

#Training for telescope teams

2022 ReadyforO4 Campaign II-GRB science counterpart as GW.

Read the table and write to the #grandma channel in slack:

« Hi, I looked at exercise 2 on the training of telescope team and I agree to [collaboration], [Telescopes], [Instruments], [Name in GCN] » (please replace [] with the correct keywords. If you disagree, please inform us with another message as to what naming scheme you prefer.

If you are handling multiple -telescopes, repeat this message and change it for each telescope.

This is a training to help bring all observational teams to the same level and perform « smooth observations » all together.

Exercise 1 - Connect to GRANDMA slack - (If you have any questions, contact sarah.antier@oca.eu his exercise will be reviewed by Patrice)

1. Subscribe with
https://join.slack.com/t/grandmagroupe/shared_invite/zt-14wn7vx6f-JzSBq0bJLPWDKOzntNIEIQ
2. Click on channels:
 - a. #grb alerts (<https://grandmagroupe.slack.com/archives/CFRQQEV6W>)
 - b. #shifters (<https://grandmagroupe.slack.com/archives/CH1MM2D4H>)
 - c. #observations
(<https://grandmagroupe.slack.com/archives/C0339NGQBNK>)
 - d. #otcandidates (<https://grandmagroupe.slack.com/archives/CHBE1MZ47>)

In Slack to access to these channels, click on the + sign next to the Channels label in the left column and then select “Browse channels” from the drop-down menu and select #grbalerts, #shifters #observations #otcandidates

3. Write to #observations - I am the [photometry/observer] expert from the [telescope team/instrument] (see the table in exercise 2 for telescope team/instrument)

Exercise 2 – Check the nomenclature If you have any questions, contact sarah.antier@oca.eu; this exercise will be reviewed by Michael)

In order to be organized, we will use a unique Nomenclature to call your telescope/instrument name. Please check this info and then you need **to use always** this nomenclature for correspondence (e.g images, photometry, article, etc ...)

This information will be stored in the DB during O4 and we will be used by our online processing. In particular, the “Instruments” column corresponds to the name to generate the observation plan in <https://github.com/mcoughlin/gwemopt/tree/master/config>.

For filter name references, see:

<https://sncosmo.readthedocs.io/en/stable/bandpass-list.html>

Please add the corresponding filters (or the closest ones) using the **sncosmo nomenclature**.

collaboration (Groups)	Telescopes	Instruments	Filters	Name in GCN	Night (UTC)
TRT	SBO	SBO	'bessellb', 'bessellv', 'bessellr', 'besselli'	TRT-SBO	00h-10h
TRT	SRO	SRO	'bessellb', 'bessellv', 'bessellr', 'besselli'	TRT-SRO	10h-16h
TAROT	TCA	TCA	ps1::open 'sdssg' 'sdssr' 'sdssi'	TCA	20h-06h
TAROT	TCH	TCH	ps1::open 'sdssg' 'sdssr' 'sdssi'	TCH	00h-10h
TAROT	TRE	TRE	ps1::open	TRE	15h-01h
FRAM	FZU-Augur	FZU-Augur	'bessellb' 'bessellv' 'bessellr'	FRAM-Augur	00h-10h
FRAM	FZU-CTA-N	FZU-CTA-N	'bessellb' 'bessellv' 'bessellr' 'sdssz'	FRAM-CTA	20h-06h
Xinglong	2.16m	BFOSC (spectro)	'bessellb' 'bessellv' 'bessellr' 'besselli' 'sdssz'	Xinglong-2.16m	12h-22h

Xinglong	TNT	TNT	'besselb' 'bessellv' 'bessellr' 'besselli' 'sdssz'	Xinglong-TNT	12h-22h
SNOVA	SNOVA	SNOVA	'besselux' 'besselb', 'bessellv', 'bessellr', 'besselli'	SNOVA	14h-00h
BJP	ALi-50	ALi-50		ALi-50	14h-00h
OPD	OPD-1.6m	OPD-1.6m	'besselux' 'besselb', 'bessellv', 'bessellr', 'besselli'	OPD-1.6m	22h-07h
OPD	OPD-60	OPD-60	'besselux' 'besselb', 'bessellv', 'bessellr', 'besselli'	OPD-60	22h-07h
SOAR	SOAR	Goodman	'besselb', 'bessellv', 'bessellr', 'besselli', 'sdssu', 'sdssg', 'sdssr', 'sdssi', 'sdssz', 'Ha'	SOAR-photo	12 - 21h
AbAO	Abastunami-T70	Abastunami-T70	'besselb', 'bessellv', 'bessellr', 'besselli'	Abastunami-T70	17h-03h
AbAO	Abastunam i-T48	Abastunami-T48	'besselux' 'besselb', 'bessellv', 'bessellr', 'besselli'	Abastunami-T48	17h-03h
C2PU	C2PU	Omicron	'sdssg' 'sdssr' 'sdssi'	C2PU-Omicron	20h-06h

