GAIA SCIENCE ALERTS

Cambridge Photometric Calibration Server manual

Łukasz Wyrzykowski & Sergey Koposov

Institute of Astronomy, University of Cambridge, UK

last update: 20 June 2012

INTRODUCTION

The main purpose of the Cambridge Photometry Calibration Server (CPCS) is to uniformly calibrate photometric follow-up observations of transient targets to be reported by Gaia Science Alerts team. Server relies on alerts released via VOEvent at Skyalert.org webpage. For details on Skyalert please refer to Williams et al. 2009, ASPC, 411, 115 and presentations of Ashish Mahabal and Roy Williams available here:

http://www.ast.cam.ac.uk/ioa/research/gsawg/index.php/Workshop2011:agenda

DISCLAIMER
The calibration server is part of the Gaia Science Alerts WG follow-up pipeline and thus should be used only for activities related to the Gaia alerts verification and follow-up. For details please go to:

http://www.ast.cam.ac.uk/ioa/research/gsawg

HOW TO SET-UP CUSTOM ALERT FEED

go to page 12 if you want to skip this step

HOW TO SET-UP CUSTOM ALERT FEED

HOW TO SET-UP CUSTOM ALERT FEED

HOW TO SET-UP CUSTOM ALERT FEED

HOW TO SET-UP CUSTOM ALERT FEED

For a New Alert

Click Here

Existing Alerts

Here are your existing alerts:
Click the "detail" to view and edit.

Bright CBAT	(detail)	(feed)	(json)	(delete)	CBAT["mag"]<17
Catalina SNe	(detail)	(feed)	(json)	(delete)	(CRTSCircular["First"]["eventClass"]=="Supernova") and (CRTS["First Detection params"]["magnitude"]<17)

Back to main page

Select the main stream of alerts:

Choose the primary stream

This is the event stream that is the basis of your alert. You can build a trigger (i.e. r
Choose the primary stream --> ☐ √ select stream...

You can also have extra condit   ased on the presence of addition
advanced option. click

| AAVSO |
| CBAT |
| CRTS |
| CRTS2 |
| CRTS3 |
| CSS_NEO |
| Fermi |
| Gaia |
| GALEX |
| HST_MCT |
| MOA |
| OGLE |
| PI_OF_SKY |
| POSS |
| SWIFT |
| Test |

[Continue to next step -->]

CRTS: Northern
        Hemisphere
CRTS2: Asteroids
CRTS3: Southern
        Hemisphere

Gaia: in future...

Select the secondary stream of alerts:

Choose the primary stream

This is the event stream that is the basis of your alert. You can build a
Choose the primary stream --> ☐ CRTS ☐

You can also have extra conditions for your alert, based on the presenc
This is an advanced option. click

Choose secondary streams --> ☐ select stream...
CatalogArchives
constellation
CRTSCircular

[Continue to next step -->]

CRTSCircular contains
classification results

HOW TO SET-UP CUSTOM ALERT FEED

Alert Detail

for the alert named CRTS SNe North

Primary Stream: **CRTS (ivo://nvo.caltech/voeventnet/catot)**
Secondary Stream: CRTSCircular (ivo://nvo.caltech/voeventnet/CRTSCircular)

Name of Alert: `CRTS SNe North` ⬅

Active alert?: `1`

Action type: `alert_email`

Action detail: `wyrzykow@ast.cam.ac` ⬅

Private alert?: `1`

What can I do here?

You can create a decision trigger in the box below, which is an expression that evaluates to true or false, for example `SWIFT["Dec"] > 70`, which is true only for events from the SWIFT stream whose declination is greater than 70. When an event comes in, it is run immediately against your trigger, and if it passes, then the action is executed. Currently the only action available is sending email ("alert_email"). Another decision formula might be `CATOT["First Detection params"]["magnitude"] < 18` to select by magnitude.

How to make an alert:

- **Step 1**: Give your alert a name, and make sure the email address is correct. Click the **Save** button.
- **Step 2**: Change the default trigger ("True") to the criterion you want. Clicking on the red dots by names of parameters will insert the correct code. Make sure your expression is a boolean expression.
- **Step 3**: Click "Save"
- **Step 4**: Click on "See Events" to see which historical events satisfy your trigger.

Trigger Expression

```
(CRTSCircular["First"]["eventClass"]=="Supernova") and (CRTS["First Detection
params"]["magnitude"]<18) and (CRTS["First Detection params"]["Dec"]>0)
```

⬅ Your filter here

the list of possible parameters for both streams is available at the bottom of the page

This button first checks the syntax of the expression above, then saves the whole alert.
The form of the trigger is python syntax. Each event type (stream) is given a dictionary of its parameters. The 'math' and 'string' libraries are also available in trigger construction.

Step 3: Click to save --> (Save) ⬅ Click once, if no error, then proceed

| Action detail | wyrzykow@ast.cam.ac |
| Private alert?: | 1 |

What can I do here?

You can create a decision trigger in the box below, which is an expression that evaluates to true or false, for example `SWIFT["Dec"] > 70`, which is true only for events from the SWIFT stream whose declination is greater than 70. When an event comes in, it is run immediately against your trigger, and if it passes, then the action is executed. Currently the only action available is sending email ("alert_email"). Another decision formula might be `CATOT["First Detection params"]["magnitude"] < 18` to select by magnitude.

How to make an alert:

- **Step 1**: Give your alert a name, and make sure the email address is correct. Click the **Save** button.
- **Step 2**: Change the default trigger ("True") to the criterion you want. Clicking on the red dots by names of parameters will insert the correct code. Make sure your expression is a boolean expression.
- **Step 3**: Click "Save"
- **Step 4**: Click on "See Events" to see which historical events satisfy your trigger.

