Pan-STARRS Calibration Strategy

Eugene Magnier
Pan-STARRS / IfA
2008 April 04

Pan-STARRS 1 : The 3π Survey Concept

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

blue   3π survey
green   ecliptic
black   galactic
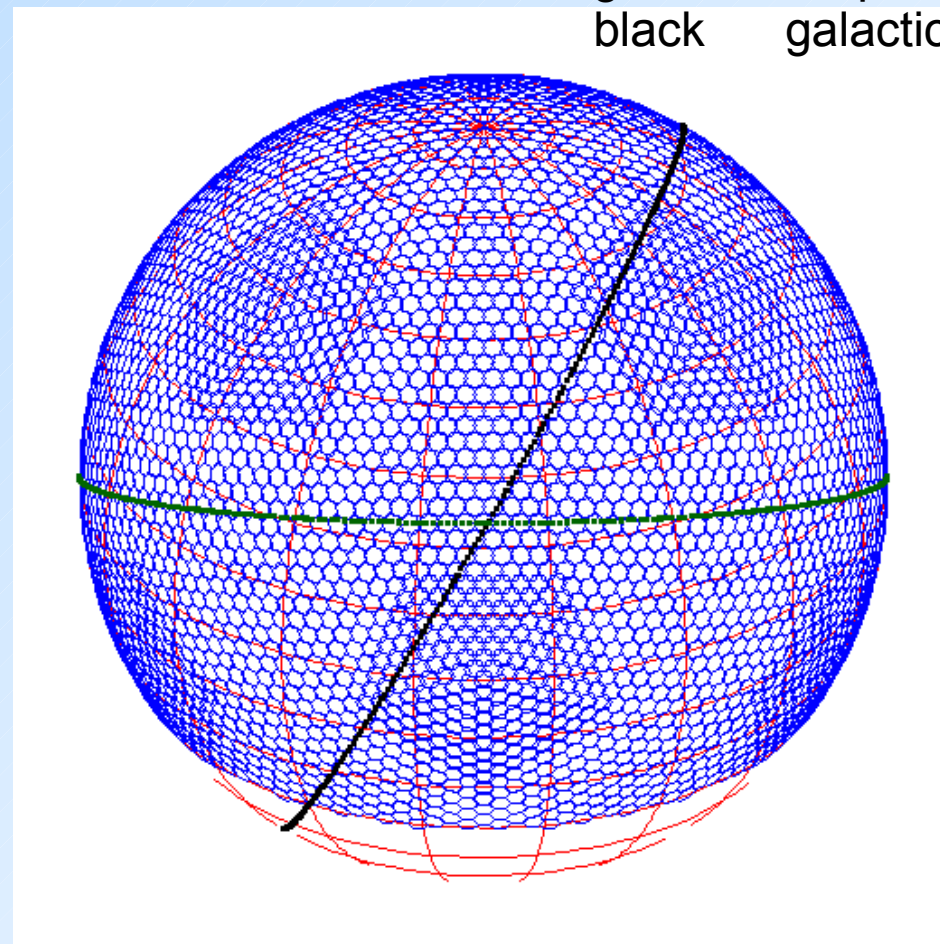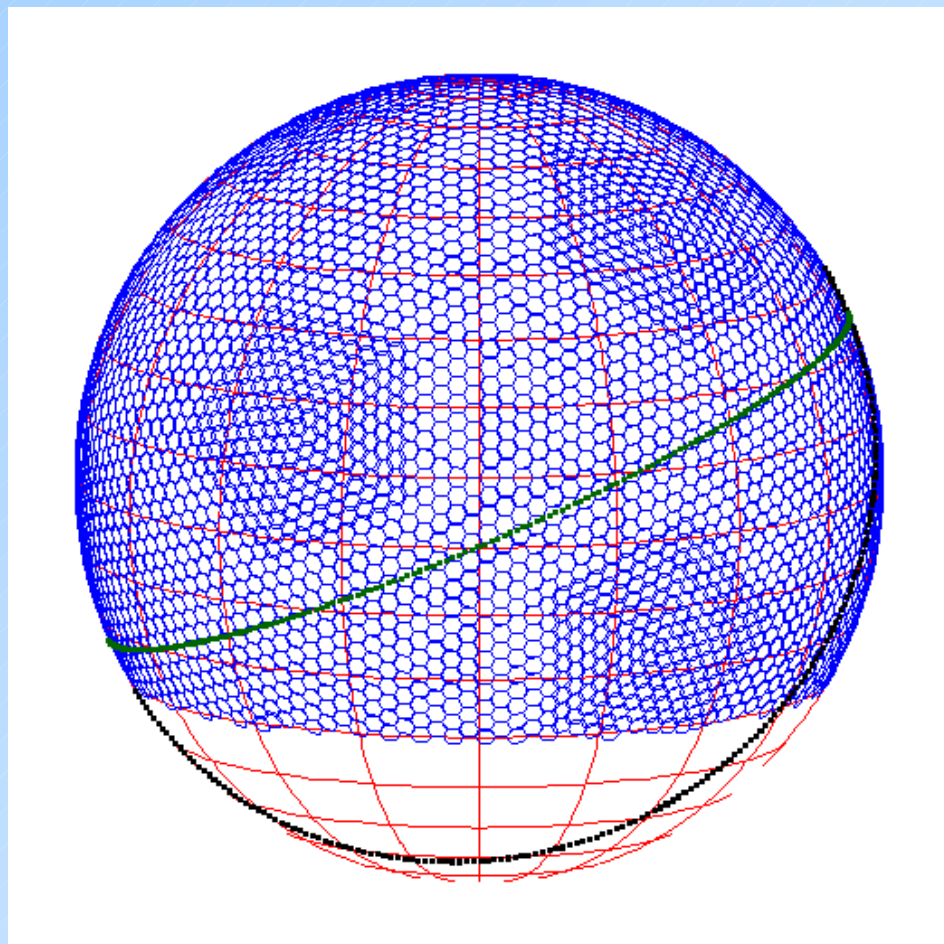
Photmetry Calibration Strategy