GMG	GMG	?		GMG	12h-22h
GMG	GMG	?		GMG	12h-22h
UBAI	UBAI-T60N	UBAI-T60N	BVRI,cl	UBAI-T60N	14h-00h
UBAI	UBAI-T60S	UBAI-T60S	BVRI,cl	UBAI-T60S	14h-00h
IRAP/AGORA	Makes-T60	Makes-T60		Makes-T60	15h-01h
MOSS	MOSS	MOSS		MOSS	20h-06h
OWL	OWL	OWL		OWL	20h-06h
TRAPPIST	TRAPPIST	TRAPPIST		TRAPPIST	20h-06h
ShAO	ShAO-T60	ShAO-T60	Rc, Ic, V, B	ShAO-T60	17h-03h
ShAO	ShAO-2m	ShAO-2m	Rc, Ic, V, B	ShAO-2m	17h-03h
HETH	CAHA	CAFOS	'sdssg' 'sdssr' 'sdssi' 'sdssz' 'bessellb' 'bessellv' 'bessellr' 'besselli'	CAHA/CAFOS	20h-06h
HETH	OSN		'bessellb' 'bessellv' 'bessellr' 'besselli'		20h-06h
VIRT	VIRT	VIRT		VIRT	22h-04h
OST	OST	CDK	besselux, bessellb, bessellv' bessellr, besselli (closest match)	OST-CDK	20h-06h
OMP/IRAP	PicDuMidi-T1M			PicDuMidi-T1M	20h-06h
CFH	CFHT			CFHT-WIRCam	10h-16h

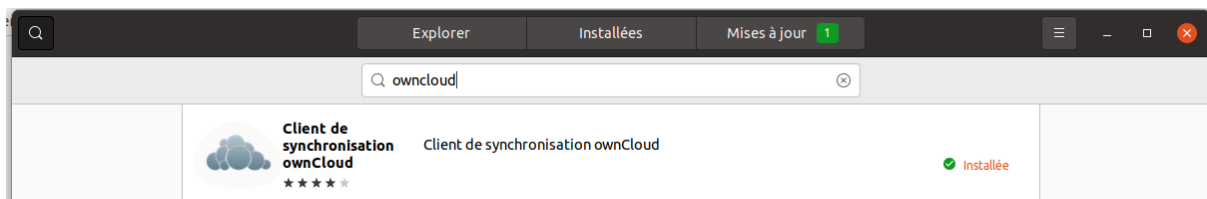
HETH	GTC	OSIRIS	'sdssu' 'sdssg' 'sdssr' 'sdssi' 'sdssz'	GTC/OSIRIS	20h-06h
HETH	GTC	EMIR	'megacampsf::y' '2massj' '2massh' '2massks'	GTC/EMIR	20h-06h
EPFL	TELESTO	TELESTO	bessellux bessellb bessellv bessellr besselli	TELESTO	20h-06h
KAO - NRIAG	KAO	KAO	sdssu sdssg sdssr sdssi sdssz bessellu bessellb bessellv bessellr	KAO-Egypt	18h-03h

HAO	HAO	CDK	L,R,V,B	CDK 12,5	20h-05h
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Exercise 3 - Connect to GRANDMA owncloud If you have any questions, contact sarah.antier@oca.eu; this exercise will be reviewed by Sarah)

1. Try to connect to https://grandma-owncloud.lal.in2p3.fr/index.php/apps/files/?dir=/GRB_campaign_2022. If you do not have access, it means you need an “openstack” account
2. Register at <https://registration.lal.in2p3.fr/>, keep track of your password and your username. If you have lost it, or want to change your email address from a previous account, contact Gerard Marchal Duval <marchal@lal.in2p3.fr>

3. Then, write to #observations, “@Sarah, I registered in openstack, waiting for approval to join GRANDMA owncloud”
4. I will grant you access and then you can have access to https://grandma-owncloud.lal.in2p3.fr/index.php/apps/files/?dir=/GRB_campaign_2022. Write in #observations, “I have access to owncloud (test)”.
5. I also have an owncloud app on my laptop (<https://owncloud.com/desktop-app/>). I don't go through the webserver. I know there is something similar on Mac or windows. Be careful, the size of owncloud is currently 4 GB (and will grow as soon as participants import images).



Exercise 4 – Provide your config file to GRANDMA If you have any questions, contact sarah.antier@oca.eu; this exercise will be reviewed by Michael)

This concerns only these teams involved: SBO, SRO, Xinglong-2.16, SNOVA, Ali-50, OPD-1.6m, OPD-60, SOAR-photo, C2PU, GMG-photometry, MOSS, OWL, TRAPPIST, Shao-2m (photometry), OST-CDK, PicduMidi-T1M, HETH-photo, TELESTO; KAO

The information will be stored in <https://github.com/mcoughlin/gwemopt/tree/master/config> to produce the observation plan during the GRB campaign (and in the future, the neutrino, and GW campaign). The idea is to provide interesting targets according to the instrument sensitivity and location.