Trigger Expression

```
(CRTSCircular["First"]["eventClass"]=="Supernova") and (CRTS["First Detection
params"]["magnitude"]<18) and (CRTS["First Detection params"]["Dec"]>0)
```
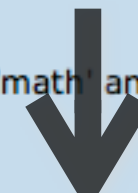
This button first checks the syntax of the expression above, then saves the whole alert.
The form of the trigger is python syntax. Each event type (stream) is given a dictionary of its parameters. The 'math' and 'string' libraries are also available in trigger construction.

Step 3: Click to save --> (Save)

This button lets you see past events that would satisfy your trigger, if executed now.
Note: you must "Save" the alert with the button above before using this function!.

Step 4: Click to see past events that satisfy this alert --> (See past events)

Primary Stream: CRTS

Click on a red dot to insert that parameter into your Decision Formula above. When you are happy with the formula, click Save.

group	Name	UCD	dataType	Description
Skyalert Standard Parameters				
	RA•	pos.eq.ra	float	Right Ascension of event
	Dec•	pos.eq.dec	float	Declination of event
	positionalError•	stat.error;pos.eq	float	Positional error of event
	ISOtime•	time.epoch		Time (UTC) of event
	MJDtime•	time.epoch	float	Time (MJD) of event

HOW TO SET-UP CUSTOM ALERT FEED

Filter is ready.

Portfolios

This page lists event portfolios whose first event is from this stream.

those allowed by the trigger rule 'CRTS SNe North' from *wyrzykow* ((CRTSCircular["First"]["eventClass"]=="Supernova") and (CRTS["First Detection params"]["magnitude"]<18) and (CRTS["First Detection params"]["Dec"]>0))

Click on the column header to sort. Table rows with gray background represent "test" events that do not represent anything in the sky.

detail meta.link	IVORN meta.id	RA pos.eq.ra deg	Dec pos.eq.dec deg	ISOtime time.epoch	Magnitude phot.mag;em.opt.R
detail	1110061400064119848	21.09311	40.39894	2011-10-06T08:41:34	17.266001
detail	1110061400024114478	7.32271	40.21338	2011-10-06T07:55:51	16.399099
detail	1110061320094139400	27.71469	33.43934	2011-10-06T07:17:51	15.320900
detail	1110061260014124074	1.33747	26.82104	2011-10-06T04:13:15	17.754499
detail	1110061381024104474	356.03657	36.80955	2011-10-06T03:33:33	13.499000
detail	1110061400994118958	0.05187	40.25335	2011-10-06T03:34:21	16.243401
detail	1110041231084160493	326.91002	24.76496	2011-10-04T03:29:00	13.095100
detail	1110031010314135324	85.39584	1.61888	2011-10-03T10:31:16	15.463400
detail	1110031010314155163	86.49273	2.35178	2011-10-03T10:31:16	14.476900
detail	1110011010184115318	48.67884	1.144	2011-10-01T09:37:28	17.697901
detail	1109281260024143595	5.20995	28.19164	2011-09-28T09:57:55	13.314600
detail	1109281210064142587	17.46047	22.40955	2011-09-28T09:27:52	13.341000
detail	1109251210404110806	117.07339	20.36483	2011-09-25T12:03:04	13.236600
detail	1109241260094142575	26.53255	27.99862	2011-09-24T10:40:14	13.490900

PICKING AN EVENT

...from emailed alert:

SkyAlert event CRTS#65193 (16.477690, -12.346840)   Inbox | X

from   **SkyAlert** help@skyalert.org   hide details 17 Nov (1 day ago)   ↩ Reply ▼
       via ast.cam.ac.uk
sender time   Sent at 10:08 (UTC). Current time there:
              16:36.
       to   wyrzykow@ast.cam.ac.uk
     date   17 November 2011 10:08
  subject   SkyAlert event CRTS#65193 (16.477690, -
              12.346840)

Skyalert email about event CRTS#65193
At 2011-11-17T04:51:09, RA,Dec = (16.477690,-12.346840)
The portfolio around this event is at http://skyalert.org/events/65193
The trigger observation alone is here: http://skyalert.org/event/121996
The XML for the trigger observation is here: http://skyalert.org/event/xml/121996
Your alert named 'Catalina SNe' was the cause of this message with this trigger condition:
(CRTSCircular["First"]["eventClass"]=="Supernova") and (CRTS["First Detection params"]["magnitude"]
<17)

(A real-time action, such as this message, occurs when the trigger condition is true *because* of the
trigger event, but is not true without it).

To cancel these alerts, go to http://skyalert.org/rules/ and change/delete your alerts. You will have to
login. Or just write help@skyalert.org

↩ Reply   → Forward

PICKING AN EVENT

...from Skyalert.org directly:

Streams

Here are the streams known to Skyalert. Click the Detail link to view or edit the stream. Some streams have first-class events that can have other events associated to form a 'portfolio'. Click the All Events link to see all the events from the stream, and pointers to any portfolios of which they are members.

Stream Name	Streams	Portfolios	Description
AAVSO		(Stream) (Portfolios)	AAVSO Alerts & Special Notices
CBAT		(Stream) (Portfolios)	Reports of possible discoveries of novae, supernovae, and new variable stars.
CRTS		(Stream) (Portfolios)	Catalina Real-time Transient Survey
CRTS2		(Stream) (Portfolios)	CRTS 1.5m Transients
CRTS3		(Stream) (Portfolios)	CRTS Siding Spring Transients
CSS_NEO		(Stream) (Portfolios)	Report of a moving object found by the Catalina Sky Survey
Fermi		(Stream) (Portfolios)	Fermi events

Portfolios

This page lists event portfolios whose first event is from this stream.

