

IVOA Interop, Victoria – 29th May 2018

ZTF: First experiences with alerts

(and some early results)

Matthew J. Graham
Research Professor
ZTF Project Scientist



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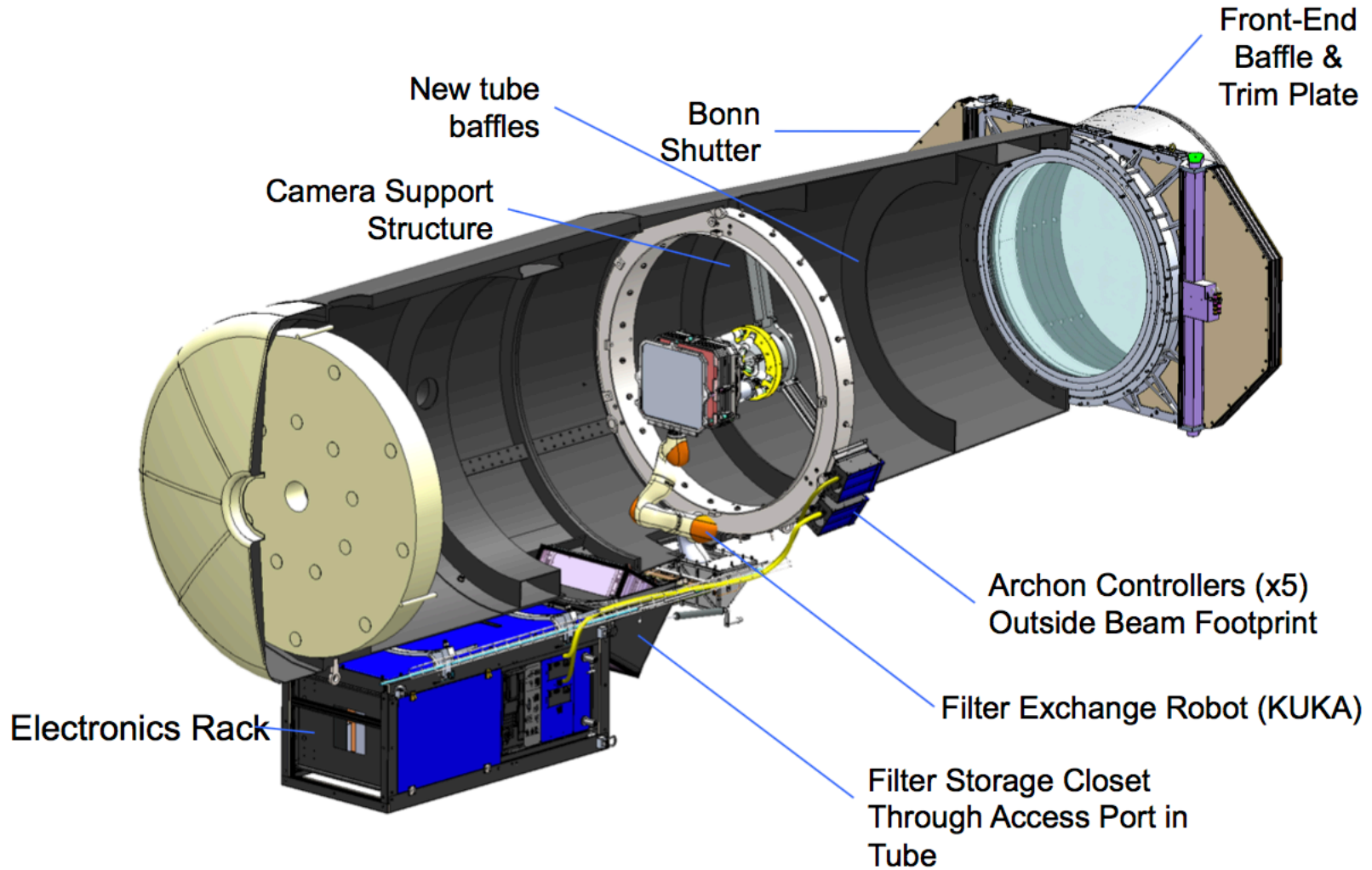
ZTF: First experiences with alerts

(and some early results)

