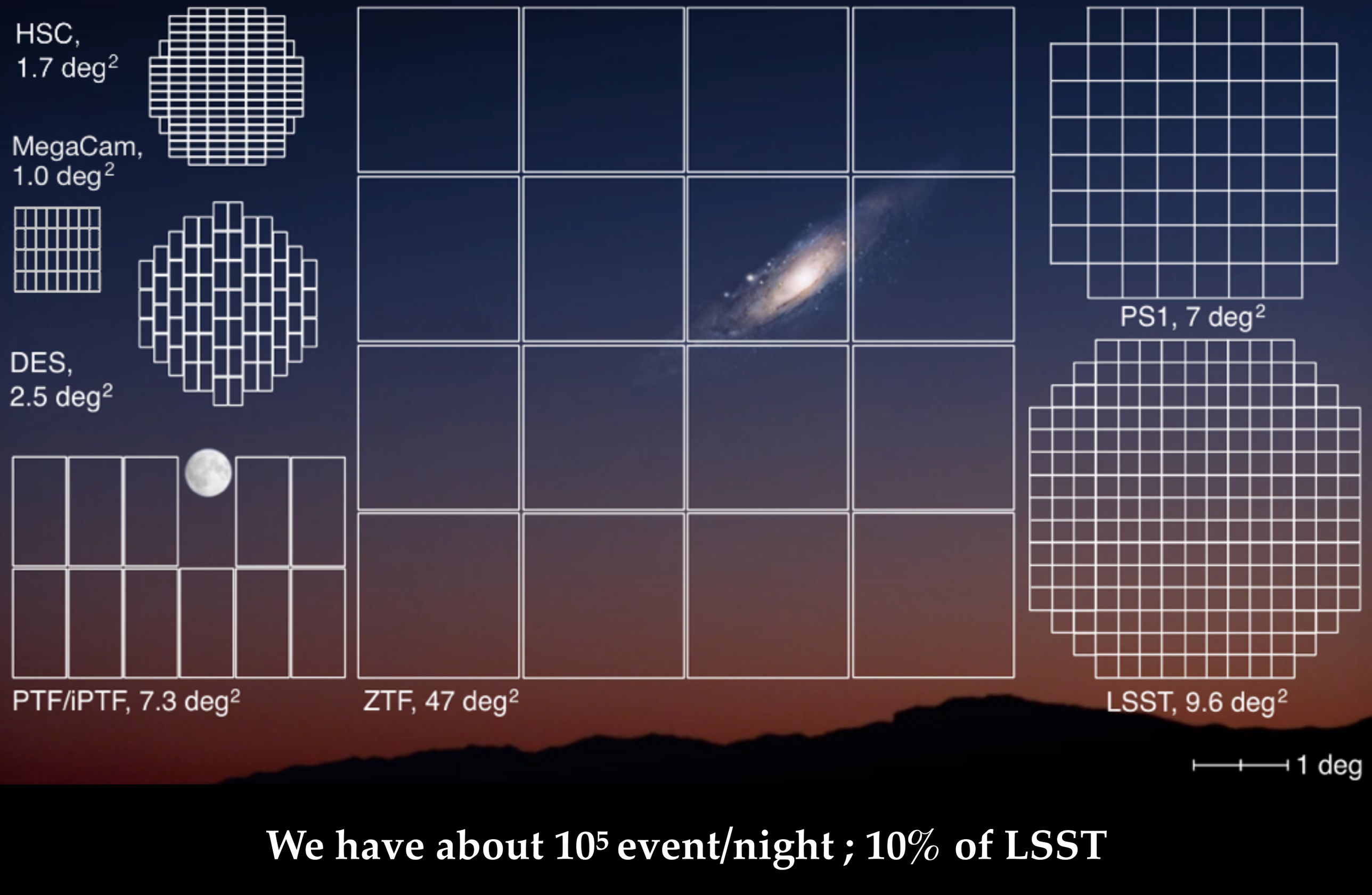
The Transient Sky see by the Zwicky Transient Facility

Mickael RIGAULT

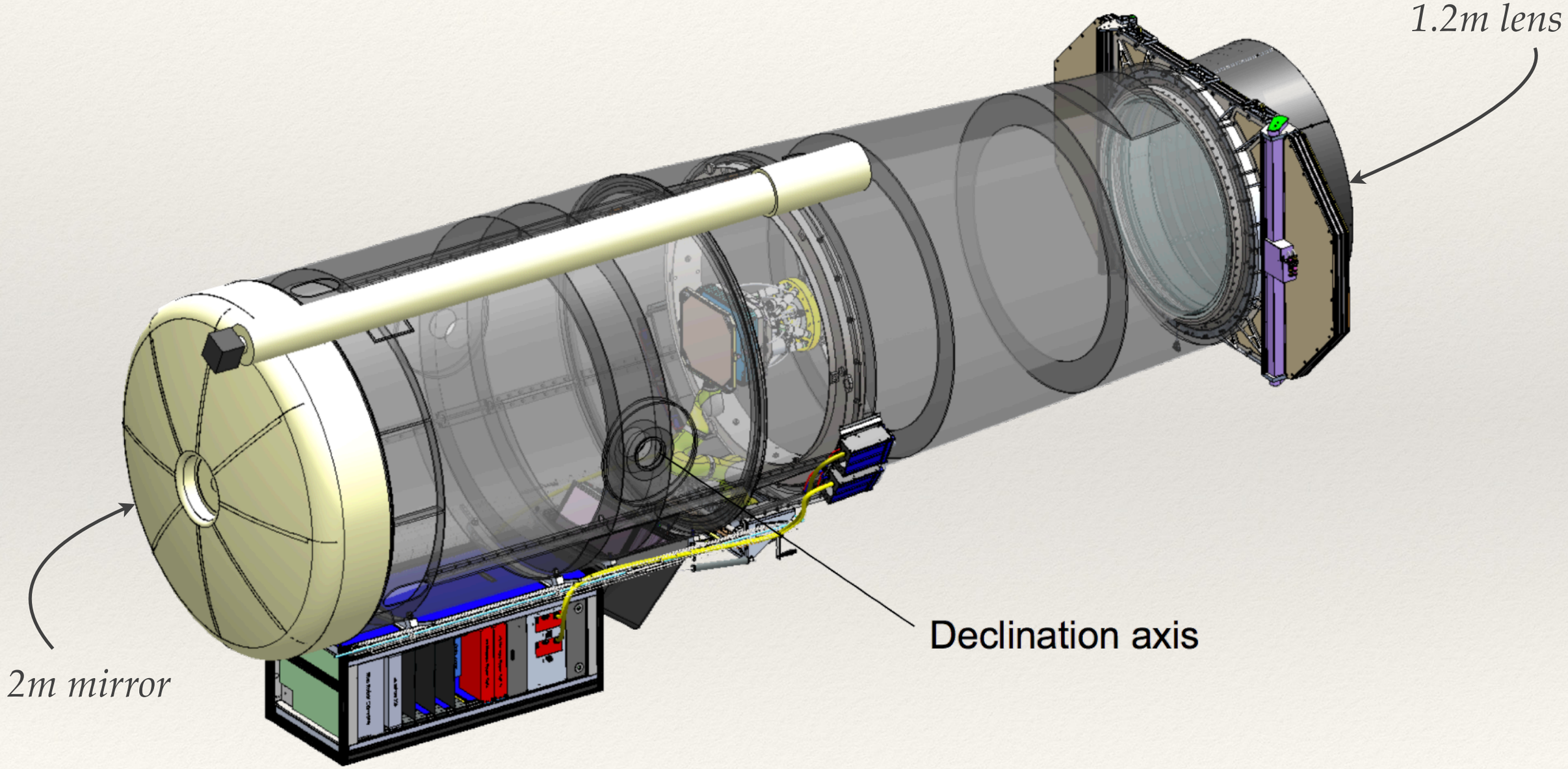
Transient Sky 2020 | 2nd edition | Montpellier June 2018