Events from stream CRTS

Click on the column header to sort. Table rows with gray background represent "test" events that do not represent anything in the sky.

detail meta.link	IVORN meta.id	RA pos.eq.ra deg	Dec pos.eq.dec deg	ISOtime time.epoch	Magnitude phot.mag;em.opt.R
detail	1111181120424127237	118.19689	12.37233	2011-11-18T12:23:46	16.657801
detail	1111181070424172387	118.28164	8.09614	2011-11-18T12:22:08	18.364100
detail	1111181230384140281	115.13648	24.15011	2011-11-18T10:52:35	18.574400
detail	1111181120414105186	115.5717	11.46381	2011-11-18T10:49:18	13.391700
detail	1111181120274120028	74.74802	12.05281	2011-11-18T10:09:56	16.465099
detail	1111181120284107174	77.83725	11.5787	2011-11-18T10:12:22	17.332100

PICKING AN EVENT

Portfolio ivo://nvo.caltech/voeventnet/catot#11111811120424127237

From the CRTS stream.
Catalina Real-time Transient Survey
Position is 118.19689,12.37233 ± 0.0012
This portfolio initiated 2011-11-18 05:32:05
Also available is the JSON representation of this portfolio.

Each event of the portfolio can be shown as Overview, Params, or XML. Click at the left to select the view.

Overview
Params
XML
None

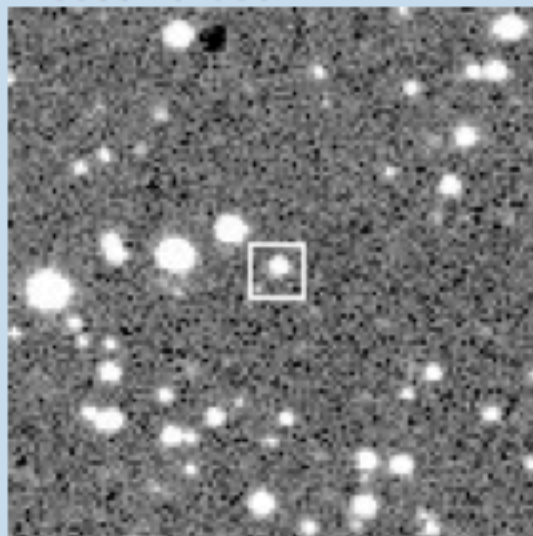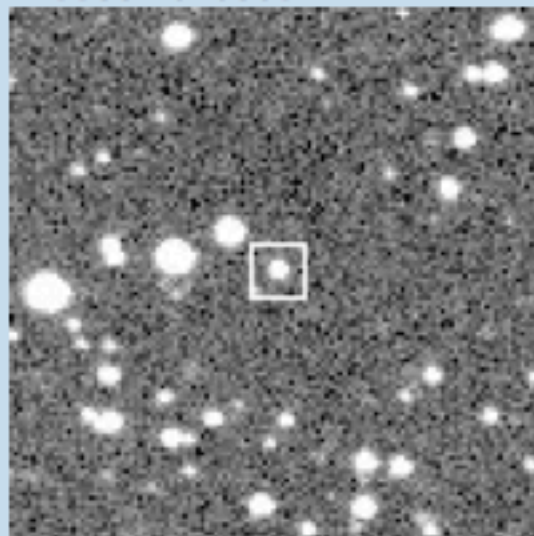**CRTS (Catalina/Mt Bigelow)**

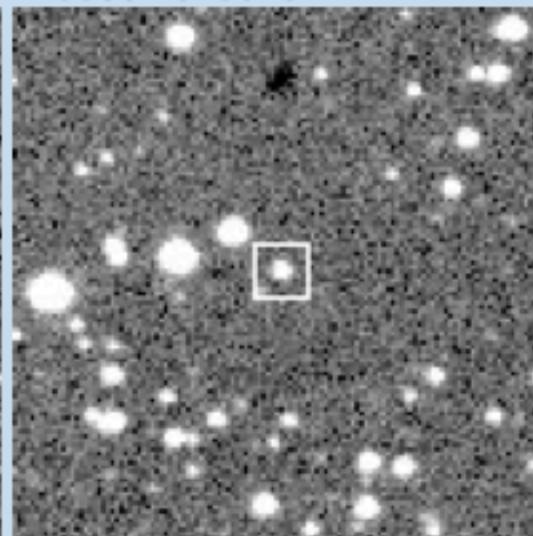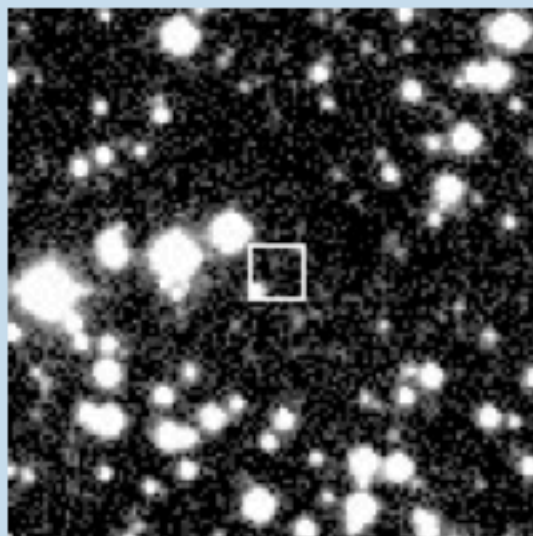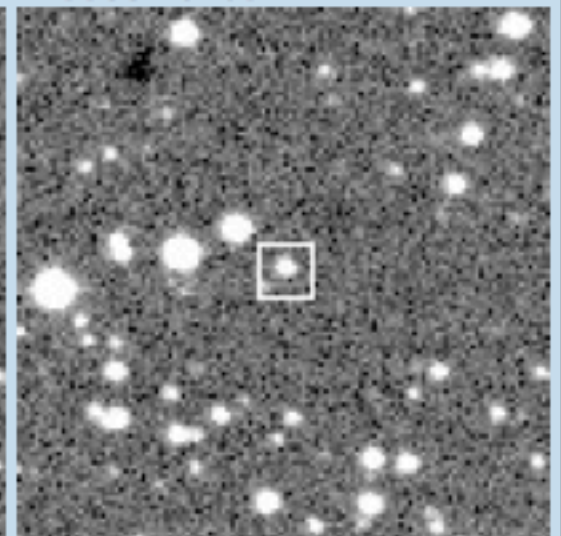Event identifier is 11111811120424127237 or CSS111118:075247+122220