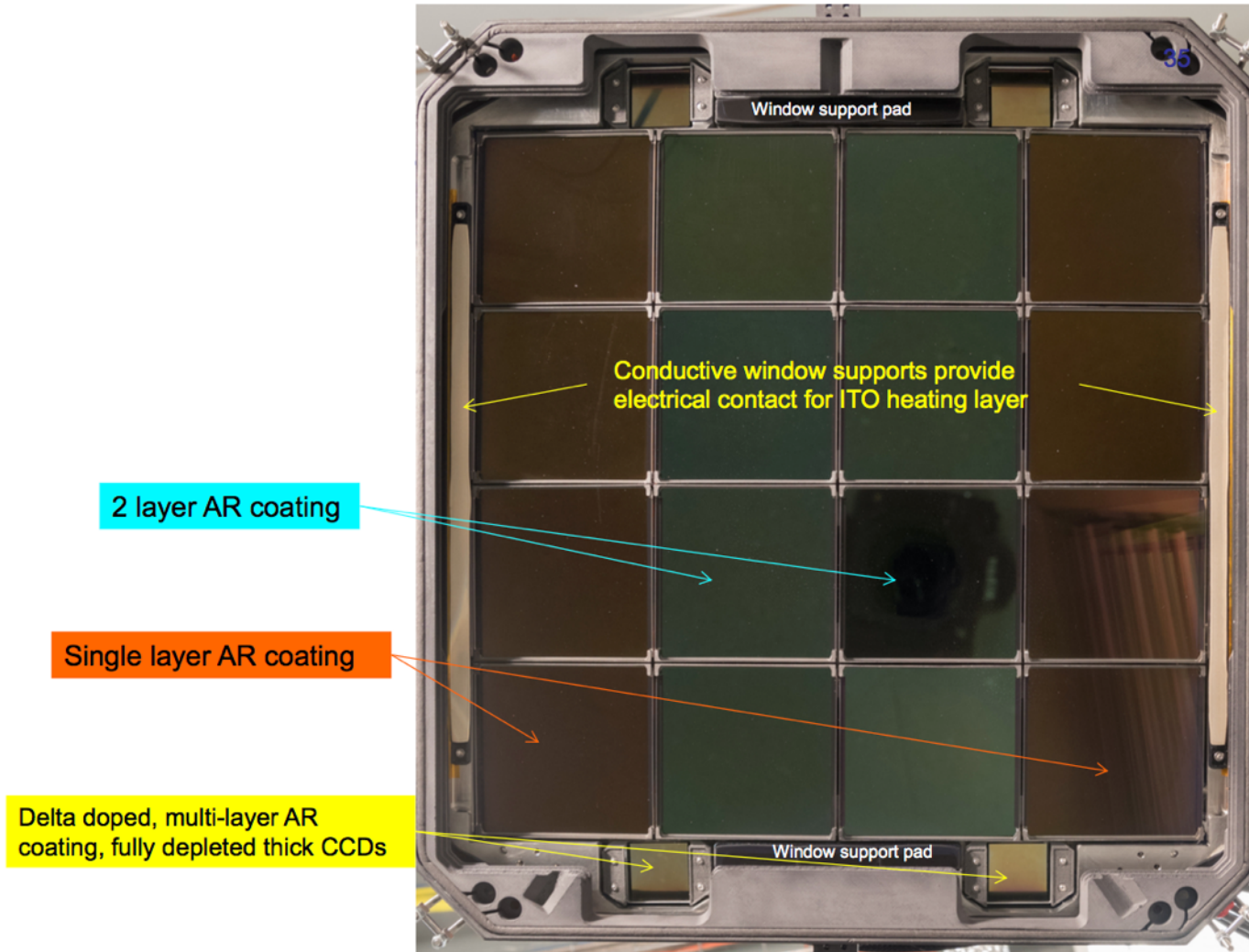
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