Lasair

https://lasair.roe.ac.uk

LSST Community Brokers Workshop
Seattle June 2019
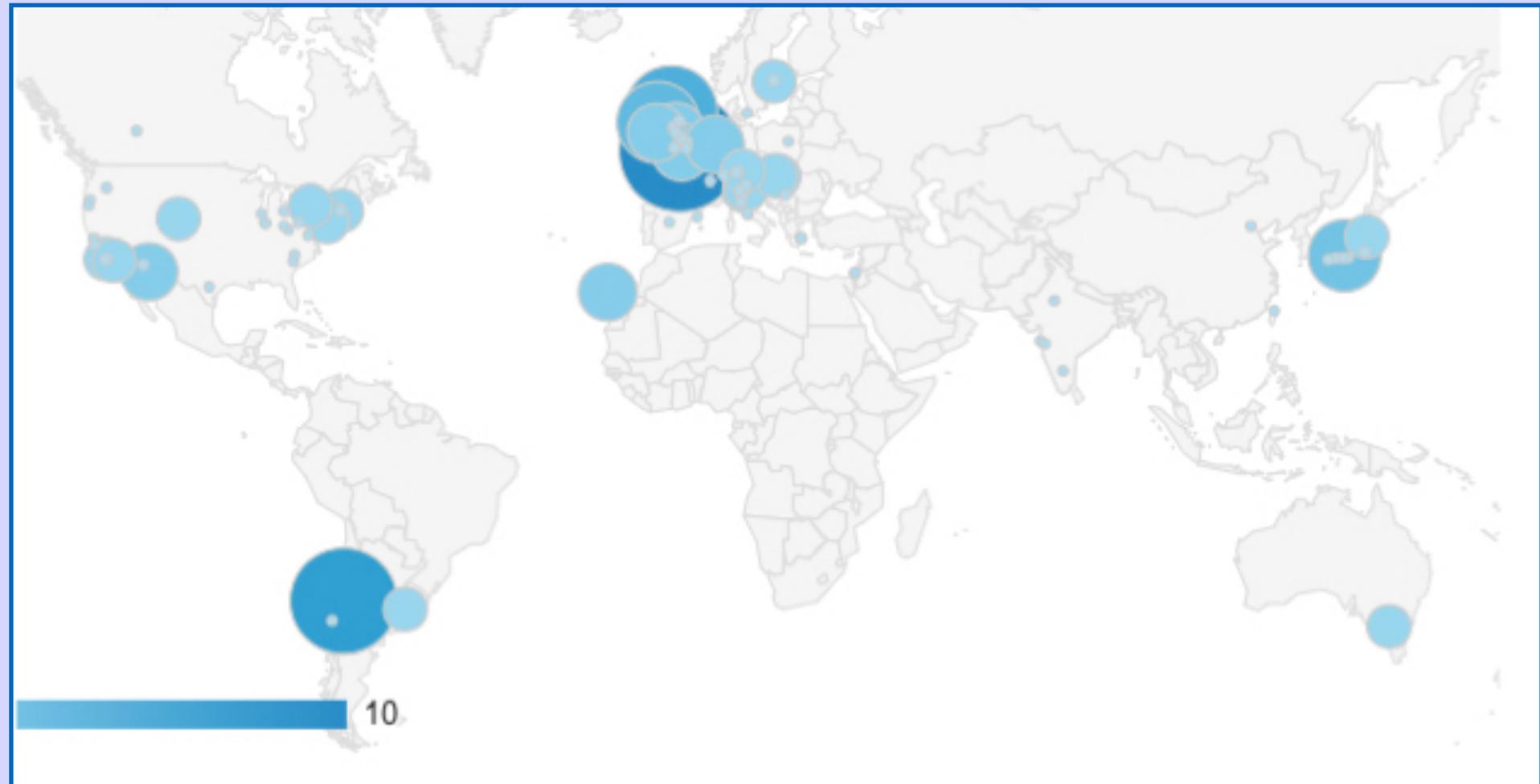
it works now

FDST spectroscopic classification of SN 2019gfm

ATel #12844; *C. Frohmaier (University of Portsmouth - ICG), M. Pursiainen (University of Southampton), C. P. Gutierrez (University of Southampton), C. Angus (University of*