2455884.019367   2455884.010803   2455884.013648   2455884.016514

Finding Chart	Click here
Past CRTS images	Click here
Other images	Click here
Lightcurve	Click here
SDSS cutout	Click here
Position	(118.19689,12.37233)
Time	2011-11-18T12:23:46 (MJD 55883.5165046)
Magnitude	16.647400
Magnitude	16.641899
Magnitude	16.676500
Magnitude	16.657801

Reference

PICKING AN EVENT

Click on the points for associated images
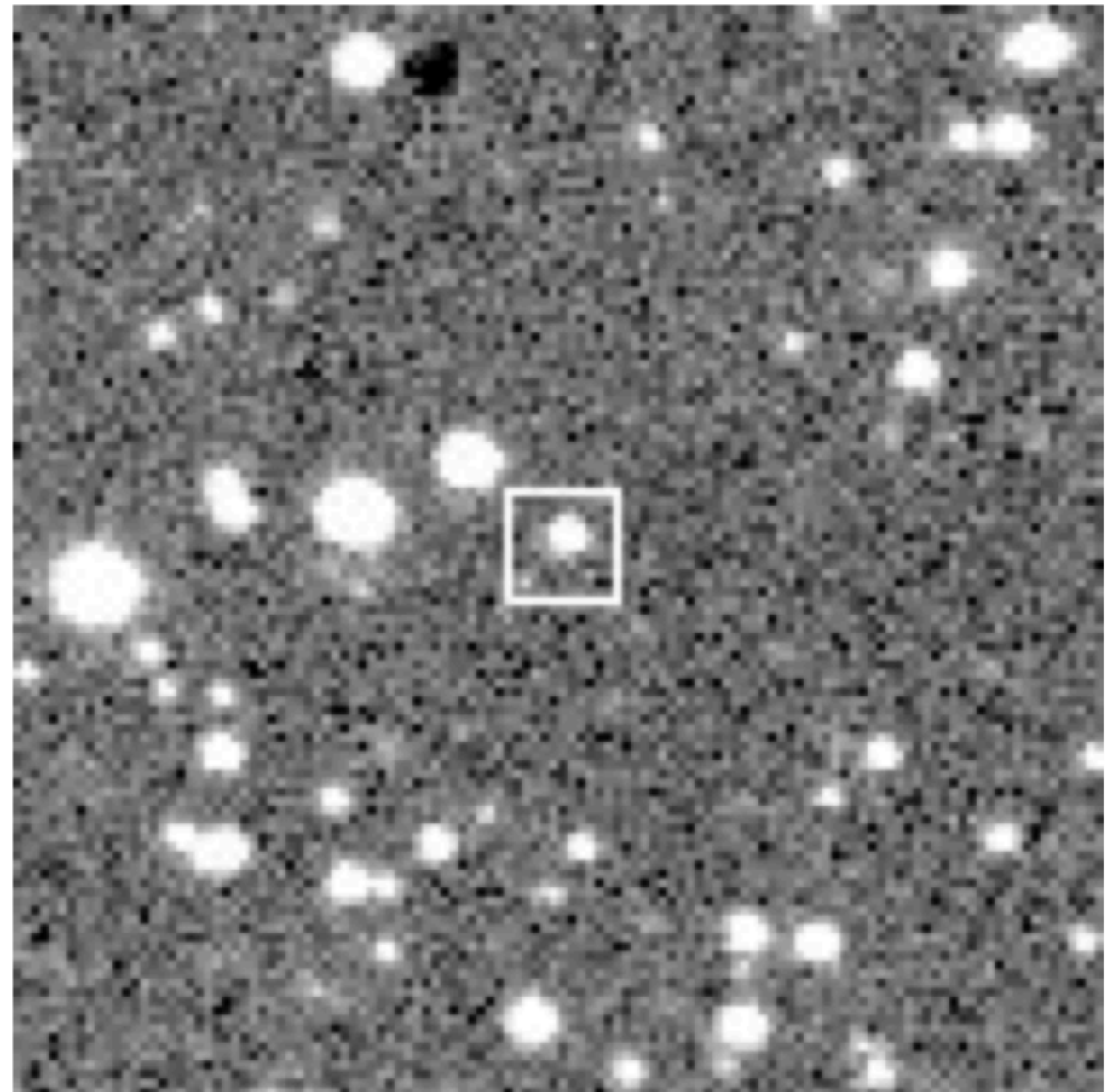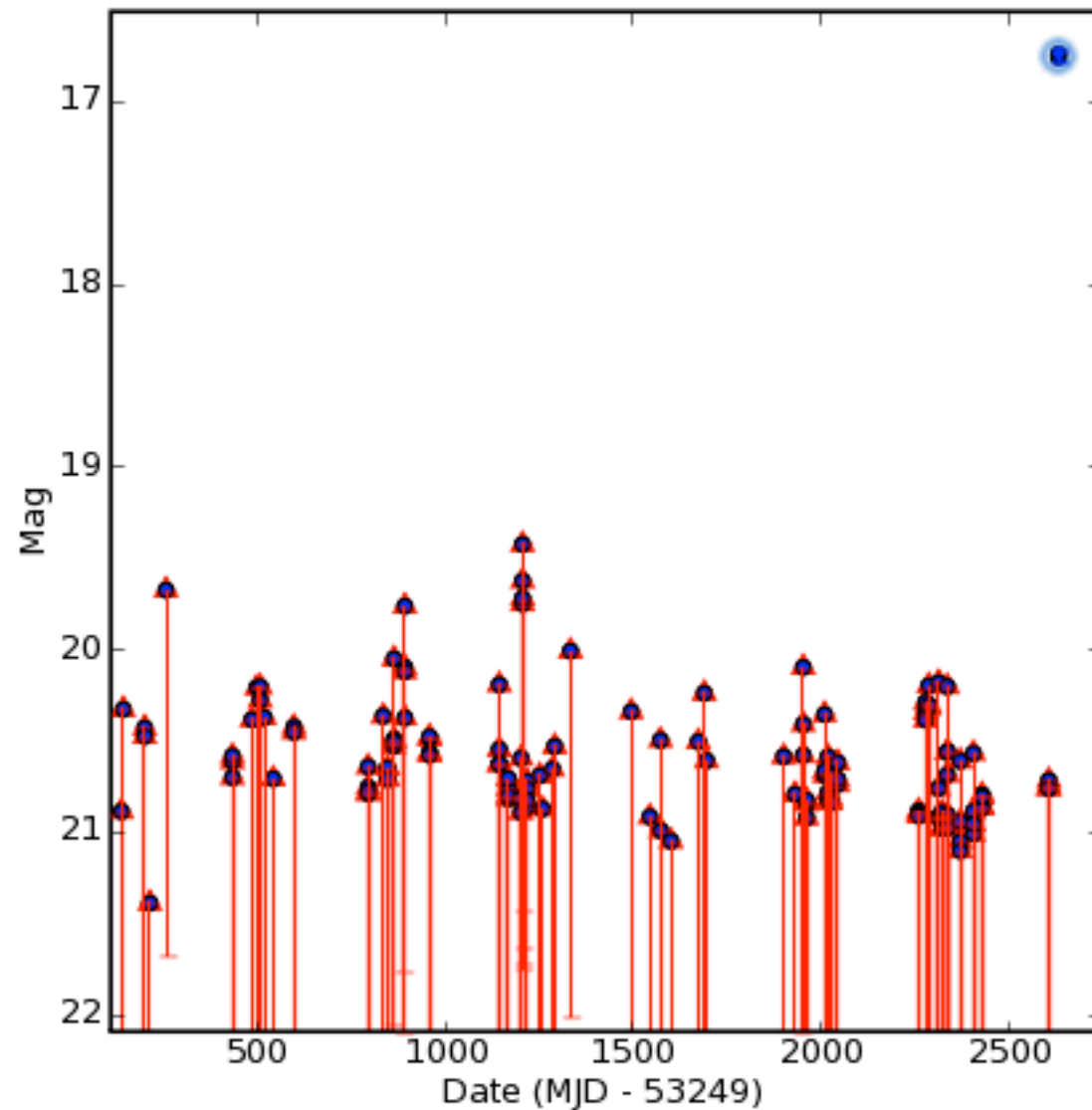Values for object: 1111181120424127237
Date: 2634.439941 (2011-11-18)
Mag: 16.75375
Error: 0.033628
Red points upper limits
Blue points measurements

OBSERVING AN EVENT

Here we rely on the experience of the observers on:
- exposure time
- what filters to use
- photometry/spectroscopy

REQUIREMENTS ON DATA REDUCTIONS (photometry):