ZTF | Go Fast (30s exp.), Scan Large (full visible sky)



We have about 10^5 event/night ; 10% of LSST

A 1.5m Schmidt Telescope



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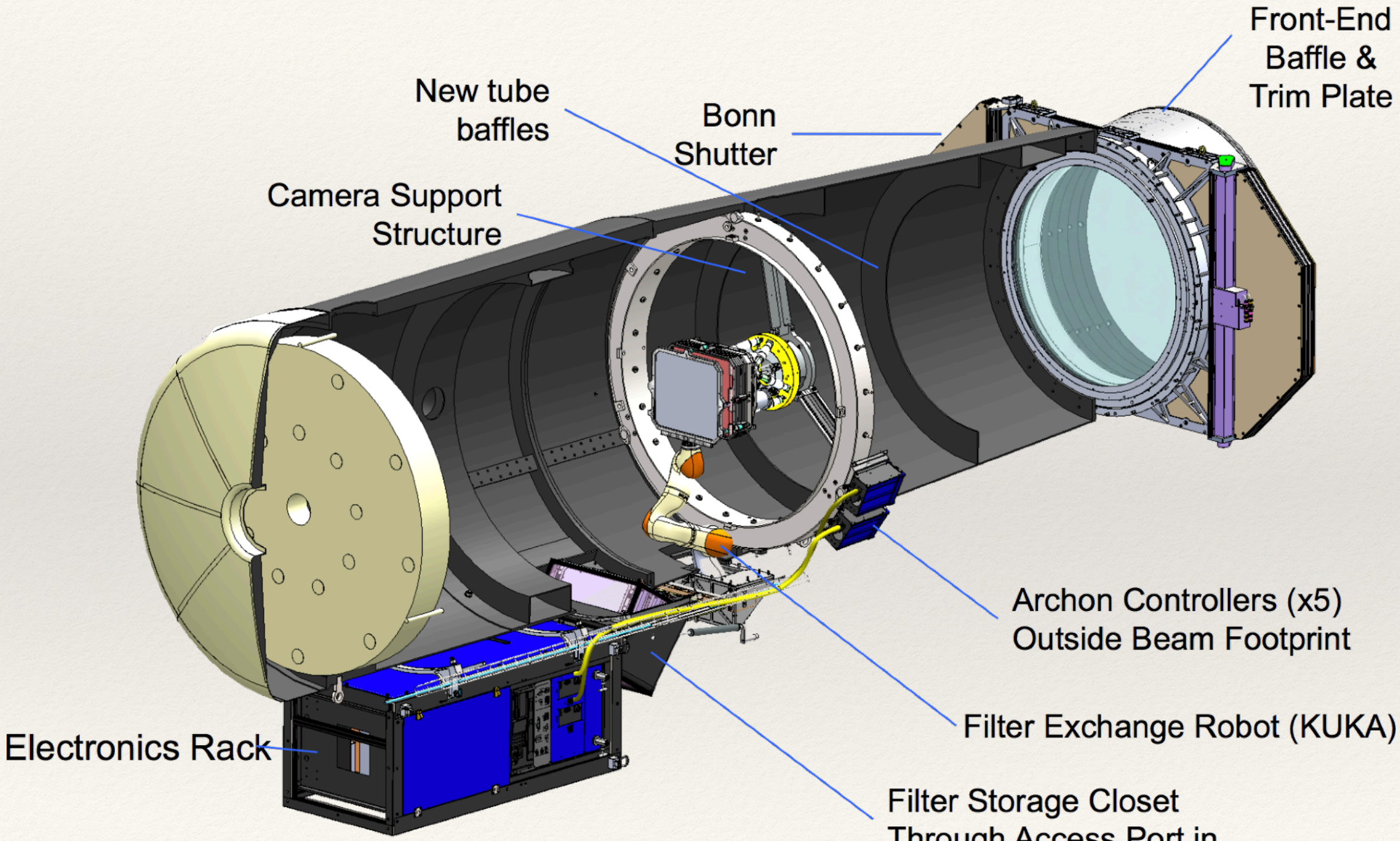
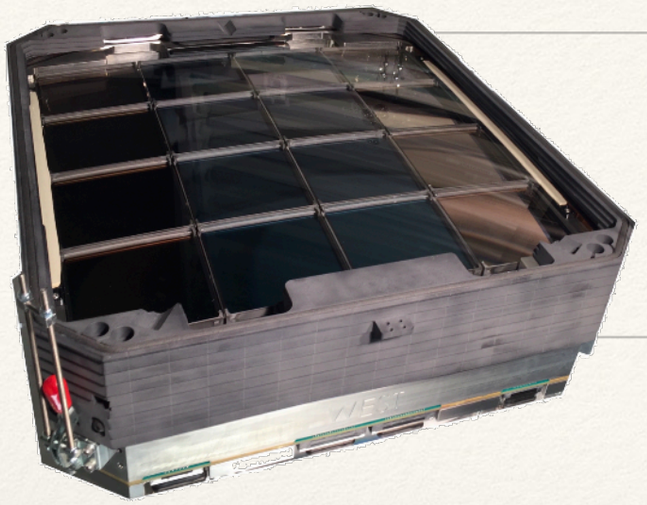




