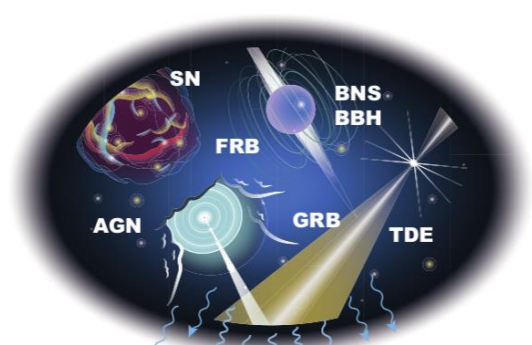


université  
PARIS-SACLAY

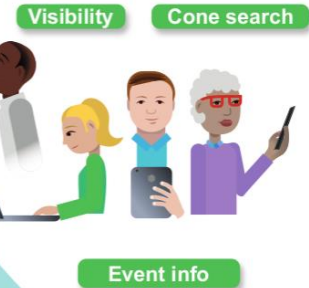


Photons, GWs,  $\nu$



PUSH ALERTS

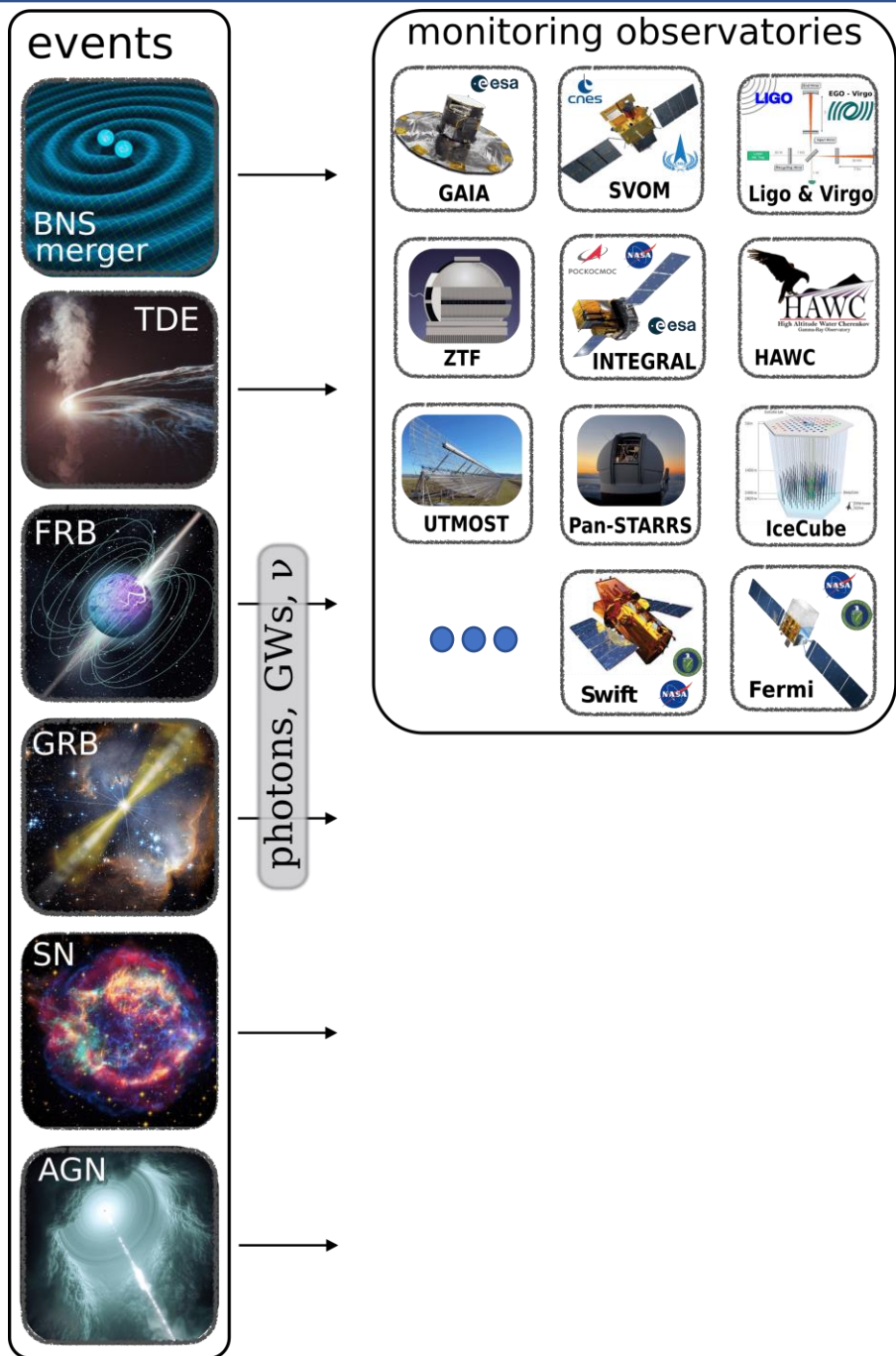