- 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
- Monochrometer for filter trace
- Advantages
  - Repeatability
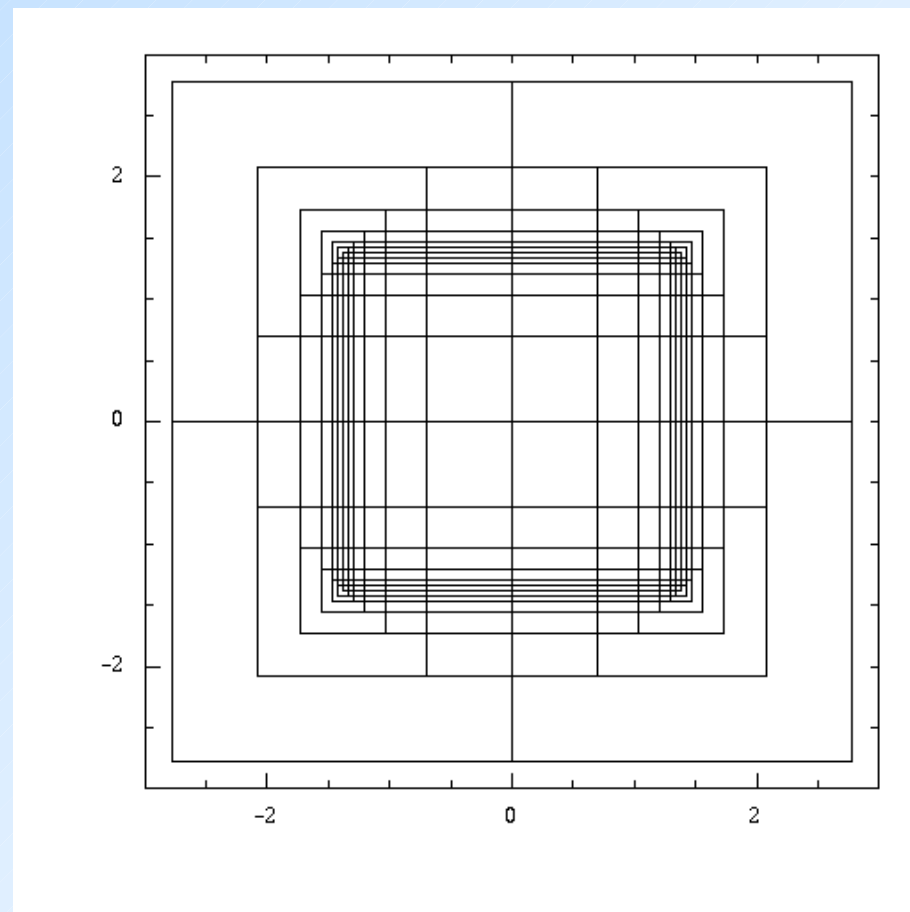 - Uniformity