The Camera

Key information

47 square degree field
(on 2 grids ; 1 main + extra)

16 E2V 6k x 6k CCDs
(2 different coatings)

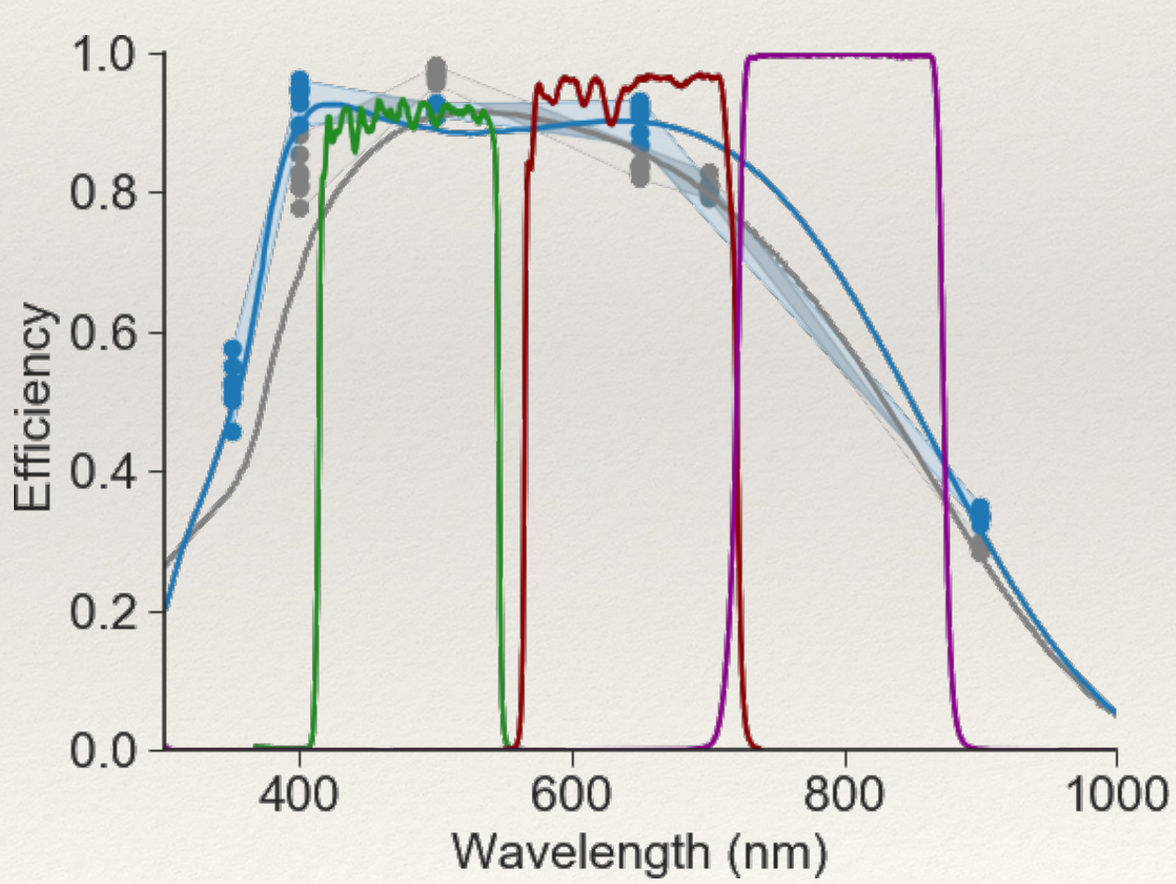
1 Pixel ~ 1 arcsec
(typical seeing ~2arcsec)

30s exposure + 15s slew

~20.5 mag (5σ) per exposure
(slightly better in R)

3 Filters

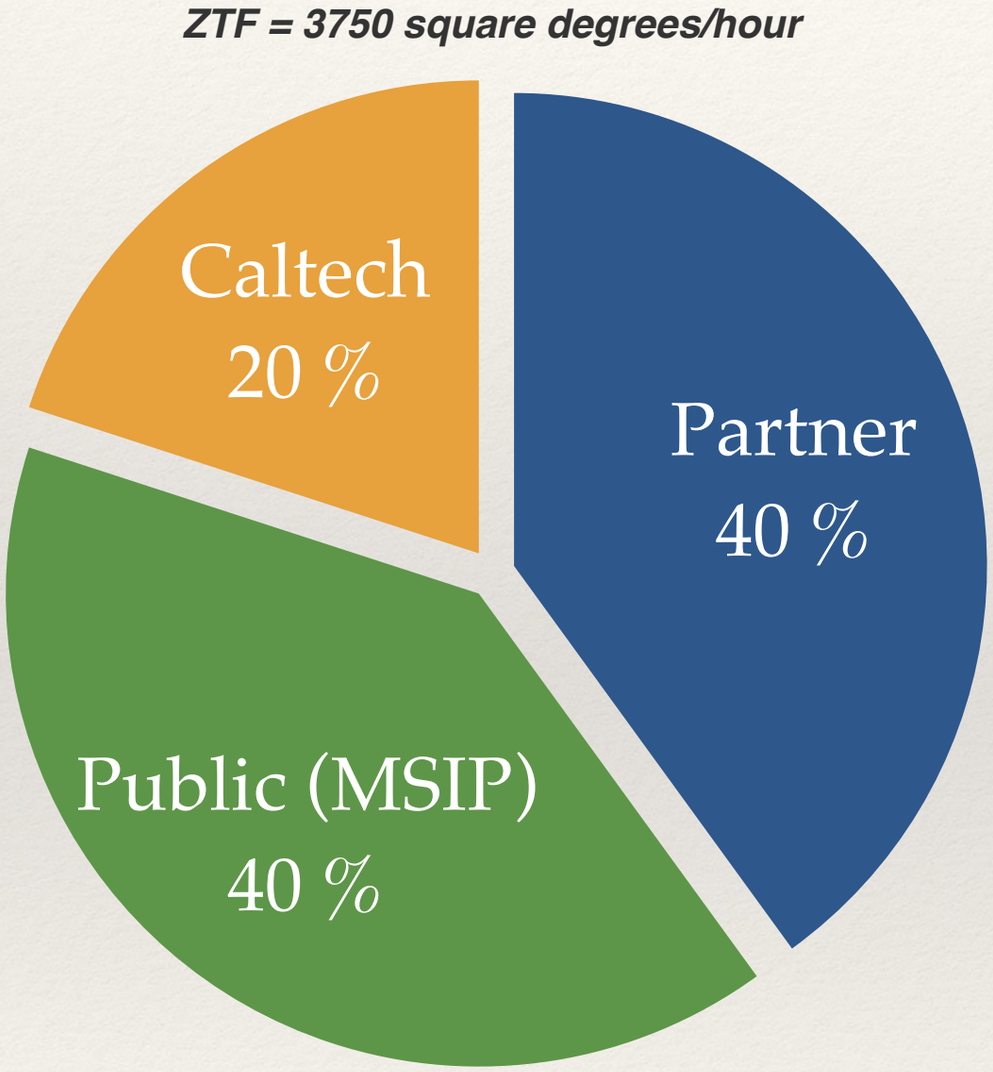
g, r, I



A Filter

Roger Smith, Technical lead

Partner | Caltech | Public



PUBLIC SURVEY "MSIP"

2 Filters (g, r)

6400 sqdeg every 3 days
(in both bands!)