FOLLOW-UP OBSERVATORY

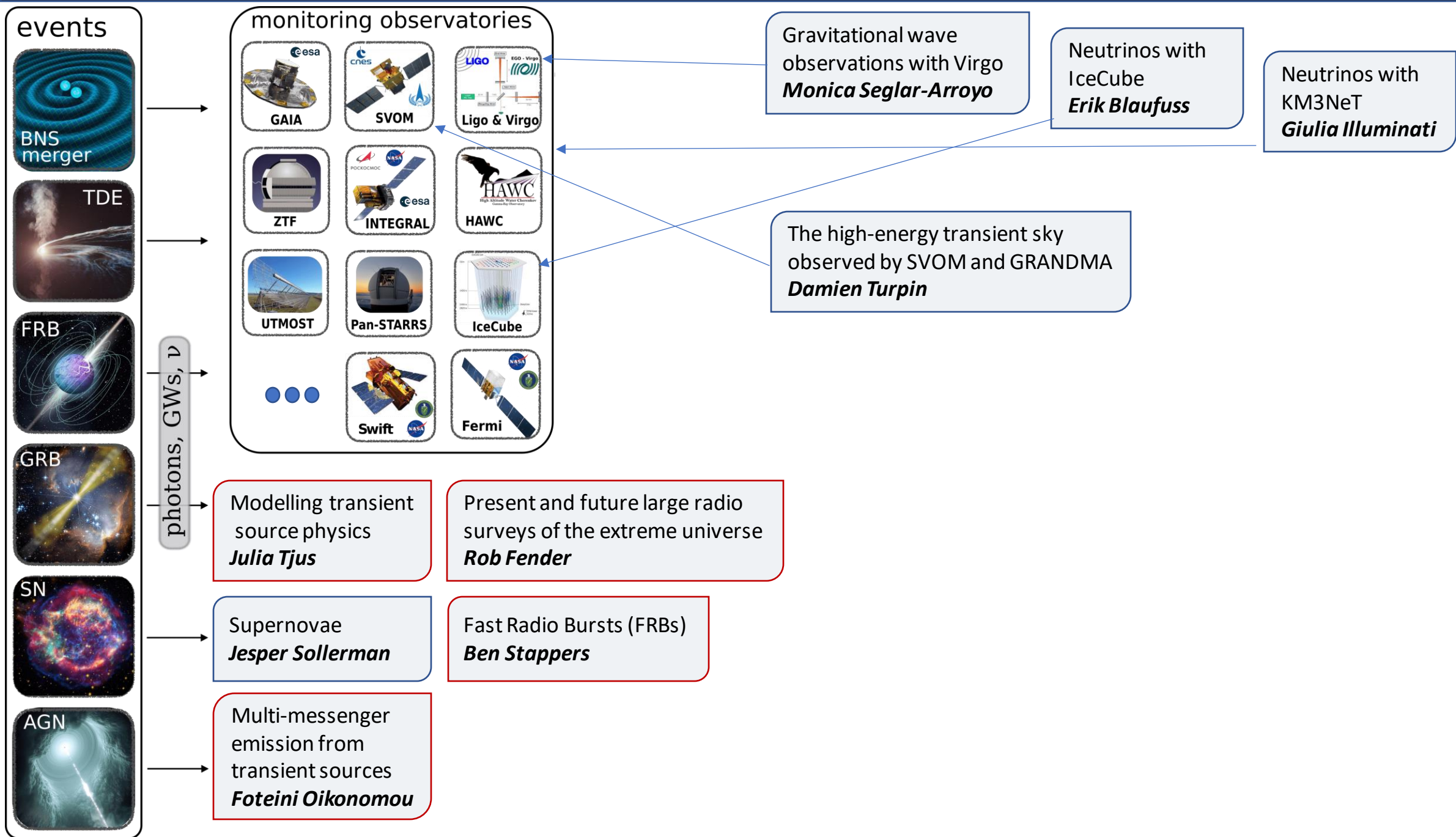


# Astro COLIBRI

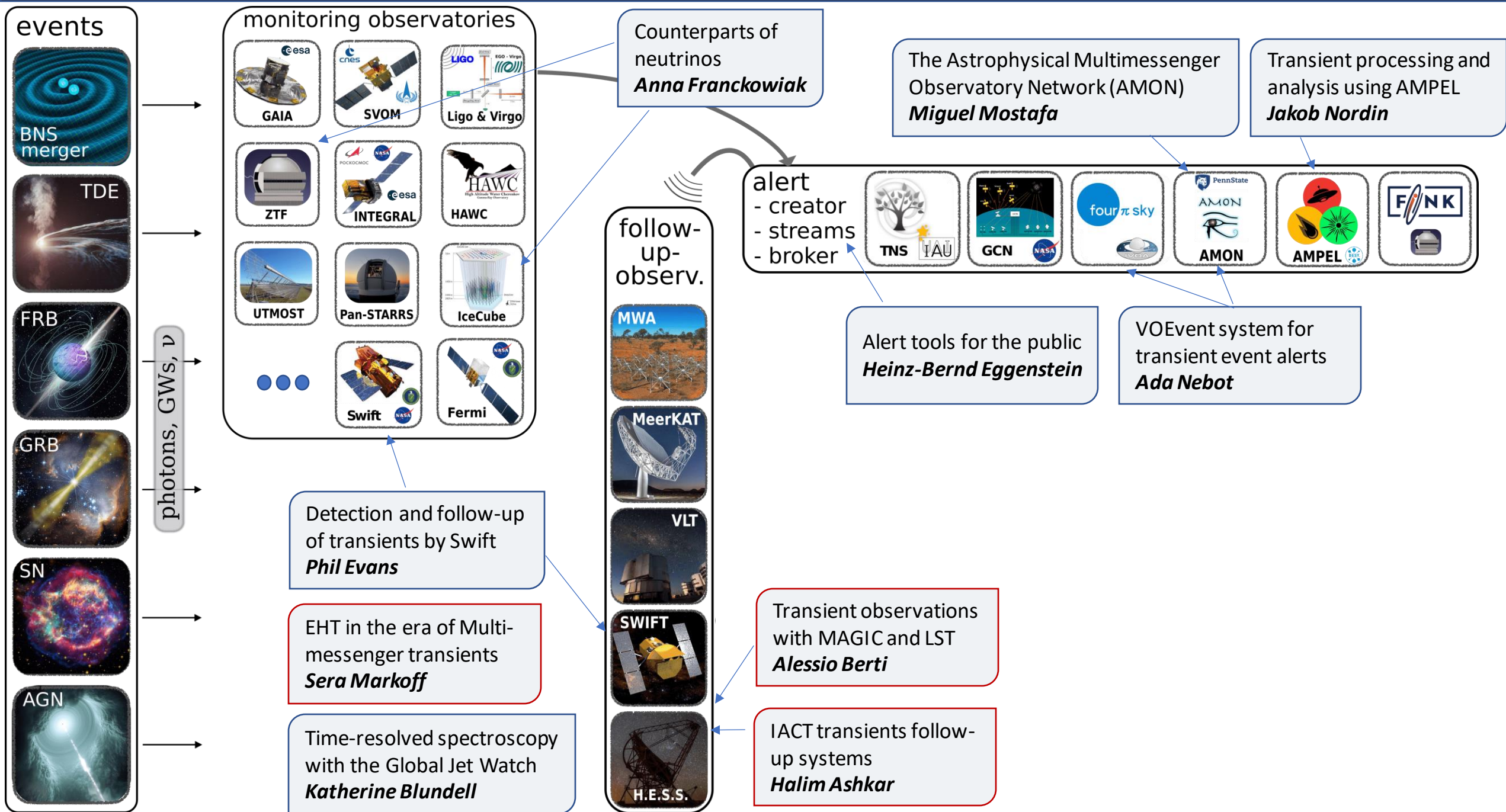
Realtime alerts of the transient sky with Astro-COLIBRI

