Status of CGFT

@APC Paris

SVOM CGFT team

2023.09.18

Outline

- General introduce to CGFT

  1) site info + design + operation mode + ability

  2) project progress/status

- General requirement

  - list all the requirements from system doc.

- Practical operation/test

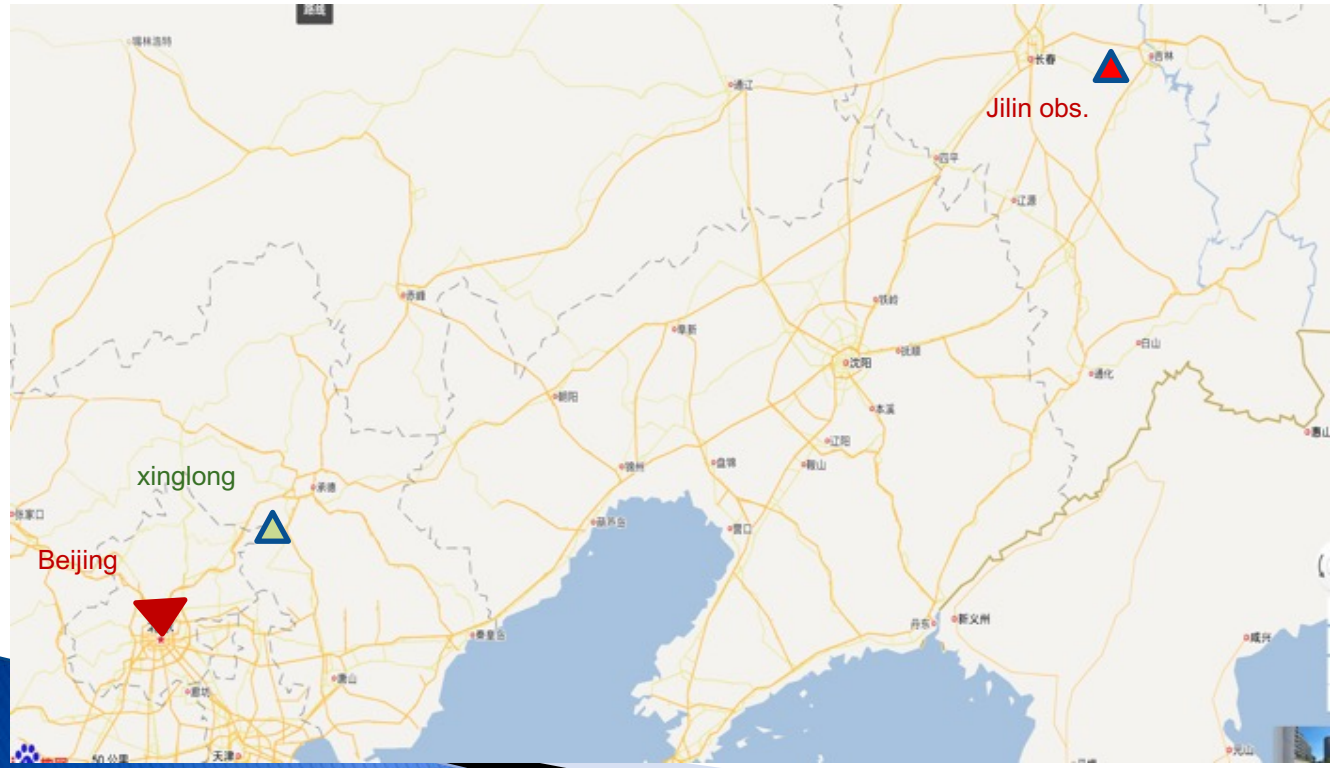
Current status of CGFT

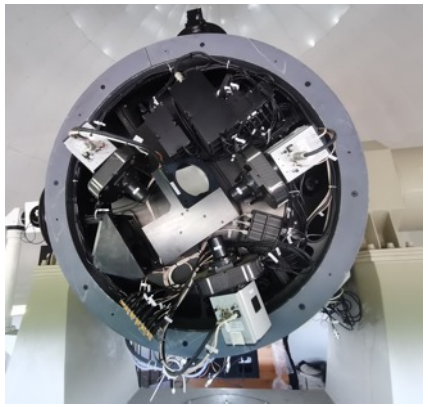
- CGFT @ Jilin observatory station

Jilin

Longitude: 126d 19m 49.7s
Latitude. : 43d 49m 27.8s
Altitude. : 320 m

- ~920 km to Beijing

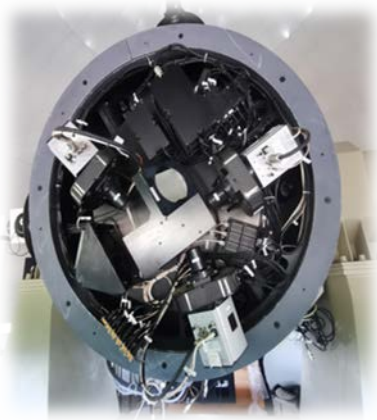


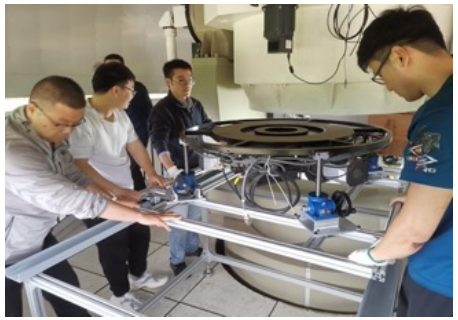


1.2m @ Jilin

Current status of CGFT

		@Jilin
Altazimuth telescope	aperture	1.2 m
	3-channel Imager (Cassegrain focus)（RRB)	g,r,i 2kx2k CCD 21'X21'
	Prime Focus	4kX4k CMOS FOV=1.5degX1.5deg





CGFT has two instrument:

- 3-channel Imager: g,r,i, in simultaneity. 21'X21'
- Prime Focus : g,r,i switch filter. FOV=1.5degx1.5 deg

NOTE: switch between the two instrument must be at day-time.

Current status of CGFT

Instrument Modification/development:

1) Prime Focus Camera:

- Automatically response to GCN/SVOM trigger and be able to take image with band g, r , i
- Automatically process observed data and send data product to CSC/BATOOLS

2) 3 channel Imager :

- Control system + hardware : complete
- Automatically repose to trigger + optimize : in progress

Requirement：

SV-SY-STB-49-JPO_0702_ System Requirement Document_2022 02 15_signed

SYS-R-5.8-210

