

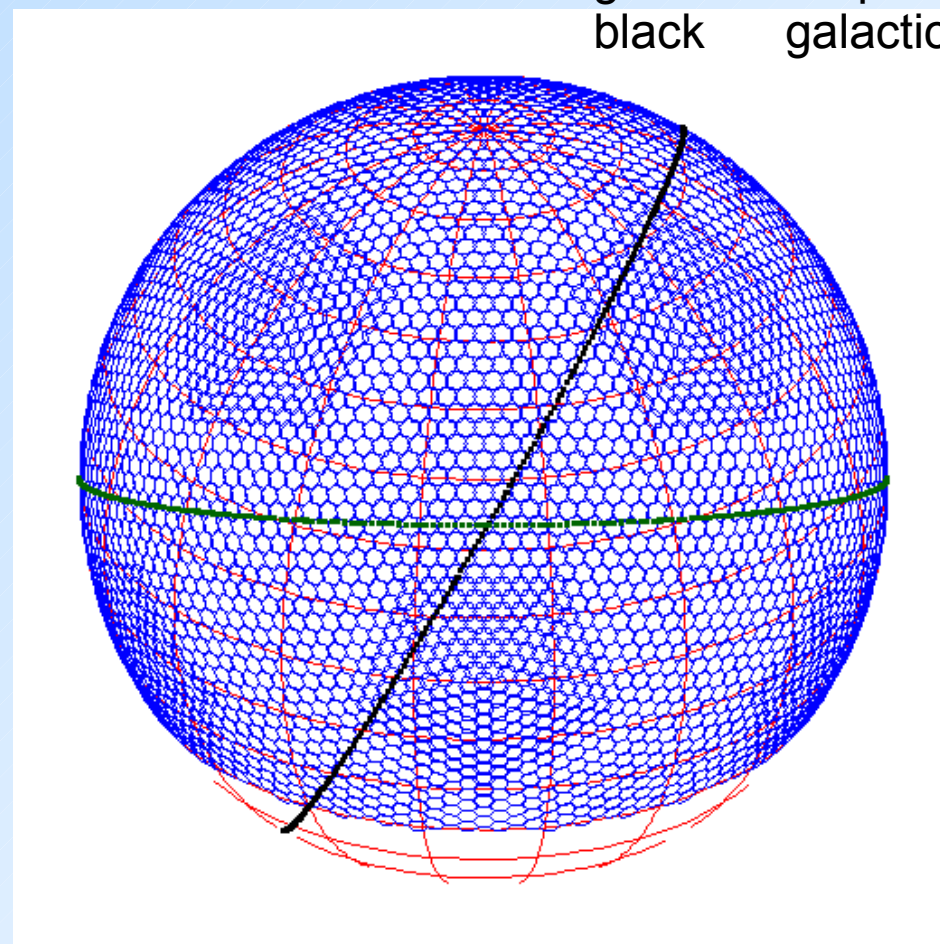
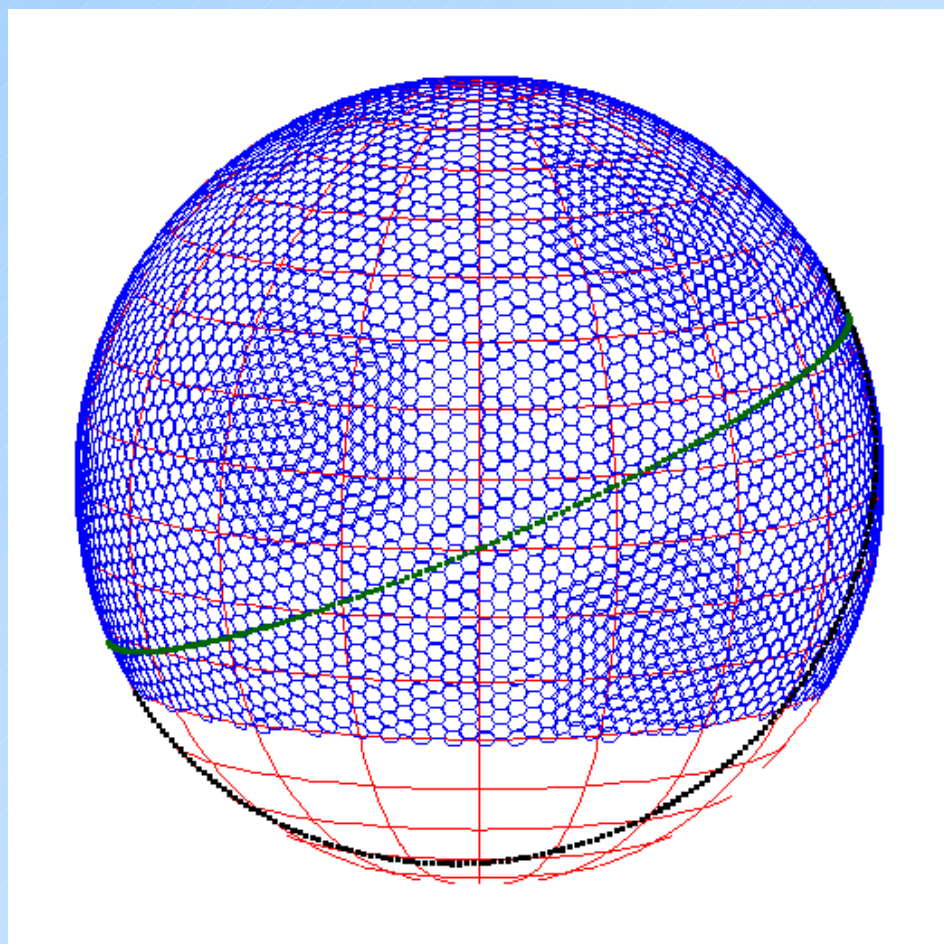
# Pan-STARRS Calibration Strategy

