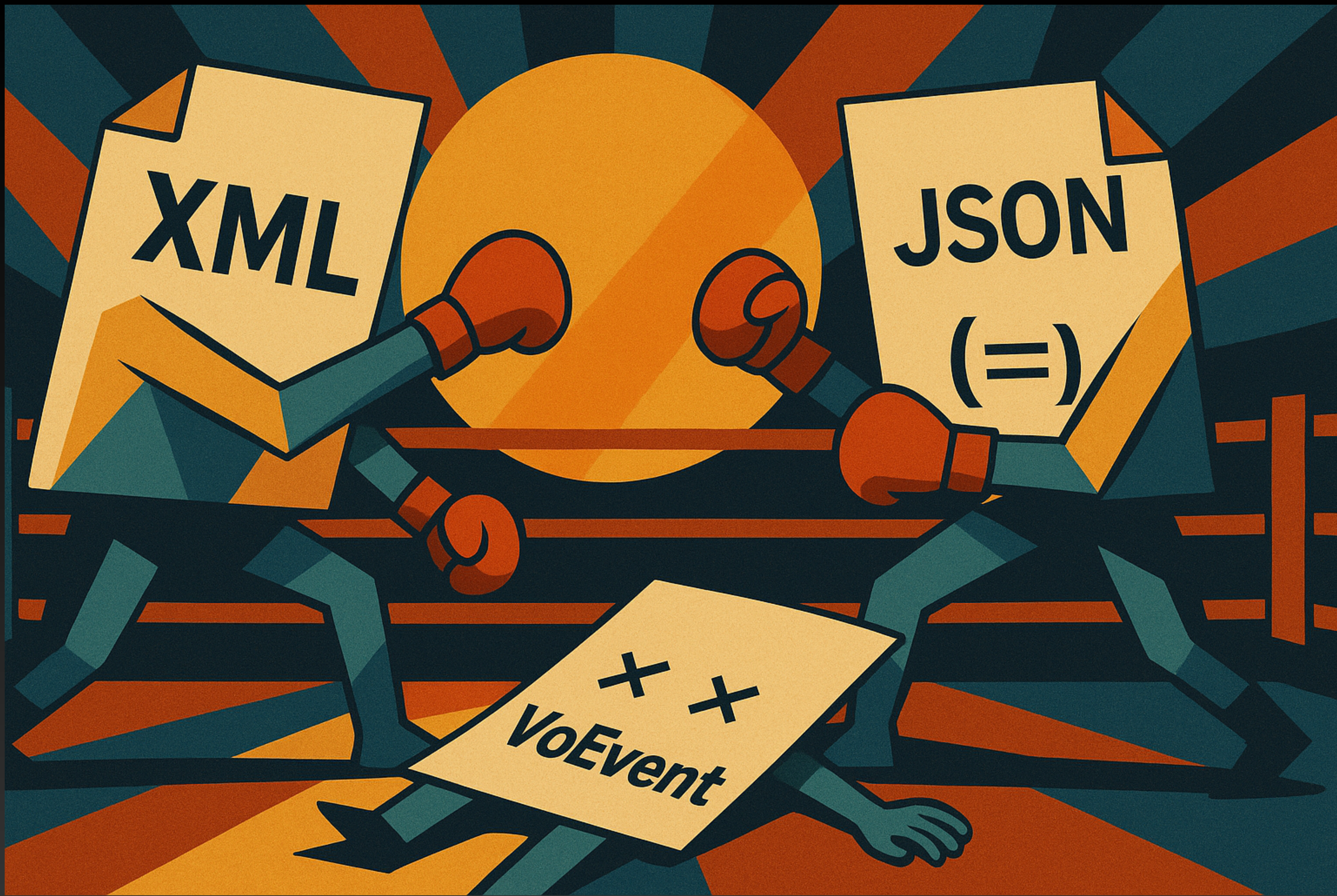
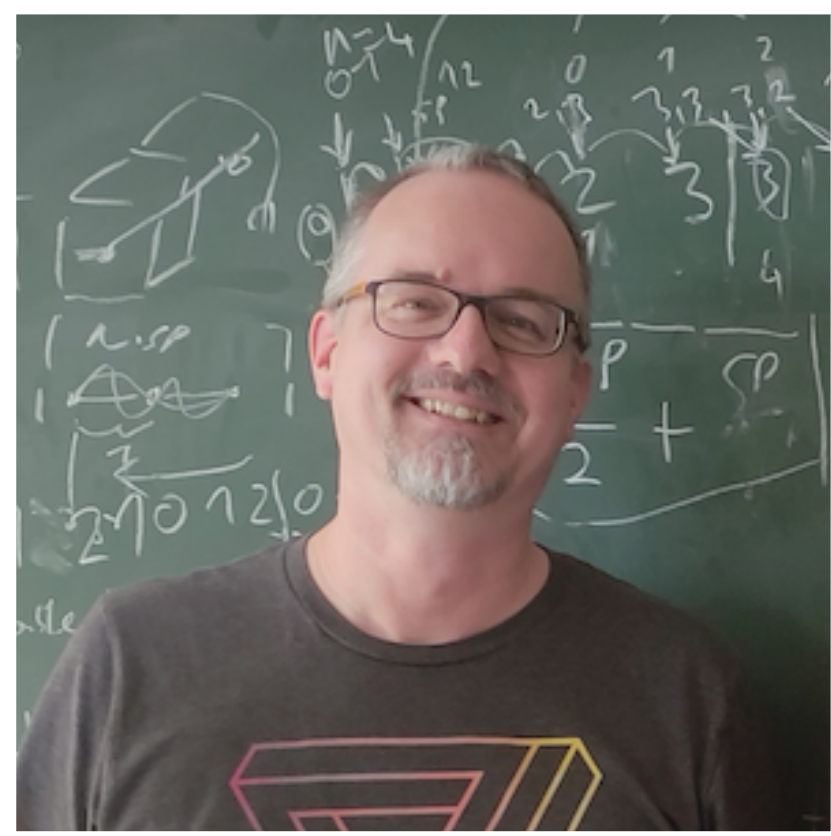