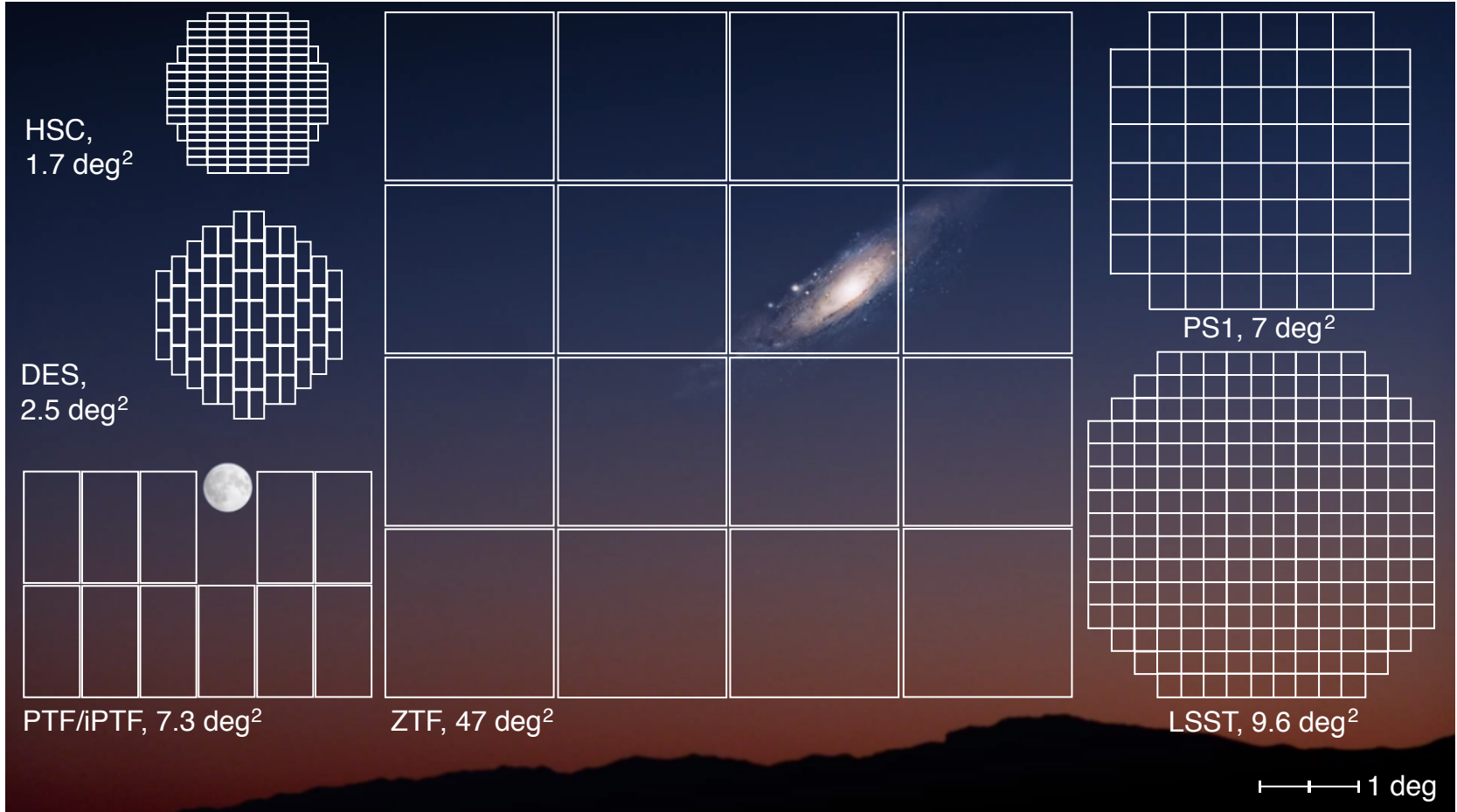
Schematic overview