The CGFT shall provide to the CSC the alert message l2f (Afterglow coordinates and photometric redshift magnitude for GRB candidate) in less than 5(TBC) minutes after receiving N1e notice (via VO interface and dedicated IF).

C-GOS.

SYS-R-5.3-1255

The alert message level 2f (*) shall be delivered by CGFT to CSC in less than 5 mn after T0 for 20% of the bursts triggered by ECLAIRs (TBC)

More test/analyze

SYS-R-5.3-1330

The CGFT field of view shall be greater than 21 arcmin x 21 arcmin.

C-GOS,

SYS-G-5.3-1260

The CGFT availability shall be at least 90%.

CSC, C-GOS,

More test/analyze

SYS-R-5.3-1270

On ground burst follow-up observation by CGFT shall start in less than 60 seconds after I1e alert message reception

C-GOS,

SYS-G-5.3-1280

The CGFT shall be able to observe 20% of the bursts detected by ECLAIRs

C-GOS,

More test/analyze

Assumption for clear night 60% regarding CGFT

SYS-R-5.3-1290

The telescope must deliver a photometric red shift of the sources brighter than Mag(r)=19^{m} in less than 5 min.

C-GOS,

To test +

SYS-R-5.3-1300

The telescope shall image the target in the Sloan ‘g, r, i’ band simultaneously.

C-GOS,

SYS-R-5.3-1310

The telescope shall have the capability to determine the GRB position with accuracy of 0.5 arcsec. at 90% confidence level for GRB afterglow detected.

C-GOS,

More test/analyze

SYS-R-5.3-1320

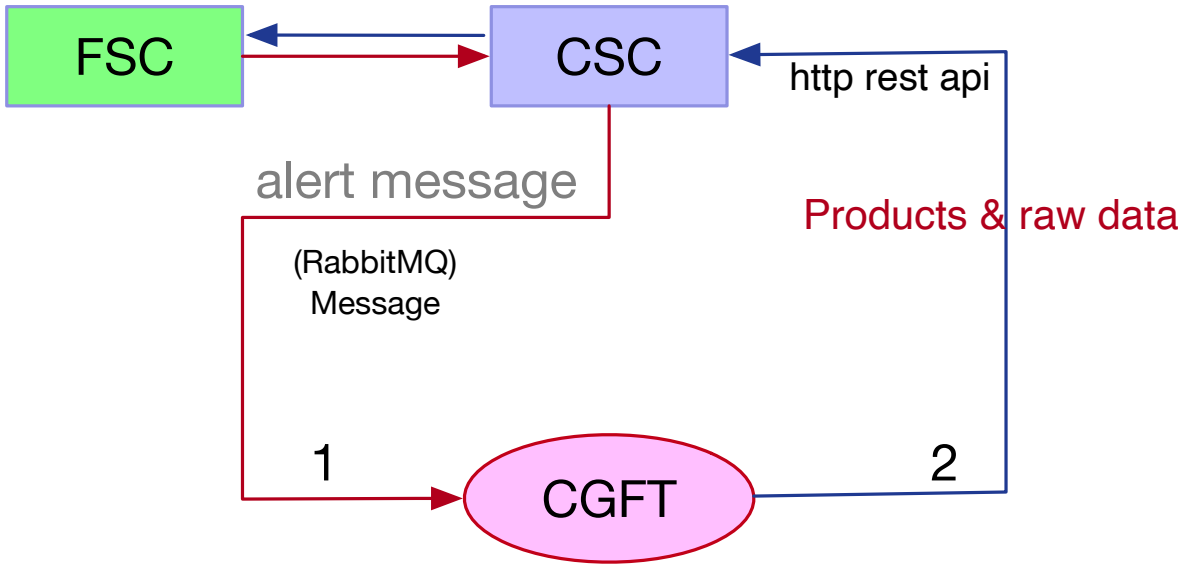
The CGFT shall deliver an Alert message 5 minutes after the trigger delivered to Chinese Science Center.

