



# PTF PROJECT OVERVIEW

NICHOLAS LAW

PTF SCIENCE WORKSHOP

AUGUST 2008

# The Palomar Transient Factory

- Wide-angle, variable cadence sky survey
- Realtime transient detection
- Realtime, automated transient classification
- Automated followup using multiple facilities
- Searchable archive of every detected source in every frame



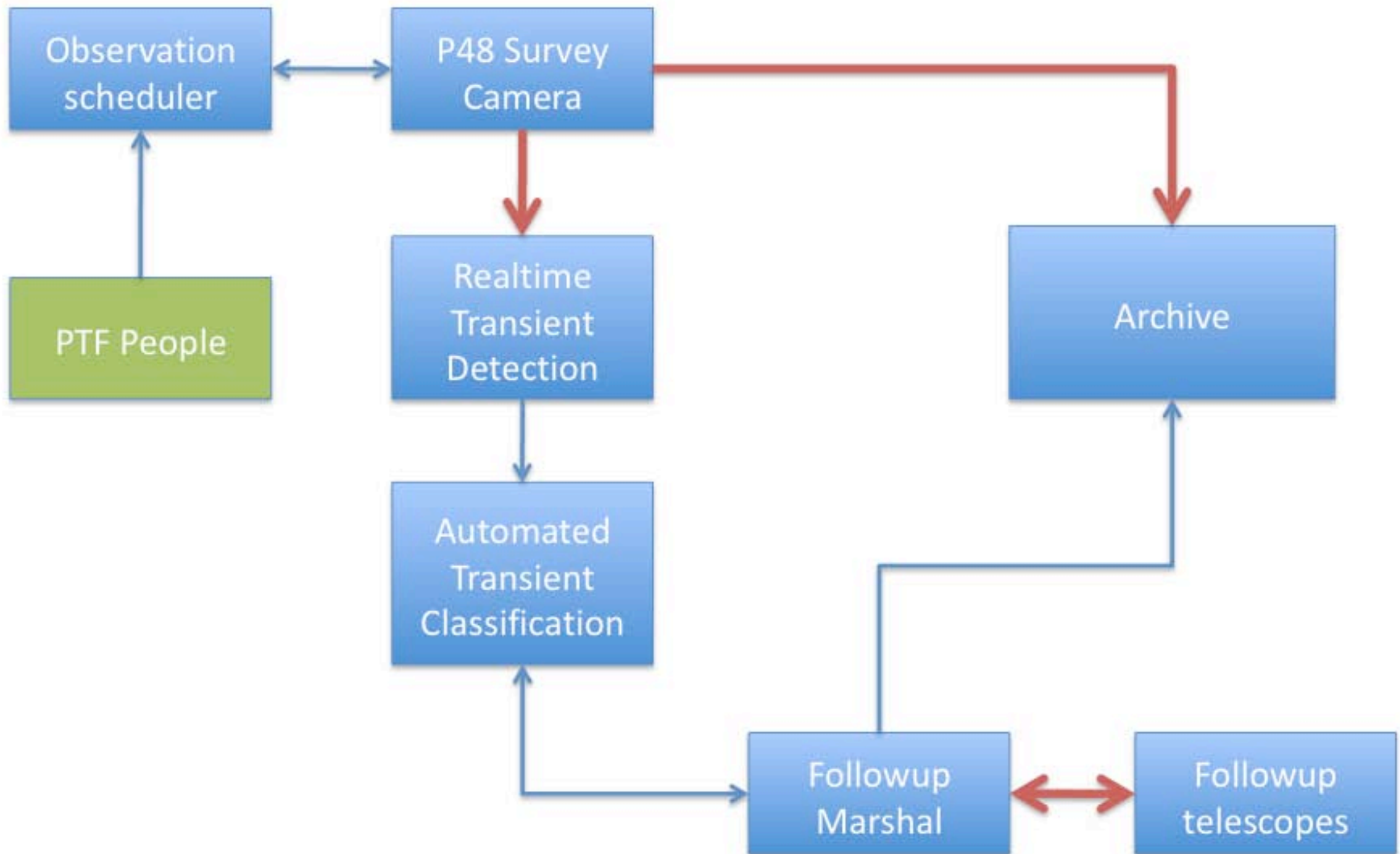
EXPERIMENT	SCIENCE GOAL	EXPERIMENT SETUP	P48 TIME USED
<b>1. Dynamic cadence</b>	<p>Explore unknown territories in transient phase space</p> <p>fast transients on timescales &lt; 1 day.</p> <p>Also: SNe, RR Lyr, CVs, AM CVn, flare stars, ...</p>	<p>R and g' bands</p> <p>60 second exposures</p> <p>cadence from one minute to one day</p> <p>Gets to roughly <math>m=21</math> in R and g'</p>	41%
<b>2. 5-day cadence survey</b>	<p>SNe 1a; core-collapse SNe; AGN; quasars; extragalactic novae; luminous red novae; ...</p>	<p><math>\sim 8000 \text{ deg}^2 / \text{year}</math></p> <p>3 - 8 day cadence after weather. 60 second exposures.</p>	40%
<b>3. Single-field</b>	<p>Transiting planets; stellar eclipses &amp; variability</p>	<p>R-band continuous observations of a single field.</p>	11%
<b>4. H-alpha</b>	<p>1/2 sky deep H-alpha survey</p>	<p>during bright time; H-alpha on and off imaging.</p>	8%