Focal plane



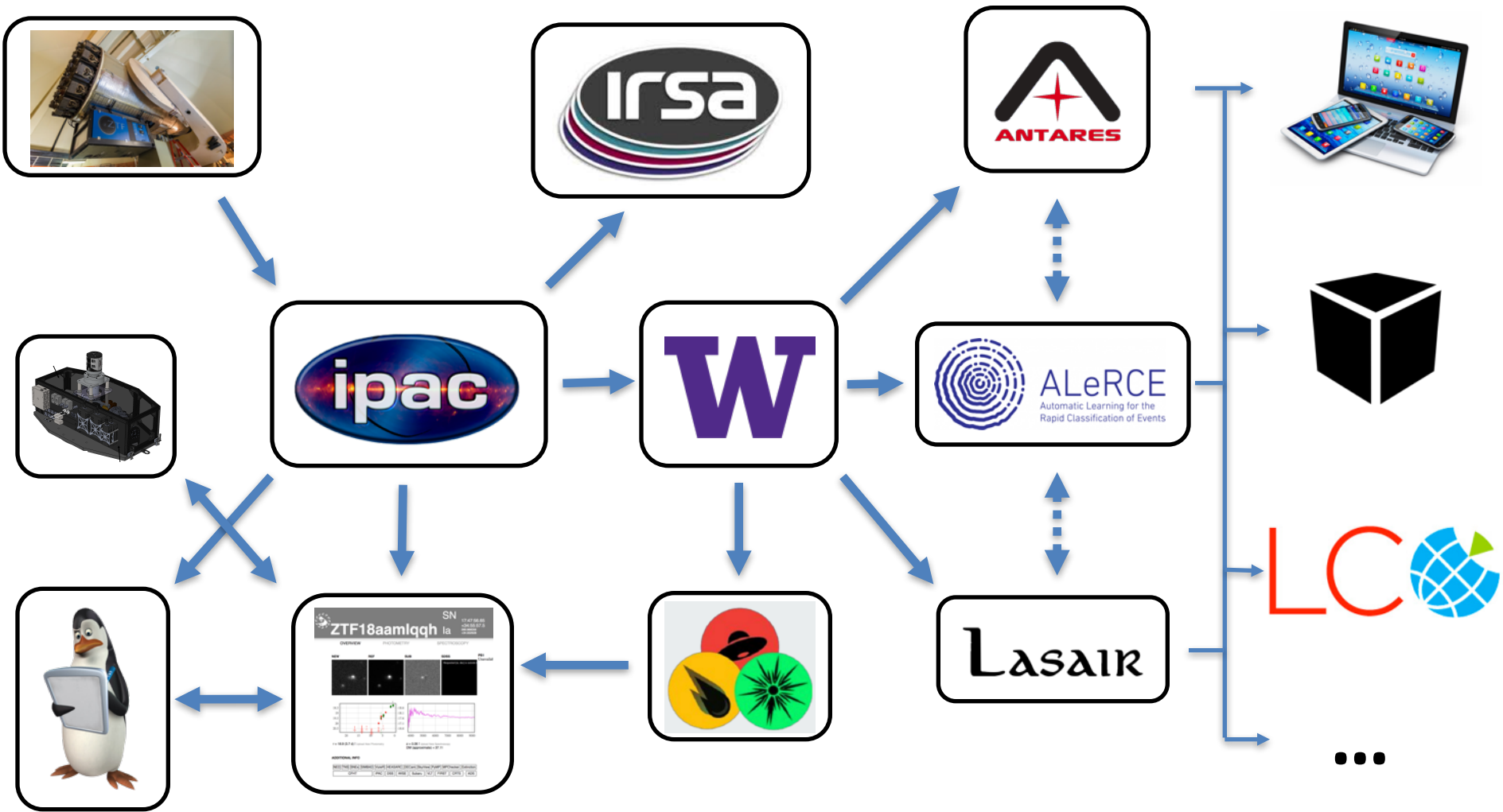
Field of view



ZTF ~ 0.1 LSST

		
No. of sources	1 billion	37 billion
No. of detections	1 trillion	37 trillion
Annual visits per source	1000 (2+1 filters)	100 (6 filters)
No. of pixels	600 million (1320 cm ² CCDs)	3.2 billion (3200 cm ² CCDs)
Field of view	47 deg ²	9 deg ²
Hourly survey rate	3750 deg ²	1000 deg ²
Nightly alert rate	1 million	10 million
Nightly data rate	1.4 TB	15 TB

ZTF: The big picture

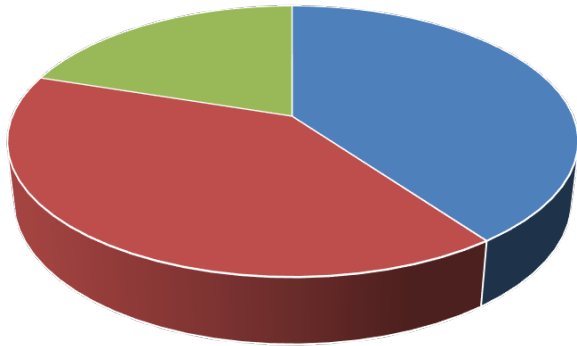


First light – Oct 2017



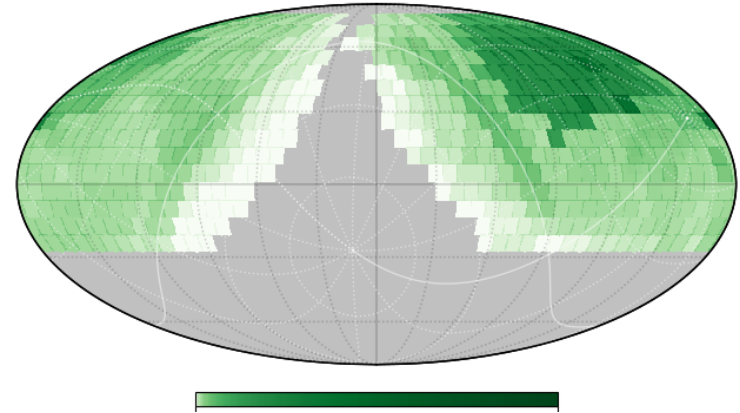
What have we observed so far?

