Welcome

Wireless setup

Talks - getting them online - send to
afriedman@cfa.harvard.edu

Conceptual Agenda:
share knowledge
get feedback & ideas on what to do next
create actions items
## Actual Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Presenter</th>
<th>Topic</th>
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<tbody>
<tr>
<td>9:15-9:40</td>
<td>Joshua Bloom</td>
<td>Welcome; Introduction to the Pipeline and New Archive</td>
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<tr>
<td>9:40-10:15</td>
<td>Cullen Blake</td>
<td>Astrometry with PAIRITELE + photometry</td>
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<td>10:15-10:30</td>
<td>Coffee</td>
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<td>10:30-11:30</td>
<td>Michael Wood-Vasey</td>
<td>Photometry with PAIRITELE</td>
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<td>11:30-12:00</td>
<td>Andrew Friedman</td>
<td>Selected PAIRITELE Data Analysis Issues</td>
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<td>12:00-1:05</td>
<td>Lunch</td>
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also, Dan Kocevski
Welcome; Introduction to the Pipeline and New Archive

Josh Bloom

UC Berkeley

2nd PAIRITEL Workshop; 16 May 2006
Outline
Outline

- Hardware Updates
Outline

- Hardware Updates
  - On-site
Outline

- Hardware Updates
  - On-site
  - @Berkeley
Outline

- Hardware Updates
  - On-site
  - @Berkeley
- Software
Outline

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  - @Berkeley
- Software
  - Operations update
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  - Pipeline1.0
Outline

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  - Pipeline1.0
  - Updates
Outline

- **Hardware Updates**
  - On-site
  - @Berkeley

- **Software**
  - Operations update
  - Pipeline1.0
  - Updates
  - Future
Onsite Hardware Updates
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- New UPS (EATON) system installed
Onsite Hardware Updates

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  - online as of mid-November 2005
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  - *bit sensing (opto22) since Mar 2006*
Basic Visualization in Place
(polling code from lyra)

next step:
set alarms on problem

http://lyra.berkeley.edu/~jbloom/Ln2opto22.html

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<th>Done State</th>
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<td>OFF</td>
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<tr>
<td>2006-05-08 20:16:22.898295</td>
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<tr>
<td>2006-05-08 20:05:51.591281</td>
<td>ON</td>
<td>OFF</td>
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<td>2006-05-08 19:00:43.044310</td>
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<td>2006-05-08 18:56:02.656107</td>
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<td>2006-05-08 18:35:40.194128</td>
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<td>2006-05-07 20:05:55.834489</td>
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<td>2006-05-07 19:00:38.711029</td>
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<td>2006-05-07 18:55:10.964551</td>
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<td>2006-05-07 18:35:47.980105</td>
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<td>OFF</td>
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<tr>
<td>2006-05-06 21:05:36.415394</td>
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</tr>
<tr>
<td>2006-05-06 20:16:24.783731</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>
@Berkeley Hardware Updates

GRB.berkeley.edu → Cluster
@Berkeley Hardware Updates

GRB.berkeley.edu → Cluster

5 Node + 5.6 TB RAID Mac Cluster

Each node = 2.3 Ghz IBM G5 Processors
2 GB RAM, 80 GB Hard Drive
RAID = 2 Gb fiber channel; 14x400Gb; RAID5

lyra →

Head Node

Cluster Nodes

RAID Array

/Bloom

Xgrid
Server+Agent

Xgrid
Agents

Agents
Software
Operations Update

🌟 Data Flow
- mirror to lyra:/Bloom/PAIRITEL-DATA/sem2006a

🌟 Database
- Nightly backup of database
- Addition of moving objects
  - Deep Impact, TNO, ...
  - requires pyephem-like string
- Helper webpages

🌟 Beta Transmission & Seeing Monitor
This form can be used to change the observation parameters of objects in the PAIRITEL database.

Please enter an object name and parameter values. This form is, in general, not case sensitive. Changes will only be made if un-completed observations remain.