PTF Science Workshop  
August 26-28 2008





# The Palomar Transient Factory

## People (some)



Nicholas Law  
Project Scientist

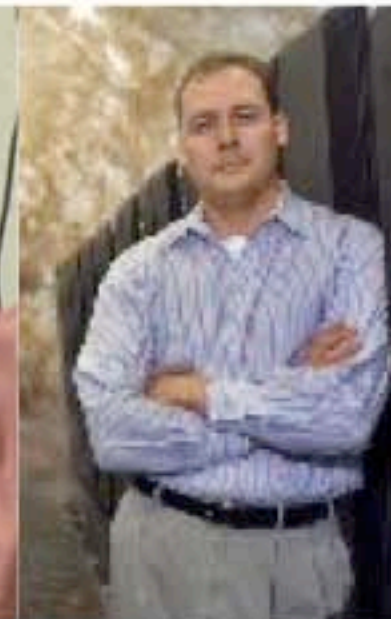
Robert Quimby  
Software Lead

Rich Dekany  
Camera lead

Carl Grillmair  
Archive Lead

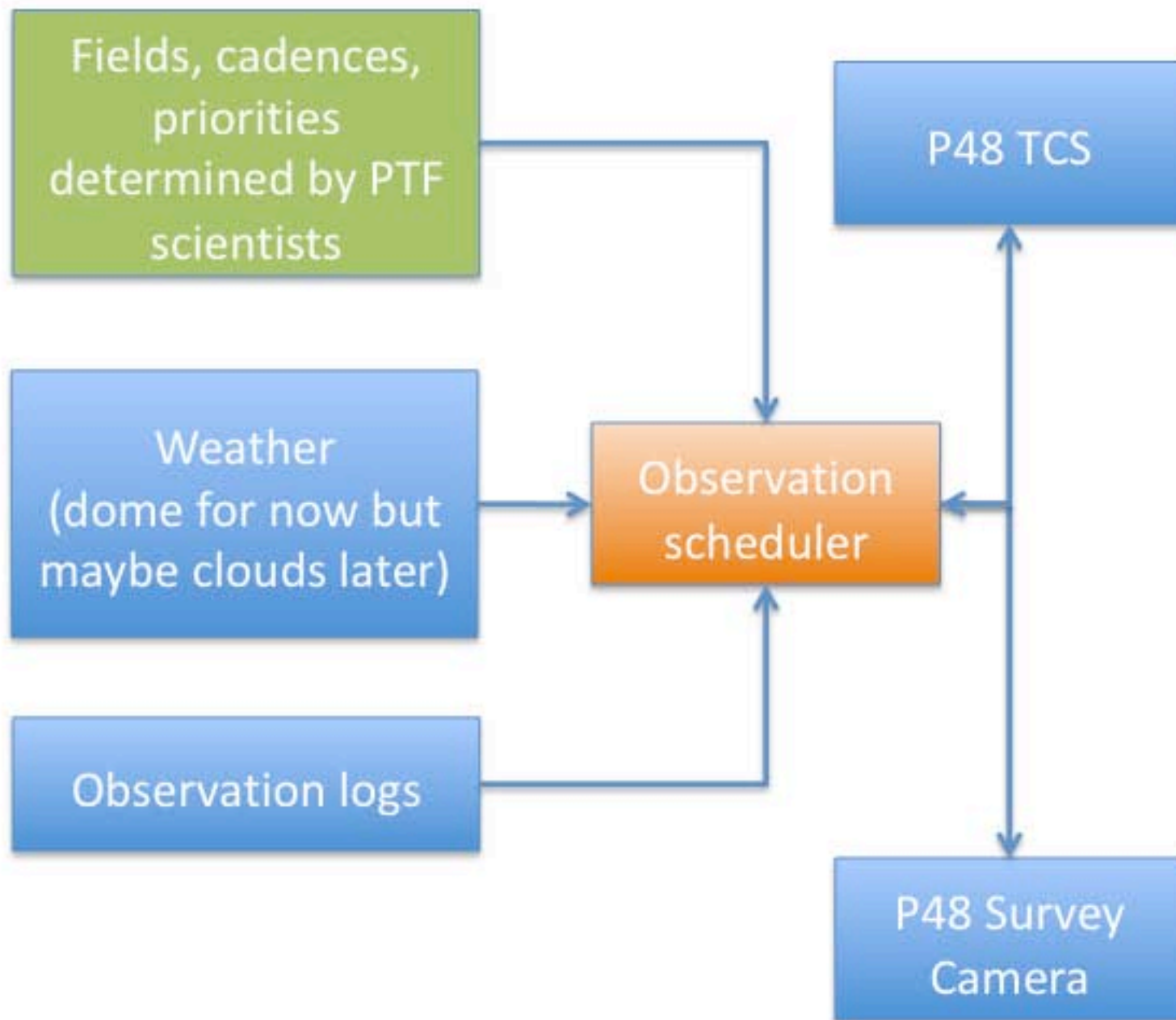
Peter Nugent  
RT Detection

Joshua Bloom  
Classification



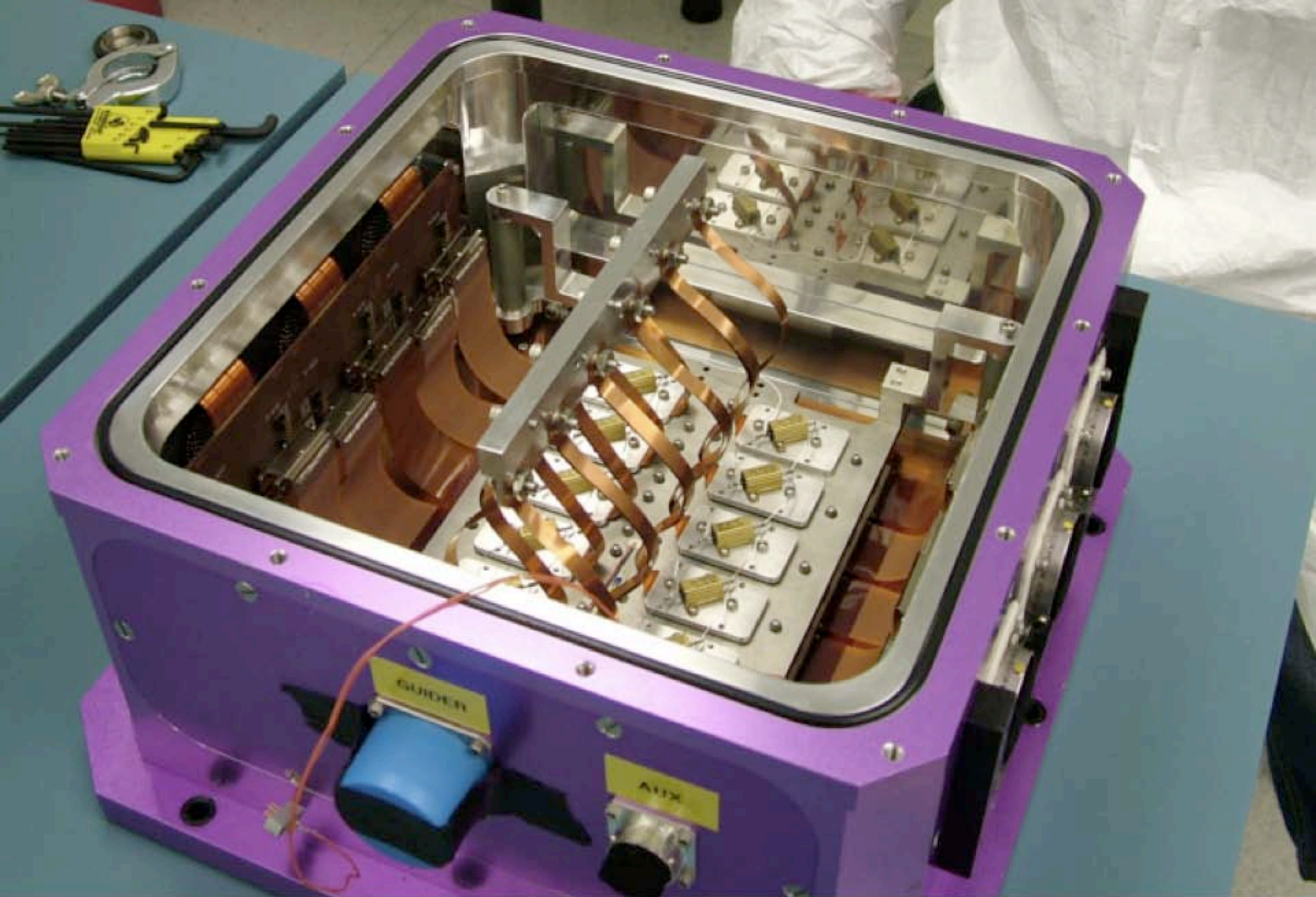


