

The NOAO DECam Community Pipeline Option

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November 29, 2011

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Note on the NOAO DEC-CP Option

This note discusses what would be required for NOAO to produce a Community Pipeline for the Dark Energy Camera. This is a fall-back plan in case the DESDM-CP is judged to be unlikely to provide a satisfactory community data product.

Many years ago, when the first DECam simulation data was generated and the DES-DM effort was just starting, a version of the Mosaic pipeline was produced to process this data. The modifications and test runs took less than a week to accomplish. This is a strong proof-of-concept that an NOAO DEC-CP can be prepared quickly. To go beyond this experiment would involve creating a version of the current, mature, Mosaic pipeline for DECam. This means all the features of this pipeline would be provided. The only significant feature not in the Mosaic pipeline but specified in the Community Pipeline requirements is weight map data products. These are planned for the ODI pipeline and should be a good synergy.

Two points to consider in judging the suitability of the DESDM-CP compared to an NOAO option are that

- the Mosaic pipeline that produces much better data products than the current DESDM-CP does on the same input data
- the Mosaic pipeline is significantly more efficient than the current DESDM-CP

A concern is the impact of diverting manpower from the ODI Community Pipeline which needs to be completed in the same time frame; namely, a first version in the fall of 2012. It is notoriously difficult to estimate software schedules. However, the key points of having

- two experience pipeline developers
- a proven infrastructure (NHPPS)
- a proven calibration pipeline (Mosaic)
- significant similarities between CCD mosaic imaging cameras

leads the authors to be fairly confident that the ODI and DECam pipelines can be produced within a 2012 schedule to meet the needs as the cameras start operations.

The bigger concern is actually the amount of time that may be required for other projects; Cosmos/Kosmos and BigBoss. The expectation is the former is largely a repetition of the same kind of data handling components we have experience with and the latter is mainly planning and, in our opinion, typical stretching out of the project in the current funding climate.

Note on the NOAO DEC-CP Option

Coming back to the technical points for a DEC-CP; what follows are various items that require more than just a simple reuse of current software.

1. Staging of data should be redesigned to make use of a read-only mount to the mass storage device. This is not hard but is different than the current method of first transferring the raw data to an initial pipeline staging area.
2. The data format is different in that the data from the two amplifiers in a CCD are stored in the same image raster along with keywords specifying the locations of the two data and bias regions. IRAF has a basic CCD calibration tool that can handle this format but it would be better make some modest modifications specifically for DECam, especially to merge it with the next item.
3. The crosstalk correction should be similar algorithmically to the Mosaic camera. However, handling crosstalk between two amplifiers stored in a single raster (as noted above) will be best handled at the same time as the overscan correction for efficiency. This should be done with a new IRAF task which will be a modest and straightforward development.
4. As is typical of interfacing software to new data there will be changes required for differences in keywords. Because of our involvement in the design of the data format there is a great deal of similarity with the Mosaic data format. Therefore, the changes will be relatively simple.
5. At the DECam Community Meeting the instrument scientists indicated that fringing was not present. This has the obvious simplifying consequence.
6. The creation and propagation of weight maps is not part of the current Mosaic pipeline. There some new work would be required to include this. A two phase approach would make sense. The first phase would be a pipeline without weight maps and the second phase with the weight maps. Since the ODI pipeline will also include weight maps there is an excellent opportunity to leverage the work for both as one development item.
7. The operator/observer review pages will need some redesign because of the larger size. The creation of graphics is the same but the smallest full field size will need to be bigger and the ability to zoom to higher resolution will need work.