  - Stability
  - Shuttered light source
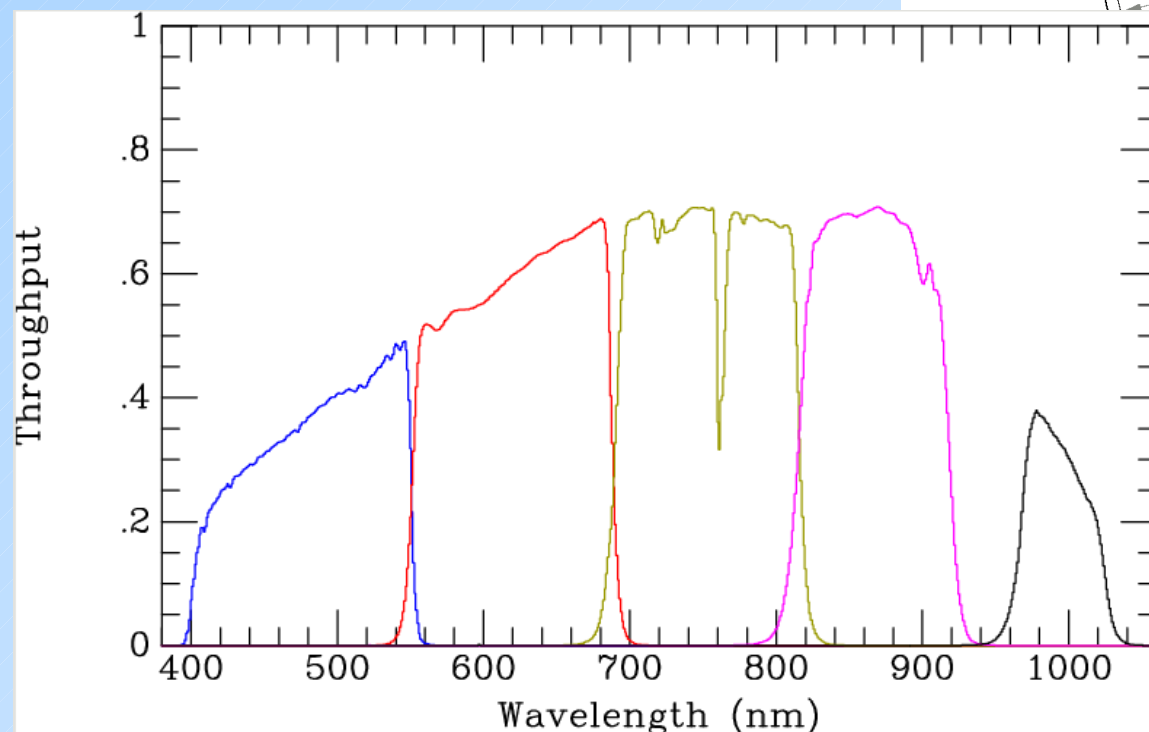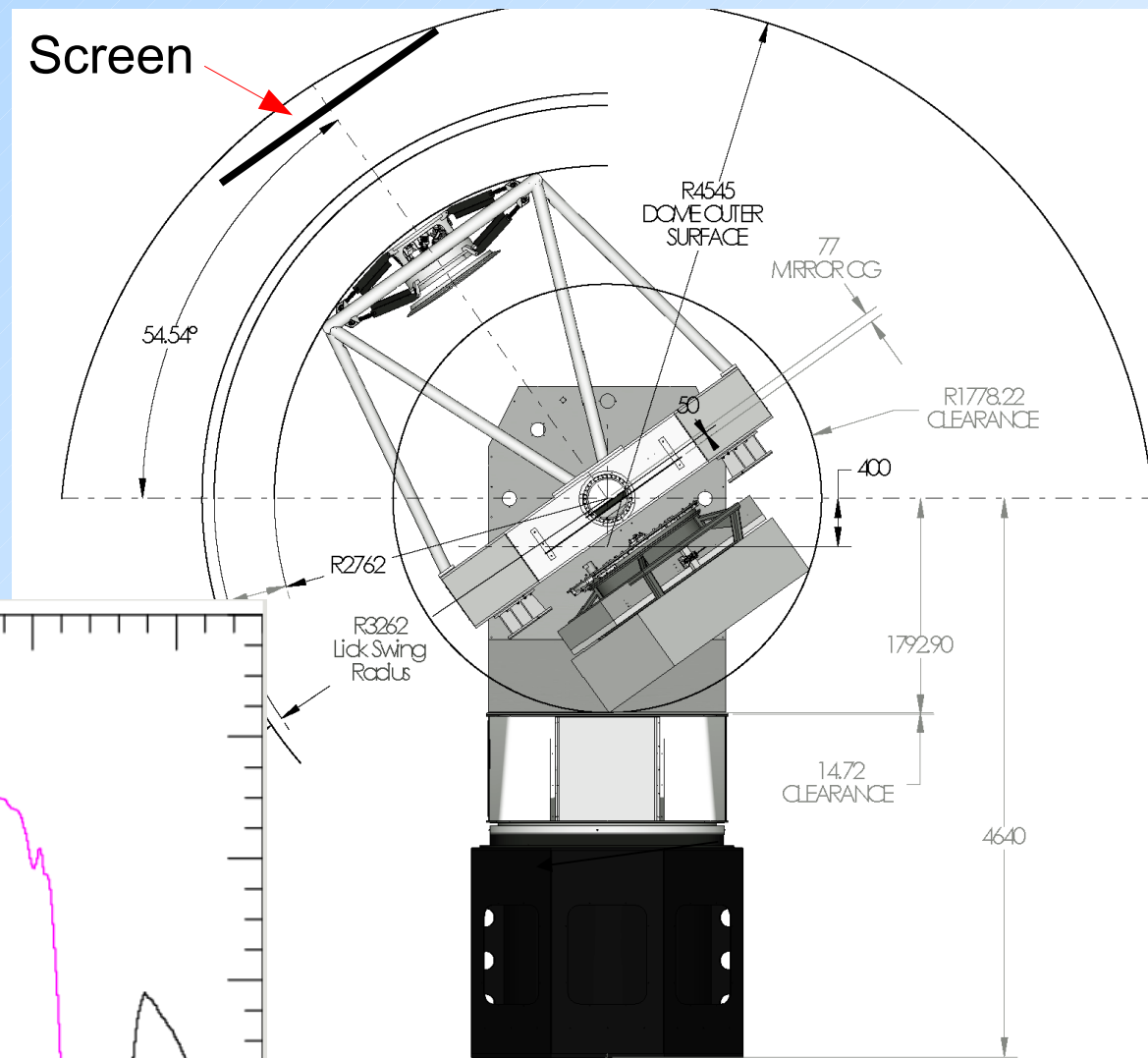
Flat-field Correction & Chip-to-chip colors

