb.ligo.org/superevents/S190924h/view/>  
Search: CBC  
HasRemnant: 0.0  
Delay since alert: 0:06:08.408828

**incoming-webhook** APPLI 5 h 04  
-----  
new GCN notice  
-----  
ID : S190924h with status Initial  
EventPage: <https://gracedb.ligo.org/superevents/S190924h/view/>  
Observation program launched

-----  
GW alert  
-----  
GW NAME : S190924h Trigger Time: 2019-09-24T02:18:46.846654  
Instruments: H1,L1,V1  
EventPage: <https://gracedb.ligo.org/superevents/S190924h/view/>  
Search: CBC  
HasRemnant: 0.0  
Delay since alert: 0:45:13.872291

Envoyer un message à #gwalert

# The SVOM activities during 03: Slack

The screenshot shows a Slack interface for the #general channel. The left sidebar lists various channels and direct messages. The main area displays a conversation with the following messages:

- ducoin Jean-grégoire** (11 h 03): hi @Damien Turpin there is no mass gap classification in the web interface?!
- ducoin Jean-grégoire** (11 h 08): @Xuhui Han, There is no observations reported on the web interface for S190923y. Can you confirm me that no observation was made ?
- Nicolas Leroy** (11 h 33): @ducoin Jean-grégoire I need to add mass gap, will do it before the Nanning meeting  
👍 1
- Damien Turpin** (11 h 40): Yes @Nicolas Leroy quick quick before the LVC break 😊
- Damien Turpin** (11 h 45): @ducoin Jean-grégoire after discussing with @Xuhui Han normally no obs done because of moon constraints. @Xuhui Han told me he is going to check carefully tomorrow. From the web interface nothing has been reported, not good a sign for observations
- ducoin Jean-grégoire** (11 h 45): ok thx
- Damien Turpin** (14 h 46): Hi @Chao WU, the status of the observed tiles (at least GWAC) can be seen here [http://cmm.svom.cn/SVOM\\_BA\\_interface/GRB\\_prompt\\_manage.php?trigger\\_IDinDB=4752](http://cmm.svom.cn/SVOM_BA_interface/GRB_prompt_manage.php?trigger_IDinDB=4752) for S190924h  
For S190923y if something happened the status is here : [http://cmm.svom.cn/SVOM\\_BA\\_interface/GRB\\_prompt\\_manage.php?trigger\\_IDinDB=4729](http://cmm.svom.cn/SVOM_BA_interface/GRB_prompt_manage.php?trigger_IDinDB=4729)  
@ducoin Jean-grégoire  
👍 1  
But for both alerts while the night is clear, the moon is too close normally  
We are really not lucky

The bottom of the screen shows a text input field with the placeholder "Envoyer un message à #general" and icons for attachments, mentions, and emojis.

# The SVOM activities during 03: Slack

The screenshot shows a Slack workspace for SVOM-03. On the left is a teal sidebar with the channel name 'SVOM-03' and a list of channels including '# xinglongobsinfo'. The main area displays the '#xinglongobsinfo' channel header with 18 members and a search bar. Below the header, a message contains two images: a grayscale satellite map of a region with a red pin, and a circular image of a celestial body with a compass rose. The interface includes standard Slack navigation and communication elements.

# The SVOM activities during 03: server

We have to develop our own tool since it has to get data from Chinese server.

On this server, BA can :

- See shift calendar
- Monitor alerts reception and observation plan
- Monitor instruments status and weather
- Make a report