# Scheduler



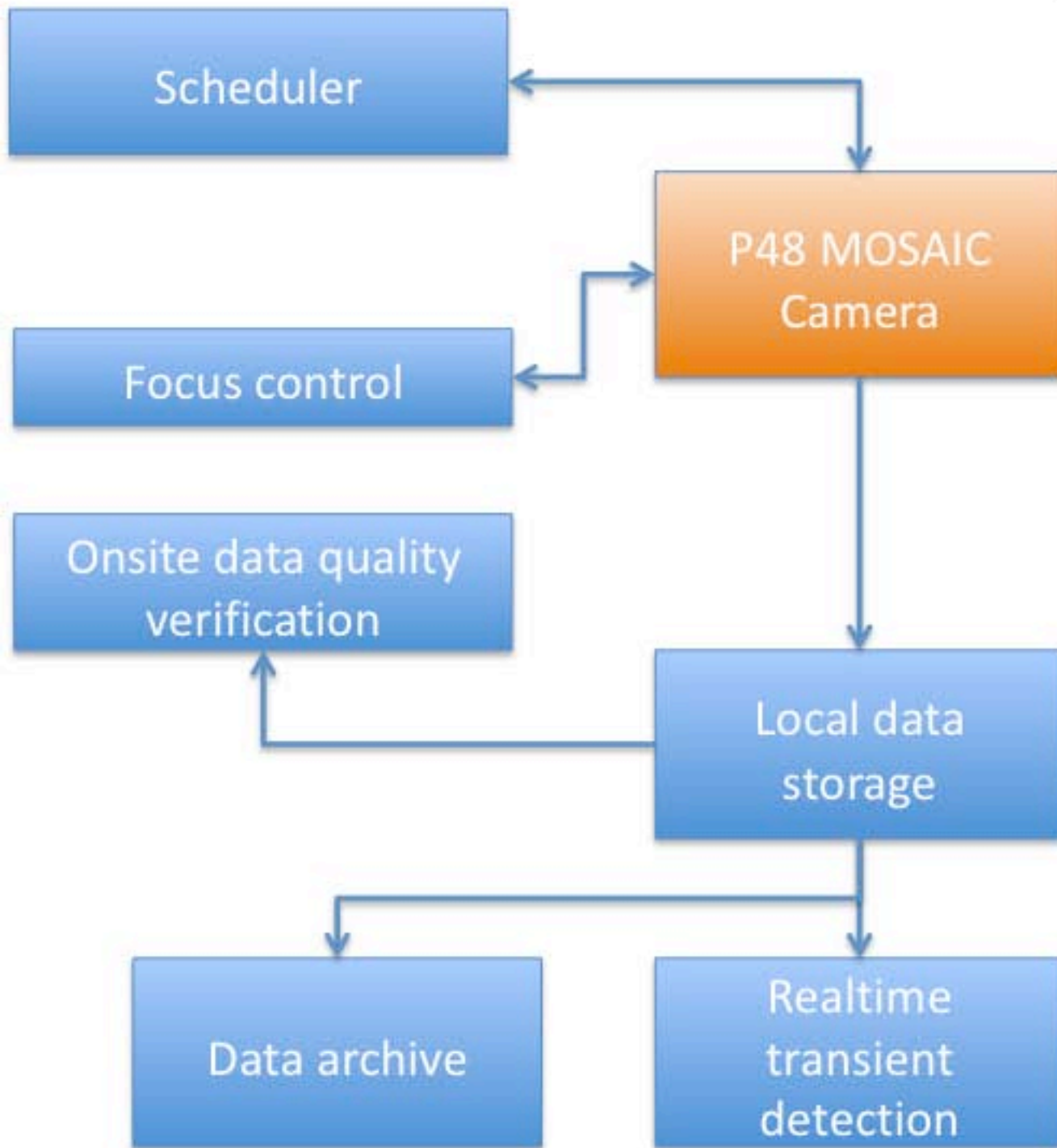
- Automated observation control system
- Commands telescope – all observations executed automatically
- Attempts to guarantee cadences (within weather constraints)