C-GOS,

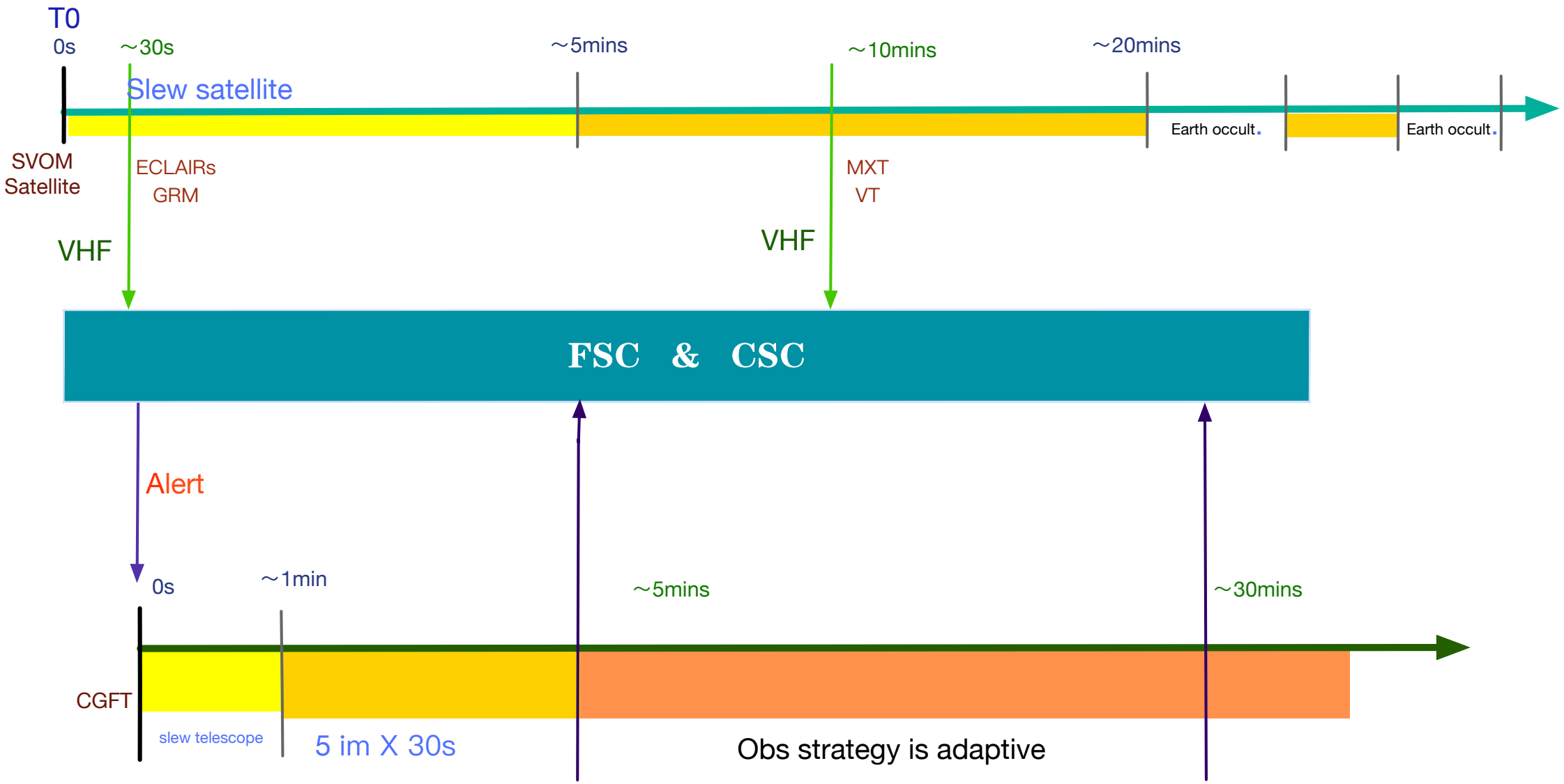
Data product and Interface to CSC /FSC

- Data product of level Quicklook and standard scientific data product
  - ✓ Data product definition is consistent with FGFT
  - ✓ Data product will be registered into database @CSC and @FSC