Alerts public right away
(all transients discovered within MSIP)

Kafka stream hosted by UW
(The LSST team and technology !)

+ Galactic plane
(August mainly)

Partner | Caltech | Public

Public ZTF Events on the TNS (links)

◎ All ztf targets

✓ Confirmed SNe

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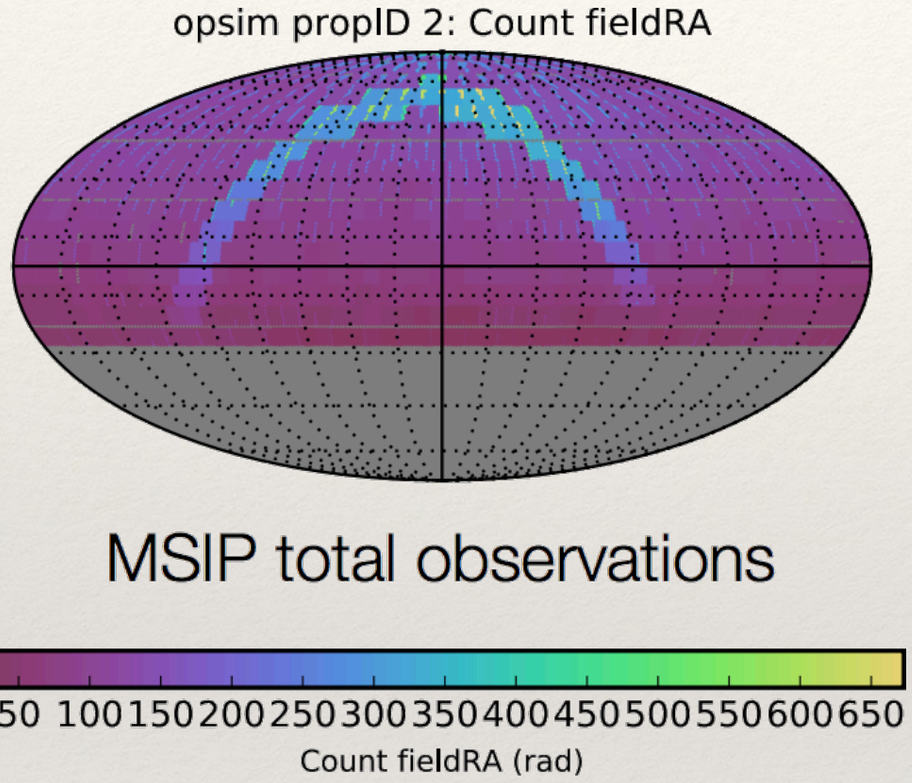
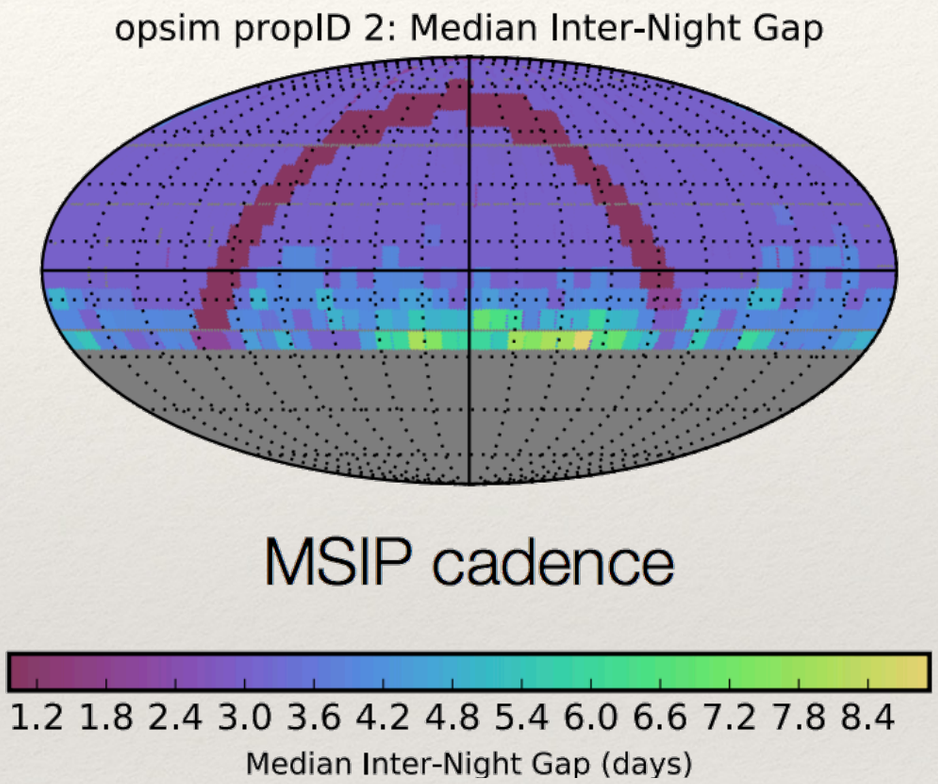
Starting TODAY (4th of June)