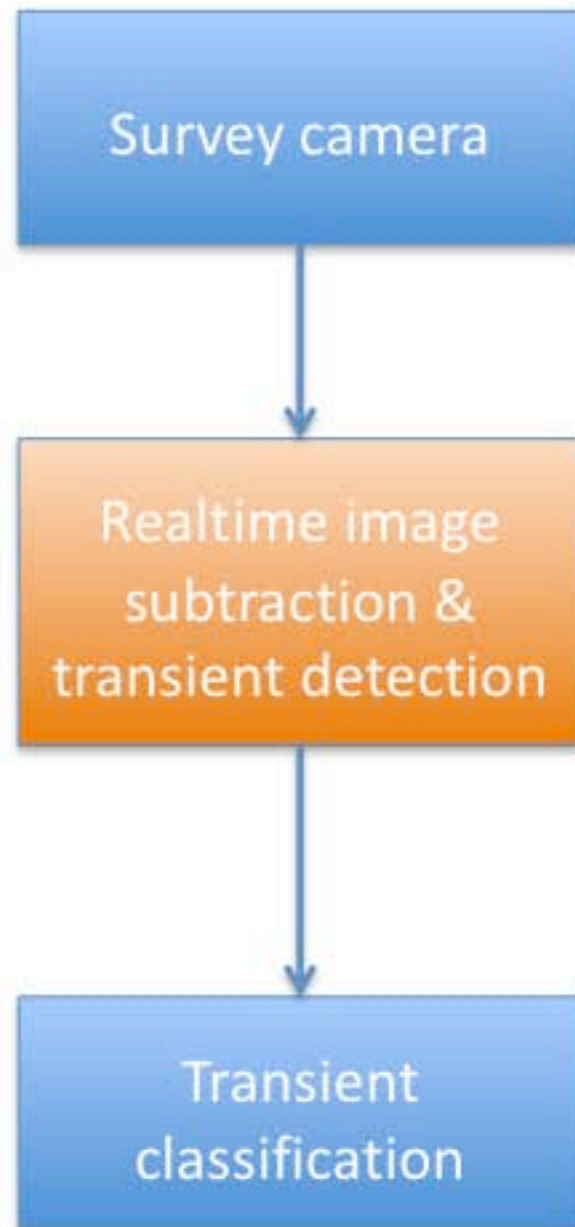


# Wide-angle Survey Camera



- Caltech & Palomar
- P48 – robotic 48 inch Schmidt telescope @ Palomar
- 100 MPixel CCD array
- 1" sampling, 2.3 X 3.4 degree field of view
- Two filters
- 2 arcsec FWHM image quality specified
- Reaches approx  $m=21$  in 60 secs (30 sec readout)

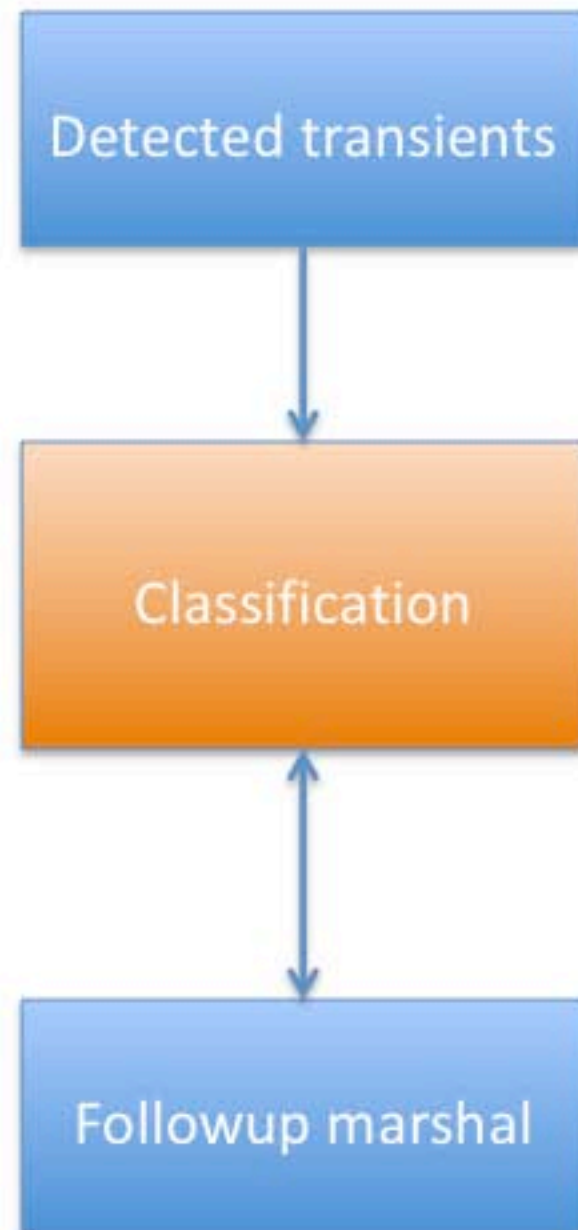
# Realtime transient detection



- LBL
- Automated, rapid astrometric & photometric reduction
- Image differencing fast enough to see rapid transients as data is taken

