

THE SVOM ToO[★] PROGRAM



★ *Target of Opportunity*

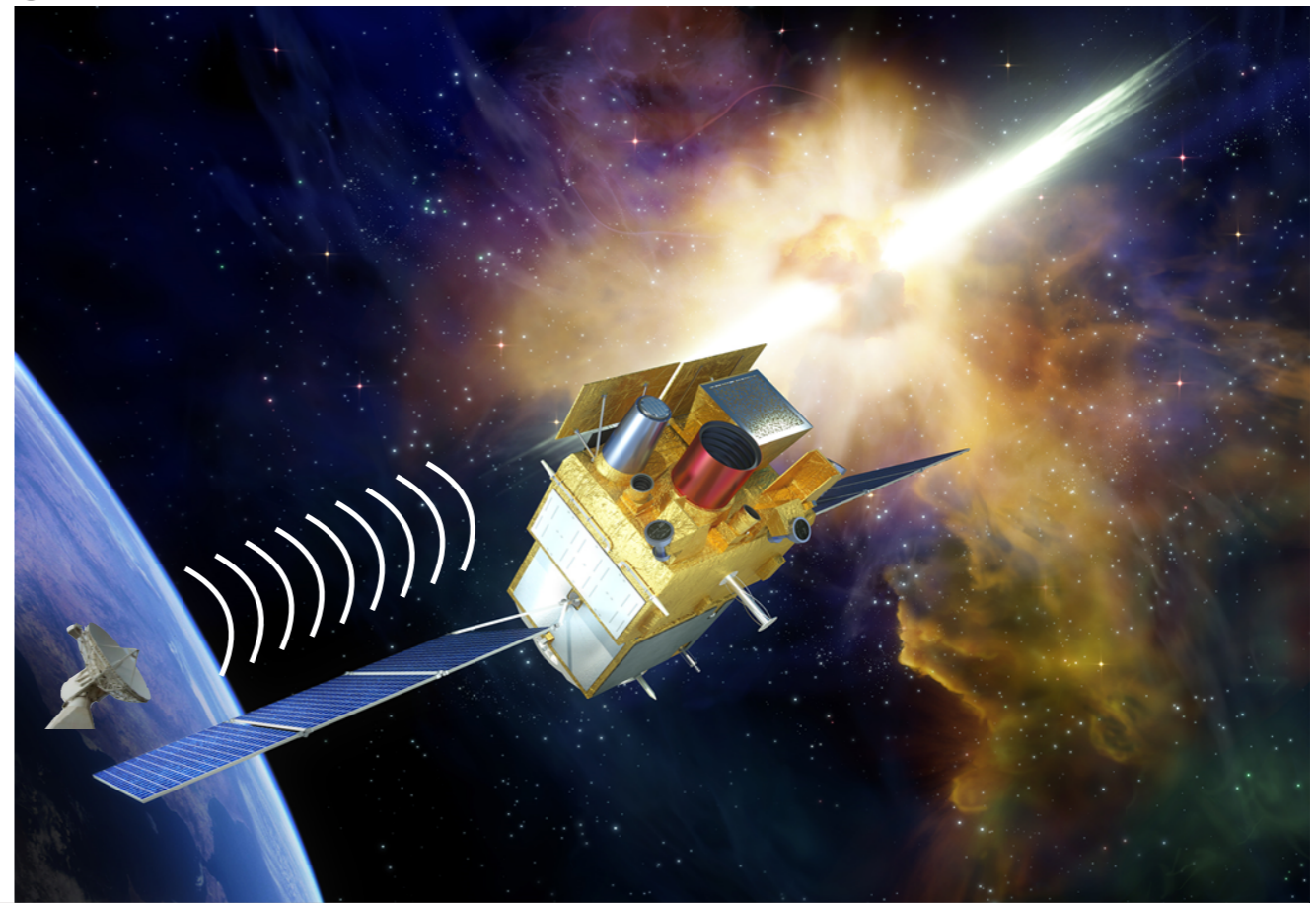
Cyril Lachaud (APC, Univ. de Paris)