*Patrick Reichherzer on behalf of the Astro-COLIBRI team (26.09.2022)*









**events**

**photons, GWs, ν**

**monitoring observatories**

**follow-up-observ.**

**alert**

- creator
- streams
- broker

```

////////////////////////////////////
TITLE: GCN CIRCULAR
NUMBER: 32562
SUBJECT: IceCube-220918A - IceCube observ
DATE: 22/09/18 14:54:14 GMT
FROM: Erik Blaufuss at U. Maryland/Ice

The IceCube Collaboration (http://icecube
event was selected by the ICECUBE Astro
This alert has an estimated false alarm
operating state at the time of detection

After the initial au
algorithms have been

Date: 2022-09-18
Time: 12:46:05.32 UT
RA: 75.15 (+3.79 / -
Dec: +3.58 (+3.70 /

We encourage follow-

Given the geometry of
several Fermi 4FGL o
Dec: 4.27 deg (1.42
region.

The IceCube Neutrino
realtime alert point
    
```

```

////////////////////////////////////
TITLE: GCN/AMON NOTICE
NOTICE DATE: Sun 18 Sep 22 12:46:52 UT
NOTICE TYPE: ICECUBE Astrotrack Bronze
STREAM: 25
RUN NUM: 137065
EVENT NUM: 22012496
SRC RA: 75.5684d {+05h 02m 16s} (J2000),
75.8669d {+05h 03m 28s} (current),
(1950)
(2000) (J2000),
(2) (current),
(4) (1950)
stat-only, 90% containment]
stat-only, 50% containment]
22/09/18 (yy/mm/dd)
2} UT

} +1.75d {+01d 45' 07"}
gle= 6.7 [hr] (West of Sun)
} +27.24d {+27d 14' 10"}

galactic lon,lat of the event
cliptic lon,lat of the event
    
```

```

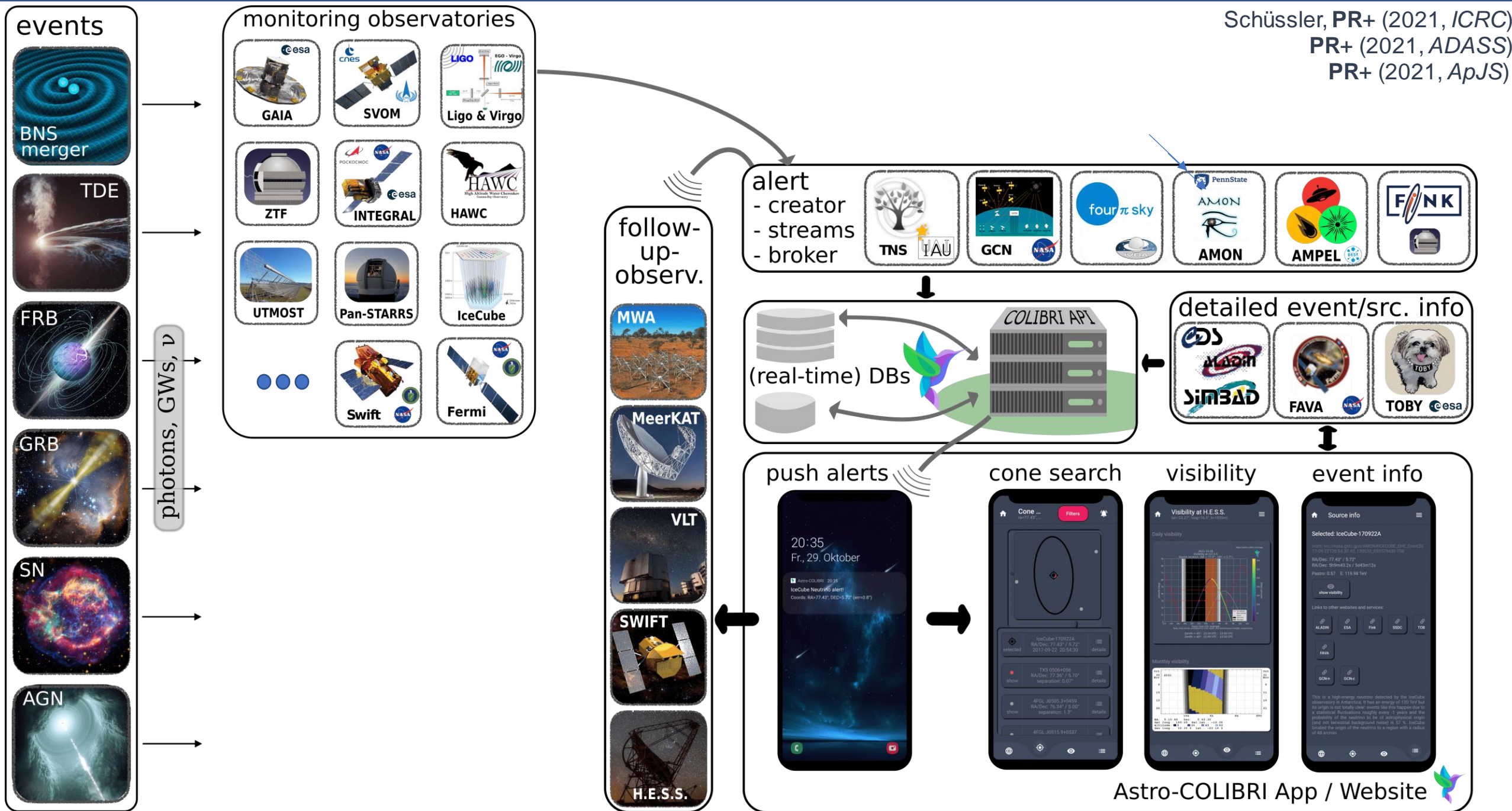
This XML file does not appear to have any style information associated with it. The document tree is shown below.
<?xml version="1.0" encoding="UTF-8" standalone="no" >
<VOEvent xmlns:vov="http://www.ivoa.net/xml/VOEvent/v2.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema
1812:46:05.32_25_137065_022012496_1" role="observation" version="2.0" xsi:schemaLocation="http://www
" >
<who>
<AuthorIVORN>ivo://nasa.gsfc.tan/gcn/</AuthorIVORN>
</Author>
<contactName>Icecube Realtime Committee/</contactName>
<contactEmail>roc@icecube.wisc.edu/</contactEmail>
</Author>
<Dates>2022-09-18T14:54:31</Date>
</who>
<Description>This VOEvent message was created with TAN VOE version: 15.08 17jun22</Description>
</who>
<Param name="Packet Type" value="174"/>
<Param name="Pkt Ser Num" value="2"/>
<Param name="AMON ID" value="13706522012496" ucd="meta.id"/>
<Description>Alert identification number.</Description>
</Param>
<Param name="run_id" value="137065" ucd="meta.id"/>
<Description>Run id.</Description>
</Param>
<Param name="Event ID" value="22012496" ucd="meta.id"/>
<Description>Event id within a given run.</Description>
</Param>
<Param name="Event ID" value="19940" unit="days" ucd="time"/>
<Param name="Event 500" value="45955.32" unit="sec" ucd="time"/>
<Param name="Stream" value="25" unit="dn" ucd="meta.id"/>
<Description>IceCube coincidence stream identification.</Description>
</Param>
<Param name="Rev" value="1" unit="dn" ucd="meta.id"/>
<Description>Alert revision.</Description>
</Param>
<Param name="signalness" value="0.4180" unit="dn" ucd="stat.probability">
<Description>Probability of a neutrino event being astrophysical.</Description>
</Param>
<Param name="FAR" value="1.7147" unit="yr-1" ucd="stat.probabil
<Description>False Alarm Rate. Number per year.</Description>
</Param>
<Param name="energy" value="168.3449" unit="TeV" ucd="phys.energy
<Description>Likely neutrino energy (in TeV).</Description>
</Param>
<Param name="src error 90" value="3.5699" unit="deg" ucd="stat.d
<Description>Angular error of the source, statistical only, (9
</Param>
<Param name="src error 50" value="2.0880" unit="deg" ucd="stat.d
<Description>Angular error of the source, statistical only, (5
</Param>
</Param>
<Param name="Trigger ID" value="0x0"/>
<Param name="Misc flags" value="0x19000000"/>
</Group name="Trigger ID">
<Param name="SubType" value="indi"/>
<Param name="Text" value="false"/>
<Param name="RADC valid" value="false"/>
<Param name="Retraction" value="false"/>
<Param name="InternalTest" value="false"/>
</Group>
    
```