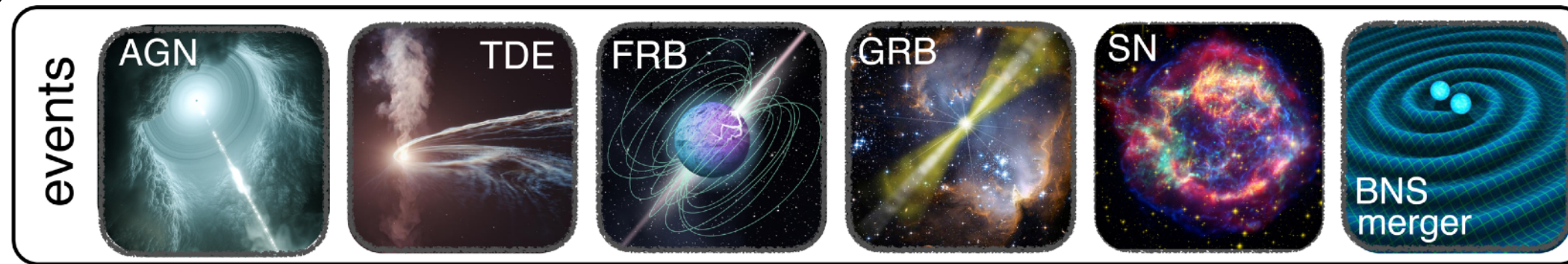
Context: Astro-COLIBRI



+ many contributions from the community

Fabian Schüssler (IRFU, CEA Paris-Saclay)





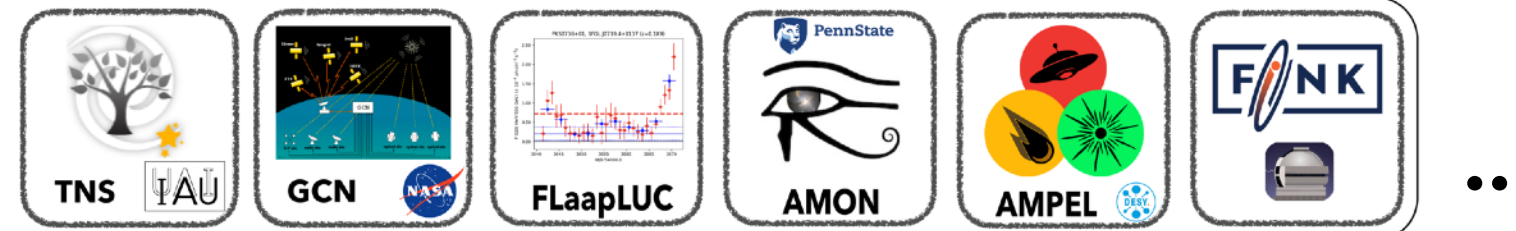
photons, GWs, ν , (CRs)

monitoring satellites and observatories



alert

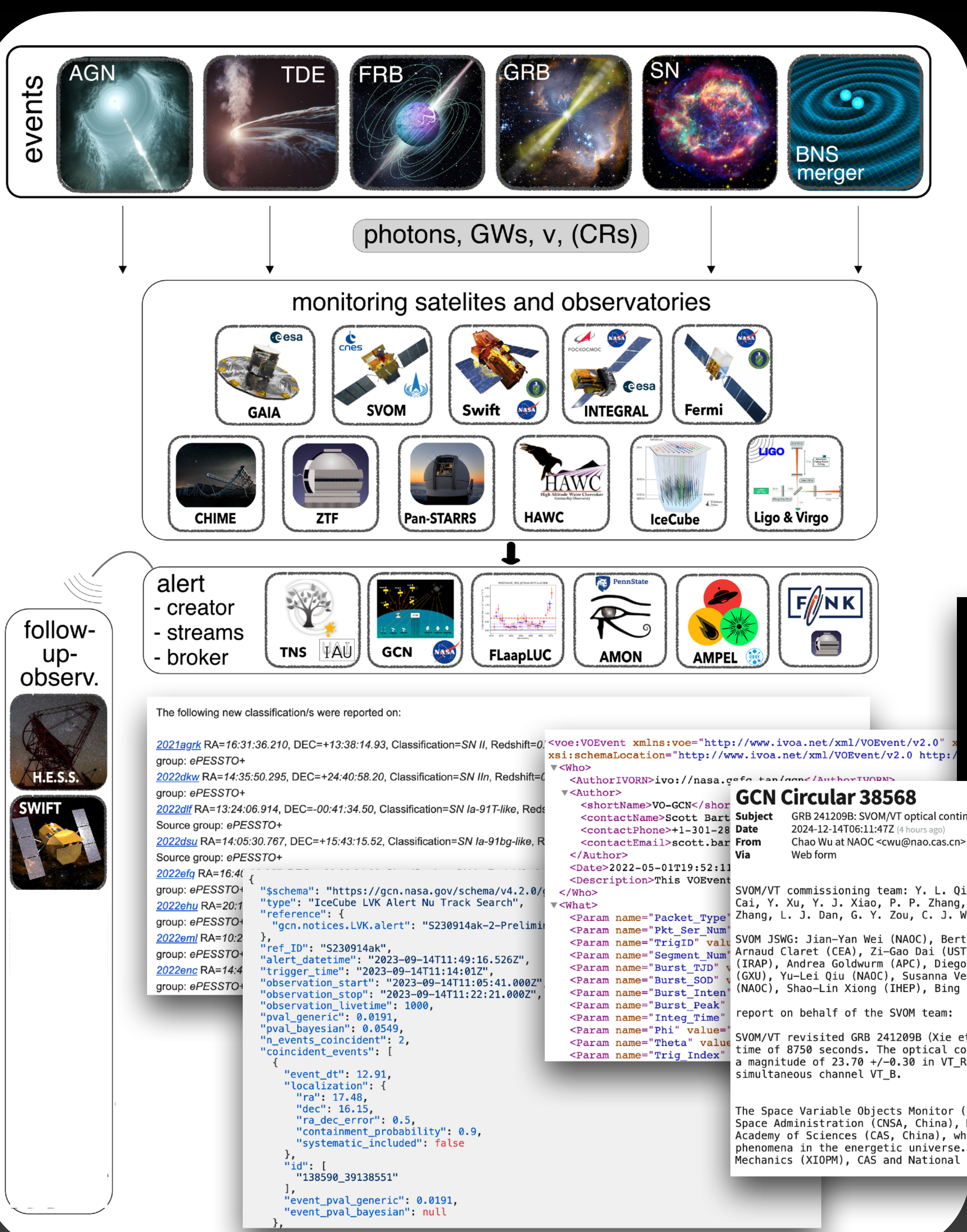
- creator
- streams
- broker



follow-up-observ.