THE SVOM ToO PROGRAM

Transient/event detected
by other facilities

Target of Opportunity program

=> send commands to the satellite
to trigger observations from the
ground



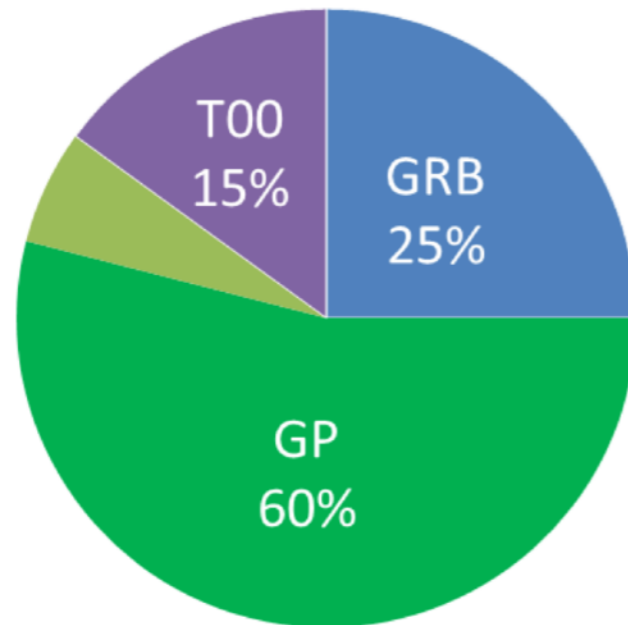
Complex operations at system level



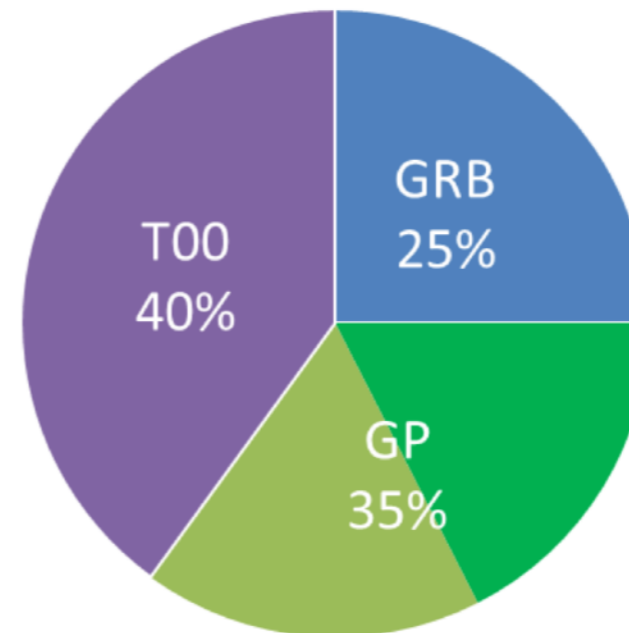
SVOM TOO OBSERVATION PROGRAM

Target of Opportunity (ToO) program : alerts sent from the ground to the satellite. Initially 1 ToO per day focussed on time domain astrophysics including multi-messengers. ToO program devoted time increases during extended mission.

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



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



Selection of the ToOs by the PIs and the two ToO scientists (Cyril Lachaud (APC) and Wang Jing (NAOC))