J5560, and http://pswww.ifa.hawaii.edu) and reported on the TNS #36099 C) We selected the target through the Lasair broker (http://lasair.roe.ac.uk/). one with Superfit (Howell et al. 2005, ApJ, 634, 1190)
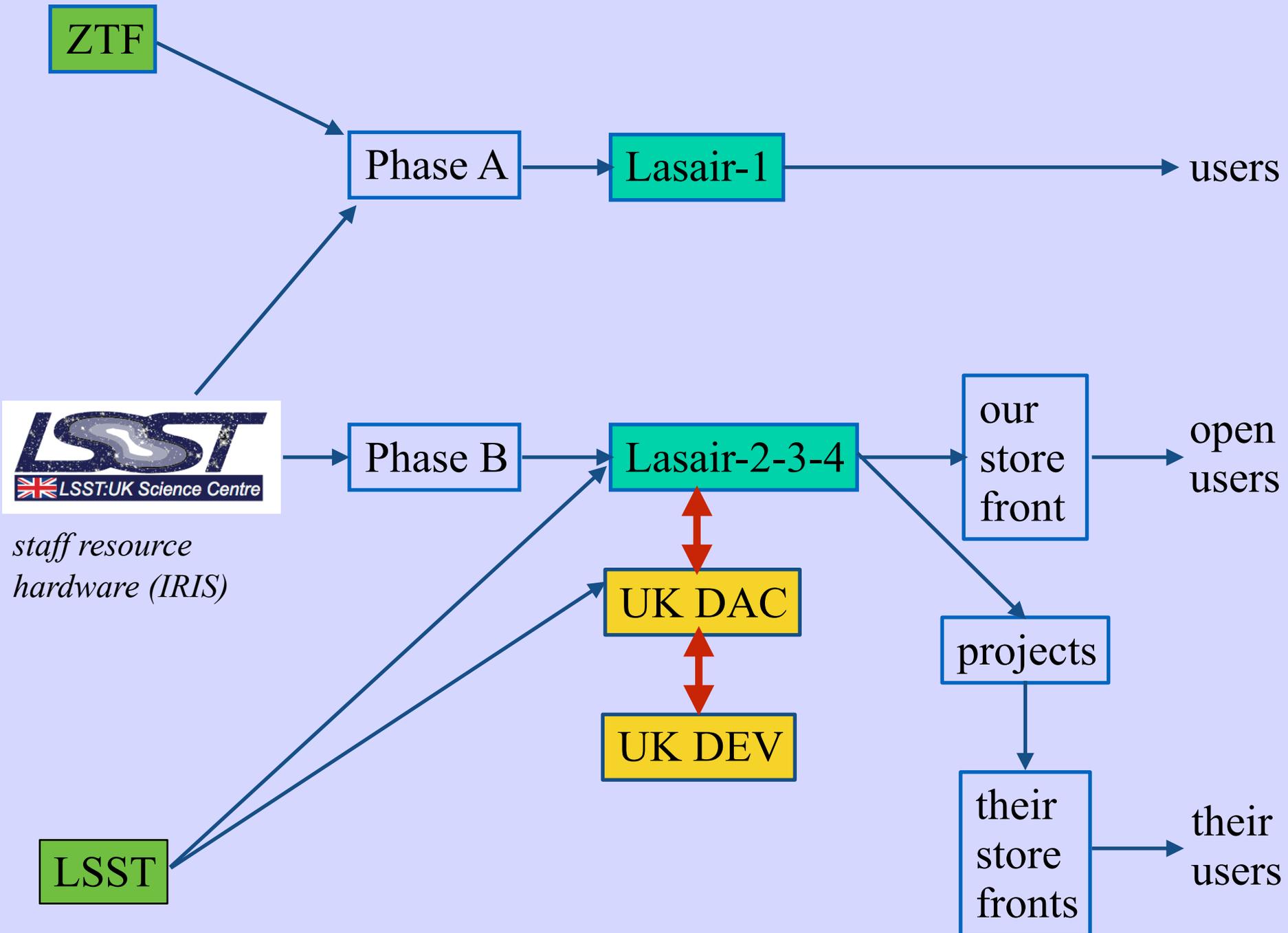