Magnitude [15] #magnitude in AB system
 exposureTime [60.0] #obtain in 60 s
 latitude [41.754021] #location of your instrument [degrees]
 longitude [42.820776] #location of your instrument [degrees]
 elevation [1610.0] #location of your instrument [meters]
 FOV_coverage [0.3] #size in deg
 FOV [0.3] #same info
 FOV_coverage_type [square] #shape of your field of view
 FOV_type [square] #sameinfo as above
 tessellationFile [./input/meniscus-50.tess] #internal file being produced by GRANDMA
 slew_rate [20] # maximal slew rate of the telescope (in degrees/second)
 readout [10] # average dead time between two images (in seconds)
 filt [r] #filter used in #Magnitude and #exposureTime
 horizon [30] # lower limit on altitude for the telescope
 overhead_per_exposure [0.0] # additional overhead per exposure beyond readout

min_observability_duration [2.0] # minimum number of hours a tile is available to be considered for observation
filt_change_time [0.0] # time it takes to change filters

→ Once you have provided these informations, write to slack #observation « @Michael Coughlin, I have provided these informations by email »

Exercise 5 - Listening to GRANDMA alerts If you have any questions, contact nicolas.leroy@ijclab.in2p3.fr; this exercise will be reviewed by Nicolas)
This exercise is to be performed by all teams.

Nicolas Leroy will provide you a detailed guide about this aspect.
As a prerequisite, you need to install python using anaconda (<https://docs.anaconda.com/anaconda/packages/pkg-docs/>)

INSTALLATION

Python environment :

- Create virtual environment :
conda create -n grandma python=3 numpy astropy pandas
- Activate the grandma environment :
conda activate grandma
- Install other libraries :
pip install requests pygcn
pip install voevent-parse (will fail on windows)
- To install voevent-parse on windows : Download the voevent-parse-master_mod.zip in Scripts/ on the grandma owncloud; Unzip, go to voevent-parse-master_mod/src/voeventparse/ and type : python setup.py install

LISTEN TO THE GRANDMA ALERTS

Must listen all the time the comet broker:

- Download Scripts/listen_grandma.py from owncloud
- Modify the telescope name(s) and the path to save the xml file containing the observation plan
- Telescope identifiers : "OAJ", "TRE", "TCH", "TCA", "ShAO-T60", "Abastunami-T70", "Abastunami-T48", "UBAI-T60N", "UBAI-T60S", "Makes-60", "Lisnyky-AZT8", "TNT", "IRIS"

and for new teams once you have done exercise 3, it will be also

SBO, SRO, Xinglong-2.16, SNOVA, Ali-50, OPD-1.6m, OPD-60, SOAR-photo, C2PU, GMG-photometry, MOSS, OWL, TRAPPIST, Shao-2m (photometry), OST-CDK, Midi-T1M, HETH-photo

- Open a terminal and type : python listen_grandma.py

This must never be closed ! you can also used the screen utility
(<https://www.gnu.org/software/screen/>)

You will receive a xml file in the format of GRANDMA_TCA_GRB867987_Initial_1.xml (where TCA will be replaced by the name in the « Instruments » column of exercice 2). This xml file is called a **VOEVENT**.

The alerts are coming only if there is a Swift-BAT alert (so most of the time, you do not receive anything:). But you can receive multiple alerts for one event, i.e. multiple voevents.

VOEVENT refers to a type of machine-readable format used in the time-domain community (in an XML format). In fact, the Swift satellite, in space, detects a flash of Gamma-rays with its gamma-ray instrument BAT. An alert from space to the ground is generated first without localization: this is the “preliminary” notice, and in general, there is one preliminary notice named Preliminary_1. Then, after image processing, the BAT instrument generates another alert 30 s after the preliminary one, that contains the localization (RA, DEC). This alert is called Initial_1 and this is the one the telescopes receive. The onboard analysis can refine the localization and several “Initial” notices can be sent afterwards (Initial_2, Initial_3 ...). Swift will slew and will observe with their narrow-field of view X-ray imager MXT and the UV instrument UVOT. If the X-ray and UV counterpart are found, another alert will be sent to the ground in an Update. Sometimes, an update never happens.... So, what you need to check is mostly Initial_1 VOEVENT, or update_1 (If it happens).

You can also find the same VOEVENTs in owncloud in the event repo as ~owncloud/Candidates/GRB/GRB20181020_867987_SWIFT/VOEVENTS/Initial_1.