Observing time

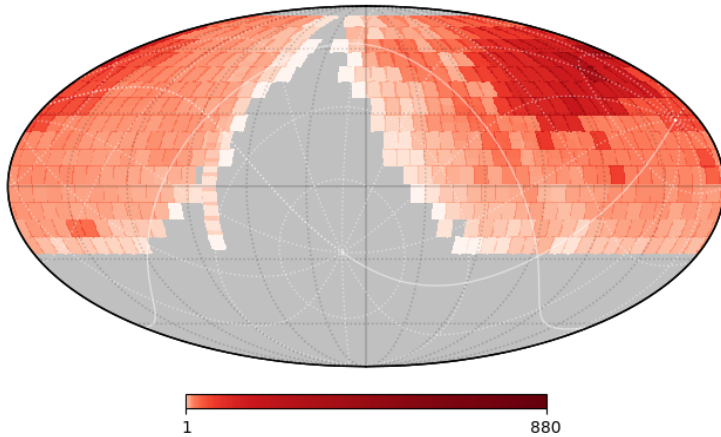


■ MSIP ■ Partnership ■ Caltech

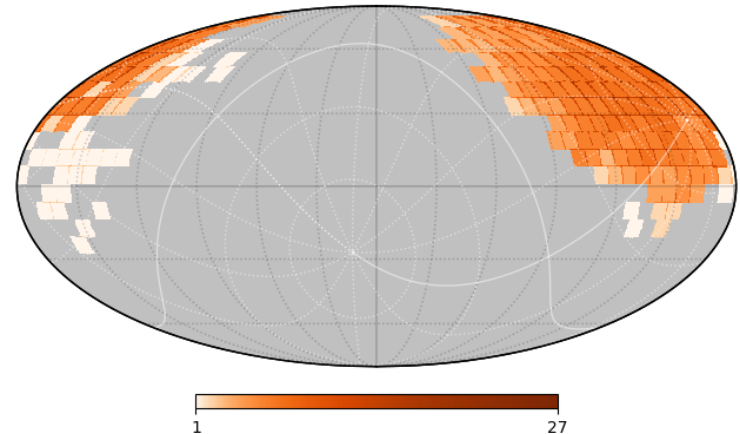
ZTF : G : Equatorial : All Programs : Thru 2018-05-22 (42/61 Nights)



ZTF : R : Equatorial : All Programs : Thru 2018-05-22 (39/61 Nights)



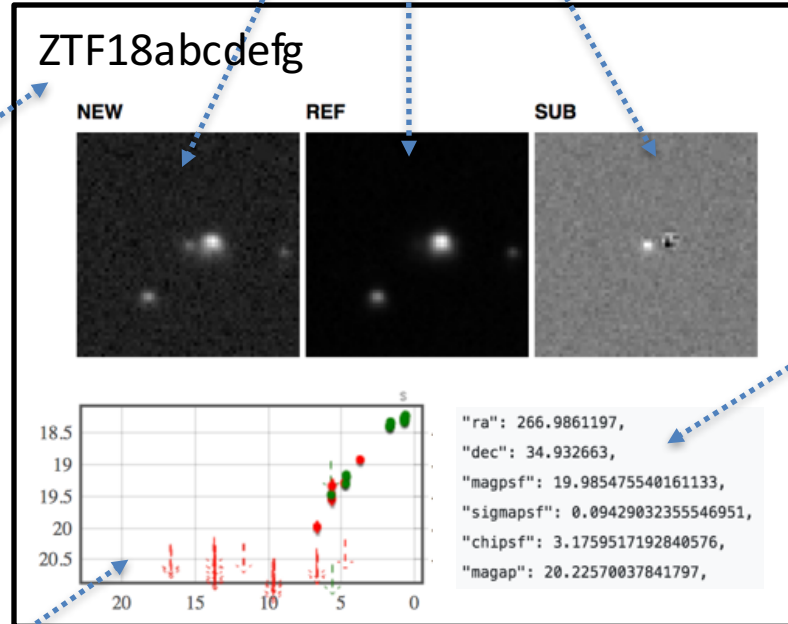
ZTF : I : Equatorial : All Programs : Thru 2018-05-22 (15/61 Nights)