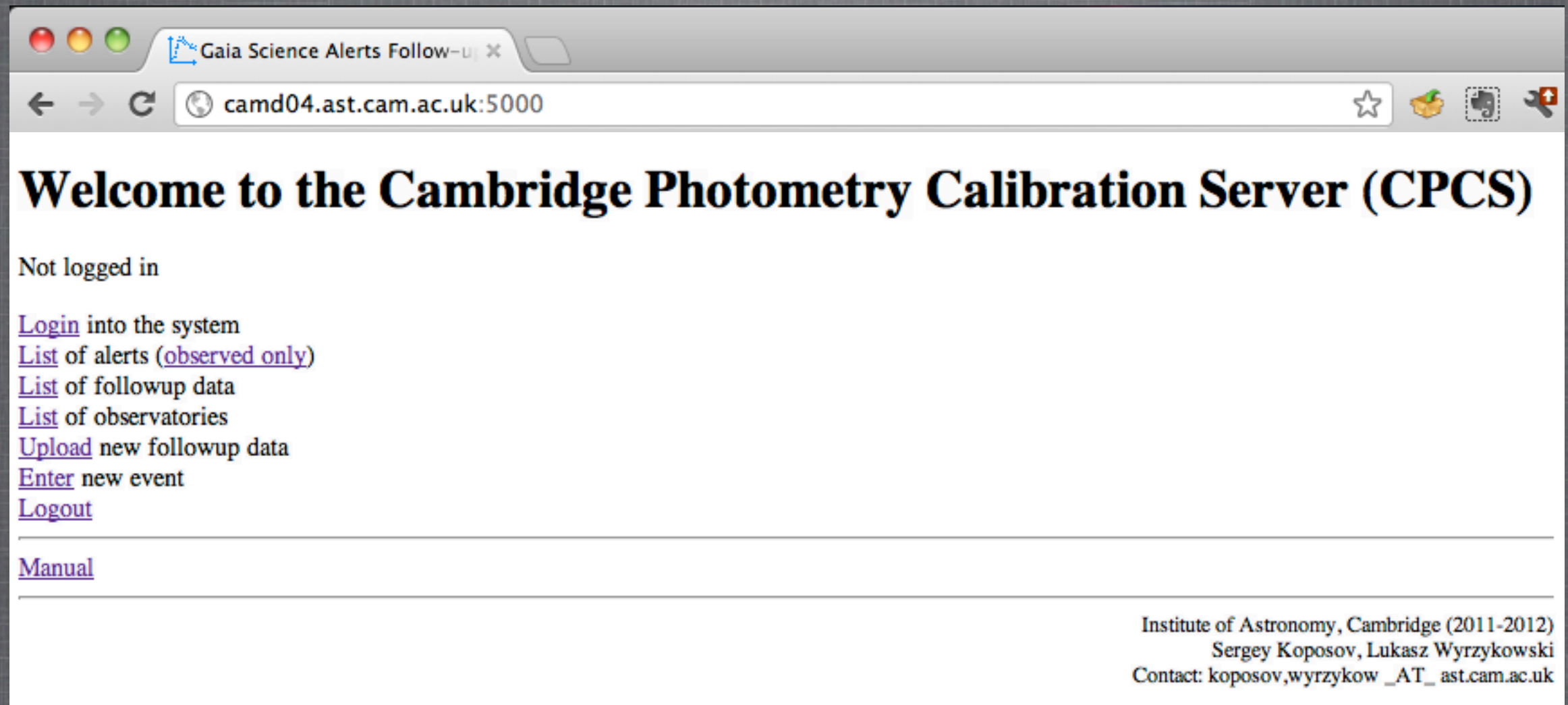- Bias, Dark, Flat-field
- World Coordinate System (WCS)
- SExtractor

Loiano Observatory, Italy

CALIBRATION SERVER

Main menu

Login

Login Form:

Hash tag: [   ]
Submit

Your unique access name/pass
(provided by Cambridge)

CALIBRATION SERVER

List of alerts

id	ivorn	published	ra	dec	nfollowup	lc
25090	ivo://nvo.caltech/voeventnet/catot#12061212106041277753	2012-06-11 22:06:54	178.23886	21.71335	0	LC
25087	ivo://nvo.caltech/voeventnet/catot#12042400908141314136	2012-05-17 12:31:29.738149	229.05438	-9.91775	6	LC
25086	ivo://nvo.caltech/voeventnet/sssot#12051403107141159533	2012-05-17 12:29:53.886991	164.16582	-31.37003	6	LC
25084	ivo://nvo.caltech/voeventnet/sssot#12042600706241321119	2012-05-14 08:56:37.080339	124.13131	-6.58991	6	LC
25083	ivo://nvo.caltech/voeventnet/catot#12042311504841010733	2012-05-14 08:52:38.205503	138.92333	14.16077	6	LC
25082	ivo://nvo.caltech/voeventnet/catot#12042310905041251813	2012-05-14 08:48:54.636982	141.1142	10.05259	6	LC
25081	ivo://nvo.caltech/voeventnet/catot#12043000106641249988	2012-05-09 14:25:31.463083	184.64554	-1.33181	6	LC
25080	ivo://nvo.caltech/voeventnet/catot#12042512107441041788	2012-05-09 14:24:11.979957	218.66588	19.86692	5	LC
25079	ivo://nvo.caltech/voeventnet/catot#12041112104641202366	2012-05-09 14:22:51.307489	135.61214	20.84623	6	LC
25078	ivo://nvo.caltech/voeventnet/mlsot#11102411606141146233	2012-05-03 14:51:01.711265	67.59319	16.91804	6	LC
25077	ivo://nvo.caltech/voeventnet/catot#12011811505641077283	2012-05-03 14:47:26.647255	162.44317	14.49414	3	LC
25076	ivo://nvo.caltech/voeventnet/catot#11092600402341281893	2012-05-03 14:33:39.574826	62.44411	-4.00095	6	LC
25075	ivo://nvo.caltech/voeventnet/catot#10052200408241071953	2012-05-02 12:51:32.575477	227.95224	5.22984	4	LC