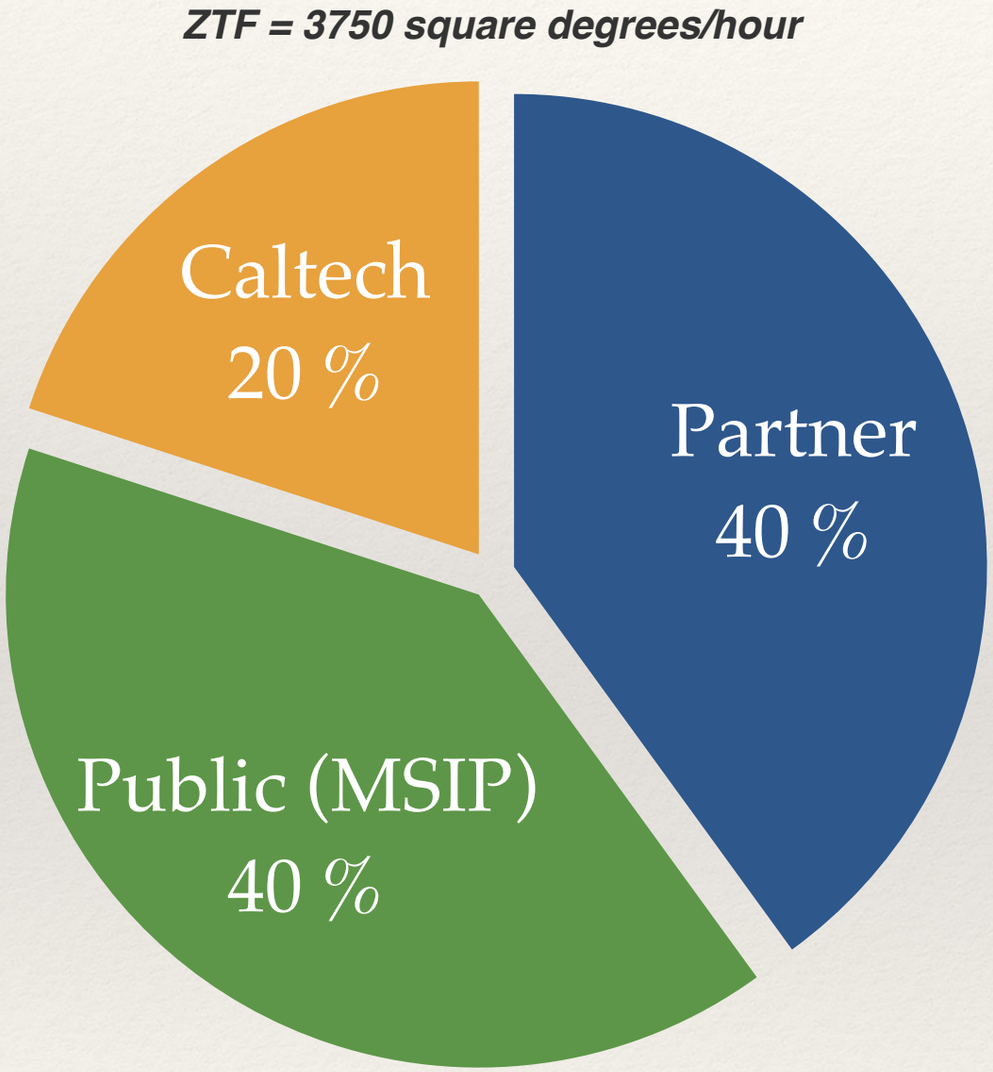
MSIP Survey





Starting TODAY (4th of June)

Partner | Caltech | Public



Public Survey "MSIP"

2 Filters (g, r) every 3 days
On 6400 sqdeg + MW

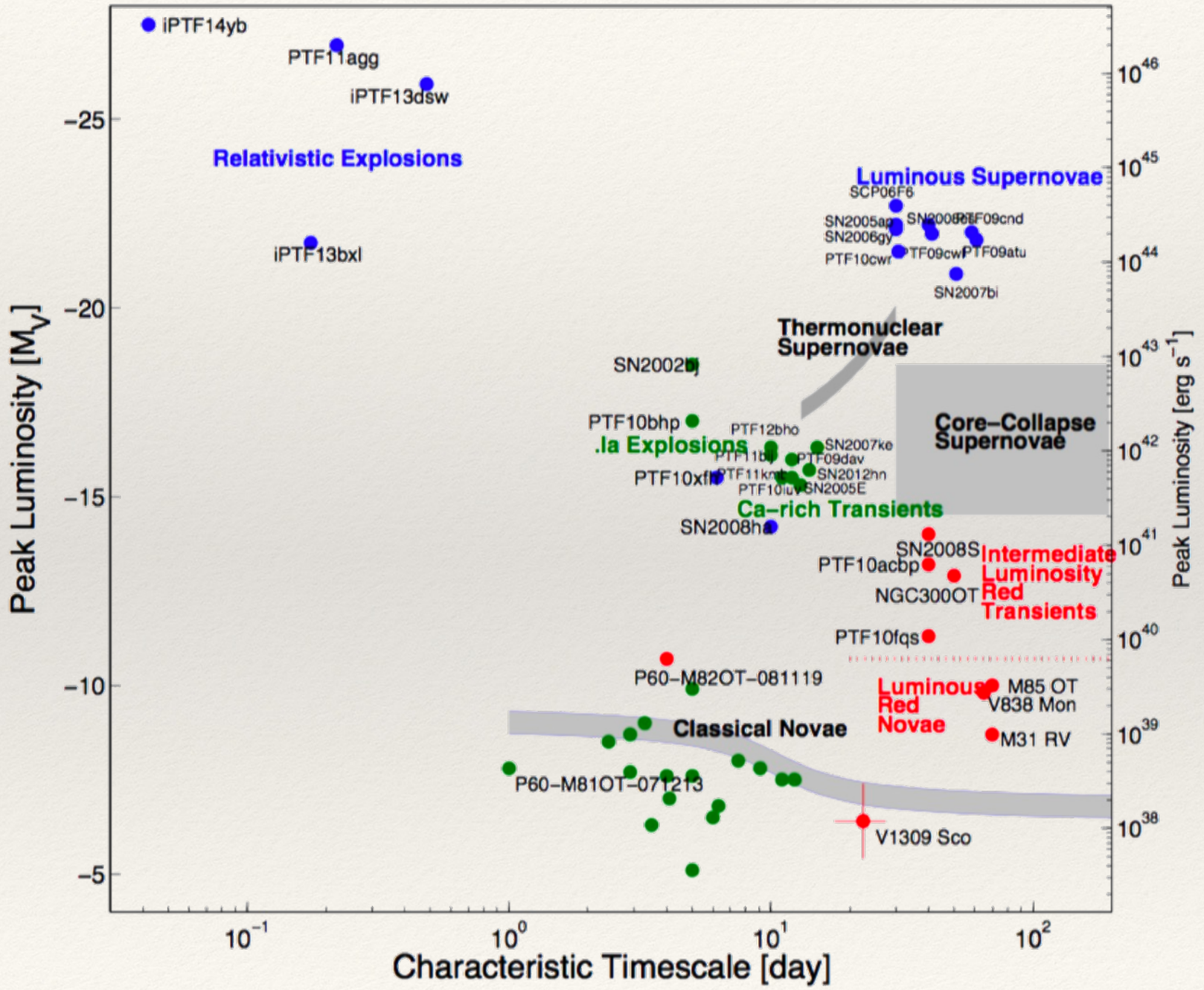
Partnership & Caltech

High cadence fields (g,r)
(4x the same field every night)