- 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)
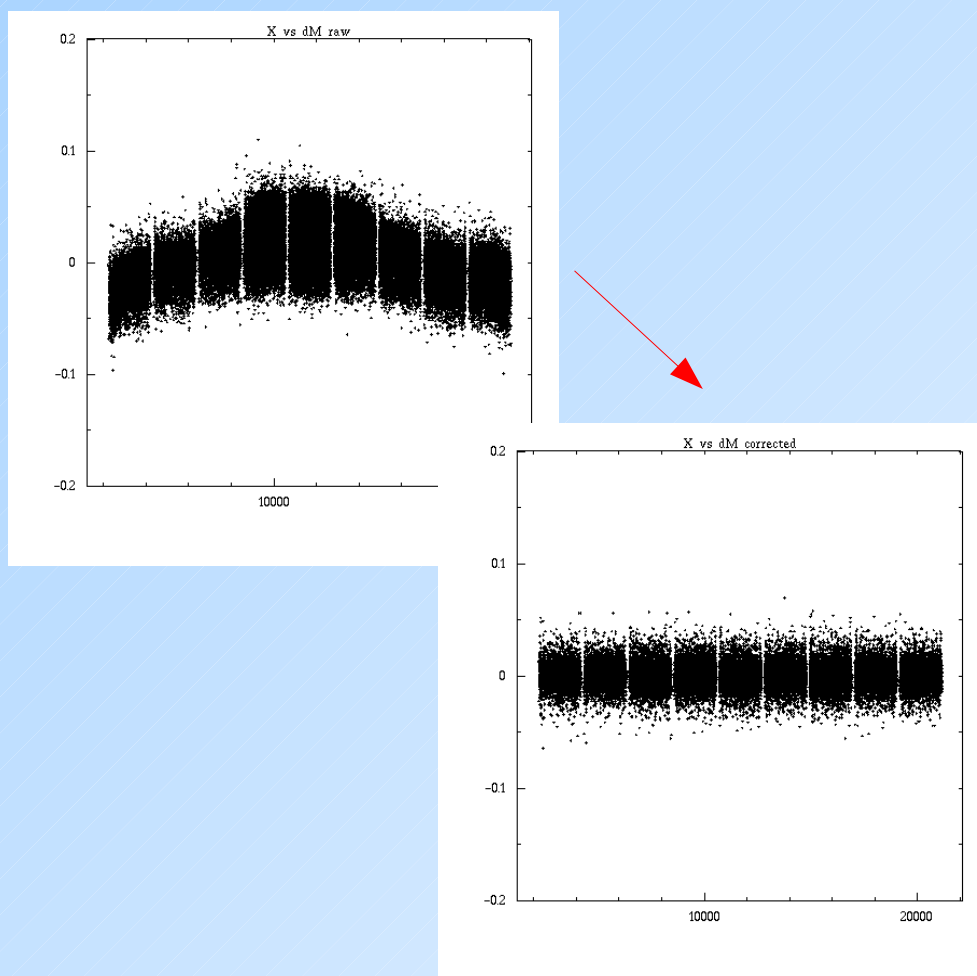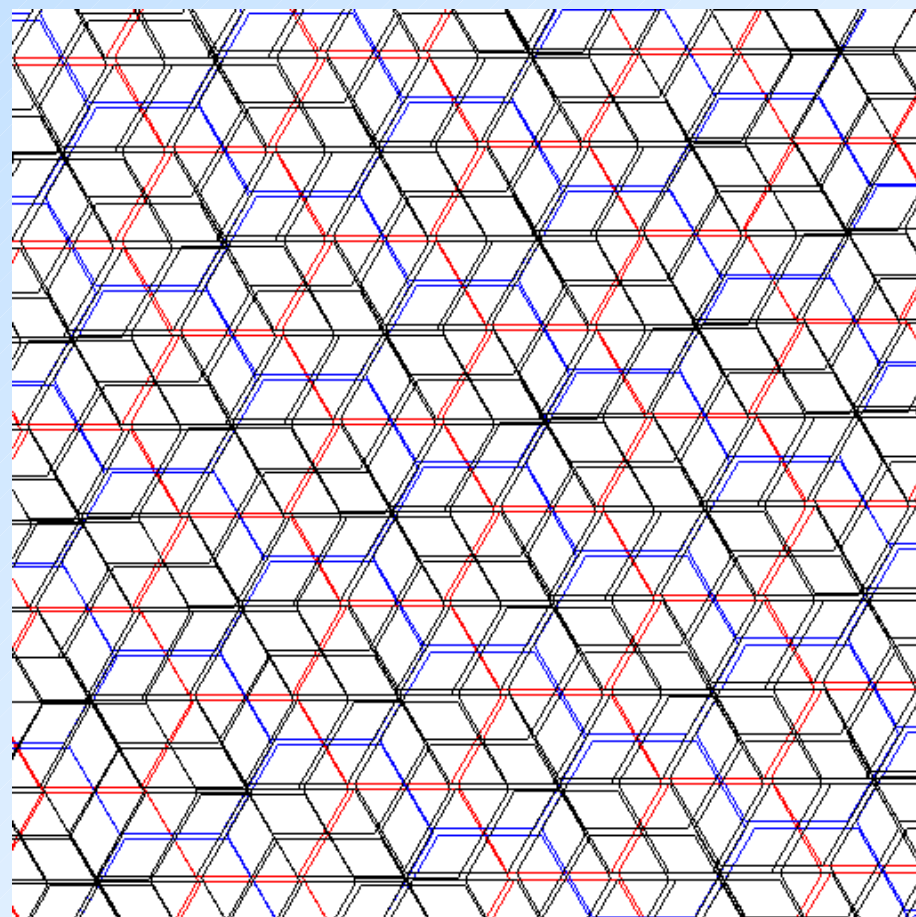
GPC1 photflat dither pattern