ToO-NOM

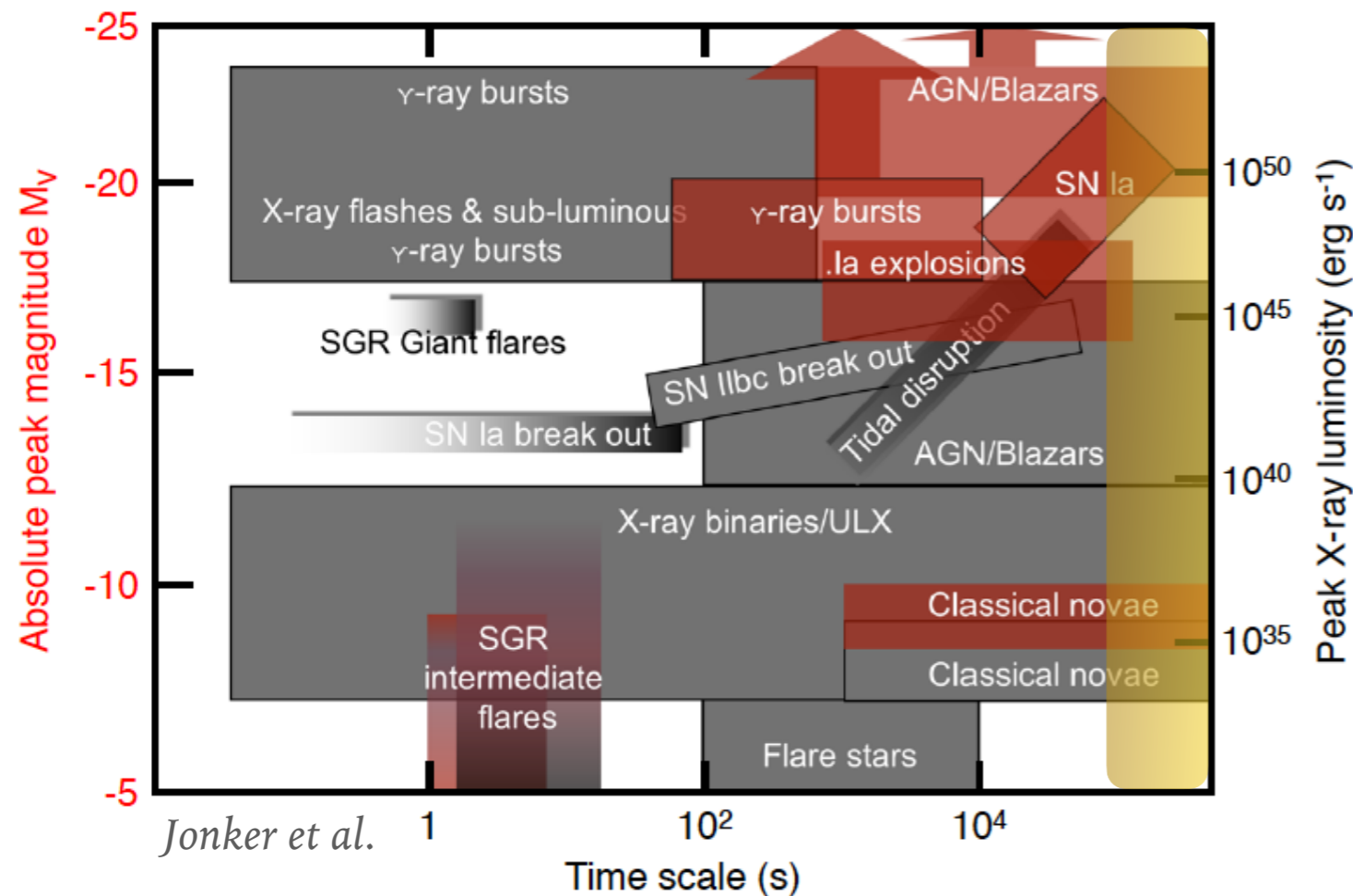
ToO-NOM is the nominal ToO which covers the basic needs for efficient transient follow-up.

Scientific target :

GRB revisit

Pre-planned observations through a GP proposal waiting for a known source to flare (AGN,...)