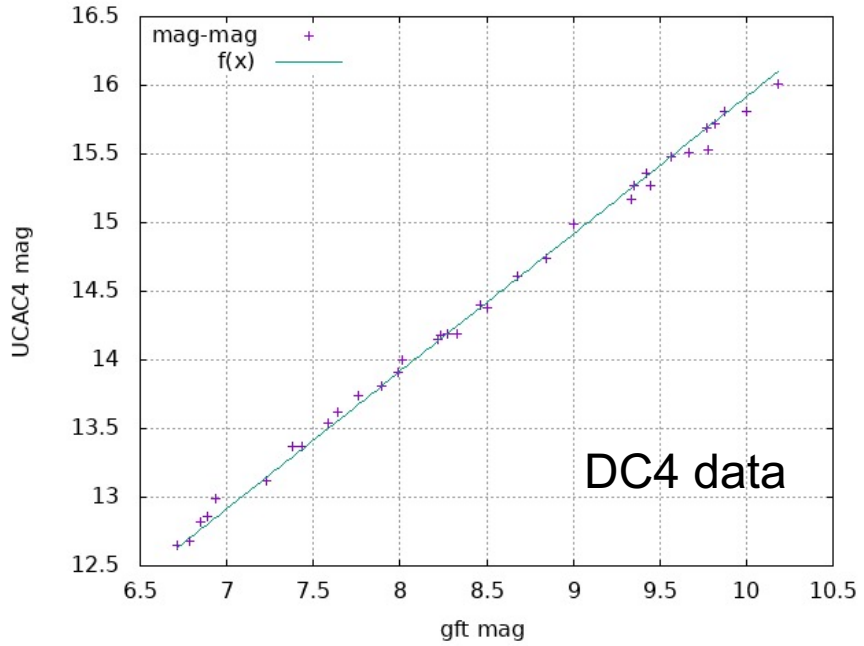
level	No	card Name
quicklook	1	QDT_GFT_CGFT
	2	QPO_GFT_CGFT
	3	QF_GFT_CGFT
	4	QLC_GFT_CGFT
	5	QTI_GFT_CGFT
	6	QUPLIM_GFT_CGFT
standard scientific product	7	DT_GFT_CGFT
	8	PO_GFT_CGFT
	9	F_GFT_CGFT
	10	LC_GFT_CGFT
	11	UPLIM_GFT_CGFT
	12	FDCHART_ GFT_CGFT
	13	PARAM_LC_GFT_CGFT



Time sequence

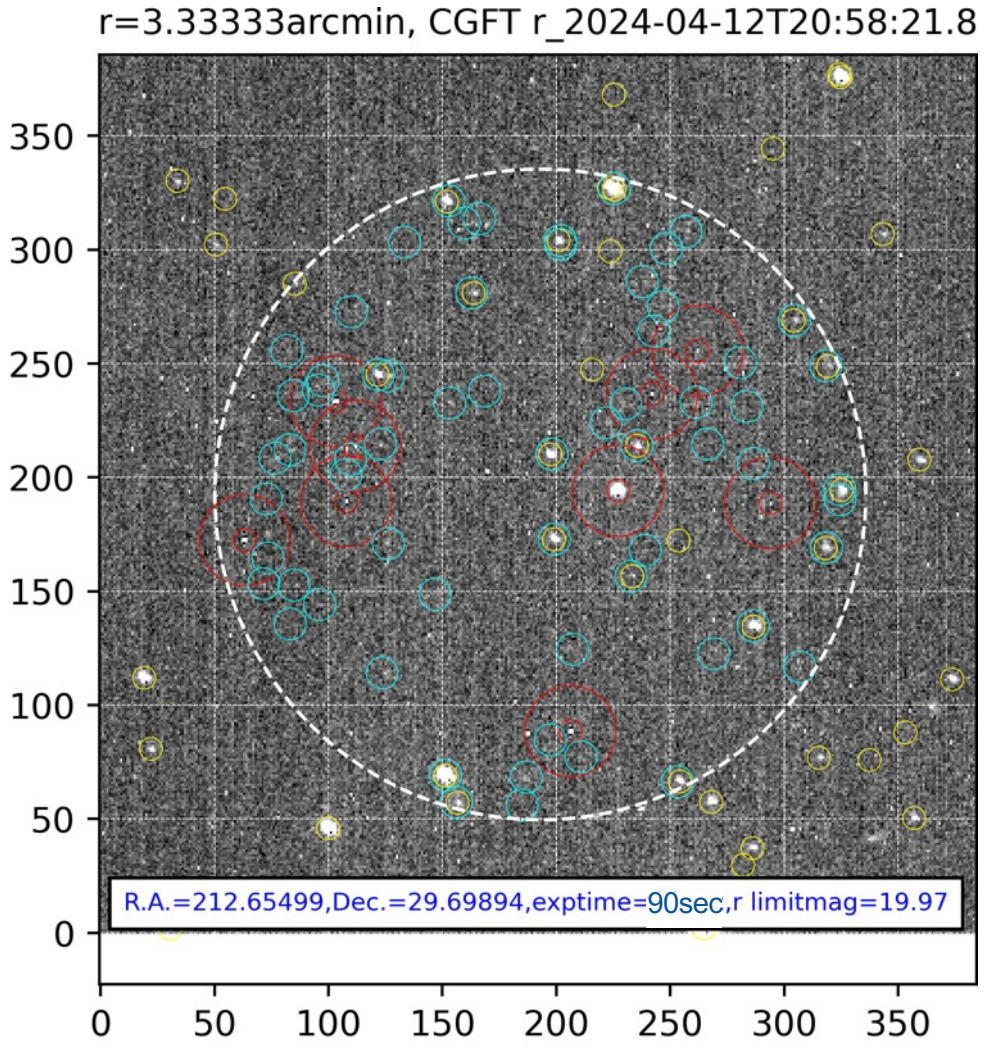


Flux calibration and estimate of the upper limit (3sigma)