## Pan-STARRS 1 : The $3\pi$ Survey Concept

- 5466 fields for  $3\pi$ : 60 epochs ( $\delta > -30$ )
- *rizy*: 12x35 sec, *g*: 12x60 sec
- all observations at opposition on asteroid cadence
- 1 mmag photometry requirement (*riz*), higher precision goals

blue  
green  
black

$3\pi$  survey  
ecliptic  
galactic

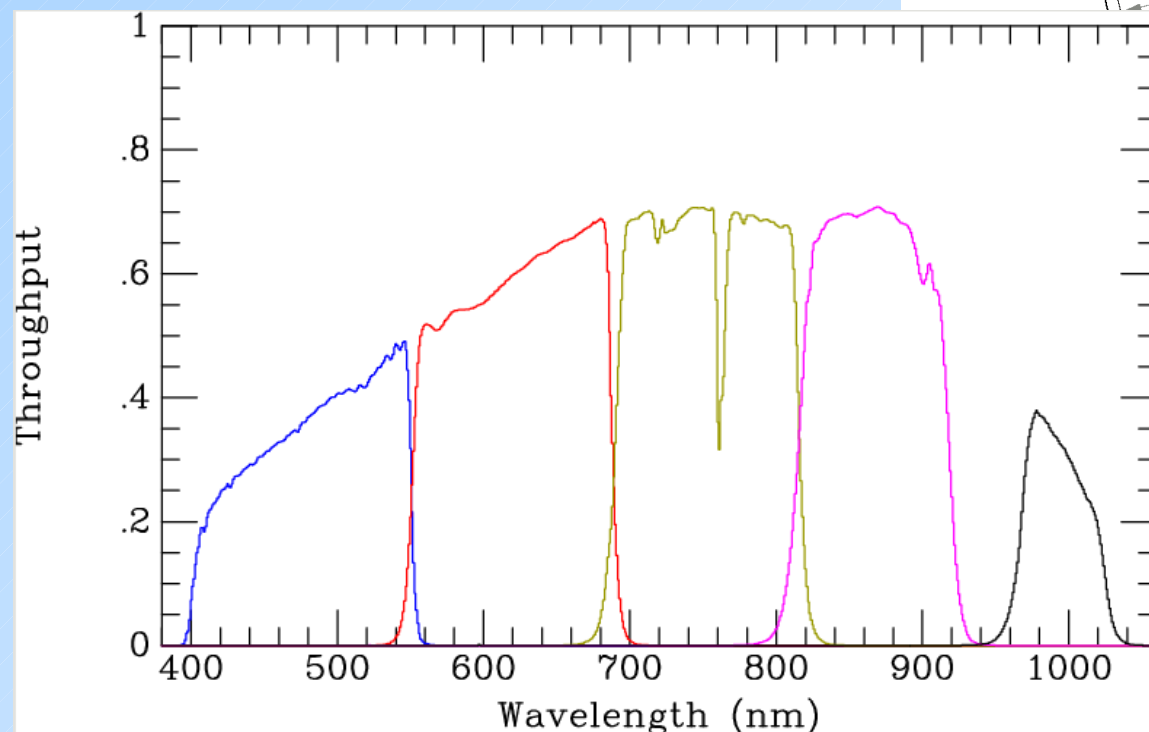
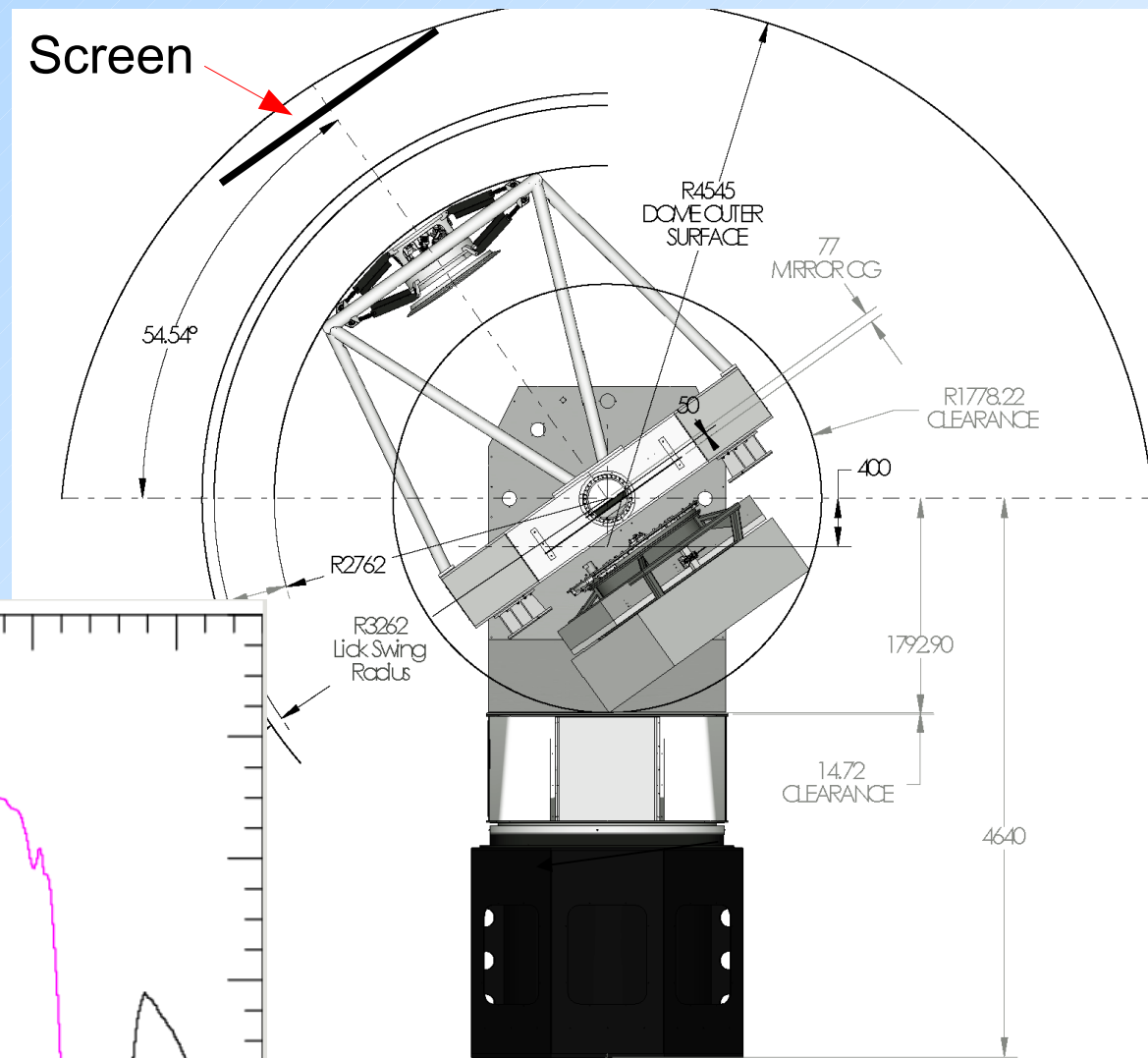