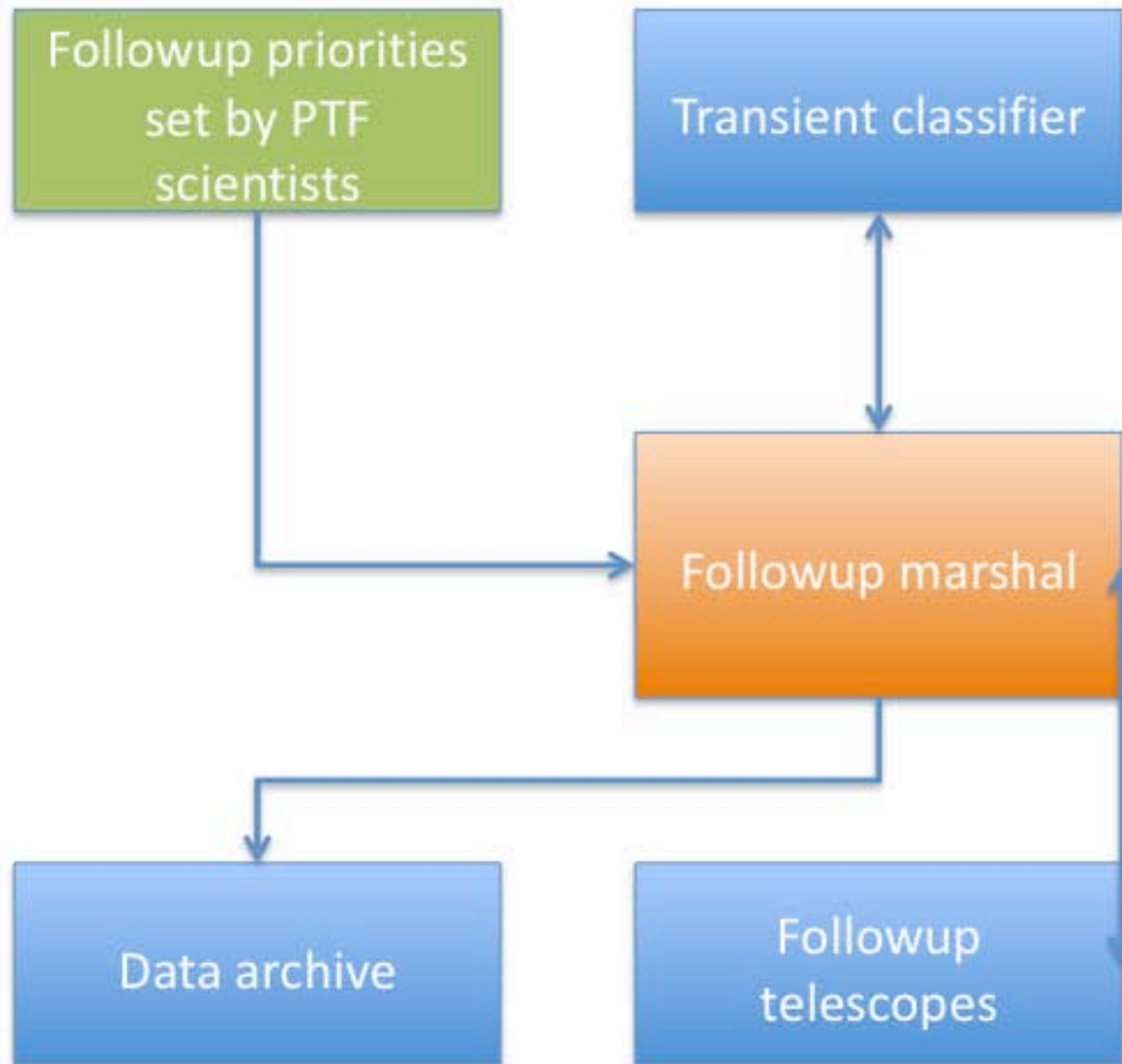


# Realtime transient classification



- Berkeley
- Realtime classification of transients detected by LBL
- Probabilistic classification on basis of all available information
- Takes followup data into account