10

Lasair: The Transient Alert Broker for LSST:UK

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A. Lawrence[2], D. Morris[2], S. Voutsinas[2], and M. Nicholl[2] iD

cone search

141.15725 25.35908

Run Cone Search

free-form

Submit Query (check this box for JSON output ☐)

```
SELECT objectId, ncand, maggmean, magrmean FROM objects
WHERE
    (maggmax-maggmin > 2 OR magrmax-magrmin > 2)
AND ncand > 10
AND sherlock_classification = "CV"
ORDER BY ncand DESC
```

watchlists

|		
		(Massaro, 2018)
AM CVn	Roy Williams	These are 56 very cl... compact objects, fro... properties of AM CV... insights from Gaia D... 2018 A&A 620A 141
AM Her	Gavin Ramsay	Magnetic CVs (B>10... prolonged low states SSRv 54 195. Object asterix indicate its e... indicates asynchron...

pre-canned

Active CVs	Roy Williams	Cataclysmic variables wide swings in magni... and more than 10 poi... the light curve
Bright SN candidates	Roy Williams	Bright objects, not coincident with a Pan STARRS star, discove... last 20 days

streams

Name	Description
SN-like candidates in last 14 days	SN-like candidates (Sherlock classifications SN, NT and orphans), time limit adjustable (just adjust the number 14). Rejects Pan-STARRS star matches
All nuclear transients and TDE candidates	Near core of inactive catalogued galaxies (within 1"), flags Pan-STARRS stellar matches to let user judge star/galaxy separation. Objects discovered in last 30 days.
TNS crossmatch	This query finds all Lasair objects that are in the Transient Name Server, meaning they have a comment that includes the string 'TNS'. The most recent are first.

Object ZTF18acsovsw
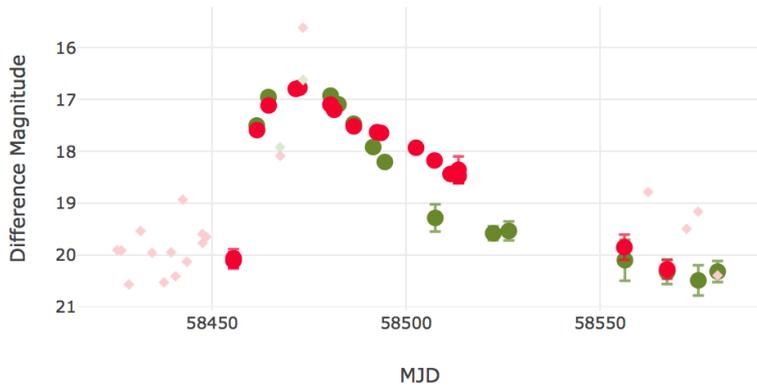
- The transient is possibly associated with *1237667143404486939/1735077/SD*; a B=18.24 mag galaxy found in the SDSS/GLADE/NED catalogues. It's located 10.46 S, 5.72 W (7.6 Kpc) from the galaxy centre. A host z=0.033 implies a transient $M = -15.51$.
- Information on this webpage also available as JSON.
- Conesearch Links (at 5 arcsec): | Simbad | NED | Transient Name Server | ZTF DR1
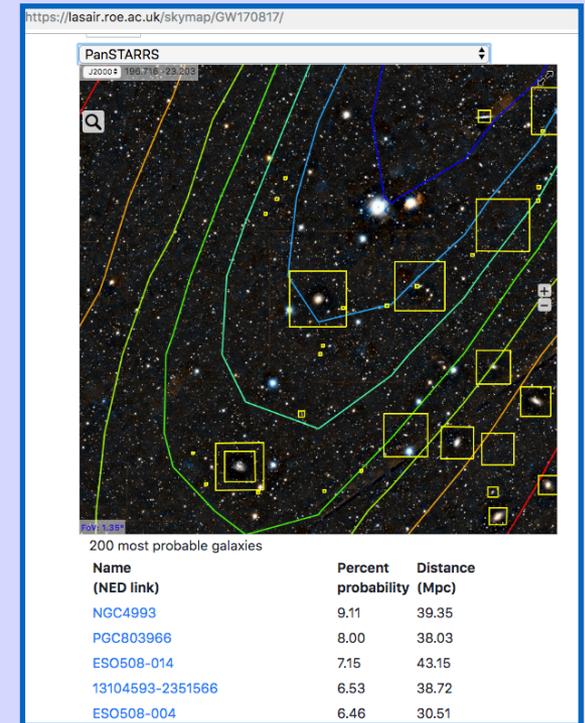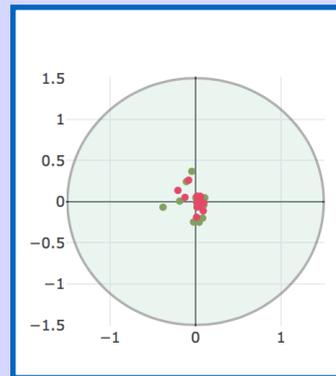
Comments

