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DECam Community Workshop

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DECam Community Pipeline



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Overview



- Describe how the community pipeline (CP) was conceived and implemented
- Paint a quick picture of the data flow leading to standard pipeline calibrated data
- Outline the pipeline calibrations and data products
- Give a brief status report
- Give an assessment of what to expect early in the science program
- Suggest things to consider in early science programs
- Point you to the people you might wish to talk with for more information



Caveats



- My aim is to give you an honest or, even, pessimistic guess as to what to expect at the start of science observing.
- People are working hard to achieve a fully capable pipeline by commissioning but developer resources are tight and software projects always take longer than planned.
- I, nor NOAO, wrote the CP so:
 - I can point you to people for details
 - I am not biased by assessing my own work



Development Roadmap



- DES/NOAO MOU requires the instrument be delivered with a DES supplied community pipeline
- NOAO provided a community requirements document
- NOAO is involved in an advisory and verification role
- DESDM-CP is a piece of the DES pipeline
 - modified as needed for community use
- DES pipeline organized around XSEDE execution while the CP is targeted to be operated by NOAO and run on NOAO hardware
- NOAO will be responsible for acceptance and, over a significant transition period, maintenance



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Community Data Flow



Raw Data:

- Transported electronically to NOAO/Tucson
- Archived in the NOAO Science Archive
- Distributed through the NOAO Science Archive

Pipeline Processing:

- Generally processed after run or block of nights
- Processed at NOAO/Tucson using the DEC-CP
- Archived in the NOAO Science Archive
- Distributed through the NOAO Science Archive
- Availability between a week and several weeks after observations



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User Input



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- No user input or control: standard processing only



Who Is Responsible?



- Calibration algorithms and codes: DES
 - Joe Mohr (DESDM Project Scientist): standard inst. calibrations
 - Emmanuel Bertin: astrometry, remapping, cataloging
- Middleware, Integration, Delivery: DES
 - NCSA
- Acceptance: NOAO
 - Chris Smith (CTIO Director), Alistair Walker, Frank Valdes, SDM Operations
- Pipeline and Archive Operations: NOAO
 - SDM: Operations, Scientists
- Community User Support: NOAO
 - SDM: Scientists, Operations



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Contacts



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- Alistair Walker (NOAO DECam Project Scientist)
 - Frank Valdes (NOAO/SDM Pipeline Scientist)
 - Robert Gruendl (UIUC – DESDM-CP Scientist)



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Calibrations



- Create Master Bias
- Create Master Dome Flat
- Create Fringe Template
- Create Illumination