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
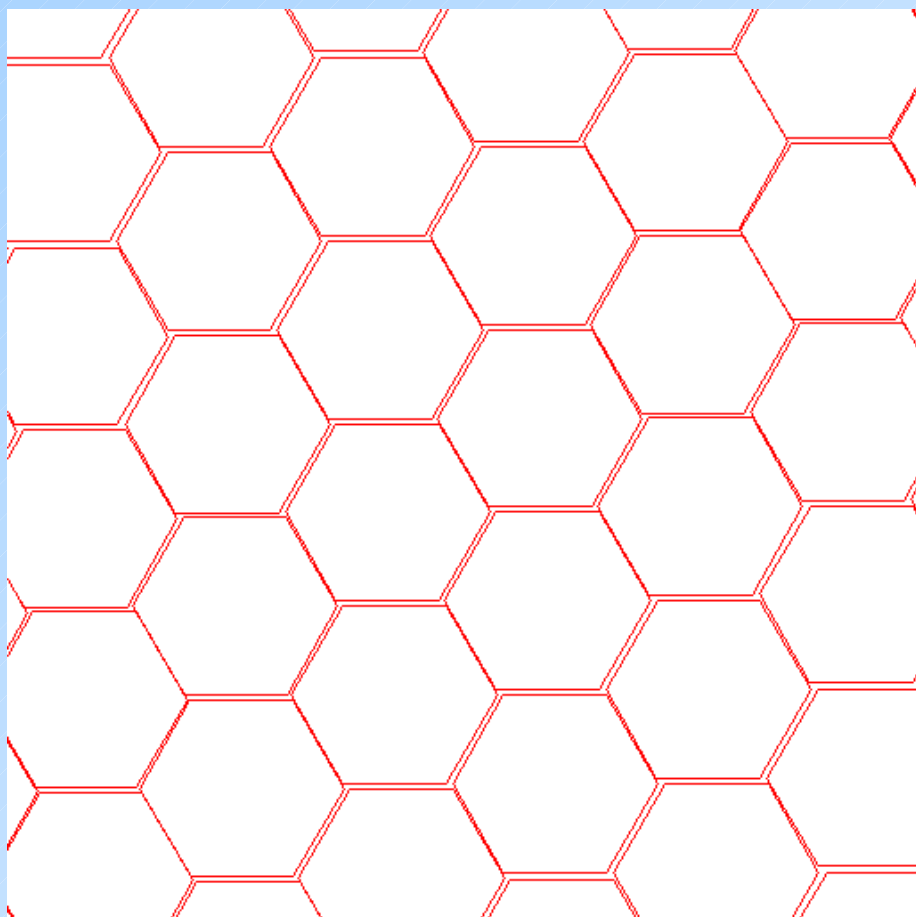
6 passes

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

SkyProbe @ CFHT: Atmospheric Attenuation

plot starts at:
2004/03/11,18:00:00 (HST)
2004/03/12,04:00:00 (UT)

plot created at:
Fri Mar 12 05:59:07 2004