| Lasair Bot | April 18, 2019, 9:08 a.m. | In TNS as SN2018jny at 0.1 arcsec, discovered 2018-12-03 11:06:05 (MJD 58455.00) by ZTF, ATLAS |

You must be signed in to post comments.

rich return with context

J2000   17 26 21.125 +19 37 14.12

FoV: 2.1'

GW skymaps

https://lasair.roe.ac.uk/skymap/GW170817/

PanSTARRS
J2000 198.718, 23.203

FoV: 1.35°

200 most probable galaxies

Name (NED link)	Percent probability	Distance (Mpc)
NGC4993	9.11	39.35
PGC803966	8.00	38.03
ESO508-014	7.15	43.15
13104593-2351566	6.53	38.72
ESO508-004	6.46	30.51
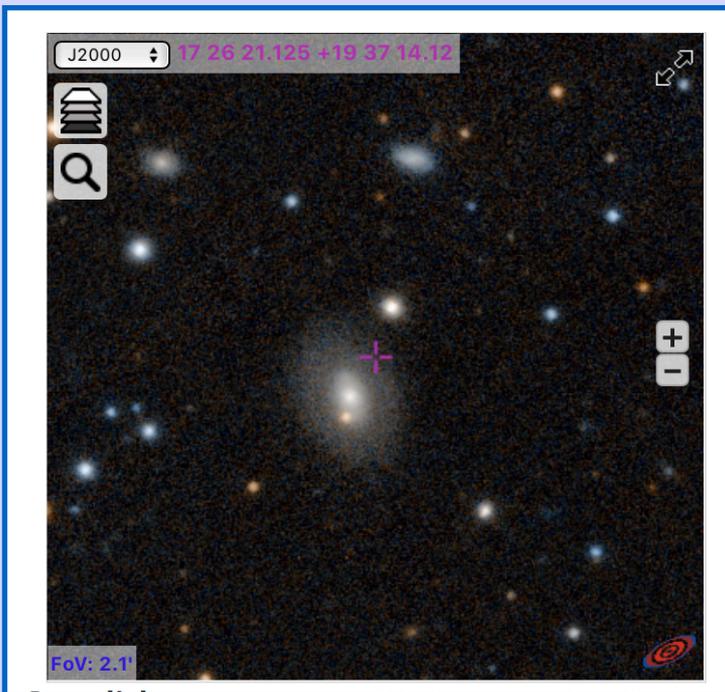
Jupyter interface

Finding KBO Makemake in ZTF

This code finds Makemake (136472) in the ZTF database

```
: import mysql.connector
  %matplotlib inline
  import matplotlib.pyplot as plt
  import numpy as np
```

This SQL query finds all sightings of Makemake ordered by time

```
: import settings
  msl = mysql.connector.connect(\
              user     =settings.DB_USER, \
              password =settings.DB_PASS, \
              host     =settings.DB_HOST, \
              database ='ztf')
  cursor = msl.cursor(buffered=True, dictionary=True)
  query = 'SELECT jd,ra,decl FROM candidates WHERE ssnamenr="136472" ORDER BY jd'
  cursor.execute(query)
  n = cursor.rowcount
  print ('found %d sightings of Makemake' % n)
```

