

WFCAM observing strategy

Some issues relevant to the WFCAM Science Archive

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This short discussion document summarises some issues concerning WFCAM observing strategy that are relevant to the WFCAM Science Archive (WSA). Archive developments and design to date are fully documented at the WSA homepage [1]. The purpose of this document is to inform discussions concerning WFCAM observing strategy at the workshop meeting at Edinburgh on 12/13 June, 2003.

The following are issues that have arisen over the course of the analysis and design phase of the WSA (all are not necessarily applicable to every UKIDSS survey):

1. Survey design:

- Organisation of observations into sub-regions and fields: it is assumed that each of the UKIDSS wide-area survey will divide their surveyed regions into chunks, each chunk being divided into a predefined system of fields, where one field corresponds to one WFCAM device ‘paw print’ on the sky.
- For ease of housekeeping within the WSA (eg. identification of associated sets of detections in single passbands into merged multi-colour source records) it will be most advantageous to have fixed lists of uniquely identifiable fields (analogous, for example, to the field numbering systems of the Schmidt photographic surveys). That is not to say anything about how any particular survey uses paw-prints and/or tiles to cover any given surveyed region; all that is needed is a set of defined paw-print centres and associated unique (within any given UKIDSS subsurvey LAS, GPS, ...) numeric identifiers.

2. Calibration (see also the calibration discussion document [2]) – if any of the following issues are relevant, then the details need to be folded into the WSA design (eg. ways of identifying associated calibration fields as such, and not part of the main target fields, need to be considered):

- local, secondary standard fields
- bootstrap overlapping fields (eg. current proposal is to make some use of non-photometric conditions and later recalibrate using overlapping frames that provide a greater overlap than the natural detector overlap)
- observations for instrumental characterisation (eg. mesostepping for photometric field-dependency measures)
- systems and units: AB/Vega/lupitudes can be accommodated in the archive design, but a decision on which are required would be helpful

Are there any outstanding issues (eg. colour terms of higher order than is currently specified in [2] and [3])?

3. Organisation of catalogue data within the WSA – it is important to ensure the current relational design [3] does not preclude any desired observing strategy. The current relational model for catalogue data uses the same basic template for each of the UKIDSS surveys: each survey image in each passband gives rise to many *detections*; each detection is merged into a multi-colour, multi-epoch *source* (it is anticipated that, at least in relatively uncrowded regions, this *source* catalogue will be the first port of call for science exploitation); this *source* list is used to drive *source re-measurement* in a uniform way across all passbands observed for a given survey; each multi-band *source re-measurement* consists of single passband *re-measurements* analogous to the original detections, and linking back to the images:
 - survey design: choice of passbands and the requirements for the ‘curation’ procedure outlined above (merging, source re-measurement, etc.) should be finalised as soon as possible to enable archive implementation. Are all survey requirements covered in the current design as detailed in [3]?
 - re-observations: WSA ingestion of sub-optimal observations and their subsequent replacement by re-observations is allowed for in the current design, but the exact mechanism for propagating the necessary housekeeping information from survey design, through the dataflow system, and into the archive is presently unclear.
4. Finally, the nested surveys within UKIDSS give rise to a complex series of requirements on the science archive which has resulted in a correspondingly complex, but flexible, WSA relational design. Housekeeping and curation of these surveys will only be successful if as much descriptive information as possible is specified and propagated into the science archive. The sooner observing strategies, and particularly survey designs, are specified the better. Procedures can be put in place to insert and/or propagate metadata into the science archive and its design.

References

- [1] WFCAM/VISTA Science Archive Development, <http://www.roe.ac.uk/~nch/wfcam/>
- [2] Photometric Calibration for WFCAM data, Simon Hodgkin & the WFCAM Calibration WG, 5/6/2003, Version 1.
- [3] WFCAM Science Archive database design document; <http://www.roe.ac.uk/~nch/wfcam/VDF-WFA-WSA-007-I1/VDF-WFA-WSA-007-I1.html>