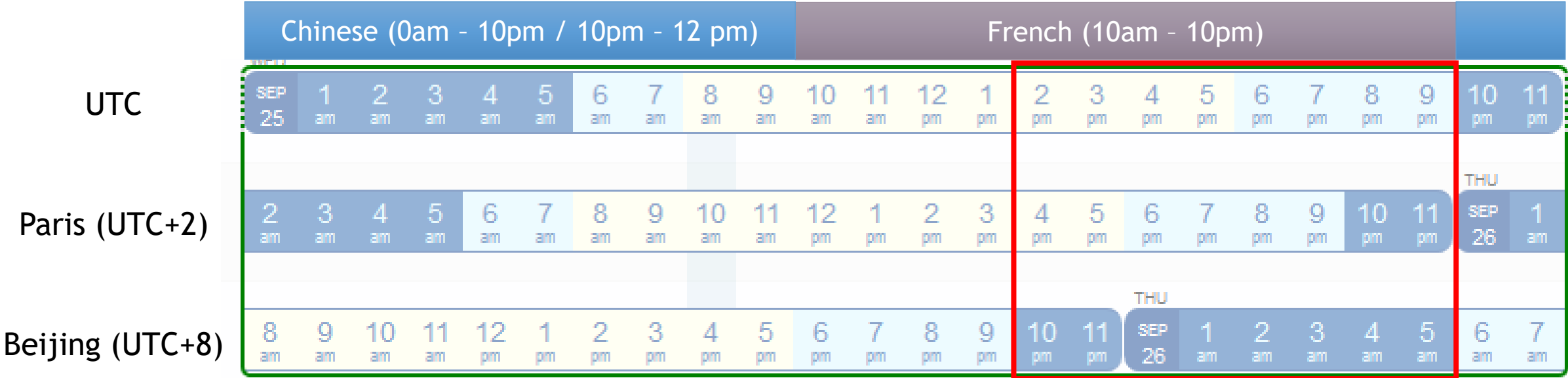
This tool have been develop by Damien Turpin (NAOC)<sub>3</sub>

# The SVOM activities during 03: server

Remote Calendar						
Today <span>◀ ▶</span> Jump to: <input type="text"/> Go						Day Week 2 Weeks <b>Month</b>
Sep 1, 2019	Mon 2	Tue 3	Wed 4	Thu 5	Fri 6	Sat 7
<b>S190101ap</b> 12:00am Xuhui HAN (Li... 10:00am Sarah ANTIER... 10:00am Merieme Cha... 10:00pm WEI Jianyan (...	12:00am Xuhui HAN (Li... 10:00am Sarah ANTIER... 10:00pm Xuhui HAN (Li...	12:00am Xuhui HAN (Li... 10:00am Sarah ANTIER... 10:00pm Xuhui HAN (Li...	12:00am Xuhui HAN (Li... 10:00am Sarah ANTIER... 10:00pm Xuhui HAN (Li...	12:00am Xuhui HAN (Li... 10:00am Sarah ANTIER... 10:00pm Xuhui HAN (Li...	12:00am Xuhui HAN (Li... 10:00am Sarah ANTIER... 10:00pm Xuhui HAN (Li...	12:00am Xuhui HAN (Li... 10:00am Sarah ANTIER... 10:00pm Xuhui HAN (Li...
8	9	10	11	12	13	14
12:00am Xuhui HAN (Li... 10:00am Sarah ANTIER... 10:00pm Xuhui HAN (Li...	12:00am Liping Xin (Xu... 10:00am Nicolas Leroy ... 10:00pm Liping Xin (Xu...	<b>S190910d</b> <b>S190910h</b> 12:00am Liping Xin (Xu... 10:00am Nicolas Leroy ... 10:00pm Liping Xin (Xu...	12:00am Liping Xin (Xu... 10:00am Nicolas Leroy ... 10:00pm Liping Xin (Xu...	12:00am Liping Xin (Xu... 10:00am Nicolas Leroy ... 10:00pm Liping Xin (Xu...	12:00am Liping Xin (Xu... 10:00am Nicolas Leroy ... 10:00pm Liping Xin (Xu...	12:00am Liping Xin (Xu... 10:00am Nicolas Leroy ... 10:00pm Liping Xin (Xu...
15	16	17	18	19	20	21
<b>S190915ak</b> 12:00am Liping Xin (Xu... 10:00am Nicolas Leroy ... 10:00pm Liping Xin (Xu...	12:00am Damien Turpi... 10:00am David Corre (... 10:00pm Damien Turpi...	12:00am Damien Turpi... 10:00am David Corre (... 10:00pm Damien Turpi...	12:00am Damien Turpi... 10:00am David Corre (... 10:00pm Damien Turpi...	12:00am Damien Turpi... 10:00am David Corre (... 10:00pm Damien Turpi...	12:00am Damien Turpi... 10:00am David Corre (... 10:00pm Damien Turpi...	12:00am Damien Turpi... 10:00am David Corre (... 10:00pm Damien Turpi...
22	23	Today 5:35pm	25	26	27	28
12:00am Damien Turpi... 10:00am David Corre (... 10:00pm Damien Turpi...	<b>S190923y</b> 12:00am chao wu (Da... 10:00am Jean-Gregoire... 10:00pm chao wu (Da...	<b>S190924h</b> 12:00am chao wu (Da... 10:00am Jean-Gregoire... 10:00pm chao wu (Da...	12:00am chao wu (Da... 10:00am Jean-Gregoire... 10:00pm chao wu (Da...	12:00am chao wu (Da... 10:00am Jean-Gregoire... 10:00pm chao wu (Da...	12:00am chao wu (Da... 10:00am Jean-Gregoire... 10:00pm chao wu (Da...	12:00am chao wu (Da... 10:00am Jean-Gregoire... 10:00pm chao wu (Da...
29	30	Oct 1	2	3	4	5
12:00am chao wu (Da... 10:00am Jean-Gregoire... 10:00pm chao wu (Da...	12:00am Xiang-Gao Wa... 10:00am Cyril Lachaud... 10:00pm Xiang-Gao Wa...	12:00am Xiang-Gao Wa... 10:00am Cyril Lachaud... 10:00pm Xiang-Gao Wa...	12:00am Xiang-Gao Wa... 10:00am Cyril Lachaud... 10:00pm Xiang-Gao Wa...	12:00am Xiang-Gao Wa... 10:00am Cyril Lachaud... 10:00pm Xiang-Gao Wa...	12:00am Xiang-Gao Wa... 10:00am Cyril Lachaud... 10:00pm Xiang-Gao Wa...	12:00am Xiang-Gao Wa... 10:00am Cyril Lachaud... 10:00pm Xiang-Gao Wa...

