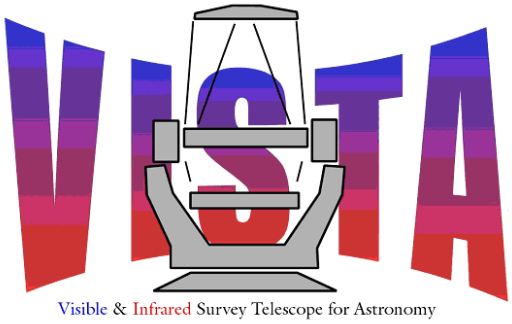

Data Flow System

Document Title: **VDFS Requirements for VISTA Data Information**

Document Number: **VIS-SPE-QMU-00001-0001**

Issue: **1.0**

Date: **09 June 2006**

Document Prepared By:	**Jim Emerson**	**Signature and Date:**	
Document Approved By:	**Jim Emerson** (VISTA PI)	**Signature and Date:**	
Document Released By:	**Jim Emerson** (VDFS Project Leader)	**Signature and Date:**	

Change Record

Issue	Date	Section(s) Affected	Description of Change/Change Request Reference/Remarks
1.0	2006-06-09	all	New document

TABLE OF CONTENTS

1 Introduction

1.1 Purpose

The VISTA Data Flow System needs certain data from the camera, to characterise the data, test the operation of its pipeline algorithms, and to deliver agreed data files to ESO. This document is to define the data required, and is AD41 to the VISTA Technical Verification Specification [RD01].

1.2 Applicable Documents

[AD01] *Data Flow for the VLT/VLTI Instruments Deliverables Specification*, VLTSPE-ESO-19000-1618, issue 2.0, 2004-05-22.

1.3 Reference Documents

[RD01] *VISTA Technical Verification Specification*, VIS-SPE-ATC-00000-0008, Issue 1.0, 09 February 2006

1.4 Abbreviations and Acronyms

AD Applicable document.
RD Reference document.

2 Instrument Description Data Files

The instrument description data files needed are those for test purposes and those that need to be delivered to ESO [AD01].

2.1 Mirror Properties

To be written …..

2.2 Window Properties

To be written …..

2.3 Lens 1 Properties

To be written …..

2.4 Lens 2 Properties

To be written …..

2.5 Lens 3 Properties

To be written …..

2.6 Thermal background properties

To be written …..

2.7 Filter Properties

To be written …..

2.8 Detector Properties

To be written …..

3 Tests during AIT in Laboratory in UK (RAL)

AIT presents the last opportunity for 6 months to acquire data necessary for testing the VDFS system, and initial files required to be delivered to ESO before VIRCAM goes on sky. Each of these data sets to be acquired is required to test, debug and exercise software components of the VISTA Data Flow System. To meet its schedule as agreed with ESO VDFS needs this data before the camera is shipped to Chile.

By obtaining a large number of frames with the science templates, in conjunction with a running TCS simulator, a body of extremely realistic data will be obtained for exercising all the pipeline modules. Further specific observations using spot-projection facilities will be invaluable in determining, or placing limits on, cross talk and persistence characteristics of the detectors in their full focal-plane configuration and with near-point sources.

Flats will not be so flat and point sources not so sharp as flats and images on the real telescope; however, the calibration products from these data runs would make a first, `quick and dirty', set of calibration data with which to bootstrap the data-reduction pipeline following first light.

It is appreciated that during AIT the degree to which illumination levels can be controlled may be limited. It is appreciated that during AIT the degree to which spots may be point like and can positioned on individual channels of individual detectors may be limited. Nevertheless the closest approximation possible to our idealised requirements is wanted.

3.1 Tests with Dark 'filter' in

3.1.1 Reset

- use img_cal_reset to take 30 frames.
- repeat several hours later.

VDFS Use:

- Characterize reset
- Check reset stability with time.

3.1.2 Dark and Reset anomaly

- Use img_cal_darkcurrent to take 5x frames for each of DIT= 1s, 2s, 5s, 10s and 20s darks, for each of NDIT = 1,2,3 at each DIT.

(resulting in 25 frames for each of NDIT=1 , 2 and 3)

- Repeat several hours later.

VDFS Use:

- Look at the structure and variation of reset anomaly as a function of exposure parameters (DIT, NDIT).
- Look for second order artefacts like curtaining (as found in the WFCAM chips).

- Look for hot spots that grow with time.
- Check reset anomaly stability with time.

3.1.3 Dark Current

- Use img_cal_darkcurrent to take frames of 1, 2, 4, 8, 16, 32, 64, 128, 256s

VDFS Use:

- Series of Dark data files with right FITS headers needed in VDFS system.

3.2 Tests requiring uniform(ish) illumination of focal plane

3.2.1 Domeflat

- use img_acq_domescreen (to get TCS simulator in correct state),
- use img_cal_domeflat to adjust exposure time (or lighting level if possible) to mid-range of ADUs,
- use img_cal_domeflat to take around 30 flats.

VDFS Use:

- 'Simulated' Dome flat files with right FITS headers.

3.2.2 Noise and gain

- Use img_cal_noisgain several times with appropriate exposure (or lighting level if possible).

VDFS Use:

- Test noise and gain determination methods

3.2.3 Linearity and bad pixels

- Adjust lighting level (to the extent possible) so DIT=~20s give not-quite-saturated images,
- use img_cal_linearity to take 20-flat sequence. (current template does not take corresponding darks - so use img_cal_darkcurrent to take matching dark frames).
- Repeat this experiment several hours later

VDFS Use:

- Check linearity solution stability with time.
- Check bad pixels stability with time

3.2.4 Twilight Flats

- Usr img_acq_twilight/img_cal_twilight to take 3 "twilights".

VDFS Use:

- 'Simulated' Twilight flat files with right FITS headers.

3.2.5 Imaging simulation

- Adjust exposure time (or illumination to the extent possible) to give "good sky"
- use img_obs_acq to "acquire" an "object"
- take a pawprint using img_obs_paw
- take a tile using img_obs_tile.
- Possibly repeat.

VDFS Use:

- Data, with FITS headers for a simulated Pawprint
- Data, with FITS headers for a simulated Tile

3.3 Tests requiring spot illumination

3.3.1 Persistence

- Adjust spot level (to extent possible) to give well-exposed, unsaturated spot.
- Take one full regular readout using img_obs_exp,
- insert dark filter,
- then follow with uncorrelated readouts as fast as possible for about one minute.
- Repeat the experiment with a series of reset-read readouts

VDFS Use:

- Look at the effect of resets on the decay of the persistence image.

3.3.2 Cross Talk

- Adjust spot to roughly centre on channel 1 of a particular chip.
- Take test frames to adjust exposure to obtain 2-3 times over-saturated image.
- Use img_obs_exp template to readout frame,
- repeat above with spot on all 16 channels on that chip. (When moving to a new channel, it may be necessary to shift to a different part of the channel then for the previous exposuree if persistence is in fact a serious problem).
- Repeat on the other 15 chips if possible.
- [Can't use img_cal_crosstalk because that needs a real telescope].

VDFS Use:

- Characterise cross talk

4 Tests at Paranal (off sky)

To be written …..

5 Tests at Paranal (on sky)

To be written ……