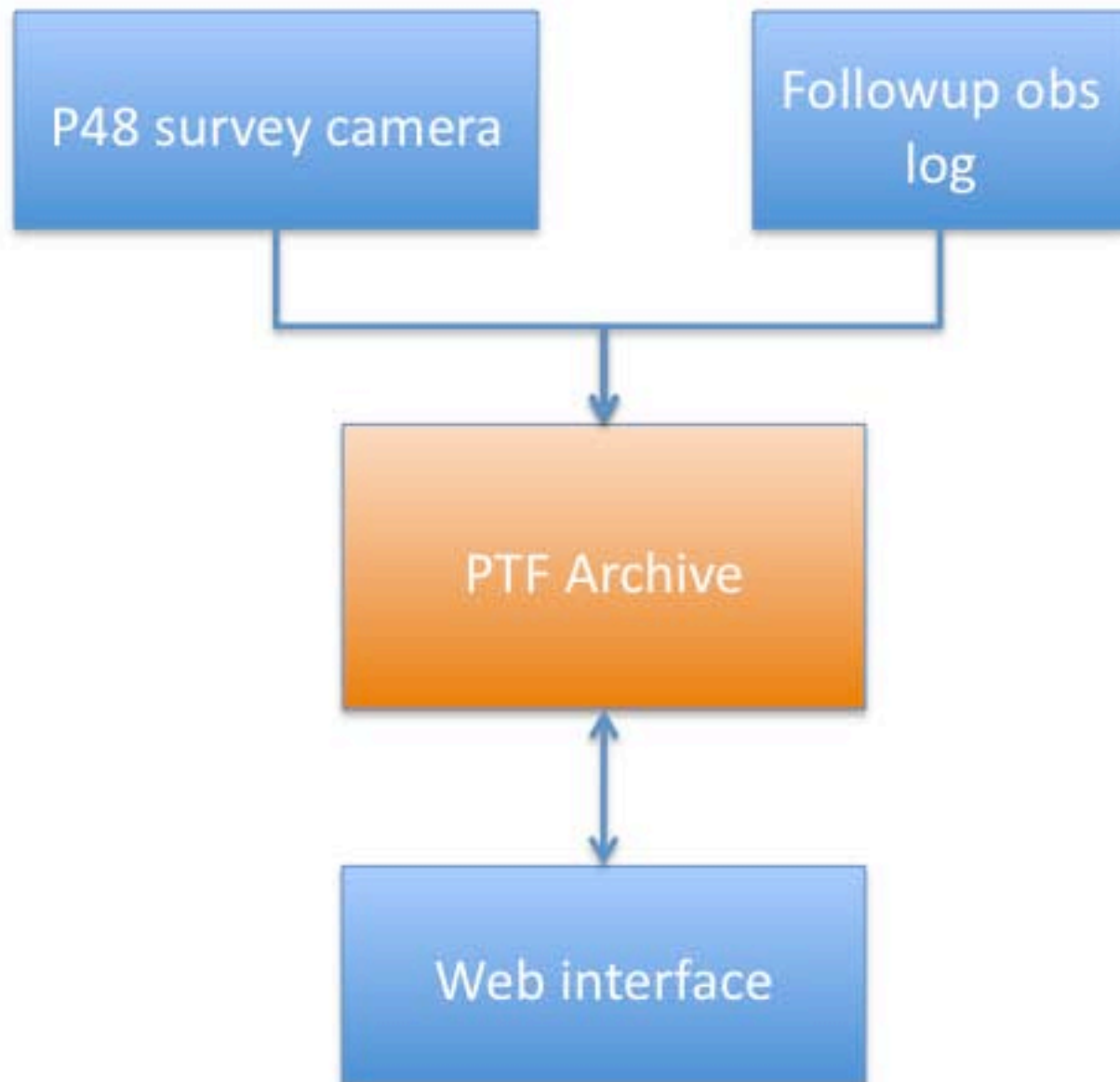
# Followup



- Led by automated “Followup Marshal” at Caltech
- Using probabilistic classifications and knowledge of the telescope resources available to automatically choose “optimal” followup program



# PTF Archive



- IPAC
- Full archive of all PTF data
- Searchable database of all sources detected in every image taken (variable or not)
- Retrieve photometric, astrometric, source upper limit, etc. information

## Data quality verification

- Multi-layered
- On mountain
  - automated twice-daily checkout of P48 camera optics + CCDs
  - Focus monitor also checks for obvious problems during the night
- Off-mountain
  - IPAC archive provides more detailed image quality statistics to be monitored by PTF team