1 Chinese + 1  
French advocates  
per week (+ 2  
backup)

# The SVOM activities during 03: server



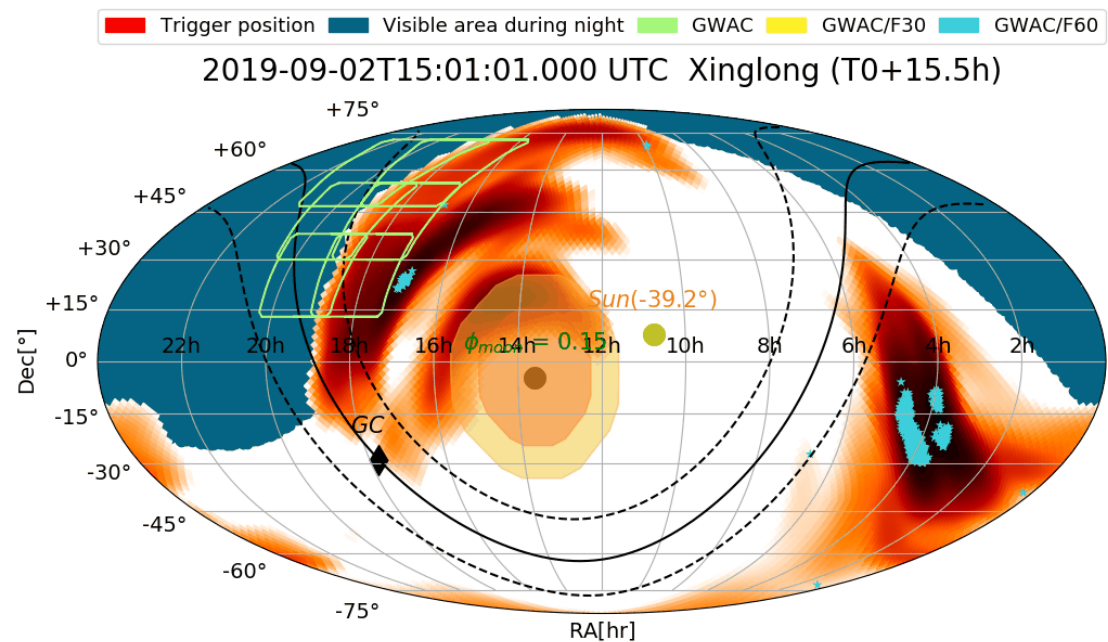
# The SVOM activities during 03: redmine

All alerts received are stored in the archive with summary of operations.