Improve time
domain astrophysics



Recurrent Nova M31N 2008-12a: Discovery of the 2024 eruption

on 13 Dec 2024; 04:31 UT
Distributed as an Instant Email Notice Novae
Credential Certification: Allen W. Shafter (ashafter@sdsu.edu)

Subject	GRB 241209B: SVOM/VT optical continuous fading
Date	2024-12-14T06:11:47Z (4 hours ago)
From	Chao Wu at NAOC <cwu@nao.cas.cn>
Via	Web form

report on behalf of the SVOM team:

The Space Variable Objects Monitor (SVOM) Space Administration (CNSA, China), Natio Academy of Sciences (CAS, China), which i phenomena in the energetic universe. VT w Mechanics (XIOPM), CAS and National

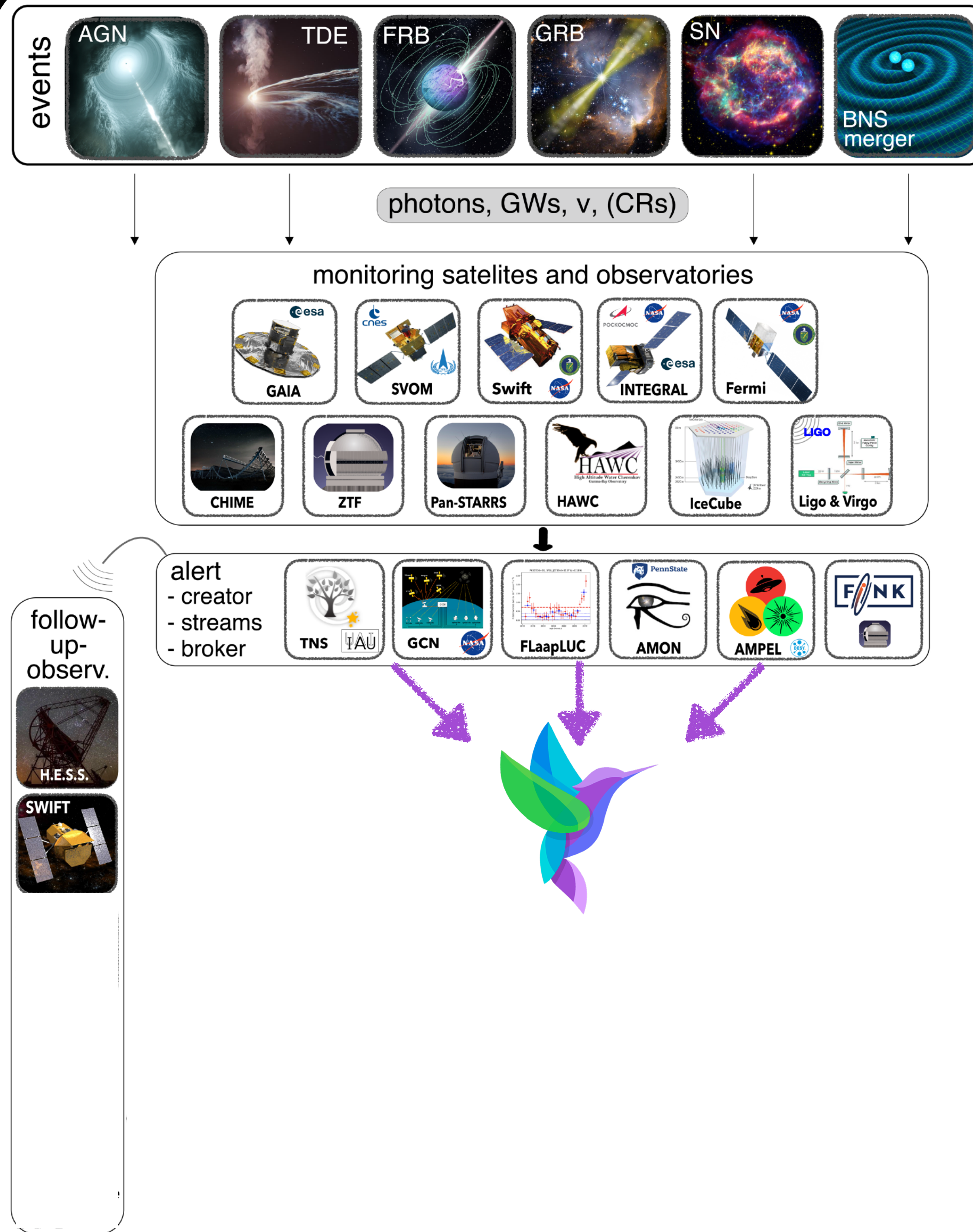
Hello,

Greetings from the BHTOM Automated Newsletter!

