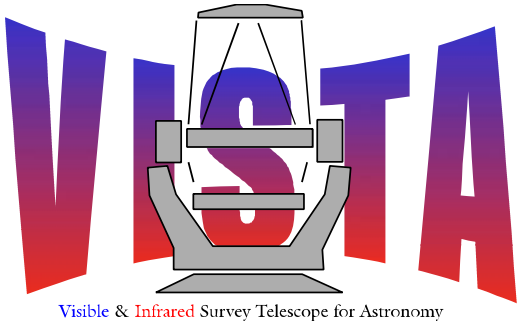

Visible & Infrared Survey Telescope for Astronomy

Data Flow System

Document Title: **Documentation for UK Design Review - Pipeline**

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Change Record

Issue	Date	Sections Affected	Remarks
0.1	2005-08-31	All	Draft document by MJI & SCH
1.0	2005-09-05	All	Rewrite by JPE

Notification List

The following people should be notified by email that a new version of this document has been issued:

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QMUL	Jim Emerson
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Contents

1 Introduction

The document set for the UK VDFS review will be based a full WFCAM documentation set revised to be generic to VDFS in terms of servicing the requirements for both WFCAM and VISTA data. This will be done by including separate sections for each instrument, or generalising the documentation where there is common ground.

A number of relevant VDFS reports have been produced and are listed below and form a basis for parts of the documentation. Some are currently specific to WFCAM and will be updated to incorporate VISTA where appropriate; others are already applicable to both. An example is the detailed Photometric Calibration document for WFCAM, which has been modified and incorporated as part of the VISTA Calibration Plan. Other documents, e.g. aspects of PSF fitting will be re-released as versions including VISTA-specific examples.

2 UK Pipeline Specific Docs

The 13 documents envisaged are:

2.1 Overview (includes reference to observing & ESO pipeline/archive)

2.2 Science Requirements Analysis

A first pass at this has been made by examining all the UK VDFS requirements and assessing which ones are already covered by existing VDFS pipeline software or, where approrpiate, planned ESO VDFS deliverables and which ones are not. The results of this exercise are annotated in a separate paper. At some point in the near future an assessment of the development effort required for each enhancement will be made. Together with the requirements this can be used to define a priority order for enhancements and possibly also a cut-off point if insufficient development effort is available.

2.3 Product Description

2.4 Management Plan

2.4.1 Management (Development & Operations - including user support)

2.4.2 Documentation

2.4.3 Schedule

2.4.4 Staffing

2.4.5 Hardware

2.4.6 Budget

2.5 Risk Analysis

2.6 Interface Control

2.6.1 ESO- CASU

The Data Dictionary Control Document (DICD) - see the VDFS Data Reduction Library Design VIS-SPE-IOA-20000-0010 - gives the current state of play of the FITS headers and the quality control parameters agreed with ESO.

2.6.2 CASU- WFAU

See http://www.roe.ac.uk/~nch/wfcam/VDF-WFA-VSA-001-I0/ for an example forWFCAM.

The interface control documents between ESO and CASU and CASU and WFAU specify the format and content of the data, data headers and data products and are crucial to the automation and successful operation of the pipeline and science archive. The main manifestation of this is the FITS file header content, which has to be well defined and agreed upon since it forms the basis of information transfer all the way through from the survey PI, through data taking, data processing, long term data-quality control, archiving and delivery to the end user.

2.6.3 VO/Astrogrid

2.7 Software Architecture Design

System pipeline processing architecture will either be based on the extant WFCAM pipelines in Cambridge or on an enhanced version of the ESO Garching pipeline (the data reduction library for which is a VDFS deliverable to ESO). The former uses high level perl scripts for pipeline control and header interrogation and updates; CFITSIO

for all data I/O operations; and calls specific C-modules for detailed numerical analysis. The latter runs within the ESO CPL environment using a proprietary data I/O engine, QFITS, but is also based on the same underlying software C-modules.

There are pros and cons to both approaches. We propose to defer this decision until we have more experience of the CPL environment after delivery of early stages of the Garching pipeline and of running test datasets through it.

2.8 Data Reception & Archiving Design

2.9 Standard Pipeline Design Description

2.9.1 Scope

The ESO pipeline for VISTA is designed to correct images for instrumental signatures and phtometrically and astrometrically calibrate them, and produce quality control measures. No combination of pawprints into tiles, or mosaicing and stacking is included. The UK pipeline will be capable of reprocessing raw data with differently tuned parameters and dealing with combination of calibrated pawprints to produce science products from combined data.

2.9.2 Pawprint processing

A large amount of documentation describing the functionality of the VISTA pipeline designed for ESO (Garching and Paranal) is available and the relevant documents are listed below. These documents describe in some detail the processing and calibration of VISTA data parts of which will be common to both the ESO and UK versions of the pipeline.

2.9.3 Tile formation

2.9.4 Mosaicing

2.9.5 Stacking

2.9.6 Calibration

2.9.7 Moving and varying objects

2.9.8 Catalogue extraction

2.10 Special processing pipeline design

2.10.1 Scope

2.11 User Interface Design (including security)

2.12 Design of Software modules for archive (@WFAU)

Would these best be reviewed under the pipeline or the archive?

2.13 Survey Progress database Design

As an Annex to the documents in 2.9, 2.10 & 2.12 above, the source code documentation generated from in-line comments will be issued.

3 Action

The VDUC is invited to comment on the proposals.

References[1]

VDFS DFS Impact	VIS-SPE-IOA-20000-0001
VDFS Calibration Plan	VIS-SPE-IOA-20000-0002
WFCAM photometric calibration	VDF-PLA-IOA-00008-0001
Astrometric & photometric distortion for WFCAM & VISTA	VDF-TRE-IOA-00009-0002
Note on non-linearity correction	VDF-TRE-IOA-00008-0003
Atmospheric Differential Refraction in the Infrared	VDF-TRE-IOA-00009-0003
PSF fitting tests	VDF-TRE-IOA-00016-0003
PSF fitting of WFCAM Data: Astrometry	VDF-TRE-IOA-00016-0004

[1] see http://www.ast.cam.ac.uk/vdfs/documentation.html for related published papers see also http://www.ast.cam.ac.uk/vdfs/publications.html