found 63 sightings of Makemake

Make the RA/Dec plot
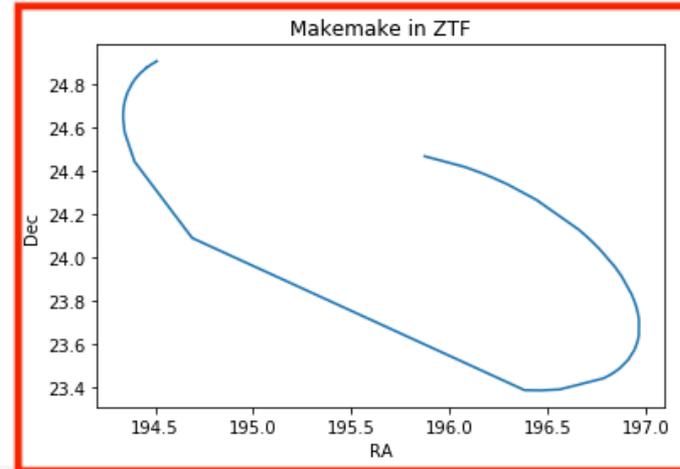
Makemake in ZTF

Development philosophy

- Iterative: start simple
- Initially conservative technology
- Work closely with users →
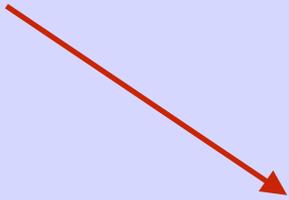
LSST:UK SWG
Key power users
Focus group meetings
Projects (eg PESSTO)

Technology

- Kafka
- MySQL / Python glue
- Sherlock
- Django
- Jupyter

Next steps: Technology

- Backend technology testing/review
- IRIS deployment
- API packaging
- Containerisation

Spark
Cassandra
Singularity
Kubernetes
Parquet
AXS

Next steps: Requirements

- Work with SCs
- Sharpen requirements versus science area

typical users
power users
projects

Latency
Resource
Capabilities

Next steps: Capabilities

- Improved interface
- Machine Learning
- Kafka filtering
- DAC integration
- VO integration
- Improved user resource

Schema drag and drop
Query auto-completion

light curve classification

user substream creation
fast and slow streams

seamless prompt+DR queries
co-hosted catalogues/pixels
eg Herschel, VISTA, Euclid

TAP interface
access via Topcat, Aladin, DS9
VO-wide joint queries

User storage (MyDB)
Processing power (IRIS)

but don't try to do everything!

VISTA/4MOST

PESSTO Marshall

Methods

- Make streams
- Provide API
- Direct collaboration

Types

- Sub-brokers
- Spec. followup
- Variability brokers

Milestones

WP	Task Name	Start	Finish	2019		2020				2021				2022				2023
				Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
3.2.1	Development and testing of classification algorithms (SHERLOCK)	01/07/2019	31/03/2020															
	LASAIR Version 2.0 launched (inc. SHERLOCK Version 2.0 classifier)	*01/04/2020*	*01/04/2020*															
3.2.2	Build links to other mult-wavelength, multi-messenger time-domain surveys	01/07/2019	30/06/2021															
3.2.3.1	Develop LASAIR web interface and user tools	*01/07/2019*	*30/06/2021*															
	Lasair Version 3.0 launched (tech. preview of web interface and user tools)	*30/03/2021*	*30/03/2021*															
3.2.3.2	Develop LASAIR web interface and user tools, Pt. 2	01/07/2021	31/03/2023															
3.2.4	Integrate spectral information, follow-up, and data access within LASAIR	01/07/2021	30/12/2022															
	LASAIR Version 4.0 launched (final web interface and user documentation)	*30/03/2022*	*30/03/2022*															
3.2.5	Testing LASAIR during Commissioning	01/04/2020	31/03/2023															
	LASAIR Version 4.0 launched (w/ interface for non-proprietary data)	*03/04/2023*	*03/04/2023*															

Figure 9.1 Summary Gantt chart for WP3.2

- Scaling and robustness
- Complexity of data rights
- LSST testing: simulation, commissioning?
- Need for sharpened requirements
- Backend technology decision
- Balancing   doing everything

  vs

  enabling others

Opportunities

- Leveraging UK resource
- Supporting SCs
- Cross-broker collaboration