As of 2025-09-22 10:05:35.180466+00:00, these are the new targets added in the last week for observing (importance $\geq$ 1), sorted by magnitude:

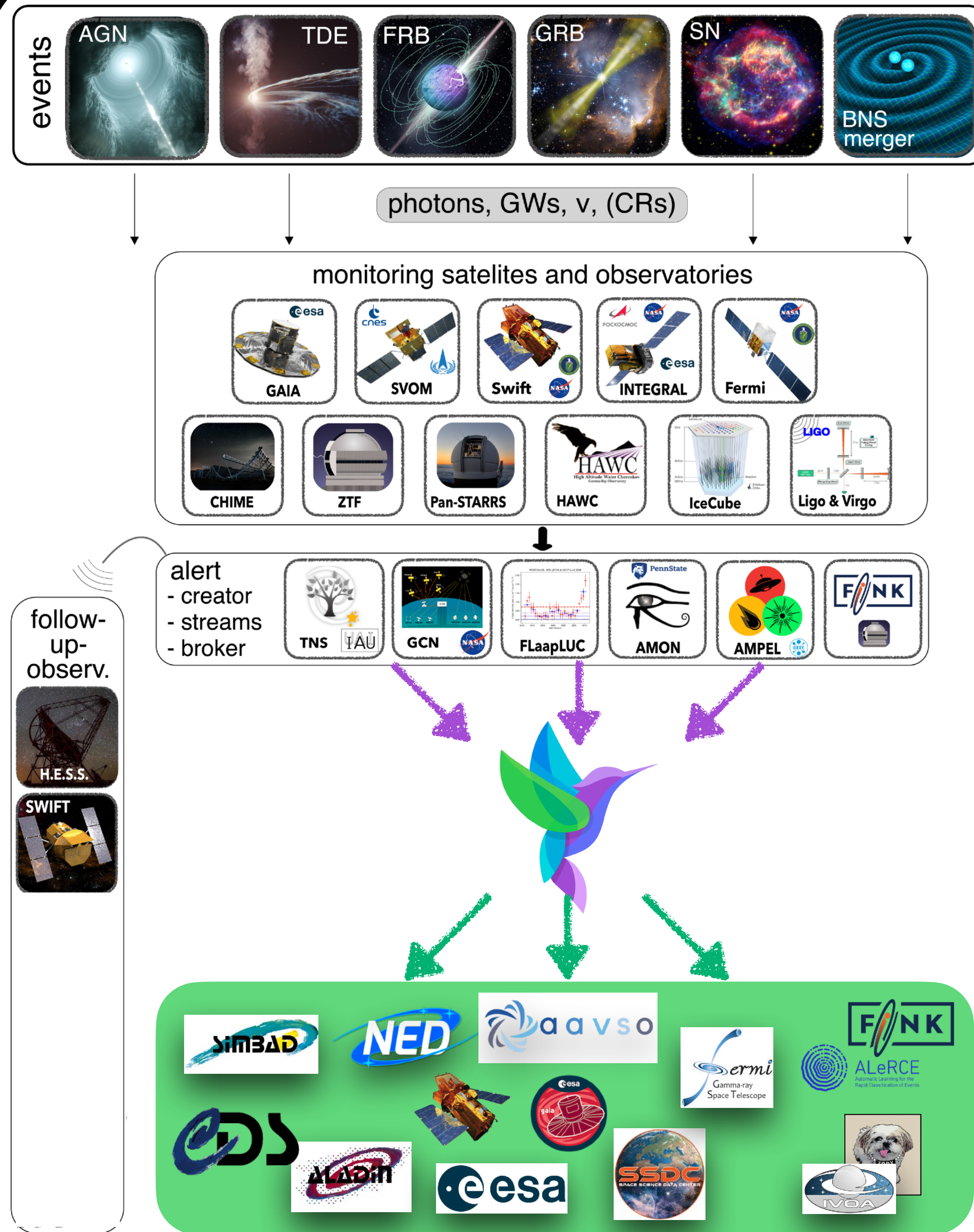
name	ra	dec	mag	last_sun_separation	classification	description
AT2025wyy	262.551250	-27.896889	11.4	84.0	Unknown	Nova found by Tadamshi Kojima
AT2025xes	66.887308	-42.165719	15.1	107.0	Unknown	Candidate nuclear transient from ATLAS via TNS
AT2025xeg	119.111725	-78.699383	15.5	85.0	Unknown	Candidate supernova from ATLAS and GOTO via TNS
AT2025xop	295.930617	-18.696344	17.0	115.0	Unknown	Candidate supernova from LAST via TNS, gone already
ZTF25aawwfive	274.631244	-20.899773	19.8	95.0	Unknown	candidate binary microlensing event from ZTF
AT2025xvc	85.526933	-67.018517	20.2	92.0	Unknown	possible bright nova or CV in LMC from GOTO,TNS

In addition, here are some older targets that are currently visible and requested for observations. These targets have an importance ≥ 4 , a sun separation last magnitude <18 , sorted by magnitude.