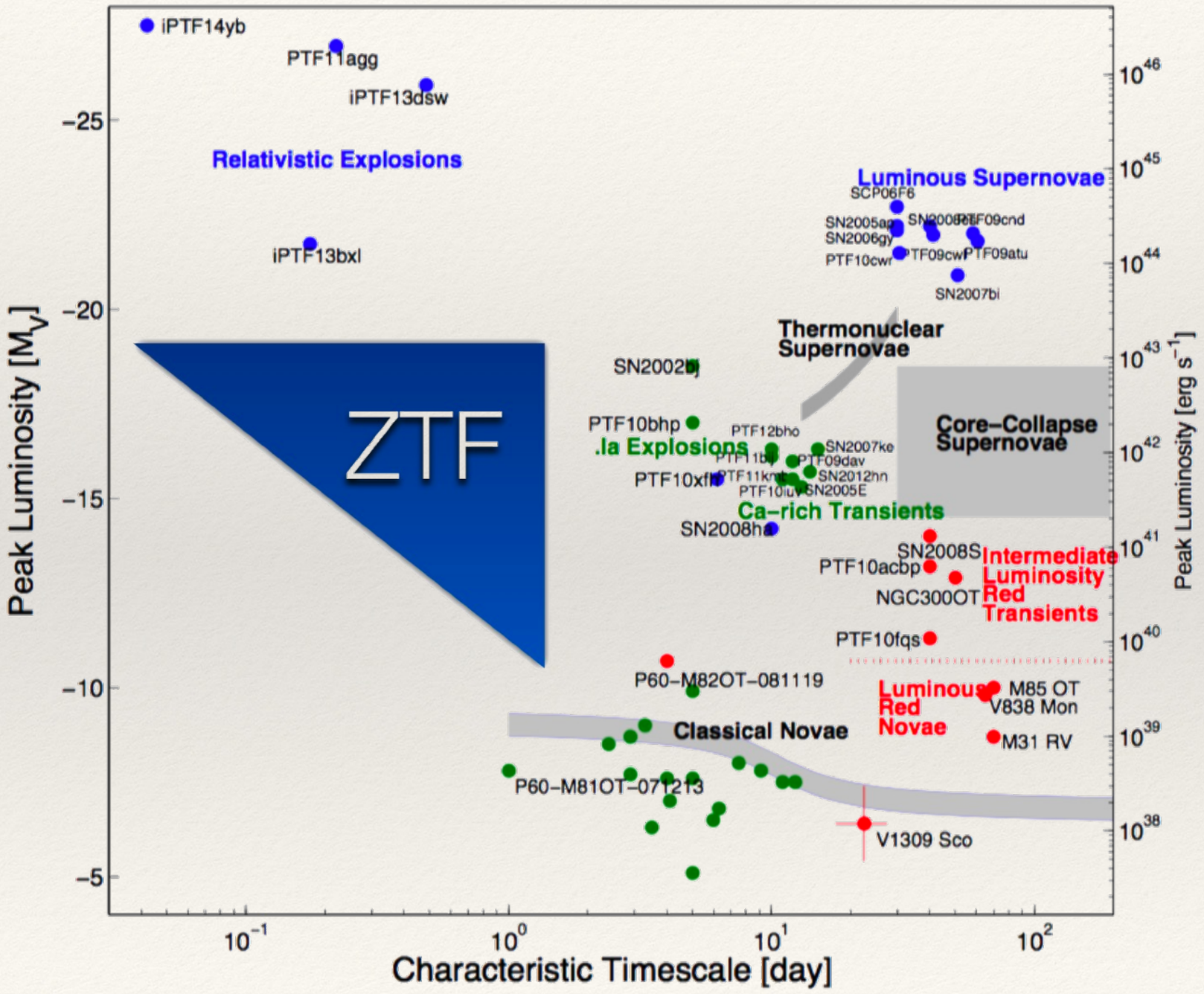
Third Filter mapping MSIP
(4 days cadence ; For Cosmology mainly)

Galactic Plane + M31
(Mainly August)