**Fermi-LAT gamma-ray observations of IceCube-220918A and detection of a new gamma-ray source, Fermi J0502.5+0037**

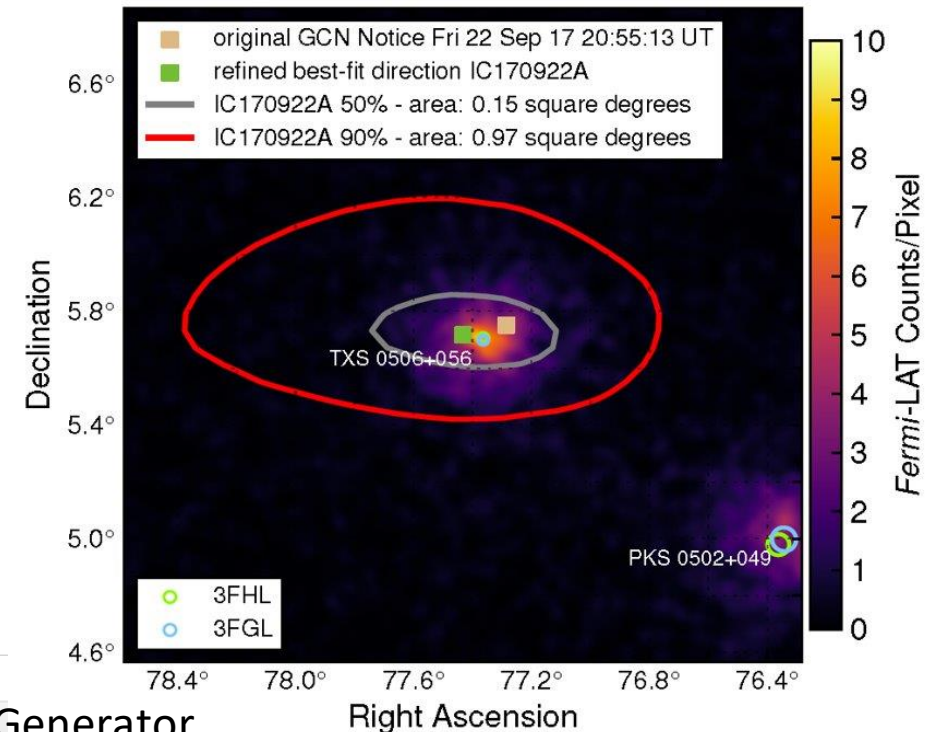
ATel #15620; S. Garrappa (DESY-Zeuthen), S. Buson (Univ. of Wuerzburg) and J. Sinapius (DESY-Zeuthen) on behalf of the Fermi-LAT collaboration:  
 on 19 Sep 2022; 20:50 UT  
 Credential Certification: Simone Garrappa (simone.garrappa@gmail.com)

Subjects: Gamma Ray, Neutrinos, Request for Observations, AGN, Blazar



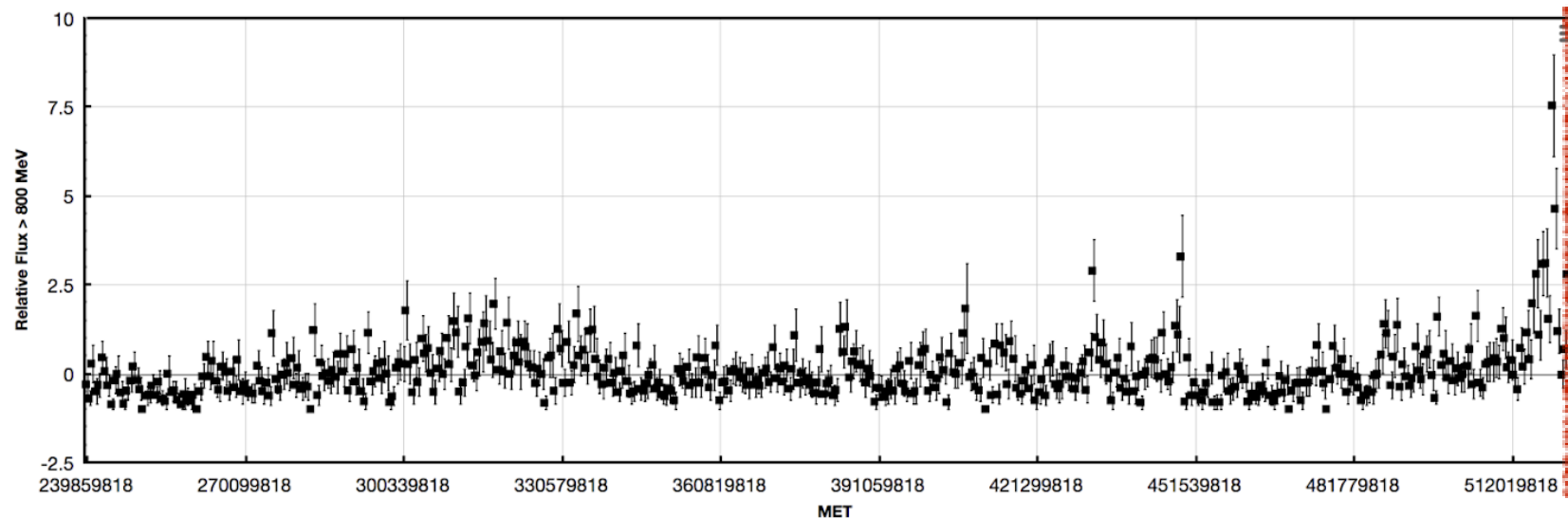


- 22/09/2017: Detection of another high-energy neutrino of about 300 TeV by IceCube: automatic and public alert distribution to follow-up observatories at all wavelengths
- 28/09/2017: Fermi-LAT: Detection of an active blazar within the neutrino uncertainty region ATEL #10791