Once you have set up these steps: write in #observations slack “@nleroy, we [instrument] have performed exercice 5 and we can listen to GRANDMA alerts **continuously**”

Exercise 6 – Reading the Voevents

If you download your corresponding VOevent you will find

```
<Param name="Trigger_ID" value="867987" ucd="meta.id" dataType="string">
```

Be careful that the Event_ID is internal to GRANDMA

And the coordinates (the same that are in slack)

```
<Position2D  
unit="deg"><Name1>RA</Name1><Name2>Dec</Name2><Value2><C1>13.9670</C1>  
<C2>-47.3799</C2> </Value2><Error2Radius>0.0500</Error2Radius>
```


Exercise 7 – Interacting with the FA and guiding observations (send questions to sarah.antier@oca.eu; this exercise will be reviewed by lara)

The FA is the Follow-up advocate of the GRANDMA collaboration. He is in charge of guiding you during the follow-up.

Once an alert comes in, you need to make sure to receive the VOEvent from GRANDMA (exercise 5) and parse the coordinates of the target to your operator/observers (exercise 6). The observers of your group will be contacted by slack or by email. You need (within 30 min) to indicate

- if you can observe the source (accounting for weather conditions or observability)
- if you can't observe the source

Sometimes the correct optical position is known, sometimes you are the discoverer.

Please read the team guide and answer to these questions (we would like to make sure you have understood your tasks ;))

Exercise 7 – question 1 ; «Which type of sources will I receive from GRANDMA during this campaign and from which instrument ? »

Exercise 7 – question 2 ; « How will I receive the coordinates of the source to observe, and who will provide me this information ? »

Exercise 7 – question 3 ; « Where should my team should tell GRANDMA about the observation conditions in the first night after the alert? »

Exercise 7 – question 4 ; « If I can't observe, should I write a message ? »

Exercise 7 – question 5 ; « How I will receive the expected magnitude of the source, and when to choose the correct set-up ? Will I be guided by the FA ? »

Exercise 7 – question 6 ; «Should I observe the following night ? Will the FA tell me what to do ? »

Exercise 7 – question 7 ; «When should I stop the observations ? »

Exercise 8 – Uploading your images (send questions to sarah.antier@oca.eu , this exercise is reviewed by lara)

For any alert, you must provide the images that you use for your photometry. Do not provide invalid images (if possible give a little visual check on your images before uploading them). It must be uploaded in the correct event repo in owncloud in the Candidate/GRB/AlertName/IMAGES/STACK repo. We are interested in the “stacked” image, in this sense, we allow only one image (per filter), every two hours. Otherwise, it is considered as “unstacked”.

Deposit as soon as possible your images.

Correct format TARGET_USERNAME_INSTRUMENT_OBSDATE_FILTER_STACK.fits

Exercise 8 - question 1 what is the correct format among these propositions ?

- ☐ GRB20181020_867987_Song_Ali-50_2021-08-10T21-38-41_V_stack_5*300s.fit
- ☐ GRB20181020_867987_Song_Ali-50_2021-08-10T_21-38-41_V_STACK_5*300s.fits
- ☐ GRB20181020_867987_Song_Ali-50_2021-08-10T21_38_41_V_STACK_5*300s.fits
- ☐ GRB20181020_867987_Song_Ali-50_2021-08-10T21-38-41_V_STACK_5*300s.fits
- ☐ GRB20181020_867987_Song_Ali-50_2021-08-10T21_38_41_V_STACK_5*300s.fits
- ☐ GRB20181020_867987_Song_Ali-50_2021-08-10T21_38_41_V_5*300s.fit

Exercise 8 - question 2 - What are the mandatory headers present in your file (see team user guide) ? Use as “GRBname” the trigger name

Exercise 8 - question 3 Go to

https://grandma-owncloud.lal.in2p3.fr/index.php/apps/files/?dir=/Candidates/GRB/GRB20181020_867987_SWIFT/IMAGES/STACK and upload a test image of your instrument that includes the correct name and that includes the keywords as mentioned in the telescope team user guide.

Exercise 9 – Uploading your photometric results (send questions to sarah.antier@oca.eu this exercise will be reviewed by lara)

Go to

https://grandma-owncloud.lal.in2p3.fr/index.php/apps/files/?dir=/Candidates/GRB/GRB20181020_867987_SWIFT/LOGBOOK, copy GRANDMA_test_GRB867987_logbook.csv and change test into the [instrument] name according to the table of Exercise 2.

Imagine that you have observed on March 16, 2022, at 22h58min32 local time, with your instrument, down to 19 mag, in r' or R band. Write (you can directly edit the file online, without upload → modify → download) the corresponding report in the according logbook csv file you just created and upload it in the same repo. Time must be in MJD with 5 digits.

Many thanks, good job team, you have done it!