Alert structure: AVRO format

63 x 63 pixel 32-bit images

Unique spatially
matched alert name

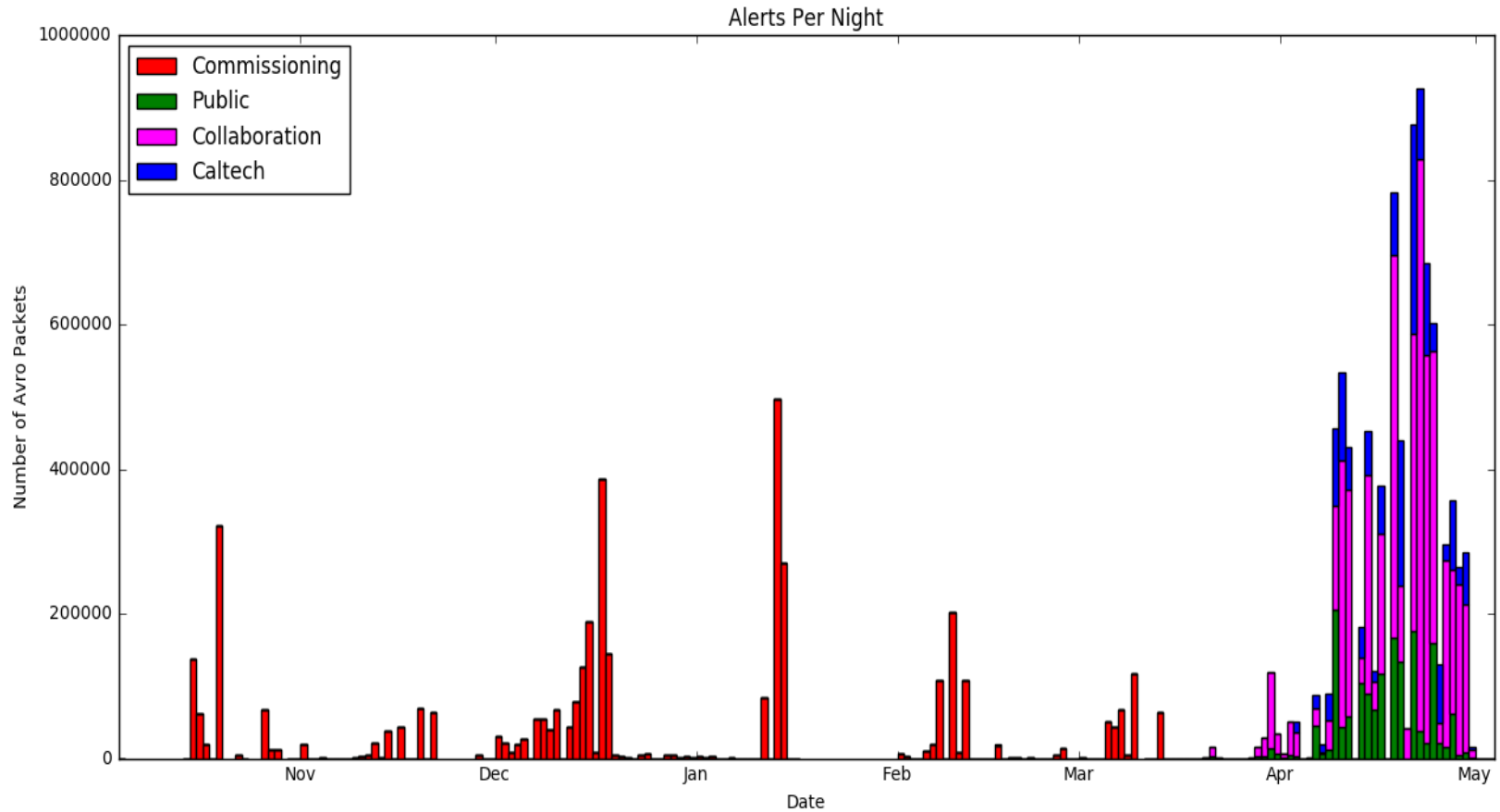


- ZOGY parameters
- Real-bogus score
- Star/galaxy score
- 3 nearest PS1 sources
- Nearest SS object
- Alert history

Rolling 30-day window
light curve

<https://github.com/ZwickyTransientFacility/ztf-avro-alert>

Alert statistics



Alert management

SN

ZTF18aarptw II

16:29:02.38
+43:37:36.6
247.259904 +43.626824

[View another](#)