The Science | The Transient Sky



The Science | The Transient Sky



Science Working Groups

Solar System Bodies

Galactic and M31 Science

ElectroMagnetic counters part of GW and Neutrinos

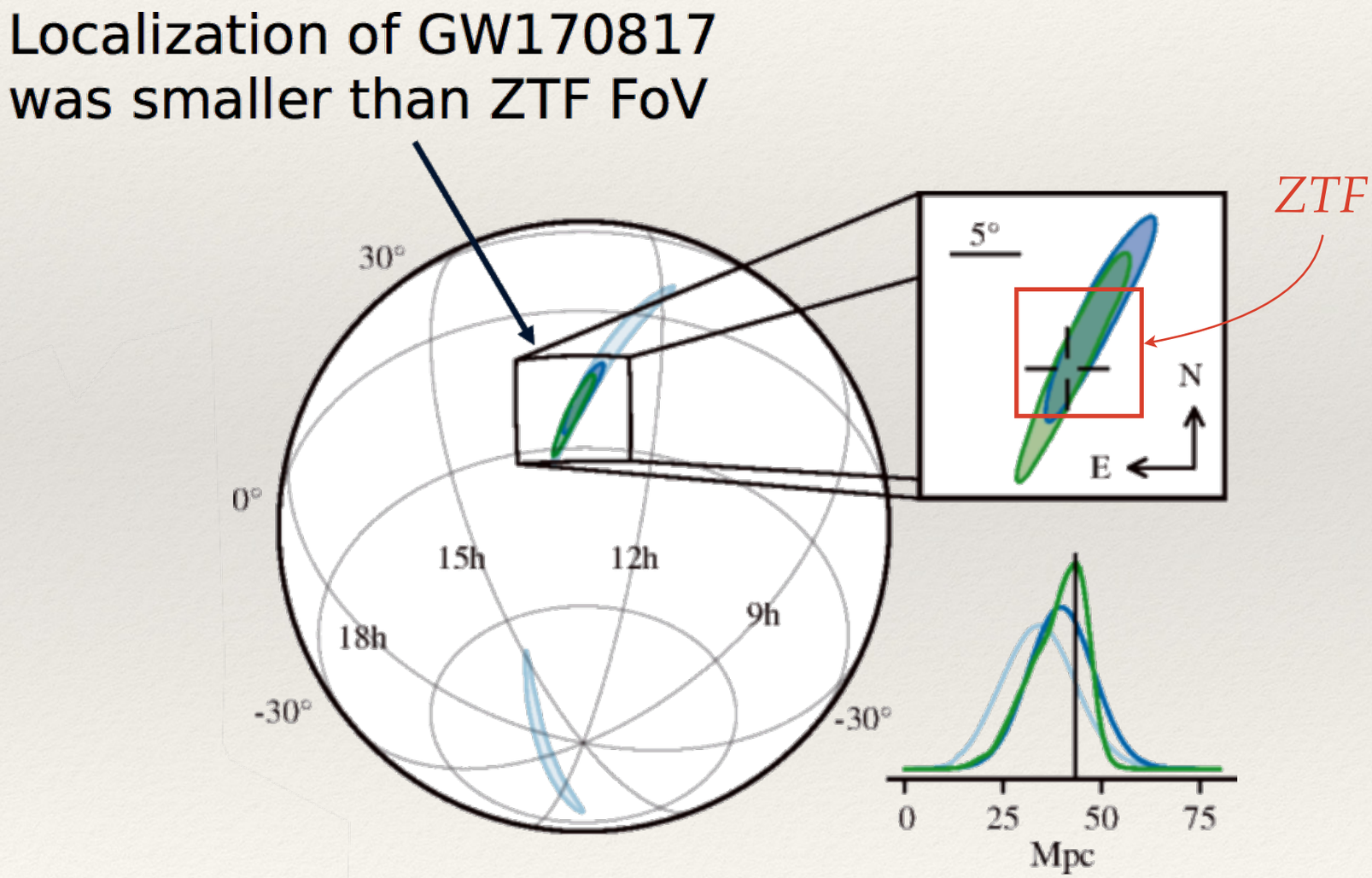
Physics of Supernova and Relativistic Explosions

AGN and Tidal Disruption Events

Type Ia Supernova & Cosmology

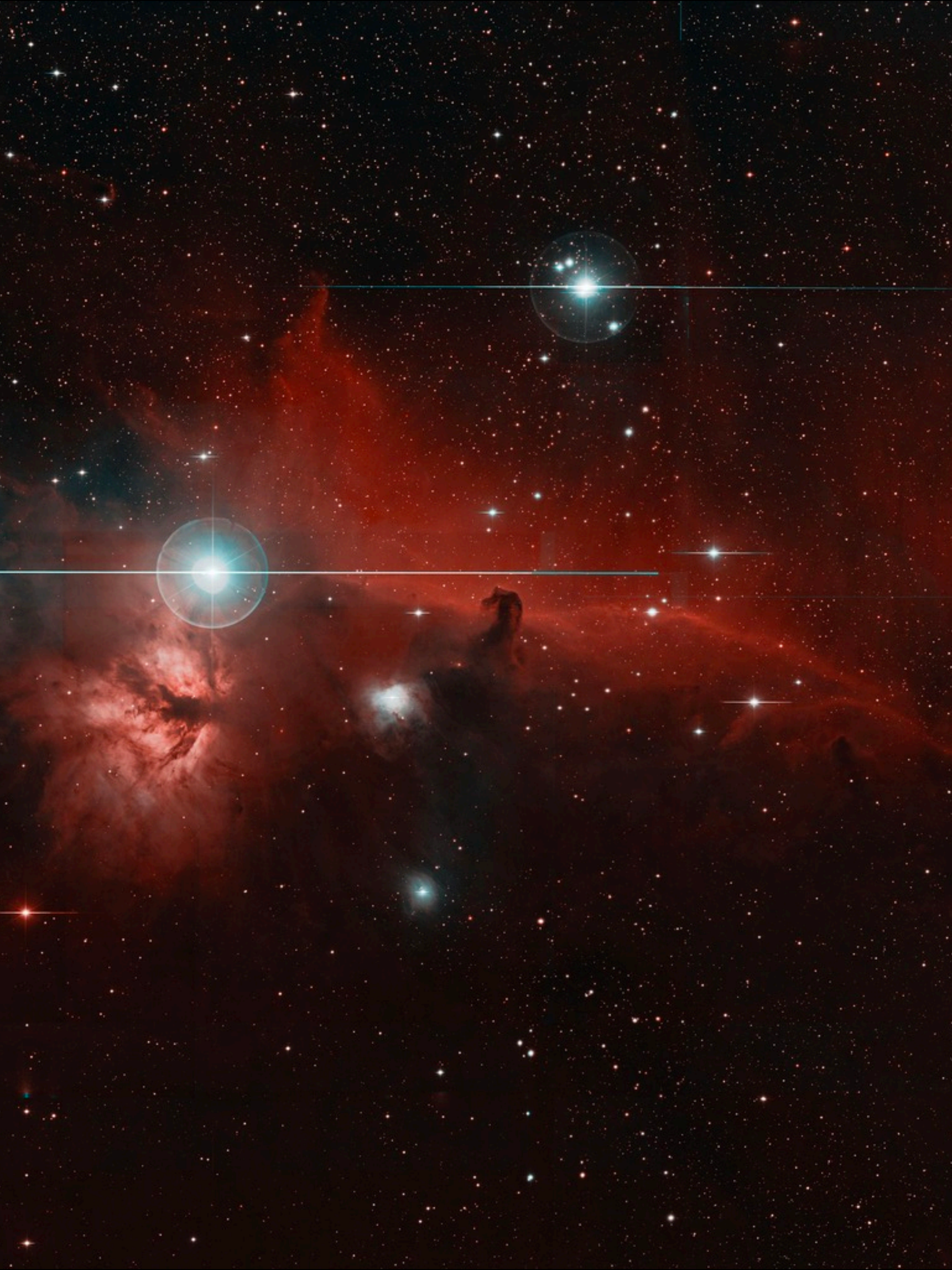
Multi Messenger Follow Up

10% of the time dedicated | Possibility to extend the exposure time up to 10min (mag 22)