**Improve time
domain astrophysics**

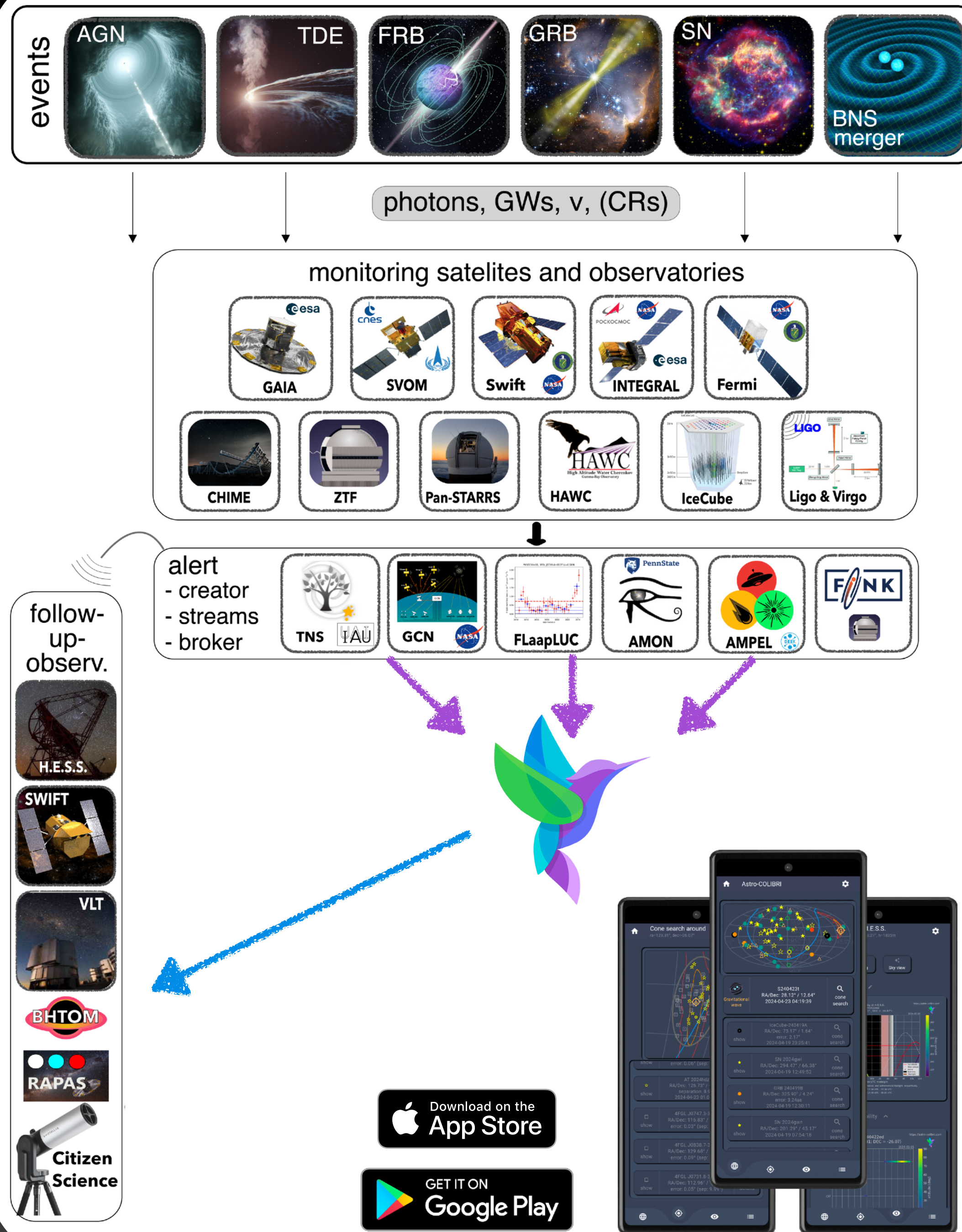
Summary of all publicly
available alert channels



Improve time
domain astrophysics

Summary of all publicly
available alert channels

Complement and interconnect
existing platforms



Improve time
domain astrophysics

Summary of all publicly
available alert channels

Complement and interconnect
existing platforms

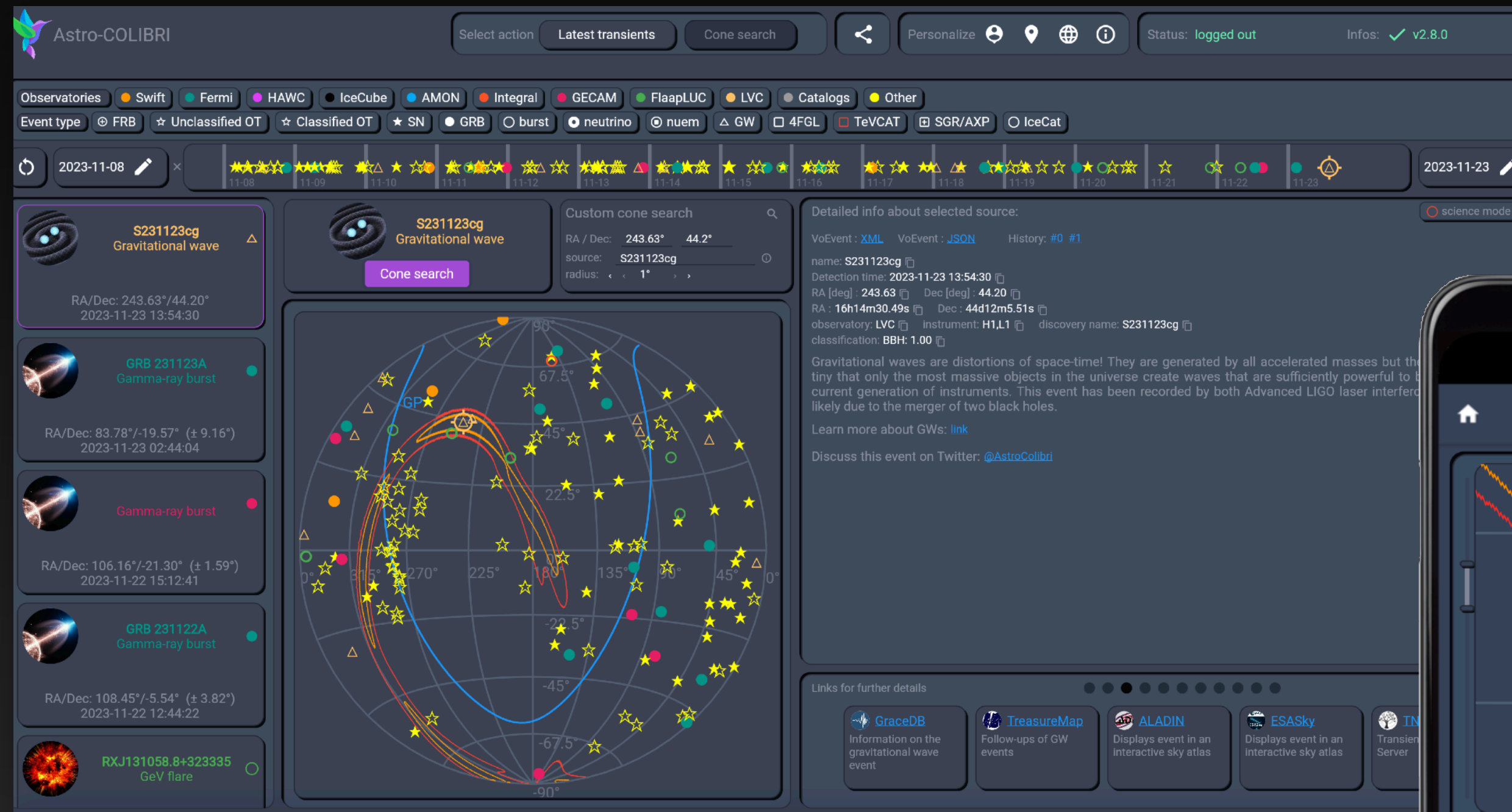
Modern platforms:
API + web + smartphones