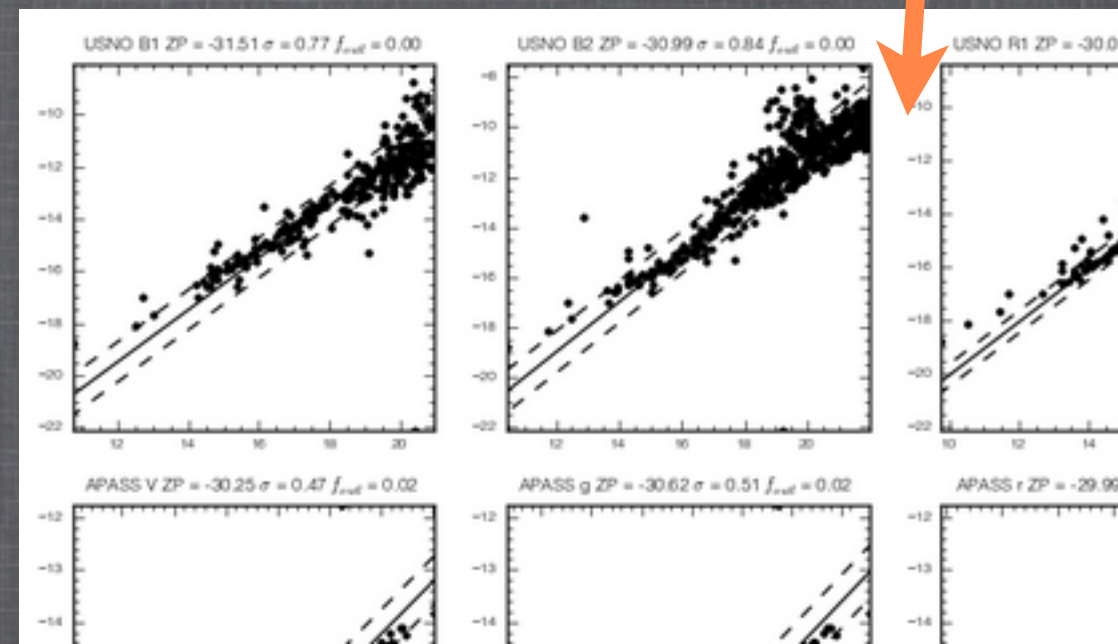Light curve with all data collected for a given object
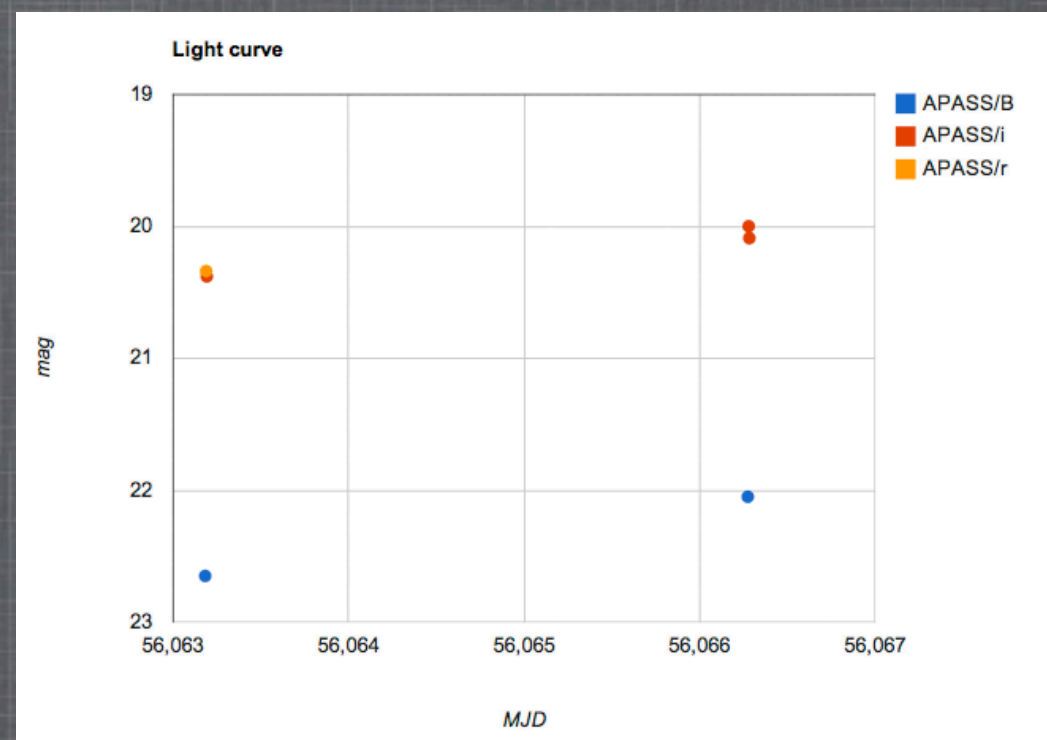
CALIBRATION SERVER

List of follow-up data

Lists all individual follow-up observations, original data (dat)
and results of the calibration