Trigger	Nature	Facility	Distance Mpc	90% area deg2	SVOM 1st obs. after T0	GWAC cov.	F30 Tiles Obs/Prog	F60 Gal Obs/Prog	Spectro	GCN
<a href="#">S190915ak</a>	BBH	H1,L1,V1	1557.21	528.13	No obs	No	No	No	No	No
<a href="#">S190910h</a>	BNS	L1	241	24226	No obs	No	No	No	No	No
<a href="#">S190910d</a>	NSBH	L1,H1	632	2482	No obs	No	No	No	No	No
<a href="#">S190901ap</a>	BNS	L1,V1	242	4176	~T0+21h	21.1%	50/50 (need to check)	500/500 (need to check)	No	Yes
<a href="#">S190829u</a>	retracted									
<a href="#">S190828l</a>	BBH	H1,L1,V1	1609	948	~T0+5h30	9.5%		No	No	Yes
<a href="#">S190828j</a>	BBH	H1,L1,V1	2276	587	~T0+5h	19.6%		No	No	Yes
<a href="#">S190822c</a>	<a href="#">retracted</a>									
<a href="#">S190816i</a>	retracted									
<a href="#">S190814bv</a>	NSBH	H1,L1,V1	267	23	No obs.	0%	No	No	No	No
<a href="#">S190808ae</a>	retracted									
<a href="#">S190728q</a>	Mass gap	H1,L1,V1	874	543		GWAC down	No	No	No	No



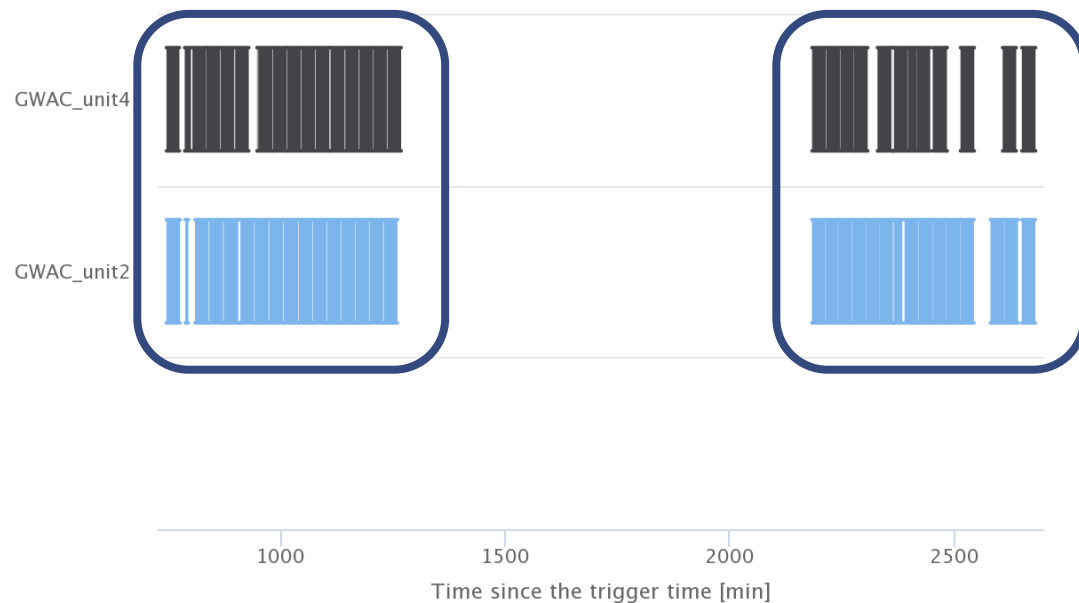
# Example for S190901ap



Observations made for the trigger : S190901ap

First night (T0+12.5h)