professional +
amateur astronomers



User interfaces

<https://astro-colibri.com>



<https://astro-colibri.science>

VoEvents in Astro-COLIBRI

- Main source: General Coordinates Network
 - Complemented by Fast Radio Bursts (CHIME VoEvent broker)
- GCN classic (VoEvents over VoEvent Transport Protocol) => VoEvent over Kafka
- Renewed discussions about the need for a modernised data format (2022/2023)
 - IVOA meetings
 - Astroparticle Symposium at Paris-Saclay
 - Astro-COLIBRI Multi-messenger Astrophysics workshops
 - ...
- My personal take-aways
 - no clear show-stopper for VoEvent schema
 - XML vs JSON: common dislike of XML serialisation, ease of use of JSON, easier parsing + integration, ...

VoEvents in Astro-COLIBRI (II)

- Listening to alerts (Comet/VoTP and Kafka)
- To help move the discussion forward: conversion of VoEvents from XML to JSON
- xmltodict
 - `voevent_xml_string = stdin.decode("utf-8")`
 - `voevent_dict = xmltodict.parse(voevent_xml_string, attr_prefix="")`
- Results in a python dictionary containing the VoEvent structure
 - Easy to parse (without the hassle of voeventparse)
 - Easy to integrate into python based systems
 - No need to look at XML 😊

JSON VoEvents: access in Astro-COLIBRI

 Astro-COLIBRI
Science









Personalize:     

Science mode: 

Status: logged in as fabian.sch Infos: ✓ v2.24.0

Observatories

Swift

SVOM

HESS

Fermi

HAWC

IceCube

AMON

Integral

GECAM

FLaapLUC

LVC

Catalogs

Other

Event type

FRB

Unclassified OT

Classified OT

SN

GRB

burst

neutrino

nuem

GW

4FGL

TeVcat

X-ray

IceCat

General



2025-10-31



×





















































































































10-31









































































































11-01

































































































11-02

























































































11-03

















































































11-04









































































11-05

































































11-06

























































11-07

















































11-08





































JSON VoEvents: example

```
▼<voe:VOEvent xmlns:voe="http://www.ivoa.net/xml/VOEvent/v2.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" ivorn="ivo://nasa.gsfc.gcn/Fermi#GBM_Fin_Pos2025-11-08T21:19:46.26_784329591_0-703" role="observation" version="2.0" xsi:schemaLocation="http://www.ivoa.net/xml/VOEvent/v2.0 http://www.ivoa.net/xml/VOEvent/VOEvent-v2.0.xsd">
  ▼<Who>
    <AuthorIVORN>ivo://nasa.gsfc.gcn/gcn</AuthorIVORN>
    ▼<Author>
      <shortName>Fermi (via VO-GCN)</shortName>
      <contactName>Julie McEnery</contactName>
      <contactPhone>+1-301-286-1632</contactPhone>
      <contactEmail>Julie.E.McEnery@nasa.gov</contactEmail>
    </Author>
    <Date>2025-11-08T23:48:02</Date>
    <Description>This VOEvent message was created with GCN VOE version: 15.08 17jun22</Description>
  </Who>
  ▼<What>
    <Param name="Packet_Type" value="115"/>
    <Param name="Pkt_Ser_Num" value="4"/>
  </What>
</voe:VOEvent>
```

```
{
  "voe:VOEvent": {
    "ivorn": "ivo://nasa.gsfc.gcn/Fermi#GBM_Fin_Pos2025-11-08T21:19:46.26_784329591_0-703",
    "role": "observation",
    "version": "2.0",
    "xmlns:voe": "http://www.ivoa.net/xml/VOEvent/v2.0",
    "xmlns:xsi": "http://www.w3.org/2001/XMLSchema-instance",
    "xsi:schemaLocation": "http://www.ivoa.net/xml/VOEvent/v2.0 http://www.ivoa.net/xml/VOEvent/VOEvent-v2.0.xsd",
    "Who": {
      "AuthorIVORN": "ivo://nasa.gsfc.gcn/gcn",
      "Author": {
        "shortName": "Fermi (via VO-GCN)",
        "contactName": "Julie McEnery",
        "contactPhone": "+1-301-286-1632",
        "contactEmail": "Julie.E.McEnery@nasa.gov"
      },
      "Date": "2025-11-08T23:48:02",
      "Description": "This VOEvent message was created with GCN VOE version: 15.08 17jun22"
    },
    "What": {
      "Param": [
        {
          "name": "Packet_Type",
          "value": "115"
        }
      ]
    }
  }
}
```


JSON VoEvents: example (II)

```
▼<WhereWhen>
  ▼<ObsDataLocation>
    <ObservatoryLocation id="GEOLUN"/>
    ▼<ObservationLocation>
      <AstroCoordSystem id="UTC-FK5-GE0"/>
      ▼<AstroCoords coord_system_id="UTC-FK5-GE0">
        ▼<Time unit="s">
          ▼<TimeInstant>
            <ISOTime>2025-11-08T21:19:46.26</ISOTime>
          </TimeInstant>
        </Time>
        ▼<Position2D unit="deg">
          <Name1>RA</Name1>
          <Name2>Dec</Name2>
          ▼<Value2>
            <C1>144.6300</C1>
            <C2>8.0300</C2>
          </Value2>
          <Error2Radius>3.2300</Error2Radius>
        </Position2D>
      </AstroCoords>
    </ObservationLocation>
  </ObsDataLocation>
  <Description>The RA,Dec coordinates are of the type: source_o
</WhereWhen>
```

```
{
  "WhereWhen": {
    "ObsDataLocation": {
      "ObservatoryLocation": {
        "id": "GEOLUN"
      },
      "ObservationLocation": {
        "AstroCoordSystem": {
          "id": "UTC-FK5-GE0"
        },
        "AstroCoords": {
          "coord_system_id": "UTC-FK5-GE0",
          "Time": {
            "unit": "s",
            "TimeInstant": {
              "ISOTime": "2025-11-08T21:19:46.26"
            }
          },
          "Position2D": {
            "unit": "deg",
            "Name1": "RA",
            "Name2": "Dec",
            "Value2": {
              "C1": "144.6300",
              "C2": "8.0300"
            },
            "Error2Radius": "3.2300"
          }
        }
      }
    },
    "Description": "The RA,Dec coordinates are of the type: source_object."
  },
}
```