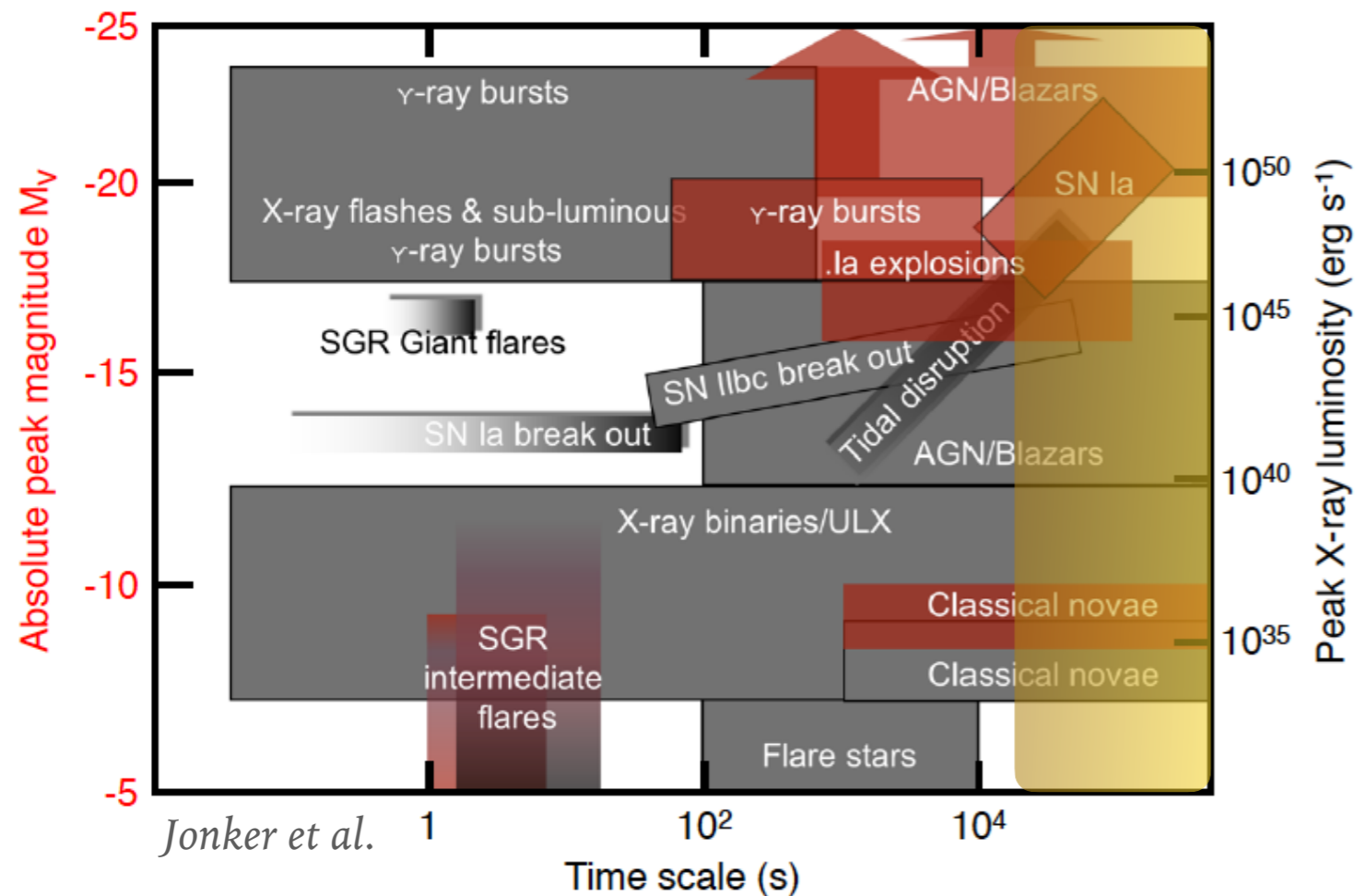
New transient (LSST, CTA, ...)



Main characteristics :
 Frequency : 1/day
 Standard delay : < 48h
 Duration : 1 orbit (or more)