Second night



Highcharts.com

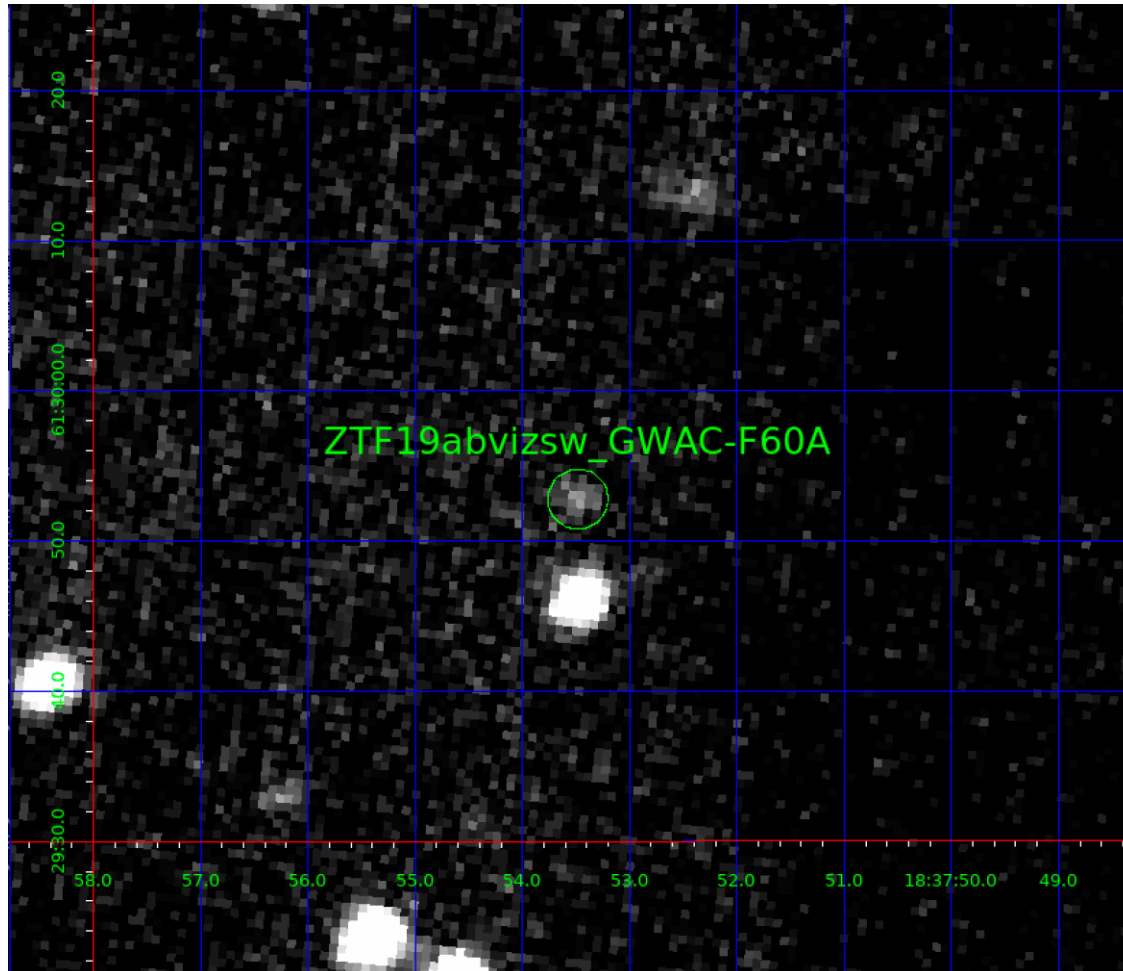
# Example for S190901ap

Obs ID	Field ID	RA mount [deg]	dec mount [deg]	Pointing grade	Obs. type	Telescope	Status	Last update	#images	#OT
551	12010765	120.13	76.5	0.0031	tiling	GWAC_unit4	break	2019-09-03 14:52:54	✗	✗
553	7590425	75.99	42.5	0.0043	tiling	GWAC_unit4	break	2019-09-03 16:54:16	✗	✗
560	29310425	293.11	42.5	0.0088	tiling	GWAC_unit4	break	2019-09-03 14:54:46	✗	✗
584	16810765	168.18	76.5	0.012	tiling	GWAC_unit2	break	2019-09-03 14:54:55	✗	✗
585	21620765	216.23	76.5	0.0147	tiling	GWAC_unit4	break	2019-09-03 14:53:49	✗	✗
552	4700255	47.06	25.5	0.0034	tiling	GWAC_unit2	complete	2019-09-03 16:21:27	✗	✗
554	30030595	300.32	59.5	0.0044	tiling	GWAC_unit4	complete	2019-09-03 16:16:38	✗	✗
555	29170255	291.75	25.5	0.007	tiling	GWAC_unit4	complete	2019-09-03 15:45:48	✗	✗
558	26420765	264.28	76.5	0.0072	tiling	GWAC_unit4	complete	2019-09-03 15:26:44	✗	✗
557	9900085	99	8.5	0.0077	tiling	GWAC_unit4	complete	2019-09-03 20:11:17	✗	✗

BA can follow observation status (received, complete, break).