Astro-COLIBRI

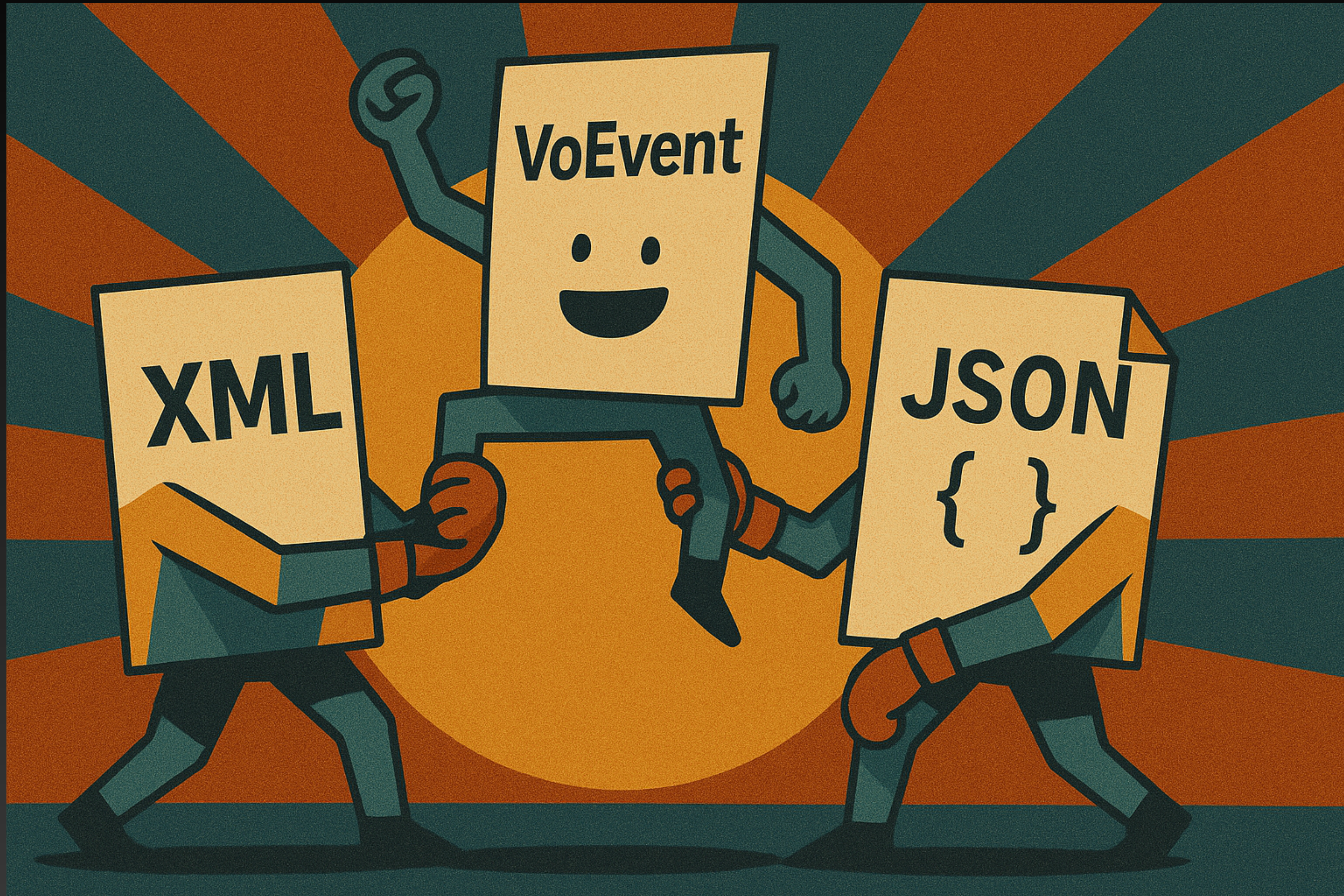
- Overview of transient detections (optical transients, GRBs, FRBs, TDEs, high-energy neutrinos, GWs, etc.)
 - interfaces: <https://astro-colibri.com> + Android + iOS
 - API + documentation: <https://astro-colibri.science>
 - P. Reichherzer et al., ApJS 256, 2021 ([link](#)) + Galaxies 11, 2022 ([link](#))



VoEvents @ Astro-COLIBRI

- Overview of transient detections (optical transients, GRBs, FRBs, TDEs, high-energy neutrinos, GWs, etc.)
 - interfaces: <https://astro-colibri.com> + Android + iOS
 - API + documentation: <https://astro-colibri.science>
 - P. Reichherzer et al., ApJS 256, 2021 ([link](#)) + Galaxies 11, 2022 ([link](#))
- VoEvent alert messages are the backbone of many alert systems (incl. Astro-COLIBRI)
- VoEvents (XML) can be easily transformed into a basic JSON serialisation
 - Meta-data naturally merged into the resulting dictionary
 - Easy to read, parse, integrate, ...
 - Sufficient for all use-cases? Drawbacks, short-comings? ...

