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This document presents work package progress by CASU during Q1 2007. For further details of group activities over the past month and quarter see http://www.ast.cam.ac.uk/vdfs/diary.html. For the minutes of all group meetings see http://www.ast.cam.ac.uk/vdfs/docs/minutes

PSF photometry

The GPS tests in sample crowded fields and areas of varying nebulosity have been completed. These tests were carried out in conjunction with Phil Lucas (University of Hertfordshire) who used DAOPHOT as a control comparison. The tests compared standard pipeline aperture and prototype pipeline PSF photometry with DAOPHOT PSF photometry. Results are mixed. In general the standard pipeline gives marginally better results but in specific cases, eg. in the middle of globular clusters, DAOPHOT is better. The conclusion is that unless we can implement full iterative crowded field PSF photometry in the CASU pipeline(s), the improvements given by PSF development stages #1 and #2 are extremely marginal and the only real benefit is more reliable error estimates. The current development of the CASU PSF software has several innovative features and is being written up as part of a draft paper which is intended to be submitted to MNRAS.

WFCAM photometric calibration

STH attended a UKIDSS calibration meeting that was held on 24th January, also present were Paul Hewett, Steve Warren and Nick Cross. There were many action items on STH to fine tune the calibration for DR3. These have been drawn up by STH into a work plan with a list of deliverables and dates. A paper describing the WFCAM photometric calibration will be drafted, built around the available information from web-based reports. The calibration of narrow-band photometry has not been considered yet in any detail. The current default is simply to use the same colour equations as for the closest broadband equivalent.

Raw WFCAM data issues

A lot of time and effort has been spent chasing down problems with incomplete tapes sent from JAC. After a fruitful discussion during a recent visit from Andy Adamson and Gary Davis everything now seems to be back under control. A simple but effective protocol to share information with Brad Cavanagh (JAC) has been put in place using collaborative Google spreadsheets. Now that we have a few weeks of complete WFCAM data, data processing of 06B has begun in earnest and data transfer of the relevant raw WFCAM data to ESO for 06B have started.

WFCAM processing status

All the data that has been received and is complete is now being processed. In practice this currently means only data from 20th December 2006 onward. The first batch of

processed data has been checked for assorted gotchas and is now being flagged as ready to transfer. For an up to date status report see <u>http://casu.ast.cam.ac.uk/surveys-projects/wfcam/data-processing/</u>. To give a better overview of status incompletely received nights of raw data are now marked as "pending". An extra column on the status web page has also been added that records the date of the most recent "header updated" flag (UPDATED) in each date directory.

A new intermittent fault has occured on detector#3. This is a bright edge channel fault which is noticeable in affected data as visible channel boundaries and greatly enhanced "noise".

Not enough darks have been taken per night for some of the science observing combinations used this semester. This issue has been raised with Andy Adamson. For now, darks are being cannibalised from other nearby nights to make up the deficit - another time consuming process.

JAC have finally come up with a way of uniquely identifying MSBs that are repeated. This will allow the data in the OMP database to be linked to an MSB observation. This is not retrospective and will only apply to new data from early this year (exact date TBFO) and only then if we can get the OMP DB mirroring functioning again.

Sky brightness properties

MR has finalised the sky brightness analysis and is writing a paper (some of the work was presented at the ESO workshop). The main conclusions are:

- there is no significant difference in sky brightness between bright and dark time for YJHK, a 0.5 mag effect is seen in Z (brighter in bright time);
- \circ there is no significant Moon effect in YJHK when at a reasonable (>20 deg) distance, a safe distance for Z is >30 deg;
- o sky brightness reduces as a function of time after twilight for J and K;
- \circ there is a correlation with temperature for K as expected using a simple Black Body model.

VISTA Public Surveys

Much time and effort has been spent interacting with the Public Survey PIs on their SMPs. In conjunction with WFAU a set of notes was drawn up and circulated to all survey PIs as suggestions to help fill in the relevant parts of the SMPs. In-depth discussions on processing strategy were held with UDS and VVV representatives. Mechanisms for fast access to the processed data for PIs, for QC purposes and rapid feedback, were raised and need assessing.

ESO calibration workshop

MJI, JRL, PSB and MR attended the ESO Calibration Workshop (22 to 26 January) noting that it was a very useful meeting. MJI, JRL and MR gave presentations that were well attended and appeared to be well-received.

Many informative side meetings were also held. In particular a pipeline meeting which discussed the ESO QC system. Apparently, there are two systems: Garching and Paranal with sometimes different requirements (eg. PAF files). CASU have been using the Garching model and need to add a few features to get it to match that in use at Paranal.

Delivery of v0.5 pipeline

This was originally scheduled for the end of February, but this deadline has been slipped by a few weeks to allow for extra checks to be made as a result of discussions held at the ESO calibration workshop. Some extra software testing procedures (eg. valgrind) have been obtained from ESO from Sandra Castro which have been used for various extra checks.

Bug fixes and a final round of updates to the documentation to be delivered with v0.5 have been proceeding in parallel. The incidence of critical comments from ESO ("tickets") have declined and in general those that have been received are mainly related to previously undisclosed DFS interface standards.

Change to catalogue keywords

There are different WCS standards for image and table data. The current method CASU use was devised before the standard for tables was agreed and is simply to copy the relevant keyword information from the image headers to the catalogue headers. FITSVERIFY objects to this use of the WCS in binary tables. Since the same catalogue generation software is being delivered to ESO as will be run in Cambridge it is timely to update how the WCS information is stored in the catalogues for the VISTA pipelines. At some future point it would be prudent to upgrade the WFCAM software in the same way.

VST SMPs

The PIs of the UK-lead VST Public Surveys have received comments regarding the (re)submitted SMPs and got the green light. Further progress awaits the outcome of the VST CDR.