→ Soon, we can get images and OT search results.

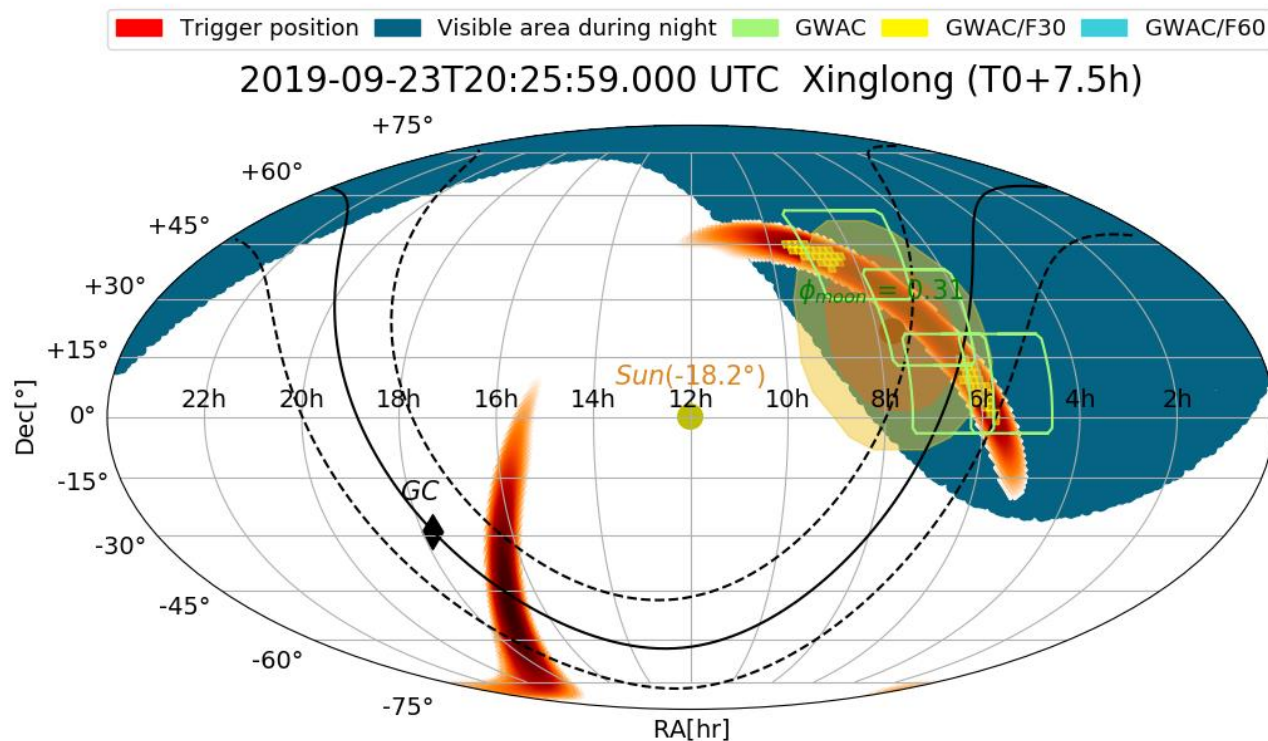
# Example for S190901ap



F60A followed ZTF19abvizsw candidate (GCN 25640) on first night (T0 + 17h).

- Observations from 17:28:07 to 18:45:07 UT on 02th, Sep. 2019.
- Stacking images: 31 x 150 sec
- $R = 20.53 \pm 0.16$  mag

# Another example for S190923y



This one was not observed due to  
Moon constrains

# What's next?

- Continue the training
- Continue the development of the “homemade” tools (results of observations, images, OTs...)
- Write specifications for the development of “official” tools (by end of October)

The story continues: next BA/MMA workshop  
in October in Nanning...

*Take home message: it's difficult to get the full system working between  
France and China, let's train to be ready in 2022 !*