

PreCam: Lessons Learned, version 0

Kyler Kuehn
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What went right?

- See ObsTac Coverage Plots: we succeeded in observing the vast majority of our proposed Rib & Keel plan, especially Stripe 82.
- All data successfully transferred off-mountain. No catastrophic data management errors (e.g. HD filled only once, was resolved quickly).
- Everything survived shipping--good news for DES.
- CCDs also weathered sudden exposure to atmospheric pressure (while cold) + a few other temperature incidents.
- “Live-fire” exercises for many components of DES hardware (CCDs, Monsoon) and software (PanVIEW, SISPI, ObsTac, QR), leading to much feedback and many improvements or new capabilities (especially in software). I expect the same outcome for upcoming Data Analysis/Pipeline activities.
- Successfully trained many observers on DES-like system.
- Communications with observers...almost like being there.

What went wrong?

Major Problems

- Optics are a perfect place for single-point failures!
- Shutter: 2 catastrophic + 1 recoverable failures in ~40k actuations
- Banding/streaking in many images (~10%?)
 - Grounding/Electrical Isolation: Telescope Ground \neq Dome Ground
 - Gravitational Loading on cables--esp. Monsoon-VIB and Monsoon power. [Cryo lines, on the other hand, performed amazingly well--spec'd for ~1 foot of unsupported weight, we had ~2m.]
- Vacuum Gauge failure after only a few weeks.
- FITS Headers took a very long time to sort out
- precam1 /boot corrupted, failover to precam2 failed (initially)
- Data processing pipeline (and even QR) not fully integrated [Not a problem in itself, but this likely would have facilitated identification of, for example, flat-field intensity issues or disconnected Rib/Keel segments before they became serious issues.]

What went wrong?

less major problems

- Too many avenues of communication: Skype, PreCam Wiki, Email, Electronic Logbook, Observing Logs, CTIO Nightly Logs, Observing Manual, C-S Manual, Daily Telecons. Pick one or a few primary modes where all essential information is conveyed!
- Training and on-mountain knowledge became attenuated as time progressed. (Documentation?)
- “15 minute” Telecons were more often 45 min. Did this impact observing or other necessary work?
- Computers are “missile technology”?!?
- Camera vessel modified multiple times during production
- Leach controller-enabled CCD ports on “wrong” end of VIB
- CCD-VIB cables installed backwards (now keyed!)
- Dewar-T/F Box mating clamps didn’t all fit--why was this a surprise?
- LS setpoint temperature not always matched by actual temperature.

What went wrong?

less major problems

- SISPI is quite baroque, with lots of moving parts; when it works it is a thing of beauty to behold. When it doesn't, it has many failure modes:
 - Internal dependencies/conflicting versions (OCS/ICS/IB/DHS)
 - External dependencies (Python, PyRO, postgres)
 - Panview (+FP Configuration), ObsTac, QR
 - DB, setup script and ini files
- Lots of support required (esp. from Kyler, Steve, Marco, Eric, Doug, TelOps, and others).
 - Sufficient expertise to diagnose/solve nearly every PreCam problem resided within a few people who were relatively easy to communicate with (i.e. +/-3 hrs from Chile). This will not be the case for DES.
 - During observing, we had 1.3MB of Skype text chat, >2.5k emails (I'm still cleaning out my inbox), numerous video chats, and daily VPN sessions for remote troubleshooting. From 12/18 to 1/18, I was on Skype/phone with observers roughly every other day for between 30 min and 9 hours. Will DES need this much (or more) support, esp. during commissioning?