Object Name: 
New RA: 
New Dec: 
New Exposure Time: 
New Priority: 
New Airmass Limit: 
New Mosaic Size (arc.min): 
New Observation Spacing (hours): 

[Submit New Values]
Operations Update

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- **Beta Transmission & Seeing Monitor**
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Software Pipeline Specs
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• Run-time selection of reduction methods:
  ✓ “Dark bank” or “sliding dark”?
  ✓ Mosaic or No Mosaic (blotting or not)?
Pipeline 1.0

atomized set of codes
Run on Berkeley cluster
Real-time:
on bang4
thru cronjob
6:30pm - 6:29pm Pacific

Offline:
on all nodes
thru Xgrid
Parallelized Reductions
Parallelized Reductions

• multiple redux directories in lyra:jbloom
Parallelized Reductions

- multiple redux directories in lyra:jbloom
- run instances of megar in parallel on different nights
Parallelized Reductions

• multiple redux directories in lyra:jbloom
• run instances of megar in parallel on different nights
• job run through Xgrid on remote machine
Parallelized Reductions

- multiple redux directories in `lyra:jbloom`
- run instances of `megar` in parallel on different nights
- job run through Xgrid on remote machine

```python
import os
from xg import *
import threading
threads = []

head_dir = '/Bloom/PAIRITEL-DATA/sem2005b/
dirs = ['Dir2006-Jan-21/','Dir2006-Jan-20/','Dir2006-Jan-19/','Dir2006-Jan-17/','Dir2006-Jan-15/','Dir2006-Jan-05/','Dir2006-Jan-04/']

c=Controller()
g=c.grid('0')

loop over nights:
    master_job.append(JobSpecification())
    master_job[-1].setName("Supernova March 2006-%i" % j)

#Add the xgwrapper.sh file, save it as xgwrapper.sh on the cluster and make it executable
master_job[-1].addFile(filepath='./xgwrapper.sh',filename='xgwrapper.sh',isExecutable=True)
master_job[-1].addTask(cmd='./xgwrapper.sh',args=[dir,redux_dir])
jsub=g.batch(master_job[-1])
jsub.results(stdout='./OutDir/s0 + str(j)'), stderr='./OutDir/err + str(j)', outdir='./OutDir')
```
Two Locations of Data under /Bloom/PAIRITEL-DATA

Actual

/sem2006a
/Dir2006-May-05
/Raw
/Real
/outs
/JHK
/Reduced
/Mosaics
/Web
Two Locations of Data under /Bloom/PAIRITEL-DATA

Actual

/sem2006a
/Dir2006-May-05
/Raw
/Real
/outs
/JHK
/Reduced
/Mosaics
/Web

04ab|05ab|06a

a: Feb - July
b: Aug - Jan
data from telescope
drizzled images
Two Locations of Data under /Bloom/PAIRITEL-DATA

**Actual**

- `/sem2006a`
- `/Dir2006-May-05`
  - `/Raw`
  - `/Real`
  - `/outs`
    - `/JHK`
    - `/Reduced`
    - `/Mosaics`
    - `/Web`

04ab|05ab|06a

- a: Feb - July
- b: Aug - Jan

Data from telescope drizzled images

**Virtual: symlinks**

- `/by_proj`
  - `/SN`
    - `/1`
      - `/Raw`
      - `/Mosaics`
      - `/SExtractor`
      - `/MosaicWeights`
      - `/Reduced`
      - `/Images`
      - `/gif`

Project name

Object number

Photometry
New Features

✴ Dark Bank
  - lookup table: significantly speed improvement

✴ Mosaicing
  - User input offset file for Drizzle
  - J→K Offsets as default
  - START_CPU and STOP_CPU of each image in header

✴ Astrometry
  - Telescope (5") → WCSTools (0.5") → IRAF/CCMAP (120 mas)
EXPTIME = 353.16
FILTER = 'k'
USEDARK = '/private/var/automount/Bloom/PAIRITEL-DATA/DarkBank/kdark-sky=33693.'
USEDARK1 = '46.fits'
CRVAL1 = 166.121458
CRVAL2 = 38.205972222223
CRPIX1 = 400.68
CRPIX2 = 391.98
CTYPE1 = 'RA---TAN'
CTYPE2 = 'DEC---TAN'
WCSDIM = 2
WAT0_001 = 'system=image'
WAT1_001 = 'wtype=tan axtype=ra'
WAT2_001 = 'wtype=tan axtype=dec'
CD1_1 = -0.0002777778
CD2_2 = 0.0002777778
FIXPIX = 'May 15 1:58 Bad pixel file is /Network/Servers/boom.cluster.private'
CCDMEANT = 832125490
CCDPROC = 'May 15 1:58 CCD processing done'
CD1_2 = 0.0
CD2_1 = 0.0
ORIGFILE = 'pkrr2006-May-15-05h43m09s-BLAZAR.3.89-p0-0.fits'
NDRIZIM = 45 / Drizzle, number of images drizzled onto this