ToO-EX

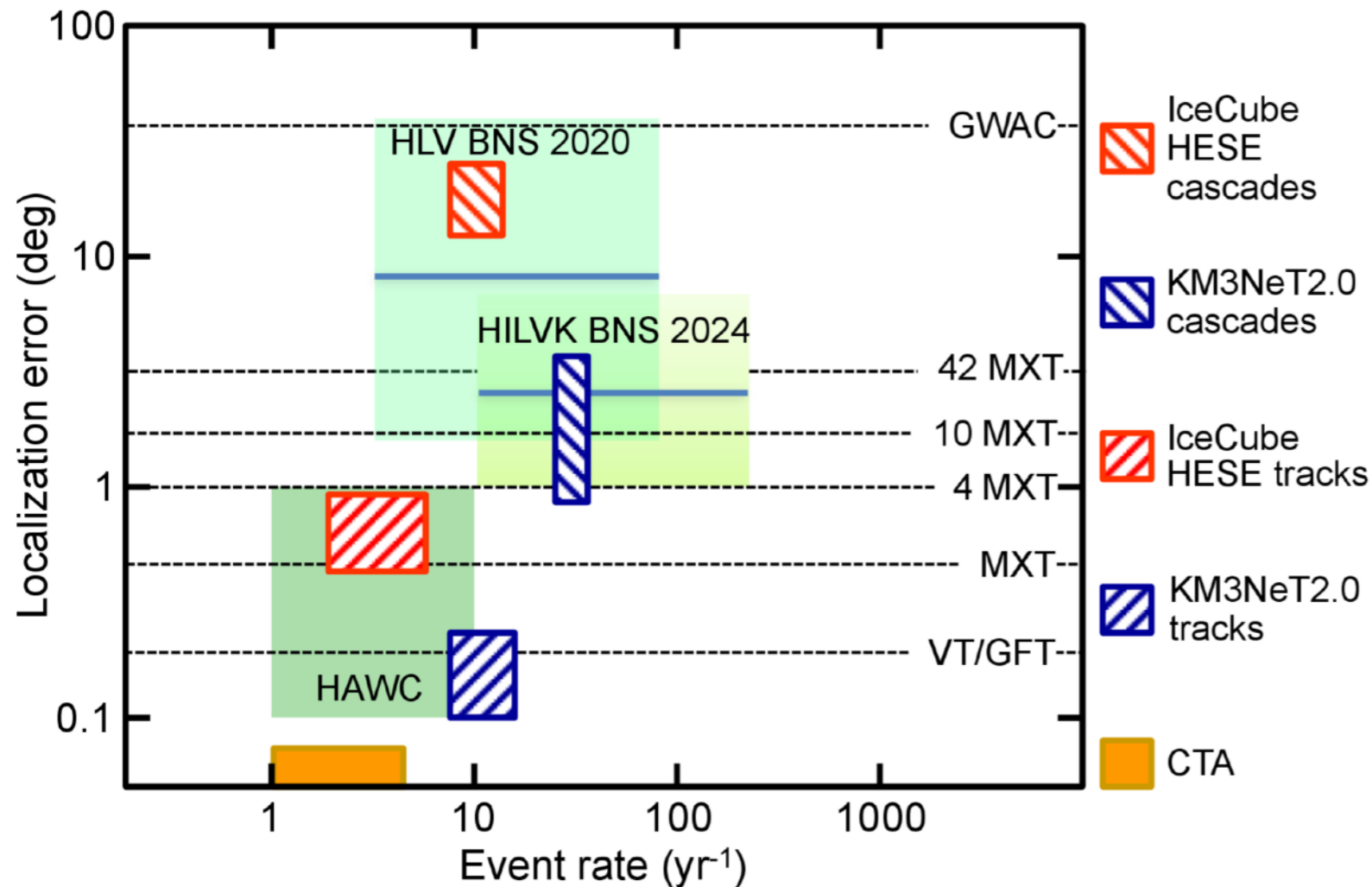
ToO-EX is the exceptional ToO which covers the needs for a fast ToO-NOM in case of an exceptional astrophysical event we want to observe rapidly.



Main characteristics :
 Frequency : 1/month
 Standard delay : < 12h
 Duration : 7-14 orbits

ToO-MM

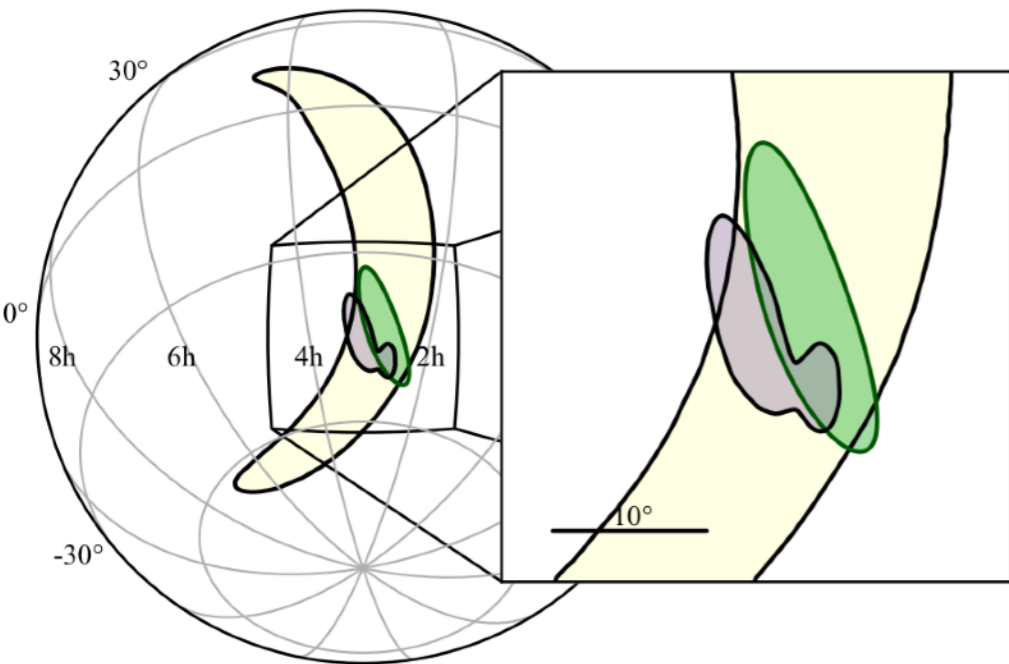
ToO-MM is the ToO dedicated to EM counterpart search in response to a multi-messenger alert. What differs from the ToO-NOM and ToO-EX is the unknown position of the source within a large error box...