CGFT r-band VS. UCAC4 r-band mag

$$\frac{S}{N} = \frac{S_\star}{\sqrt{S_\star + n_{\mathrm{pix}} \cdot (S_S + t \cdot dc + \mathcal{R}^2)}}$$



From the end of 2022,

- BATRAINING test:

  - 2022012(06-07)

  - 20230216 : (swift+svom trigger)

- report to GCN:

GRB230816A

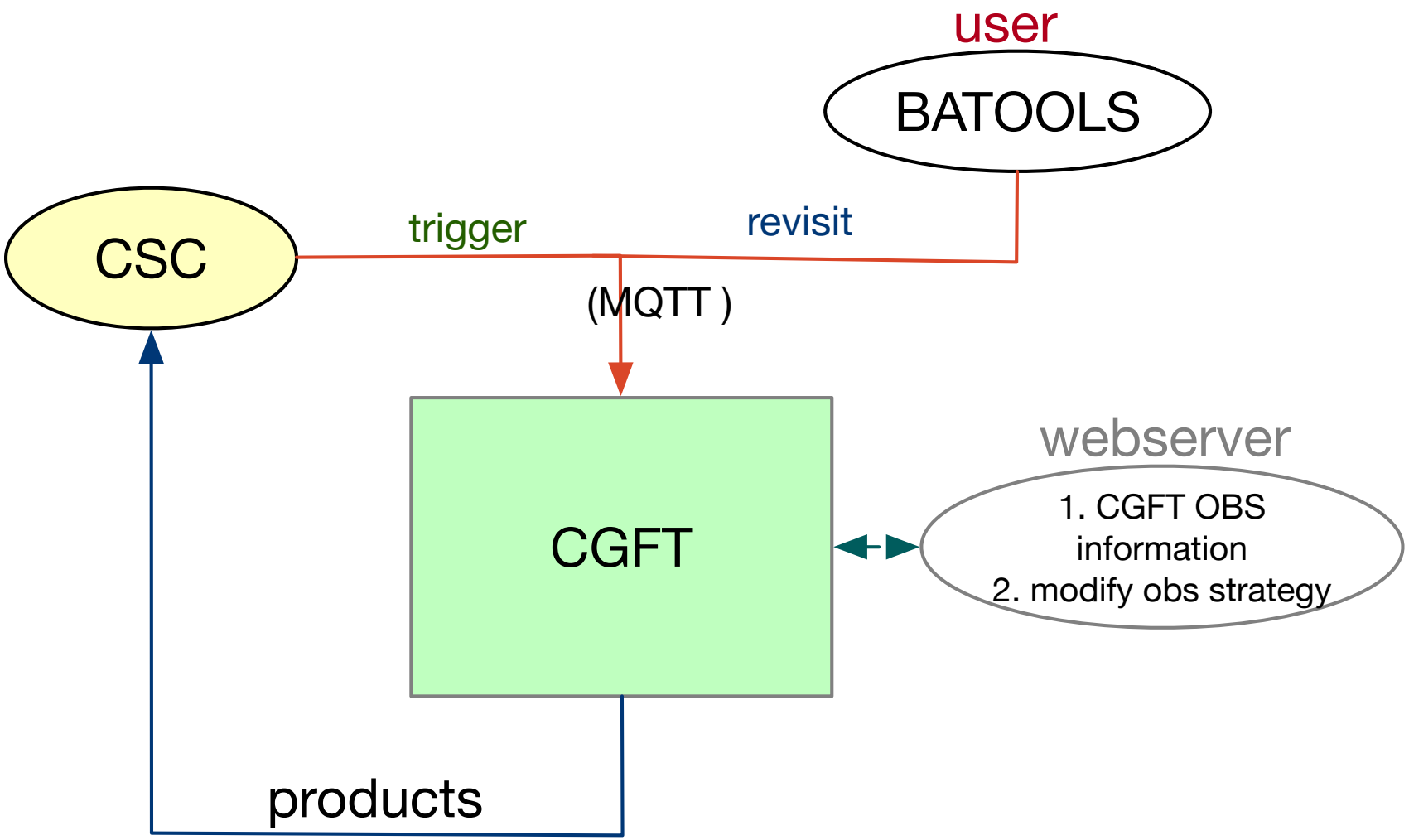
GRB230216A

GRB230205A

Note: we need to have a gold sample, which can show/test all the parts ability of CGFT system.