# Photometry Calibration Strategy

- Instrument Characterization
  - Stubbs Calibration Screen
  - Frequent, in-situ filter transmission function
  - Extensive 'metadata' stream in database
- Empirical System Response
  - Chip-to-Chip Color Terms
  - Finer Spatial variation if needed
- Atmosphere Characterization
  - Atmospheric Transparency Monitor(s)
  - Heavy Standards Monitoring
  - Extreme Spatial Overlaps

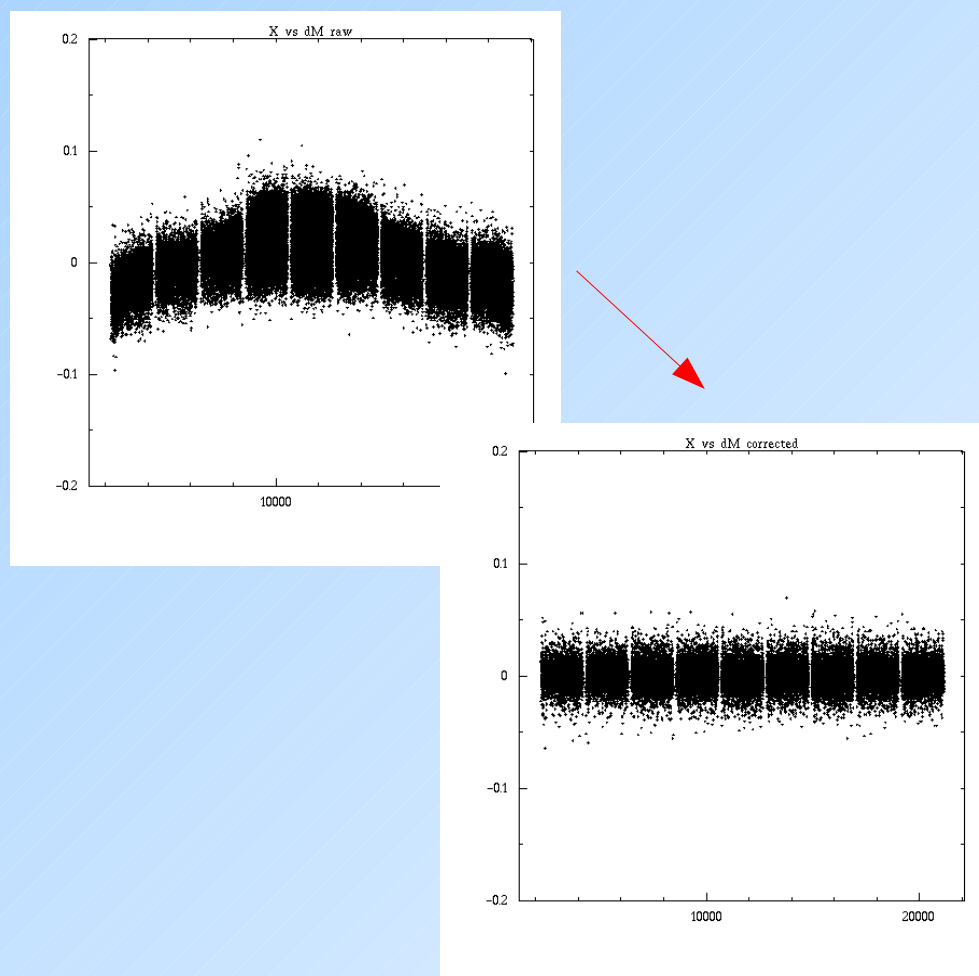
# Stubbs Calibration Screen

- Fiber fed from light source
- Continuum source for flat-field
- Monochromator for filter trace
- Advantages
  - Repeatability
  - Uniformity
  - Stability
  - Shuttered light source