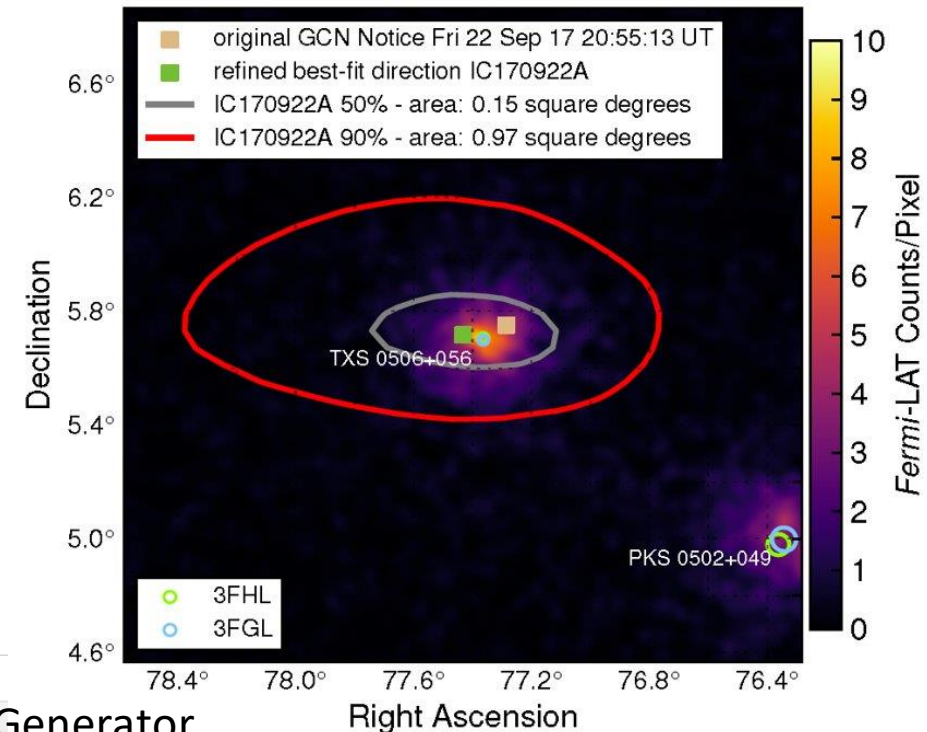


High Energy Light Curve (800 MeV - 300 GeV)

Fermi All-sky Variability Analysis (FAVA) - Light Curve Generator

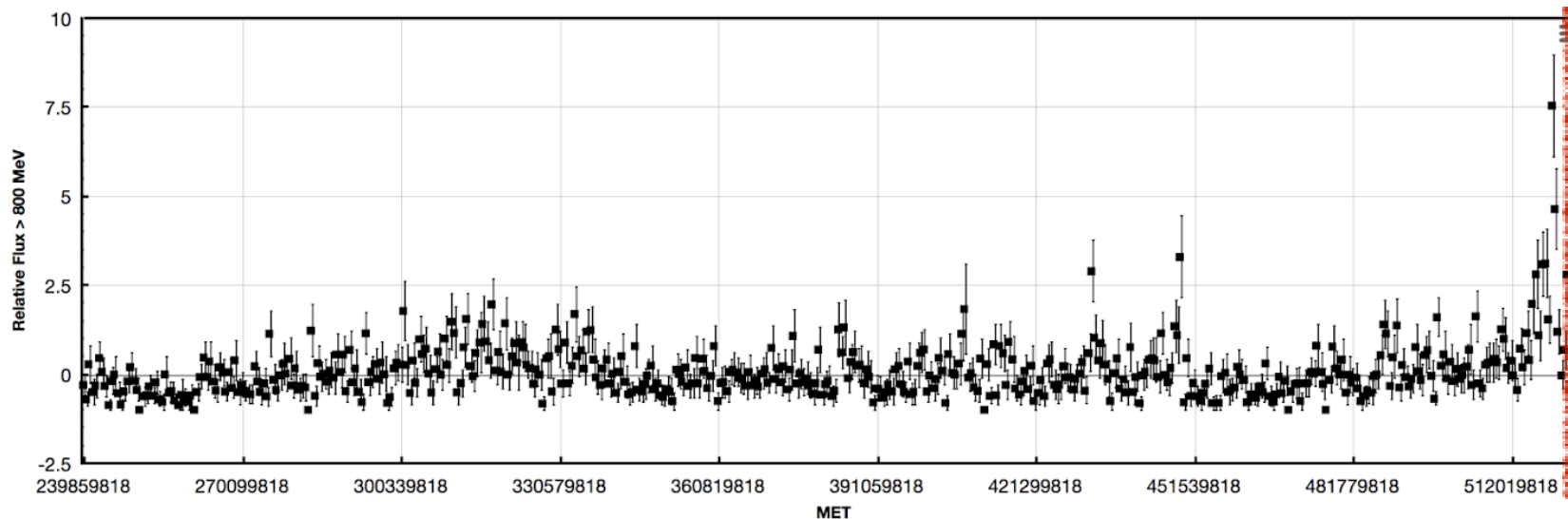
Neutrino  
detection

- ❑ It took 6 days between the neutrino detection and the realization that there is a flaring blazar within the localization uncertainty!
- ❑ Cone search within the neutrino uncertainty => TXS 0506+056
- ❑ Check state of the source(s) in FAVA
- ❑ Get optimal observation window for various observatories
- ❑ => Many tools are available but need for automatization + interfaces

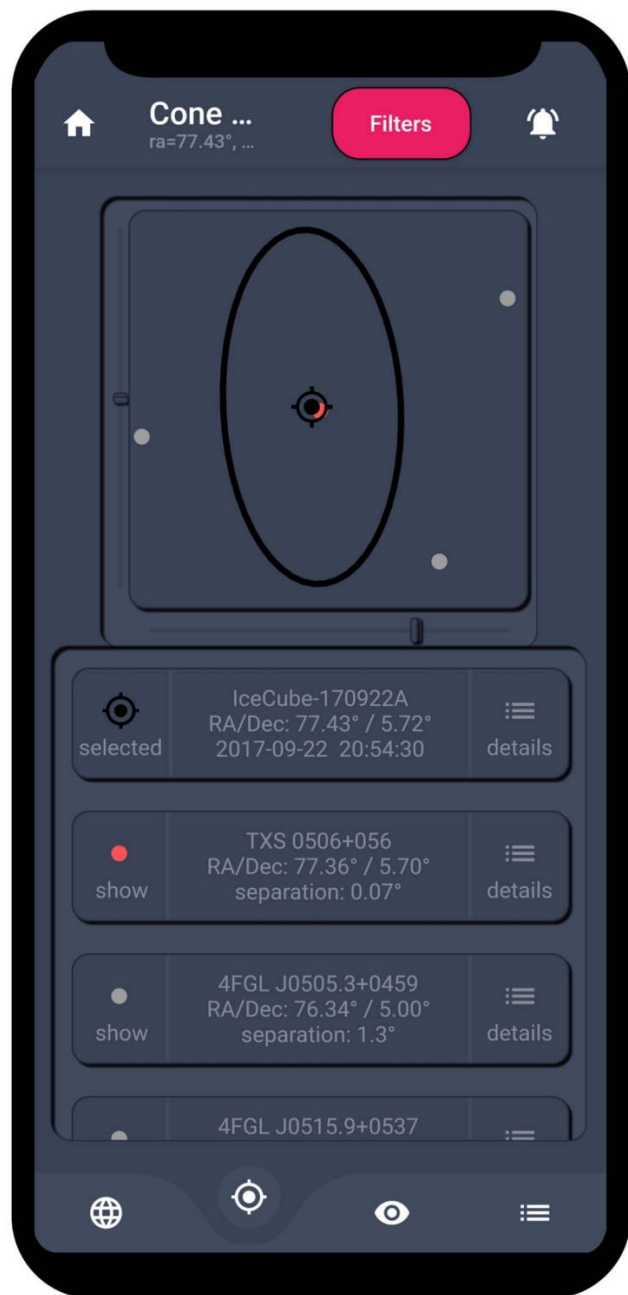


High Energy Light Curve (800 MeV - 300 GeV)