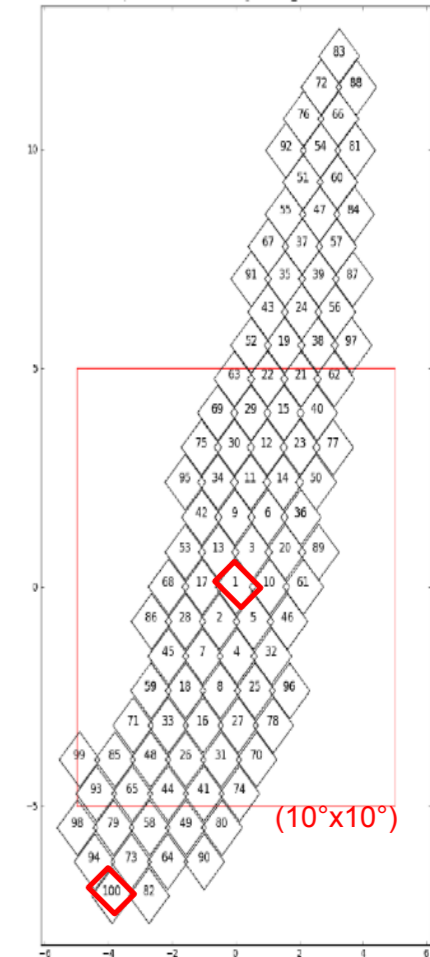
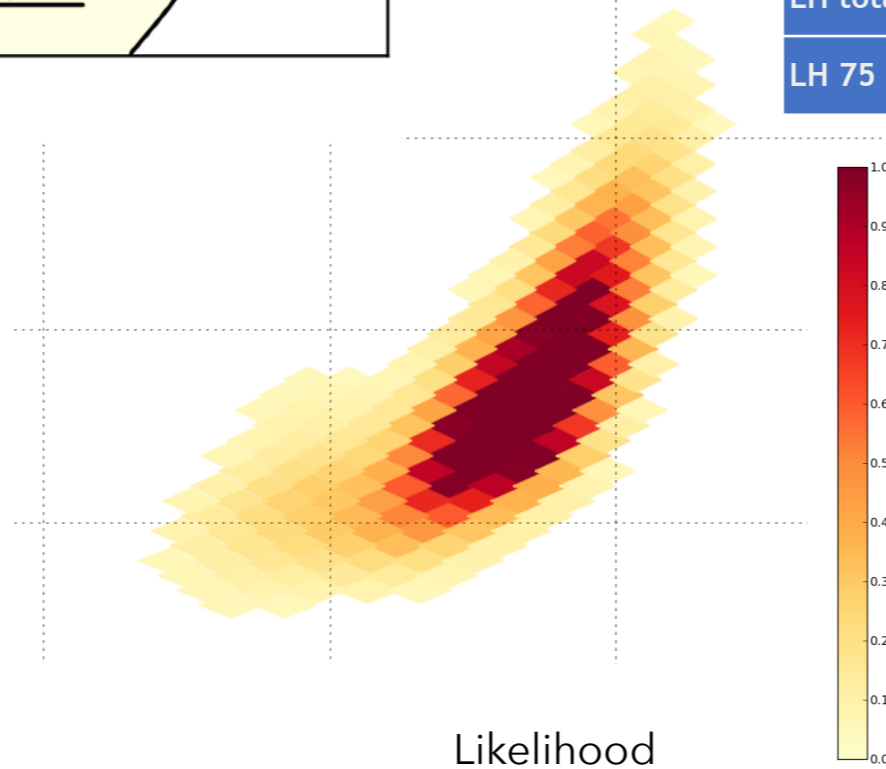
Main characteristics :
 Frequency : 1/week
 Standard delay : < 12h
 Duration : ~14 orbits
 Tiling Operations