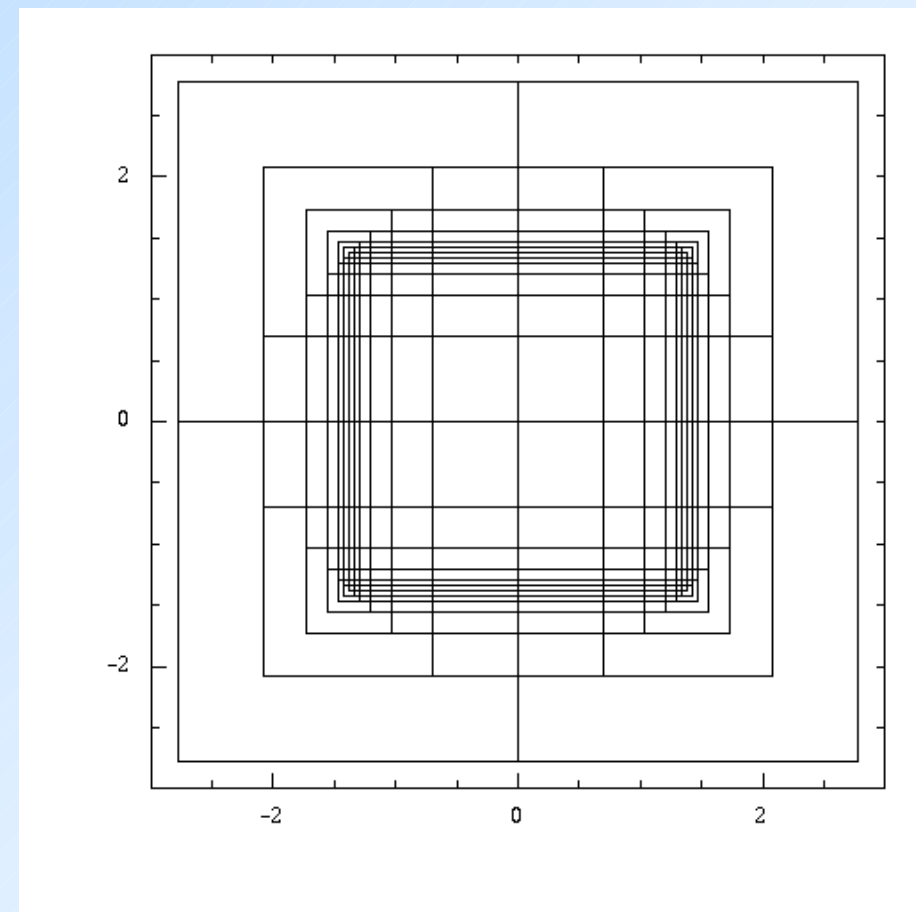


## Flat-field Correction & Chip-to-chip colors

- Flat-field correction based on stellar photometry
- Measures all large-scale static flat-field errors
- Includes geometric correction
- Chip-to-chip color terms (finer grid if needed)