More test and optimizing is needed

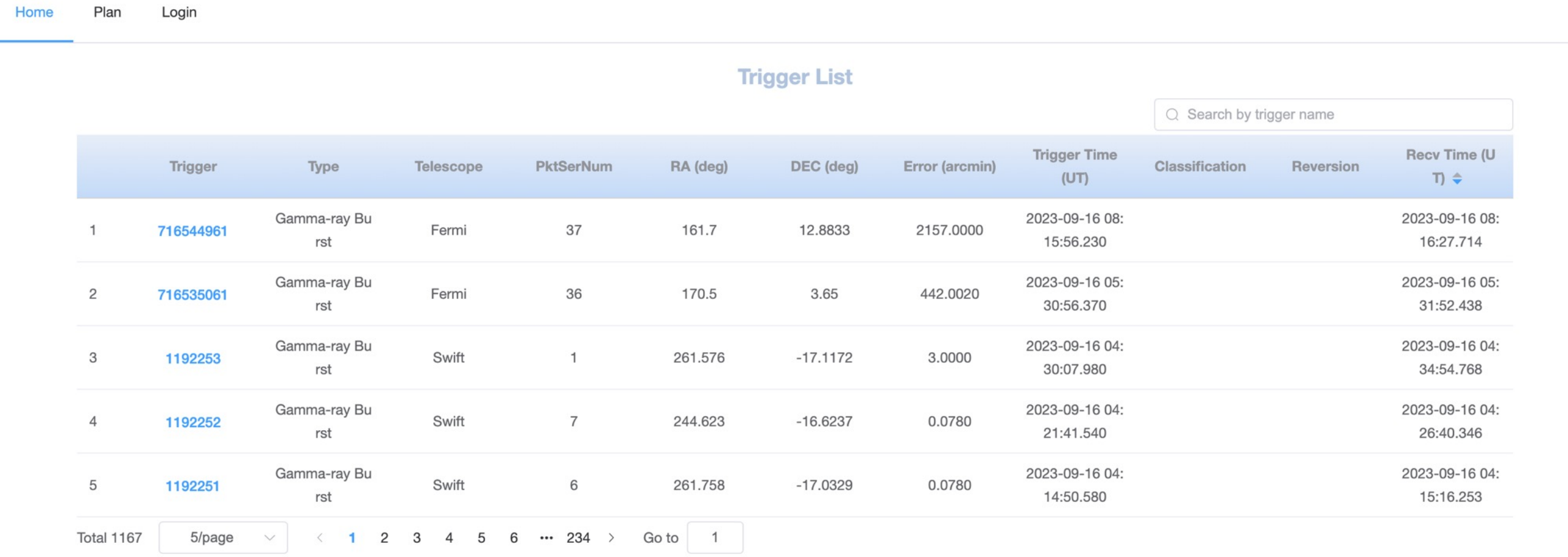
Flowchart of CGFT response to trigger



Check observation status

http:// cgft.svom.cn:8081/cgft-new/#/home

CGFT site information (under construction)
http://cgft.svom.cn:8081/cgft/homePage.action



	Trigger	Type	Telescope	PktSerNum	RA (deg)	DEC (deg)	Error (arcmin)	Trigger Time (UT)	Classification	Reversion	Recv Time (UT)
1	716544961	Gamma-ray Burst	Fermi	37	161.7	12.8833	2157.0000	2023-09-16 08:15:56.230			2023-09-16 08:16:27.714
2	716535061	Gamma-ray Burst	Fermi	36	170.5	3.65	442.0020	2023-09-16 05:30:56.370			2023-09-16 05:31:52.438
3	1192253	Gamma-ray Burst	Swift	1	261.576	-17.1172	3.0000	2023-09-16 04:30:07.980			2023-09-16 04:34:54.768
4	1192252	Gamma-ray Burst	Swift	7	244.623	-16.6237	0.0780	2023-09-16 04:21:41.540			2023-09-16 04:26:40.346
5	1192251	Gamma-ray Burst	Swift	6	261.758	-17.0329	0.0780	2023-09-16 04:14:50.580			2023-09-16 04:15:16.253

http://cgft.svom.cn:8081/cgftobs/

Check observation status

Date (UT) 2023-09-05 Reset TELESCOPE: Closed PLAN: running complete-observed interrupted --> redo part-observed expired