- Crosstalk
- Overscan, Bias, Dome Flat
- Fringe
- Illumination
- Astrometry



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Data Products



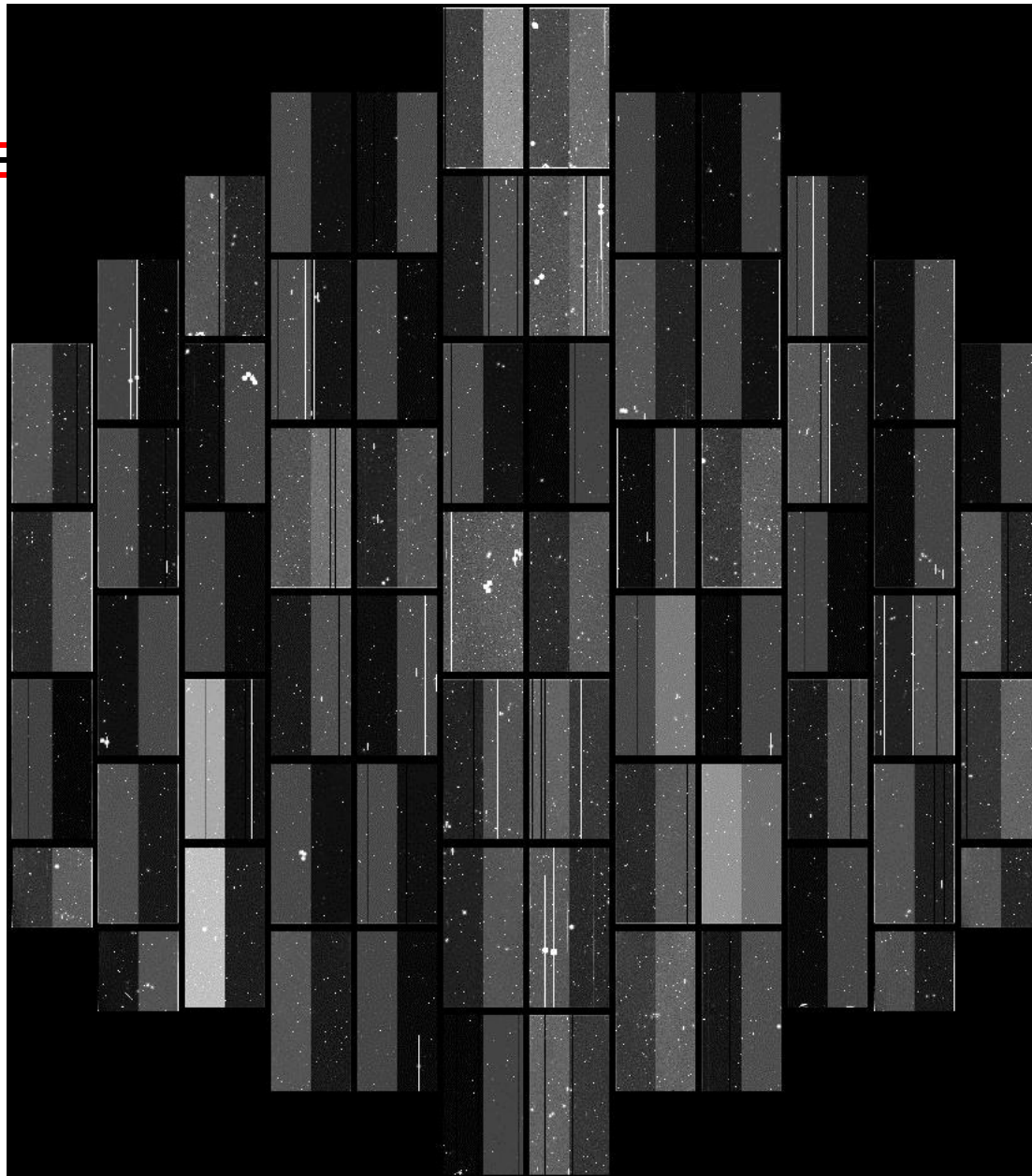
- Master calibrations (bias, dome flat, fringe, illumination)
- Instrumentally calibrated CCDs (i.e. not remapped)
- Remapped science images
- Stacks
- Source catalogs