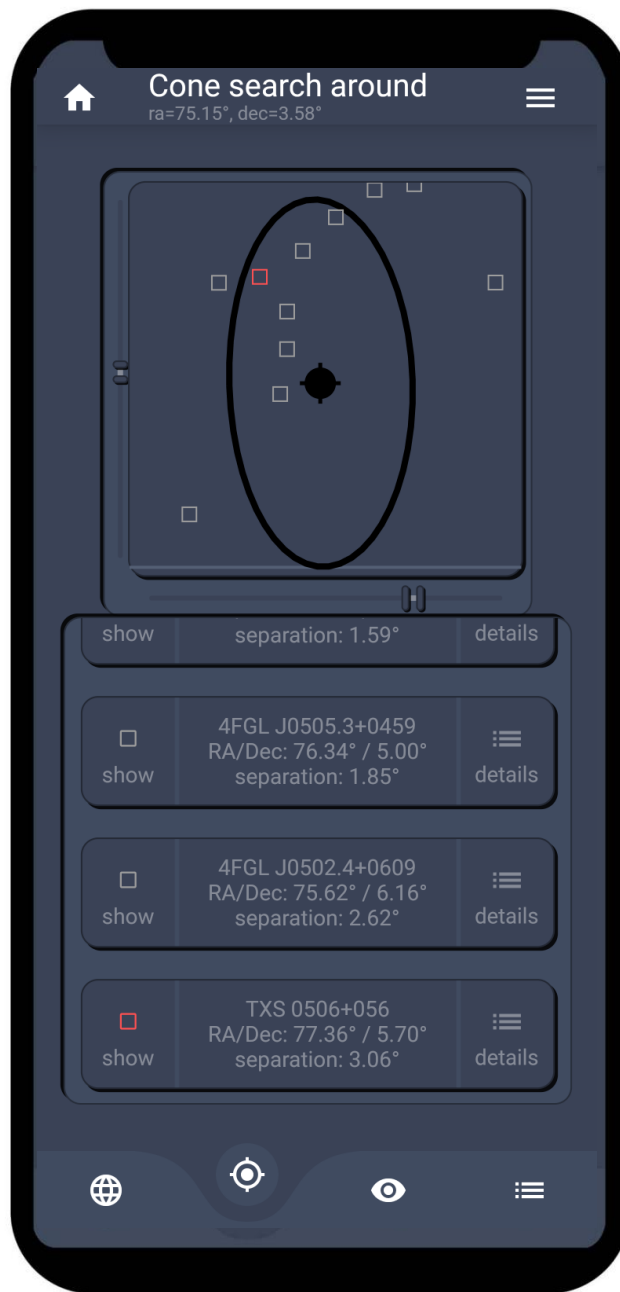
Fermi All-sky Variability Analysis (FAVA) - Light Curve Generator

Neutrino  
detection

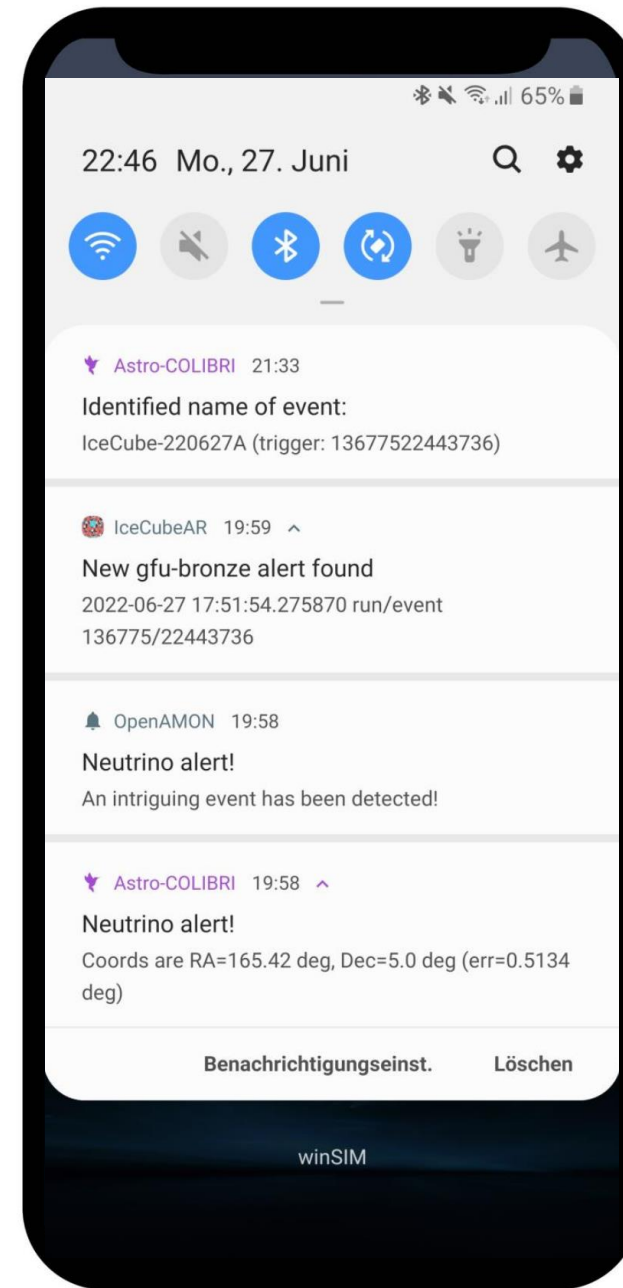




IceCube-170922A (2017-09-22)



IceCube-220918A (2022-09-18)