Abbot et al. (2017), PRL 119, 161101

Video link



Type Ia Supernova Cosmology with ZTF

Our Goal — A Fully typed SNeIa Sample of *all* SNeIa nature provides up to z~0.1

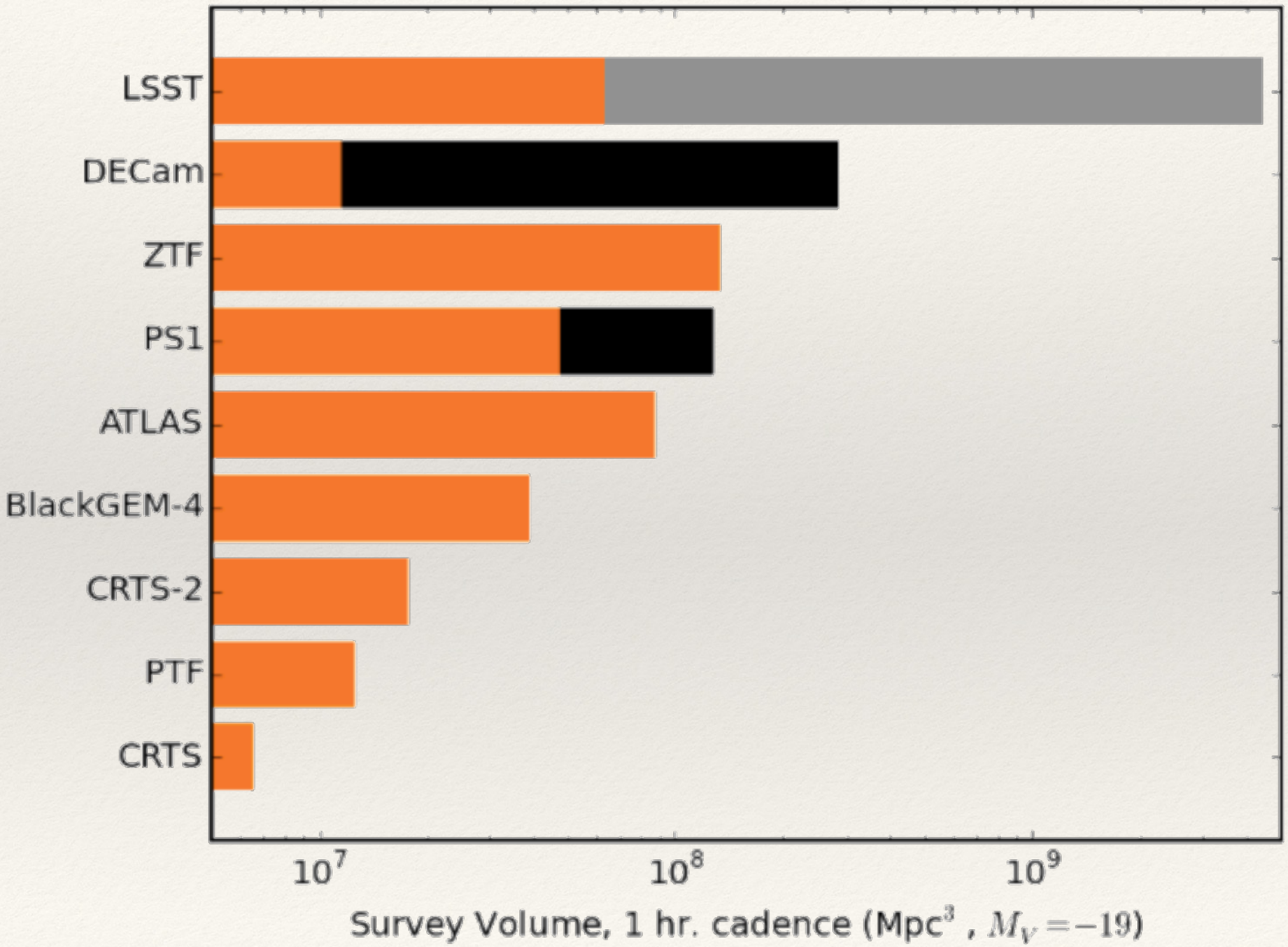
WE SHOULD GET ~800 SNEIA PER YEAR WITH

At least 5 points per filter (g,r,i)
(the limitation is the i-band)

At least 1 point prior -7 days to max
(We catch them really early)

At least 1 point after +40 days to max
(we should see the second bump for all of them)

Type the Transient Sky !



ZTF | Camera & Spectros

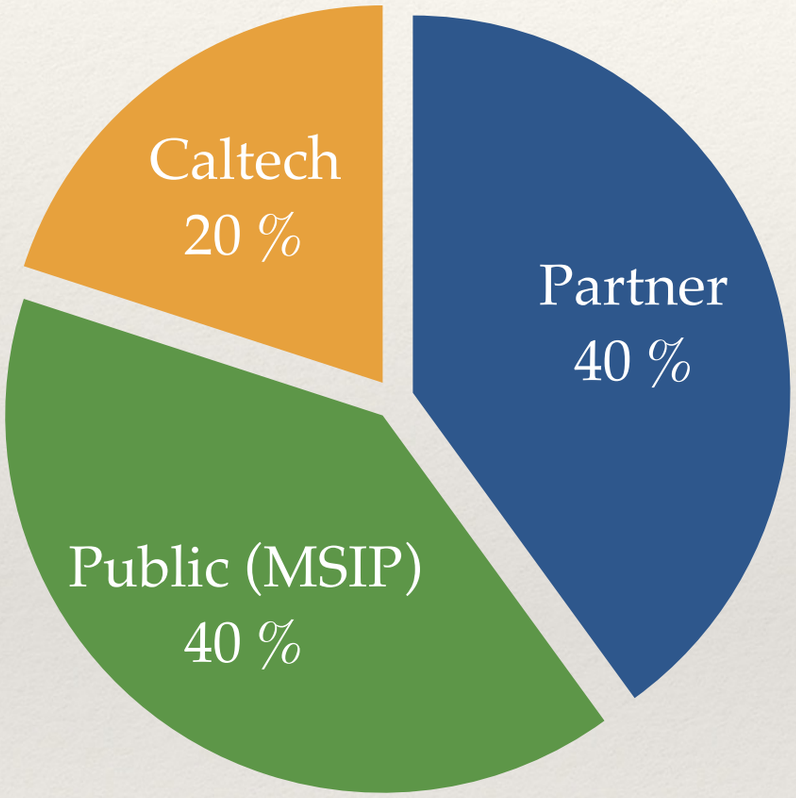
ZTF Camera (P48)

SEDmachine (IFU P60)

Long slit (P60)

See the Broker talk

ZTF | observing the transient sky



Starting TODAY (4th of June)
(check ATel / TNS)

KEY FEATURES

47 square degree field

3 filters (g, r, I)

~20.5 mag (5σ) per exposure

3700 sq-deg / hour
(MSIP = 12 000 sq-deg /night)

MSIP : g & r 3 day cadences