- Data quality maps
- Weight maps
- Coverage (a.k.a. exposure) maps



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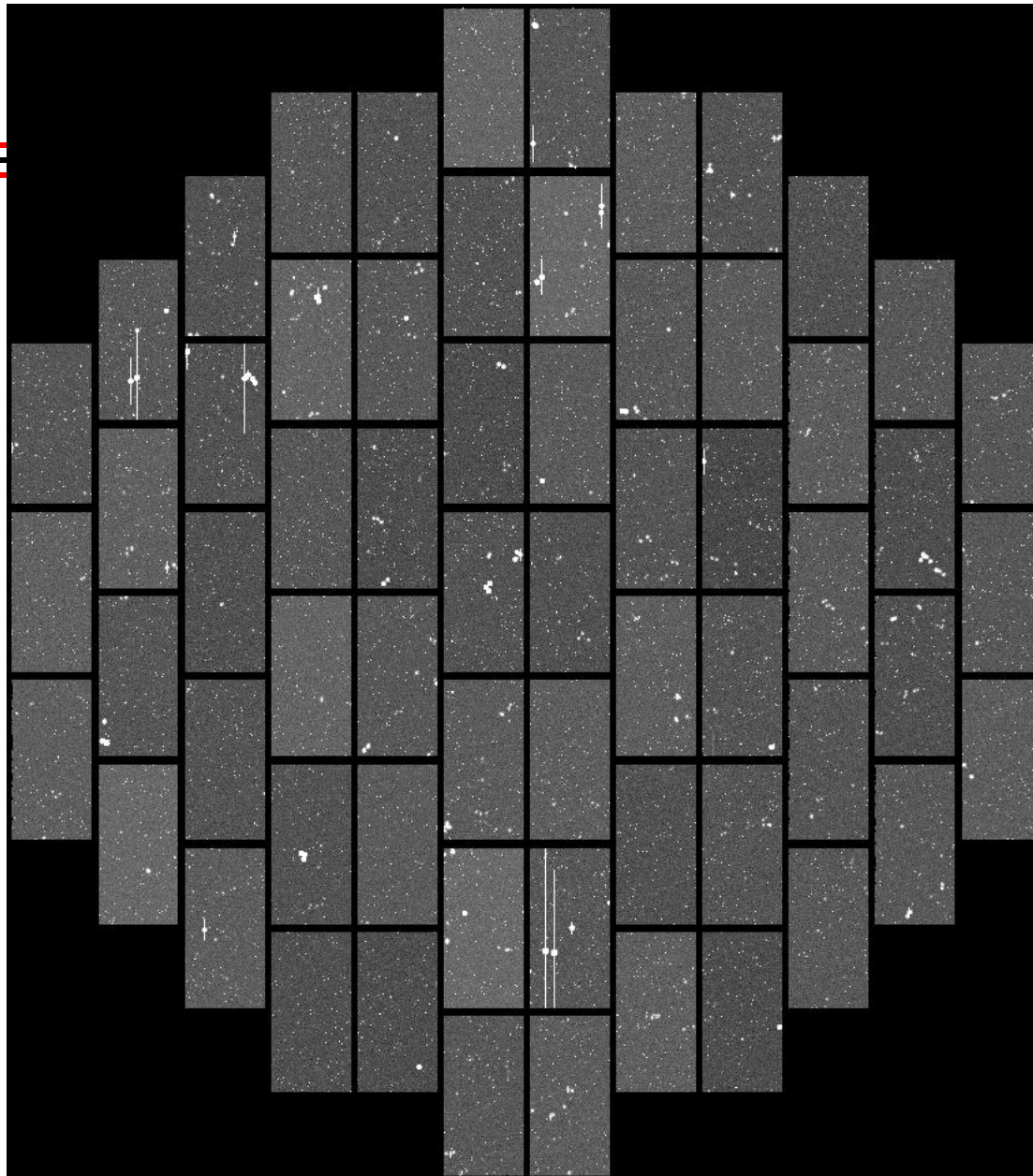
Raw simulated exposure





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Pipeline processed exposure





Status



- Preliminary pipeline is operational
- NOAO hardware is in the requisition stage
- Further work is required in a number areas
 - Calibrations: A work list has been prepared but work has not started. Current level of calibrations is not adequate beyond basic bias and dome flat steps (except for uncrowded, well-dithered, survey-style fields).
 - Data Products: Creation of final data products is pending.
 - Archive: Integration with the NOAO Science Archive is pending.
 - Operations: Additional operator interfaces are needed.



Schedule



- DES works on improving CP science quality (as well as operational functionality) through January.
- NOAO will use preliminary pipeline and then the January version for data flow and archive integration
- NOAO will require a pipeline review around February
- Deficiencies will be addressed through commissioning, science verification, and into early science programs
- Commissioning will undoubtedly discover aspects of the system, including unforeseen instrument characteristics, which will need to be addressed



What To Expect



My reading of the stars:

- At start of the science programs:
 - quality of crosstalk removal unknown without real data
 - basic calibrations (bias and dome flats) will be good
 - dark sky calibrations may be poor for non-sparse fields
 - astrometric mapping and stacks may have problems for non-sparse fields
 - remapped data may be on tiles rather than by FOV
 - faint cosmic ray removal will likely be poor or absent
- After first year of science programs:
 - generally complete provided developer resources are adequate
 - two-pass transient removal possibly implemented



Hints for Early Programs



- If you are prepared to work from dome flattened data, which may have uncalibrated pointing offsets, then any program will be successful.
- Prefer deep imaging of sparse (e.g. cosmological) fields
- Mapping programs will be fine
- Use plenty of dithering and exposures per filter
 - e.g. a smaller number of exposures in exchange for data in more filters will likely yield poorer dark sky calibrations
- Don't expect analysis support
 - this is true in general since there is no plan to provide the community with more than archive access to standard pipeline calibrated data products
 - Characteristics and formats similar to NOAO Mosaic so any tools you used before (e.g. IRAF mscred) should work fine



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The End