OVERVIEW
PHOTOMETRY
SPECTROSCOPY
OBSERVABILITY

NEW
REF
SUB
SDSS
PS1

AUTO ANNOTATIONS

2018 May 24 fremling [IAU name]: AT2018frem

2018 May 17 annayqho [passed_filter]: AT2018annayqho

2018 May 14 annayqho [passed_filter]: AT2018annayqho

2018 May 14 liyan [passed_filter]: AT2018liyan

2018 May 09 yiyang [SDSS_photz_auto]: AT2018yiyang

2018 May 09 yiyang [passed_filter]: ZTF18aarptw II

r = 19.2 (1.0 d) | [Upload New Photometry](#)

z = 0.047 | [Upload New Spectroscopy](#)

DM (approximate) = 36.55

Data Access Programs: 1, 2

ADDITIONAL INFO

[NED](#)
[TNS](#)
[SNEx](#)
[SIMBAD](#)
[VizieR](#)
[HEASARC](#)
[DECam](#)
[SkyView](#)
[PyMP](#)
[Extinction](#)

[skipper.caltech.edu:8080/cgi-bin/growth/plot_lc.cgi?name=ZTF18aarptw](#)
[Subaru](#)
[VLT](#)
[FIRST](#)
[CRTS](#)
[ADS](#)

ZTF Home Query Tutorials
Logged in as admin

Query the databases

Cone search

RA/Dec, ICRS: Examples: [(0.0, 0.0), (1.0, 1.0)] [(08:55:29.205, -34:02:36.8944*)]

Cone search radius:

Query all catalogs? Select all

Enforce rerunning? Rerun existing query

Catalogs

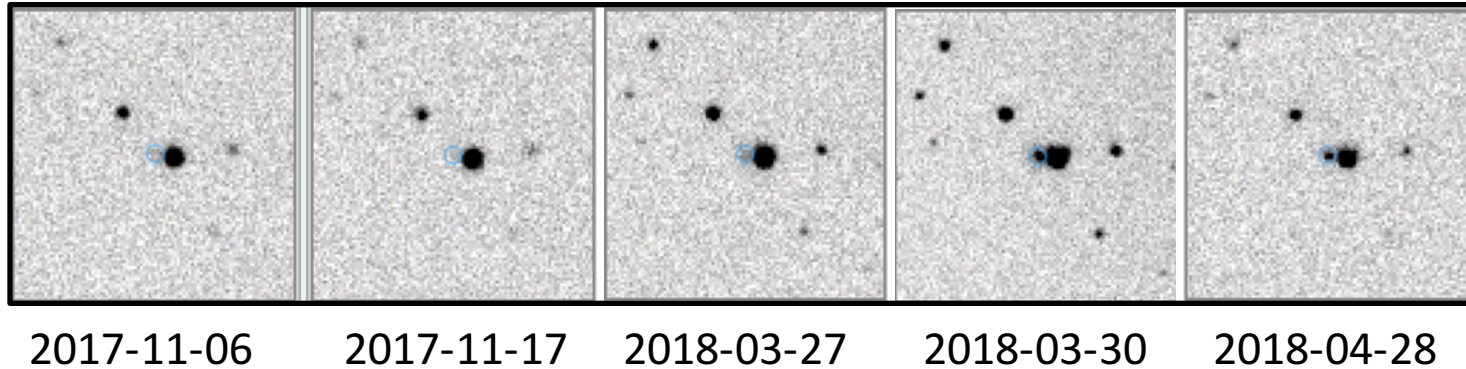
- ZTF_alerts

Alert issues

- “It would be useful to also report...”
 - “What did we observe last night?”
 - “Why can’t I see any alerts?”
 - “<Survey x> detected this – why didn’t we?”
 - “What’s wrong with the values of parameter <x>?”
-
- Evolving packet structure: versioning
 - Image quality
 - User reluctance to participate in QA work