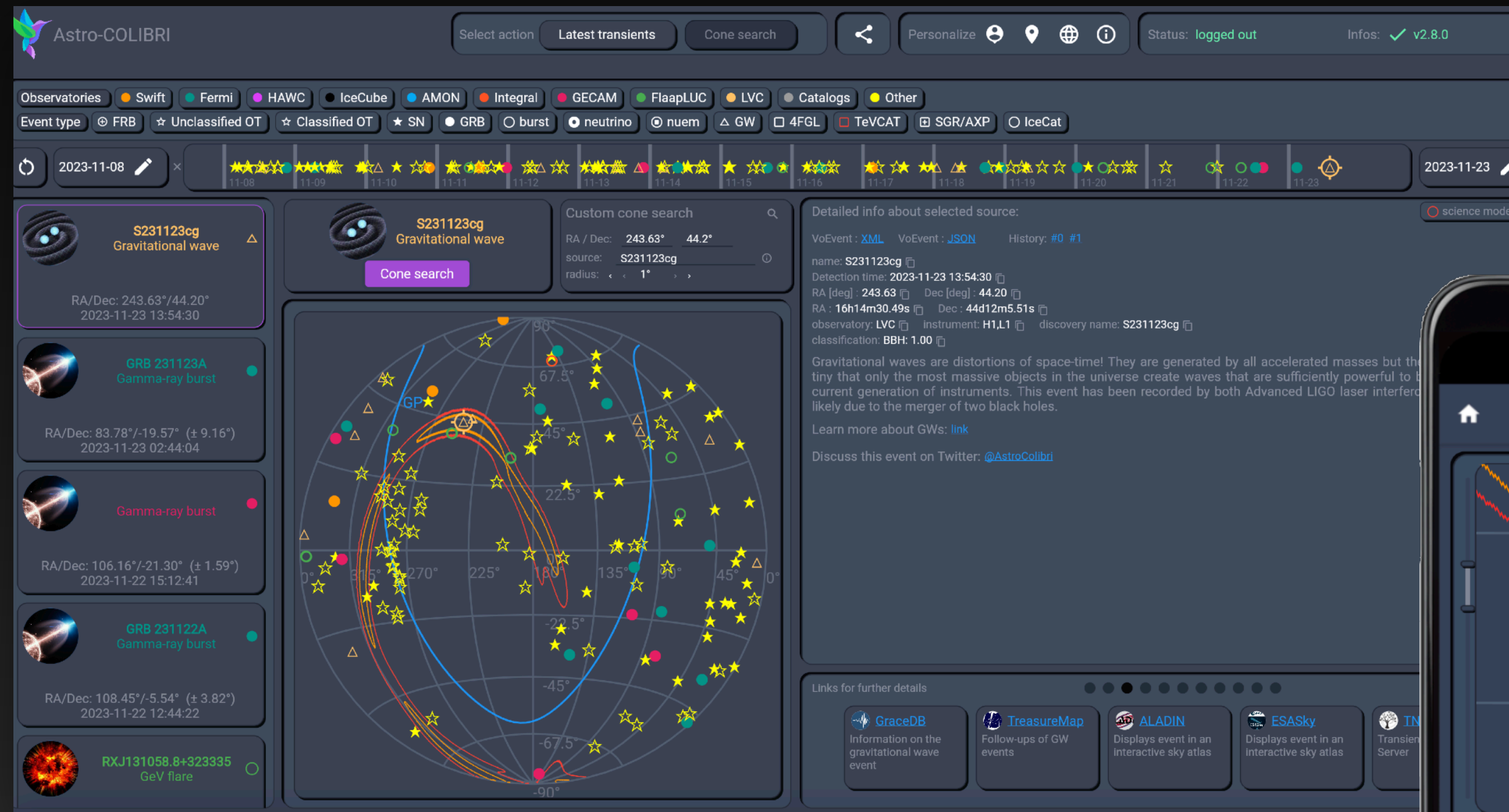
No need to reinvent the VoEvent wheel !?!





Astro-COLIBRI

<https://astro-colibri.com>



<https://astro-colibri.science>



Parsing JSON-VoEvents in Astro-COLIBRI

```
def get_parameter(self, path, name, format, value="value"):
    """
    Retrieve a parameter from the JSON-converted VOEvent structure.

    This method navigates through the nested dictionary/list structure of a VOEvent
    to extract a specific parameter value by its path and name.

    Args:
        path (str): Slash-separated path to navigate the VOEvent structure.
            Examples:
            - 'What/Param' - for top-level parameters
            - 'WhereWhen/ObsDataLocation/ObservationLocation/AstroCoords/Position2D/Value2'
            - 'What/Group/Svom_Identifiers/Param'

        name (str): The name of the parameter to retrieve.
            Examples: 'Det_Signif', 'C1', 'TrigID', 'GraceID'

        format (callable): Type conversion function to apply to the retrieved value.
            Examples: float, str, int

        value (str, optional): The key to extract from the parameter.
            Defaults to 'value' to get the parameter value.
            Use 'unit' to get the units instead.

    Returns:
        The parameter value converted to the specified format, or None if:
        - The path doesn't exist in the VOEvent structure
        - The parameter name is not found
        - The conversion to the specified format fails

    Examples:
    >>> self.get_parameter('What/Param', 'TrigID', str)
    '123456'

    >>> self.get_parameter('What/Param', 'Det_Signif', float)
    5.2

    >>> self.get_parameter('What/Param', 'Burst_Inten', str, 'unit')
    'erg/cm2/sec'
    """
```

```
def get_parameter(self, path, name, format, value="value"):
    path_list = path.split("/")
    if len(path_list) == 0:
        return None

    param = self.v.get("voe:VOEvent", {})

    for step in path_list:
        if step == "voe:VOEvent":
            continue

        if isinstance(param, dict):
            param = param.get(step, {})
        elif isinstance(param, list):
            for entry in param:
                if "name" in entry and entry["name"] == step:
                    param = entry
                    continue

    try:
        if isinstance(param, list):
            matches = [
                entry.get(value) for entry in param if entry.get("name") == name
            ]
            if len(matches) > 0:
                return format(matches[0])
        elif isinstance(param, dict):
            if value in param and param[value] is not None:
                return format(param[value])

    except Exception:
        logger.warning(
            "Could not find the parameter %s in the path %s.", name, path
        )
        return None
```




Astro-COLIBRI

Contact: astro.colibri@gmail.com

- Central webpage: **<https://astro-colibri.science>**

Android Play Store



Apple iOS App Store



Introductions/tutorials on YouTube



Mastodon, Insta, Threads



Architecture