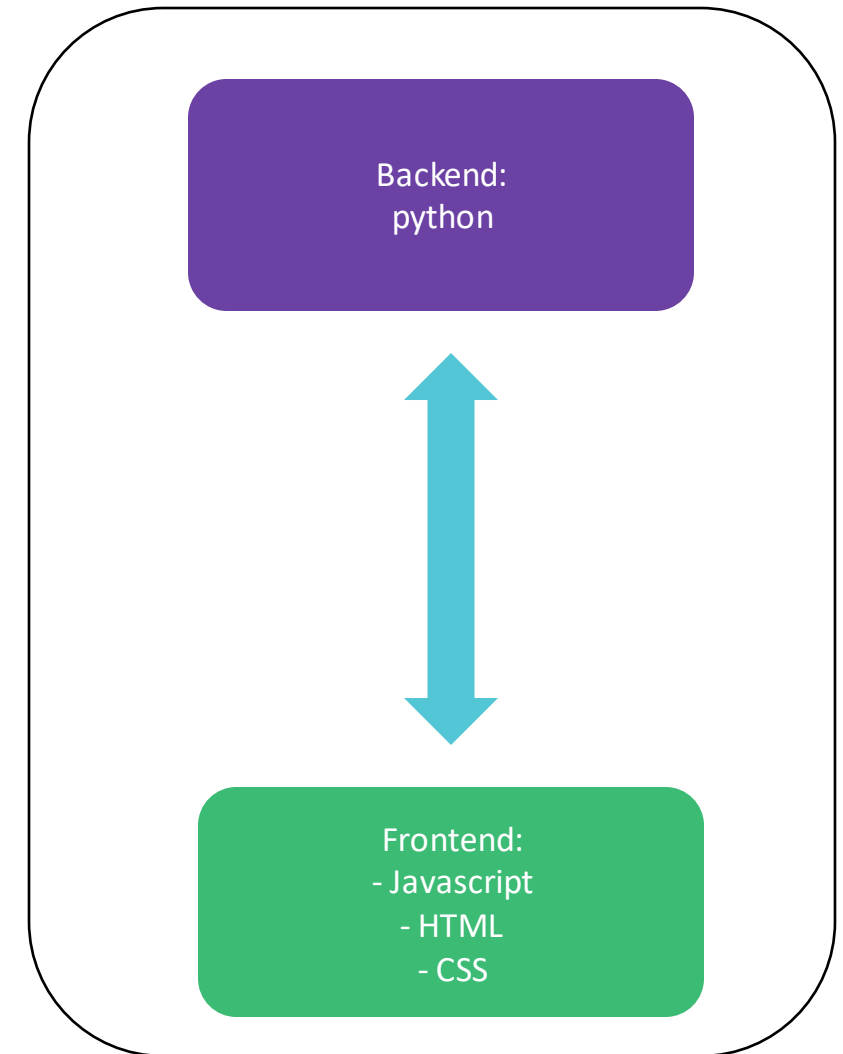
IceCube-220627A (2022-06-27)



After 4 merges and  $\approx 200$  commits:



H.E.S.S. collaboration meeting (11.2019)



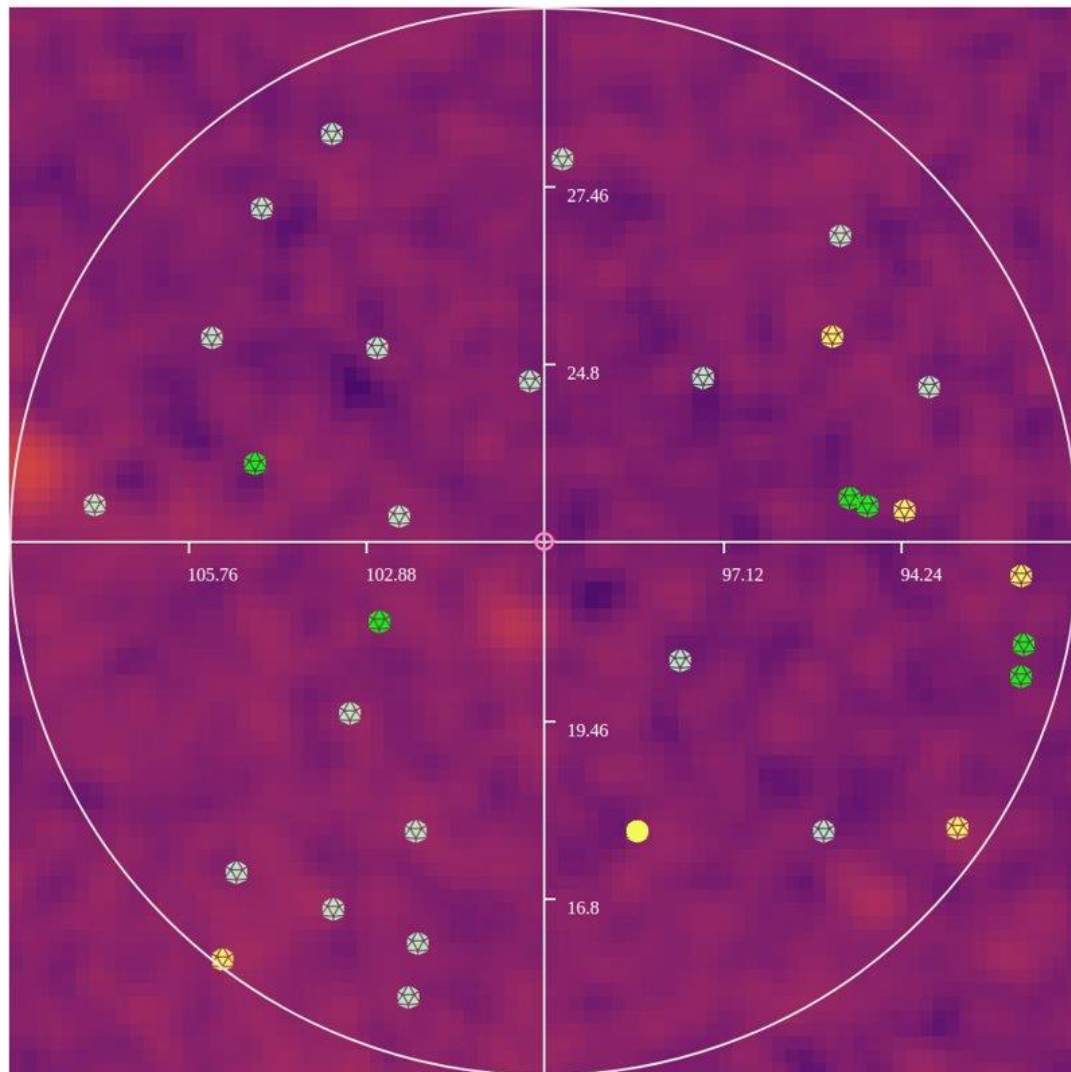


Backend:  
python

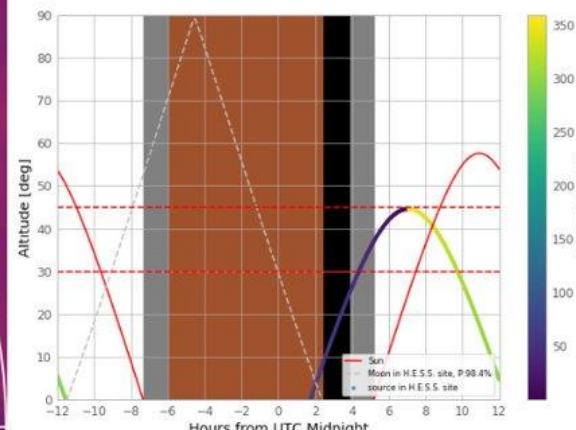
Eel

Frontend:  
- Javascript  
- HTML  
- CSS

After further 10 merges and  $\approx 230$  commits:

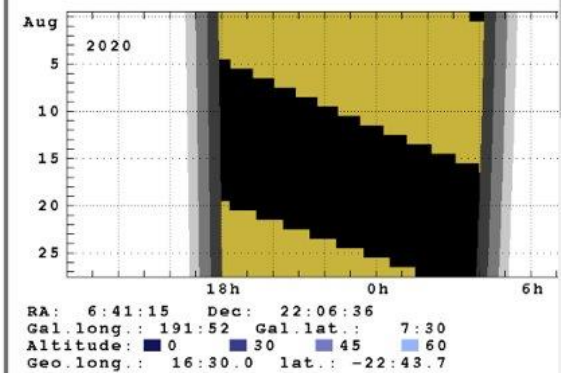


Visibility of source: RA:  $100^\circ$  Dec:  $22.13^\circ$   
at observatory: RA:  $-23.271778^\circ$  Dec:  $16.50022^\circ$   
during 2020-08-29



Visibility of an astronomical object during  
darkness

Selected object at R.A. 6:40:00, Dec. 22:07:48 (J2000)



Status

Source name not known. Please remove text or choose known source!  
Internet connection: established  
Visibility plots: finished next night / finished this month  
Latest grbs: finished search  
Latest neutrinos: finished search

Search area

Source name: abc

RA\*: 100 Dec\*: 22.13 Radius\*: 8

Time window

date & time\*: 08/28/2020, 12:11:49 PM window [days]\*: 50

VoEvent

VoEvent: e.g. ivo://nasa.gsfc.gcn/SWIFT#BAT\_GRB\_Pos\_848890-834

Catalogs

VoEventDB  4FGL  TeVCat  FLAPLUC

Latest transients

GRBs  Neutrinos  None

START

End of August 2020





Release of **v1.0.0** in August 2021: P. Reichherzer *et al.* 2021 ApJS **256** 5

**Colibri** | select action: Latest transients | Cone search | personalize | status: still logged in as patrick.reich ✓

Filters: From 2021-03-22 to 2021-06-22 | swift | fermi | hawc | icecube | amon | integral | other | Type of events: FRBs | TDE | GRBs | Burst | Neutrino | other

**GRB 210411A** (selected)  
RA/Dec: 259.39° / -27.41°  
error: 3.05  
2021-04-11 05:30:56

**SGR J1555.2-5402** (show)  
RA/Dec: 238.79° / -54.06°  
error: 0.000  
2021-06-21 19:05:24

**GRB 210621A** (show)  
RA/Dec: 248.31° / -61.07°  
error: 8.6  
2021-06-21 12:44:03

**PKS0537-286** (show)  
RA/Dec: 85.00° / -28.66°  
error: -1  
2021-06-21 00:31:01

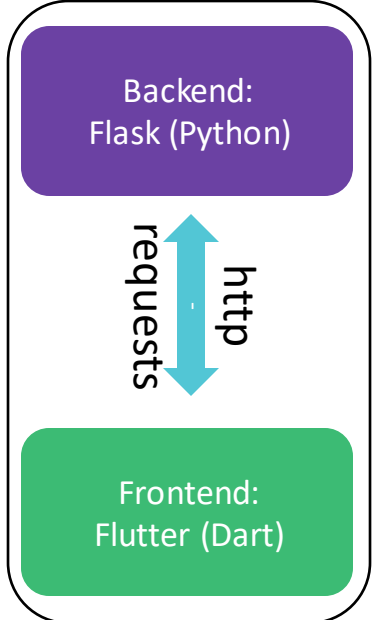
**RA/Dec: 183.97° / 53.17°** (show)  
error: 30.51  
2021-06-20 18:20:45

**RA/Dec: 291.11° / 47.60°** (show)  
error: 8.5  
2021-06-20 06:54:14

**Detailed info about selected source:**  
VoEvent: [Click here](#)  
name: GRB 210411A  
RA / Dec: 17h17m33.6s / -27d24m36s  
observatory: Fermi  
comment: z=2.826 (VLT/X-shooter, GCN 29806)  
Links: [ALADIN](#) [ESA](#) [SSDC](#) [TOBY](#) [FAVA](#) [GCN-n](#) [GCN-c](#)

**Visibility at H.E.S.S.**  
(long=16.5°, lat=-23.27°, height=1835m)  
2021-06-22  
Visibility at H.E.S.S.  
Source location: (RA = 259.4°, DEC = -27.4°)  
altitude (deg) vs hours from UTC midnight

**Detailed monthly visibility at H.E.S.S.**  
RA: 17:18:57 Dec: -27:26:19  
Gal. long.: 357:58 Gal. lat.: 6:01  
Altitude: 1835 m Elevation: 20 m  
Geo. long.: 16:30.0 Lat.: -23:16.2

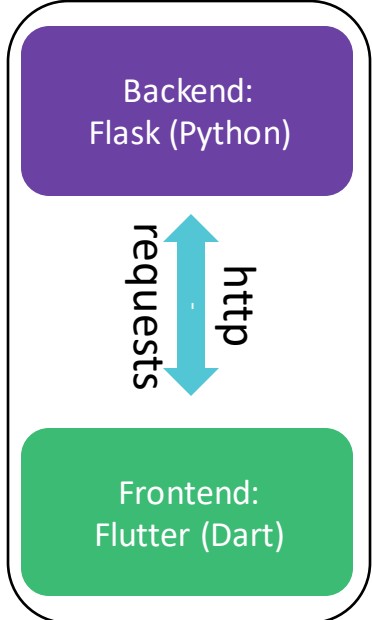


≈2000 commits



Release of v2.0.0 in September 2022

The screenshot displays the Astro-COLIBRI v2.0.0 interface. At the top, there are navigation buttons for 'Select action', 'Latest transients', 'Cone search', 'Personalize', and 'Status: logged out'. Below this is a filter bar for 'Observatories' (Swift, Fermi, HAWC, IceCube, AMON, Integral, LVC, other) and 'Event types' (FRB, OT, SN, GRB, burst, neutrino, GW, other, nuem, 4FGL, TeVCAT, SGR/AXP). A timeline shows dates from 2022-09-09 to 2022-09-24. The main content area is divided into three sections: a list of recent events on the left, a central star map with a 'Cone search' overlay for 'IceCube-220918A Neutrino', and a 'Detailed info about selected source' panel on the right. The event list includes SN 2022vek, SN 2022vju, SN 2022vcv, FRB 20220918A, and IceCube-220918A. The detailed info panel shows coordinates (RA: 75.15°, Dec: 3.58°), detection time (2022-09-18 12:46:05), and visibility graphs for 'Daily' and 'Monthly' views. At the bottom, there are links for further details to external services like ALADIN, ESASKY, Pan-STARRS, Fink, SSDC, and Pholix/ASA.



≈3200 commits