No.	OP ID	OP Name	RA	DEC	Priority	Insert Time	Observable Time Start	Observable Time End	Time Taken Start	Time Taken End	TODO	EDIT
1	-60	23090602_TEST	358.1	53.4	99		2023-09-05T18:40:56.078	2023-09-06T04:26:23.350			1	
2	-40	23090601_TEST	359.9	53.8	99		2023-09-05T18:40:56.078	2023-09-06T04:26:23.350			1	
3	-20	23090601_TEST	360.0	54.0	99		2023-09-05T18:40:56.078	2023-09-06T04:26:23.350			1	
4	0	do_flat			10		2023-09-05T18:09:53.586	2023-09-05T18:30:55.654			-2	
5	5	do_bias			10		2023-09-05T18:33:55.654	2023-09-06T04:33:31.388	2023-09-05T19:46:20.170	2023-09-05T19:47:05.141		
6	10	do_dark10			10		2023-09-05T18:33:55.654	2023-09-06T04:33:31.388	2023-09-05T19:47:05.392	2023-09-05T19:49:21.031		
7	15	do_dark30			10		2023-09-05T18:33:55.654	2023-09-06T04:33:31.388	2023-09-05T19:49:21.148	2023-09-05T19:55:04.528		
8	20	do_focus			10		2023-09-05T18:33:55.654	2023-09-06T04:33:31.388	2023-09-05T19:55:04.574	2023-09-05T19:55:31.045		
9	1010	G0020_28130414	281.38	41.4	1		2023-09-05T18:40:56.171	2023-09-05T20:56:41.626	2023-09-05T19:55:31.419	2023-09-05T19:58:00.362		
10	1020	G0020_28130474	281.35	47.4	1		2023-09-05T18:40:56.171	2023-09-05T20:31:14.353	2023-09-05T19:58:00.400		-2	
11	1020	G0020_28130474	281.35	47.4	1		2023-09-05T18:40:56.171	2023-09-05T20:31:14.353	2023-09-05T19:59:07.344		-2	