TILES SEQUENCING SIMULATIONS: MXT

Simulation of a ToO-MM request for GW170814



Scenario	GW170814
Nb. tiles	230
RA min (°)	34.4
RA max (°)	53.4
Dec min (°)	-54.3
Dec max (°)	-7.8
LH total (%)	90.0
LH 75 (%)	66.0



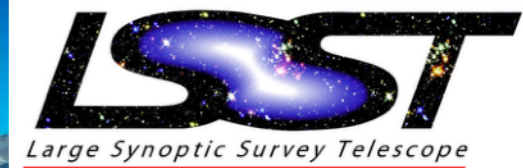
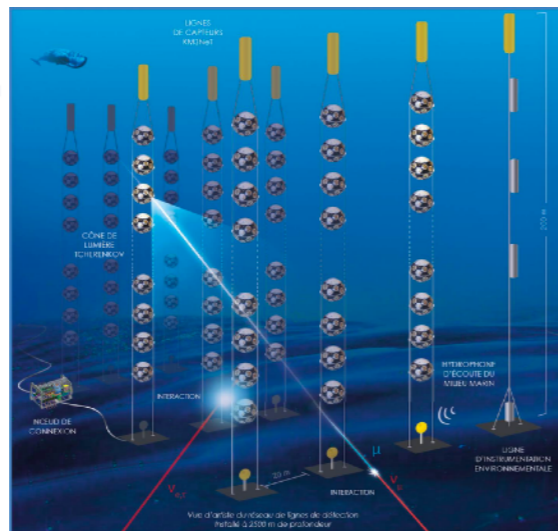
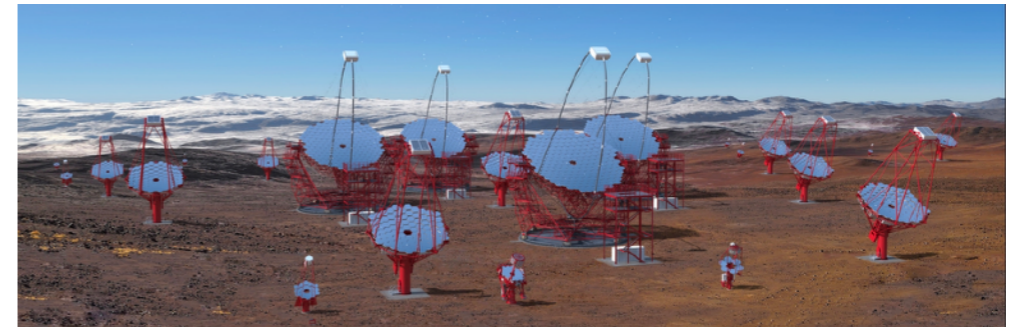
ToO : TRANSIENT SKY COMMUNITY

We are at the origin of the PNHE supported TS2020 initiative.

Its goal is to federate the Transient Sky French community (three workshops in 3 years).



We have already strong links with the major incoming observatories :



(through FINK broker)



ToO : TRANSIENT SKY COMMUNITY

ToO Data policy

There are three possibilities :

- ToO initiated by SVOM : the scientific products are private*
- ToO triggered by external facilities/user : the scientific products are public immediately*
- In case a MOU has been signed : refer to the specific policy*

Conclusion

In the past years we have significantly increased the SVOM ToO capabilities, in particular to deal with the multi-messenger revolution.

Most of the French laboratories contribute to the ToO program either directly and/or through the links with external facilities.