id	ivorn	observatory_name	mjd_obs	mag	mag_err	calib_err	npoints	catalog_name	filter_name	calib_date	ima	dat
177	ivo://nvo.caltech/voeventnet/sssot#1205140310714115953	RichardAndersonEulerLaSillaChile	56066.0311274	14.74	0.00	0.42	430	USNO	R1	2012-06-12 18:20:07.225125	i	d
176	ivo://nvo.caltech/voeventnet/sssot#1205140310714115953	RichardAndersonEulerLaSillaChile	56066.0347727	14.8621	0.00	0.42	66	APASS	r	2012-06-12 18:19:59.551522	i	d
175	ivo://nvo.caltech/voeventnet/sssot#1205140310714115953	RichardAndersonEulerLaSillaChile	56066.0257356	15.1538	0.00	0.04	63	APASS	B	2012-06-12 18:19:52.017222	i	d
174	ivo://nvo.caltech/voeventnet/catot#1204240090814131436	RichardAndersonEulerLaSillaChile	56066.2804758	20.0047	0.05	0.19	36	APASS	i	2012-06-12 18:19:44.983191	i	d
173	ivo://nvo.caltech/voeventnet/catot#1204240090814131436	RichardAndersonEulerLaSillaChile	56066.284137	20.0929	0.08	0.15	37	APASS	i	2012-06-12 18:19:37.749625	i	d
172	ivo://nvo.caltech/voeventnet/catot#1204240090814131436	RichardAndersonEulerLaSillaChile	56066.2750417	22.0503	0.11	0.07	36	APASS	B	2012-06-12 18:19:29.664582	i	d
171	ivo://nvo.caltech/voeventnet/sssot#1204260070624132119	RichardAndersonEulerLaSillaChile	56063.9985699	19.4504	0.02	0.09	107	APASS	i	2012-06-12 18:19:18.179591	i	d
170	ivo://nvo.caltech/voeventnet/sssot#1204260070624132119	RichardAndersonEulerLaSillaChile	56064.0022757	19.5937	0.03	0.09	106	APASS	r	2012-06-12 18:19:06.97499	i	d
169	ivo://nvo.caltech/voeventnet/sssot#1204260070624132119	RichardAndersonEulerLaSillaChile	56063.9931679	20.5294	0.03	0.06	105	APASS	B	2012-06-12 18:18:55.62879	i	d
168	ivo://nvo.caltech/voeventnet/catot#1204231150484101073	RichardAndersonEulerLaSillaChile	56063.9691711	21.7105	0.17	0.16	304	SDSS	R	2012-06-12 18:18:44.81498	i	d
167	ivo://nvo.caltech/voeventnet/catot#1204231150484101073	RichardAndersonEulerLaSillaChile	56063.9728966	21.3041	0.12	0.09	334	SDSS	i	2012-06-12 18:18:33.62659	i	d
166	ivo://nvo.caltech/voeventnet/catot#1204231150484101073	RichardAndersonEulerLaSillaChile	56063.9637415	25.9646	-1.00	0.08	29	APASS	B	2012-06-12 18:18:22.99388	i	d
165	ivo://nvo.caltech/voeventnet/catot#1204231090504125181	RichardAndersonEulerLaSillaChile	56063.9839058	25.5375	-1.00	0.11	325	SDSS	R	2012-06-12 18:18:12.52376	i	d
164	ivo://nvo.caltech/voeventnet/catot#1204231090504125181	RichardAndersonEulerLaSillaChile	56063.9875627	27.6429	-1.00	0.06	342	SDSS	i	2012-06-12 18:18:01.6132 8	i	d
163	ivo://nvo.caltech/voeventnet/catot#1204231090504125181	RichardAndersonEulerLaSillaChile	56063.9783852	26.0187	-1.00	0.11	27	APASS	B	2012-06-12 18:17:51.5235 0	i	d
162	ivo://nvo.caltech/voeventnet/sssot#1205140310714115953	RichardAndersonEulerLaSillaChile	56062.9567401	14.69	0.00	0.05	59	APASS	r	2012-06-12 18:17:44.0915 7	i	d
161	ivo://nvo.caltech/voeventnet/sssot#1205140310714115953	RichardAndersonEulerLaSillaChile	56062.9677255	14.8857	0.00	0.05	64	APASS	r	2012-06-12 18:17:36.850 7	i	d

Calibration plots
for each filter

UPLOADING THE FOLLOW-UP DATA

only alerts present in the database can be calibrated
if the event is not there it can be added manually - see later

Follow-up Data Uploading Form

Logged in as ********************************

Event ID: ivo://nvo.caltech/voeventnet/catot#12011

MJD OBS: 55123

Exposure time (sec): 300

Comment(optional): comment

Sextractor catalog: Choose File 110610_B.cat

Matching radius:
- 1 arcsec
- ✓ 2 arcsec
- 4 arcsec
- 6 arcsec

Force filter: No (automatic
- ✓ No (automatic determination)
- APASS/i
- APASS/r
- APASS/B
- APASS/g
- APASS/V
- USNO/I
- USNO/R2
- USNO/B1
- USNO/B2
- USNO/R1
- SDSS/B
- SDSS/g
- SDSS/i
- SDSS/I
- SDSS/r
- SDSS/u
- SDSS/V
- SDSS/R
- SDSS/z
- 2MASS/H
- 2MASS/K
- 2MASS/J

Dry Run: ☑

Submit

for SDSS there are also standard filters available (B,V,I,R) (conversion following Jordi et al. 2006)

REQUIRED SEXTRACTOR FIELDS:

\# ALPHA_J2000   Right ascension of barycenter (J2000) [deg]
\# DELTA_J2000   Declination of barycenter (J2000) [deg]
then, either:
\# MAG_APER   Fixed aperture magnitude vector [mag]
\# MAGERR_APER   RMS error vector for fixed aperture mag. [mag]
or:
\# MAG_AUTO   Automatic aperture magnitude [mag]
\# MAGERR_AUTO   RMS error for automatic aperture mag. [mag]

Maximum distance allowed for cross-matching your objects with the db (reflects the astrometric accuracy)

Output filter:
select the best matching filter to your filter or select "**No**" to find the best matching

Selecting "**Dry Run**" prevents data from being stored in the database. It allows for submitting the same data many times (e.g. for filter testing) **Don't forget to submit the data after the tests!**

RESULT OF CALIBRATIONS

plots show calibration results for each available filter/survey

The list of events is regularly updated from Skyalert.org,
but if you still want to add a new event go to:

TO DO LIST

- Automatically submit the follow-up data back to Skyalert.org as an annotation

- Expand the web interface, e.g. add scrollable list of events

CONTACT

Łukasz Wyrzykowski : wyrzykow@ast.cam.ac.uk
(pron. Woocash Vizhikovsky)

Sergey Koposov: koposov@ast.cam.ac.uk

Gaia Science Alerts Working Group
WWW: http://www.ast.cam.ac.uk/ioa/research/gsawg