From 1 to 300 , total: 300 items.

```
/disk2/data/raw/primfoc/cmos15/20230905/G0020_28130414_r_1693914959_0001_2.fit  2023-09-05T19:56:39.758721
/disk2/data/raw/primfoc/cmos15/20230905/G0020_28130414_r_1693914959_0001_3.fit  2023-09-05T19:56:53.193188
/disk2/data/raw/primfoc/cmos15/20230905/G0020_28130414_r_1693914959_0001_4.fit  2023-09-05T19:57:06.575653
/disk2/data/raw/primfoc/cmos15/20230905/G0020_28130414_r_1693914959_0001_5.fit  2023-09-05T19:57:19.962118
/disk2/data/raw/primfoc/cmos15/20230905/G0020_28130414_r_1693914959_0001_6.fit  2023-09-05T19:57:33.397585
/disk2/data/raw/primfoc/cmos15/20230905/G0020_28130414_r_1693914959_0001_7.fit  2023-09-05T19:57:46.833052
/disk2/data/raw/primfoc/cmos15/20230905/G0020_28130414_r_1693914959_0001_8.fit  2023-09-05T21:30:13.164006
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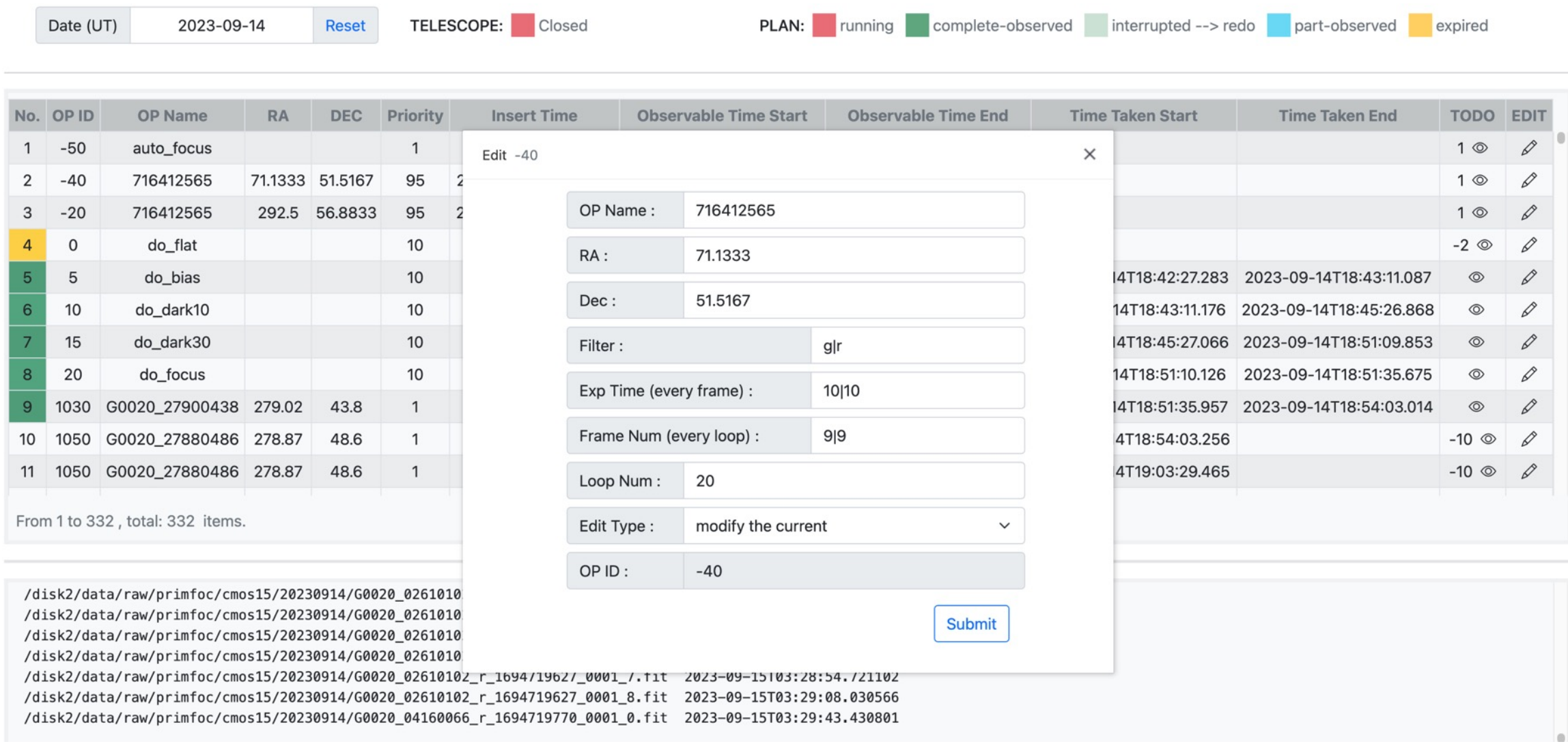
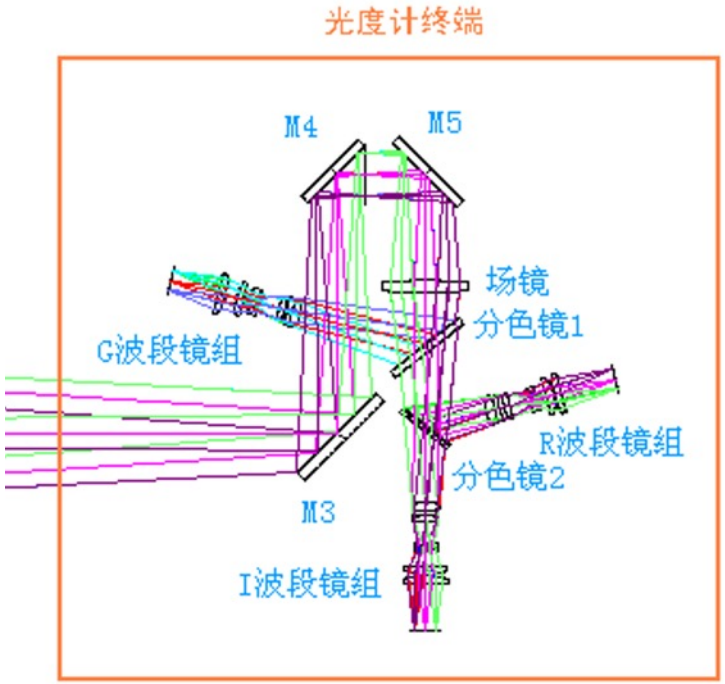
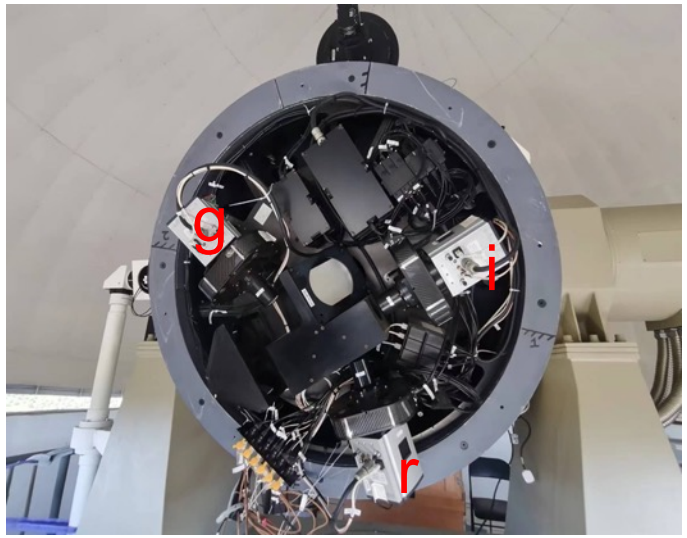
Modify observation strategy, or revisit from BA

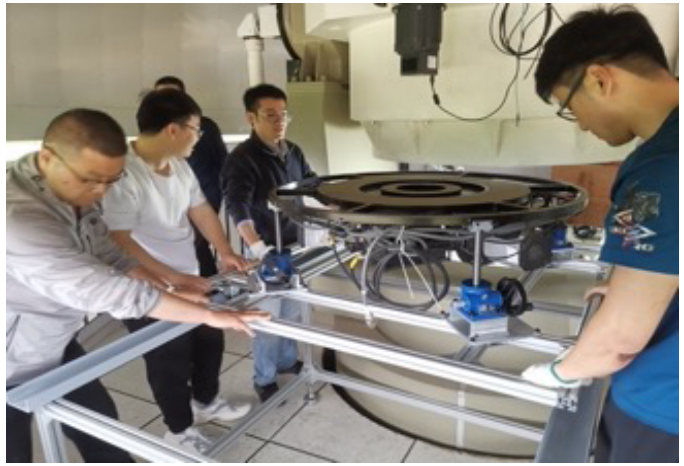


BACKUP

Current status of CGFT








MEA
LX200