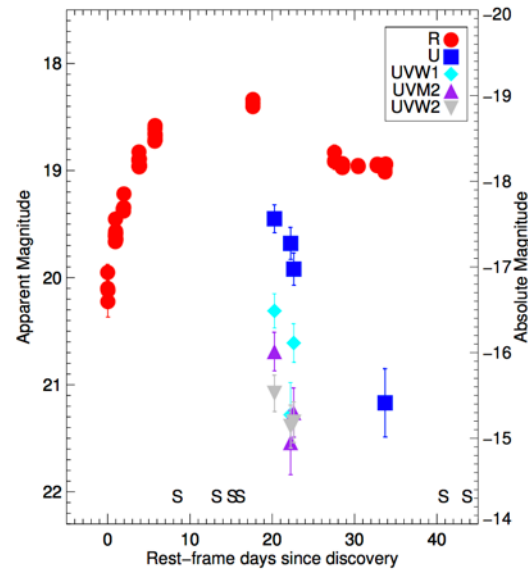


Some early results: SNe

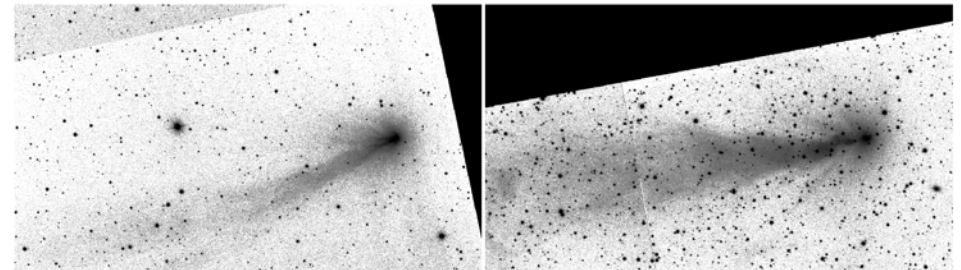
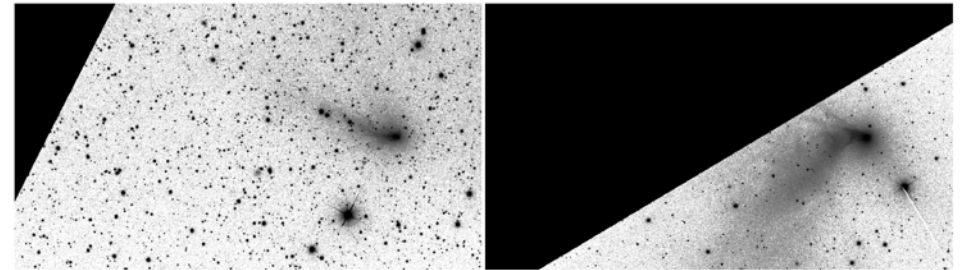
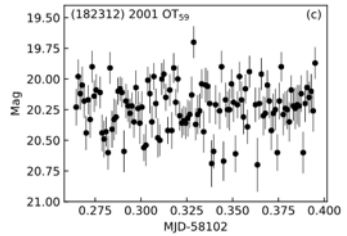
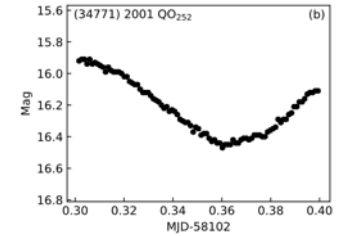
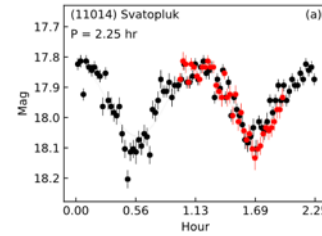
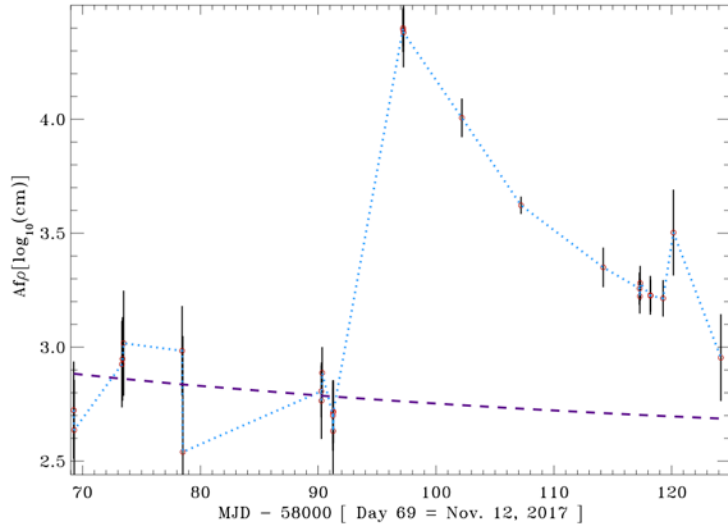
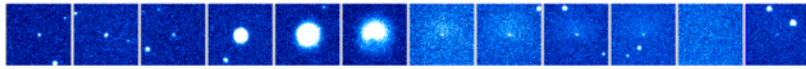


Total: 166 SNe so far

- Ia: 116
- II: 30
- Ib: 5
- Ic: 3
- Ic-BL: 2
- SLSNe: 3



Some early results: small solar system bodies



Summary

- ZTF is the community precursor survey to LSST for:
 - Transient astronomy
 - Follow-up orchestration
 - Machine learning
 - Archival analyses

- Public alerts will be on Monday June 4th