STOP0001 = '2006-05-15 05:43:17.627675'
STOP0002 = '2006-05-15 05:43:25.560555'
STOP0003 = '2006-05-15 05:43:33.467548'
STOP0004 = '2006-05-15 05:44:45.838086'
STOP0005 = '2006-05-15 05:45:06.147942'
STOP0006 = '2006-05-15 05:45:14.128422'
STOP0007 = '2006-05-15 05:45:22.038103'
STOP0008 = '2006-05-15 05:45:42.348155'
STOP0009 = '2006-05-15 05:45:50.268195'
STRT0010 = '2006-05-15 05:45:50.274134'
STOP0038 = '2006-05-15 05:51:45.029444'
### Astrometry/Photometry Files

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<th>Mode</th>
<th>User</th>
<th>Size</th>
<th>Date</th>
<th>File Name</th>
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<tbody>
<tr>
<td>rw-rw-rw-</td>
<td>jbloom</td>
<td>2643840</td>
<td>May 15 21:57</td>
<td>moshGRB.10434.1-2006May10.fits</td>
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<td>rw-rw-rw-</td>
<td>jbloom</td>
<td>903</td>
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<td>moshGRB.10434.1-2006May10.sex.match.db</td>
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<td>rw-rw-rw-</td>
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<td>2644</td>
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<td>rw-rw-rw-</td>
<td>jbloom</td>
<td>4576</td>
<td>May 15 21:57</td>
<td>moshGRB.10434.1-2006May10.sex</td>
</tr>
</tbody>
</table>

```
WCSRCAT= 'tmc'
WCSIMCAT= 'moshGRB.10434.1-2006May10.sex'
WSCMATCH= 33
WCSNREF = 68
WCSTOL = 2.0000
RA = '15:56:27.709'
DEC = '+78:33:57.72'
WEQUINOX= 2000
EPOCH = 2000
RADECSYS= 'FK5'
CROTAL = 0.000000
SECPIX1 = 0.9971
SECPIX2 = 0.9913
WCSSEP = 0.649
IMWCS = '3.5.0, 22 November 2003, Doug Mink (dmink@cfa.harvard.edu)'
EQUINOX = 2000.
ETA_STAT= 'ETA fit ok'
XI_STAT = 'XI fit ok'
RA_RMS = 0.0837
DEC_RMS = 0.118
```
Reductions Pipeline 2.0
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• minimal file I/O; should be RAM intensive
Reductions Pipeline 2.0

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• parallelized by night or by observations
Reductions Pipeline 2.0

- minimal file I/O; should be RAM intensive
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- IRAF-free
Reductions Pipeline 2.0

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  - implied Drizzle-free (Swarp?)
Reductions Pipeline 2.0

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- reënvision basic reduction algorithm
Reductions Pipeline 2.0

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- parallelized by night or by observations
- IRAF-free
  - implied Drizzle-free (Swarp?)
- reënvision basic reduction algorithm
  - global modeling of pixel(t)
PAIRITEL Code + Development
(free!)

cvs server (user = obs):
  grb.cfa.harvard.edu
  pteld.sao.arizona.edu (mirror)

c control daemons
cvs -z3 -d:ext:obs@grb.cfa.harvard.edu:/home/obs/cvs_root co control_daemons

c reduction codes
cvs -z3 -d:ext:obs@grb.cfa.harvard.edu:/home/obs/cvs_root co redux

c database and scheduling codes
cvs -z3 -d:ext:obs@grb.cfa.harvard.edu:/home/obs/cvs_root co datasked

discussion group:
http://groups.yahoo.com/group/ptel
ptel@yahoogroups.com

local installation: conf015@zeus.cfa.harvard.edu