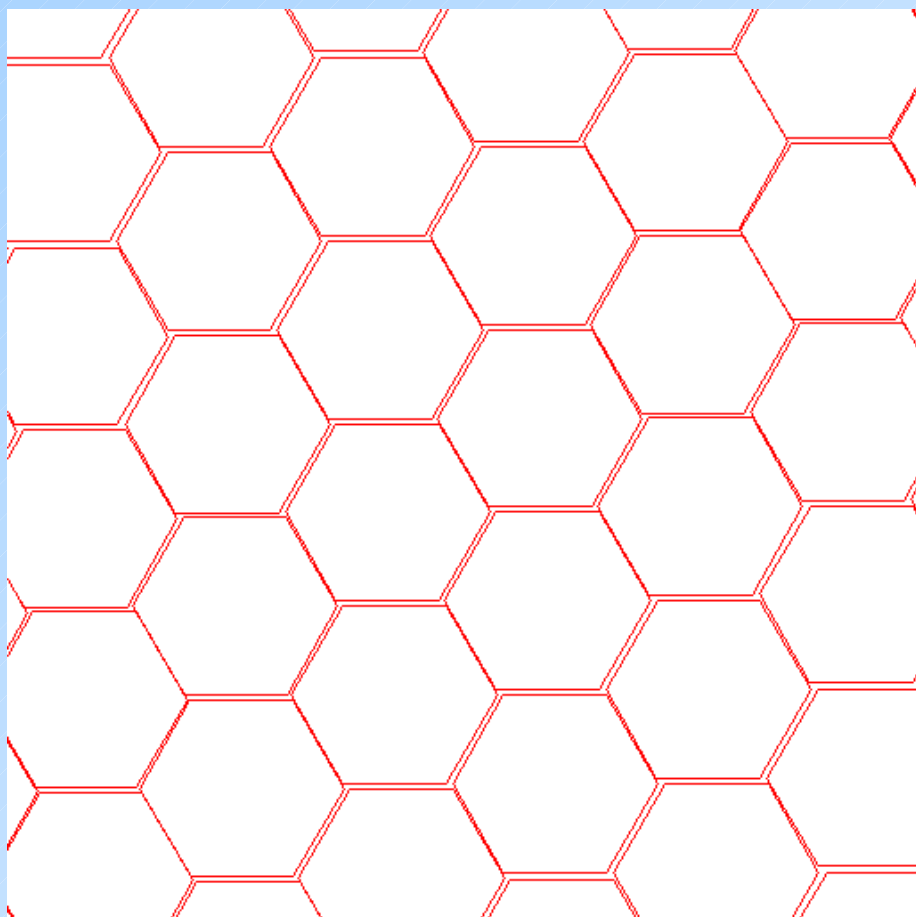
GPC1 photflat dither pattern



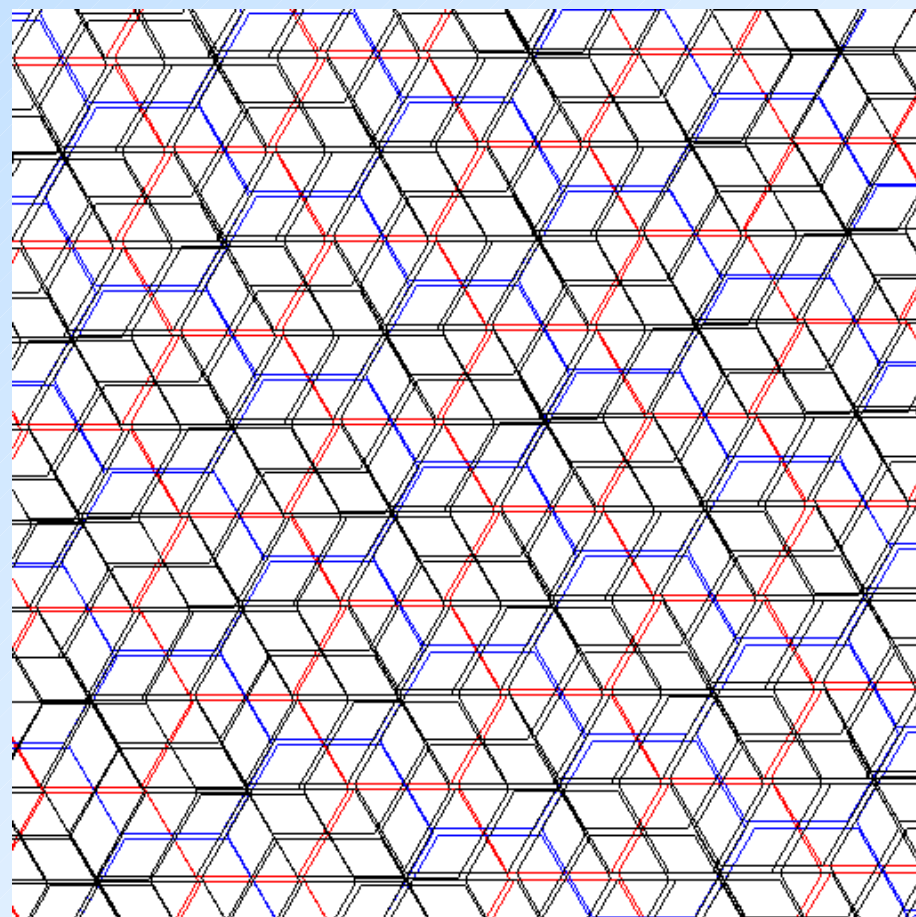
## Observing Strategy : Extensive Dithers + Reference Fields

- repeated tessalations (12 per filter) with larger dithers
  - solve for a single photometric system using overlaps
- hourly reference star field (internal standards)
  - tie down low-frequency atmosphere changes & accumulated errors

initial tessalation



6 passes





# SkyProbe



## SkyProbe @ Pan-STARRS

- larger detector ( $2048^2$ )
- back-side illumination
- larger aperture (120 mm)
- 5 filters (*grizy*)
- better sampling (5 arcsec)
- controlled focus

## SkyProbe @ CFHT

