AstroWise - OmegaCAM

OmegaCEN – TarGet
Kapteyn Astronomical Institute
University of Groningen

Edwin A. Valentijn

28 sept 2010

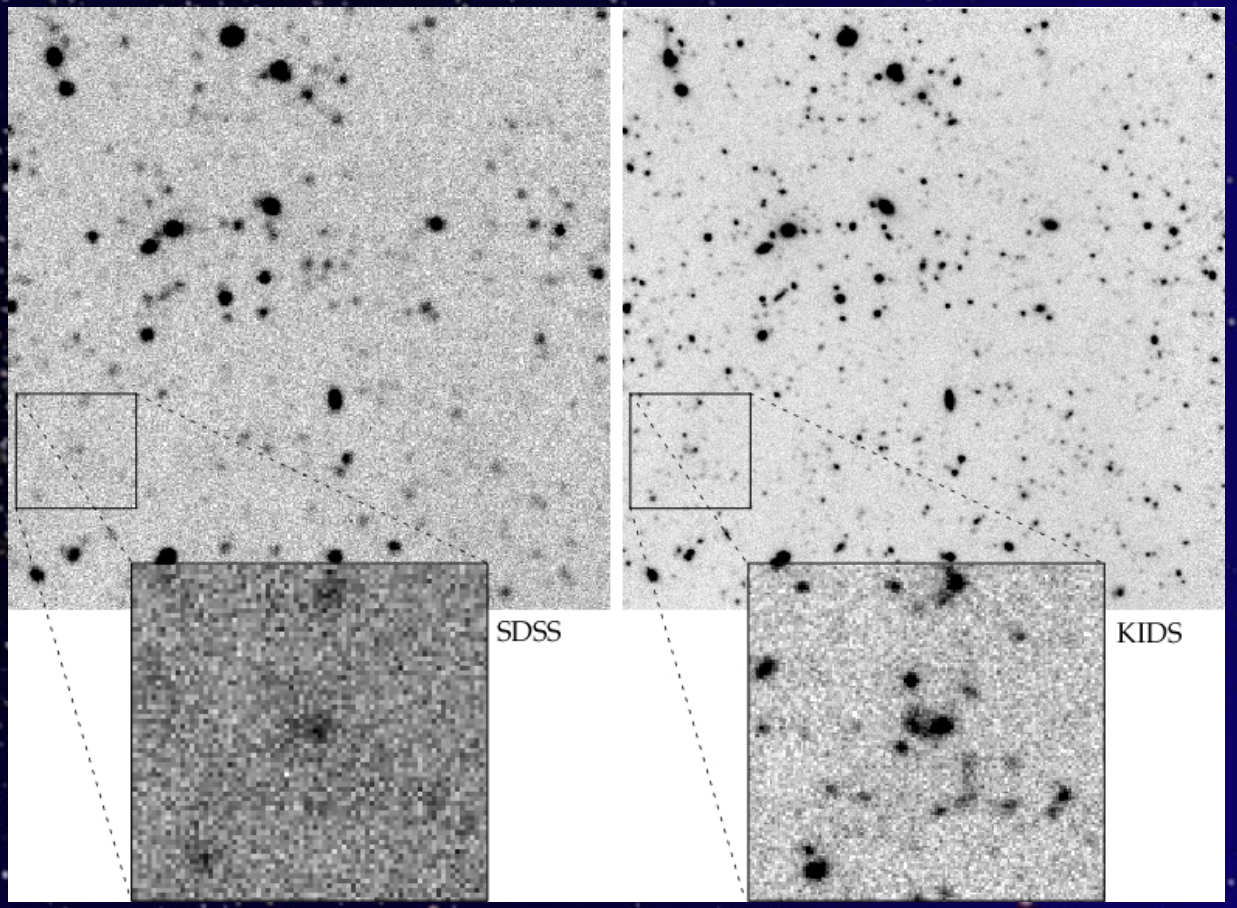
ESO- VST Public Survey review

OmegaCAM
2005
mar/sep

16k x 16k
256Mpix
0.2” pixels
1 x 1 degree
2.6 m VST

KIDS vs. SDSS, CFHTLS

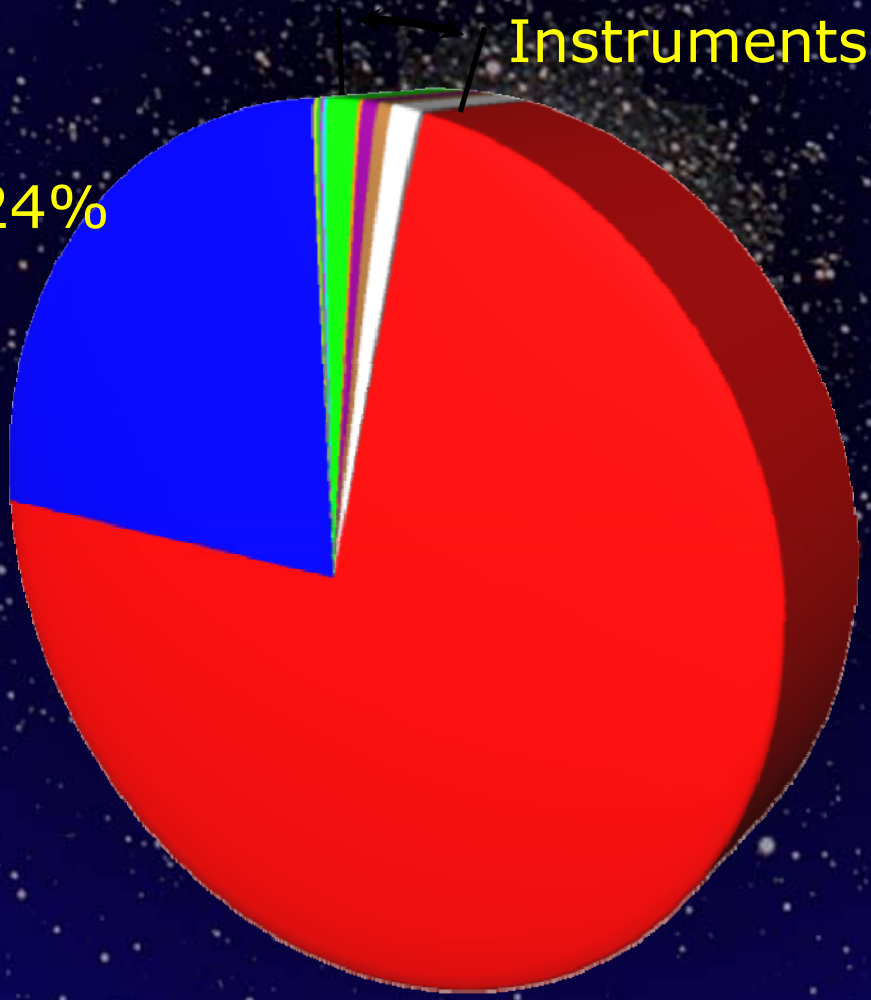
SDSS	CFHTLS
6 x area	1/9th area
2 mag shallower	1 mag deeper
2x worse seeing	~same



(M.Neeser)

Paranal Monthly Data Rates 2007 statistics

FORS1 FORS2 GIRAFFE ISAAC MIDI
NACO SINFONI UVES VIMOS VISIR
VIRCAM OmegaCAM



All Current Paranal Instruments 4% (433.2 GB)

OmegaCAM 24% (~2500 GB)

VIRCAM 72% (~7500 GB)

VST - Virtual Survey Telescope

HPC (RC)

Parallel Pipeline (Python)
Oracle Client
FileServer Client (Python)

Users

Gateway to Astro-Wise Compute Server

Compute Server

AWE Monitor
Pipeline (Python)
Oracle Client
FileServer Client (Python)

Leiden
München
Napoli
Paris

WAN

Switching Hub

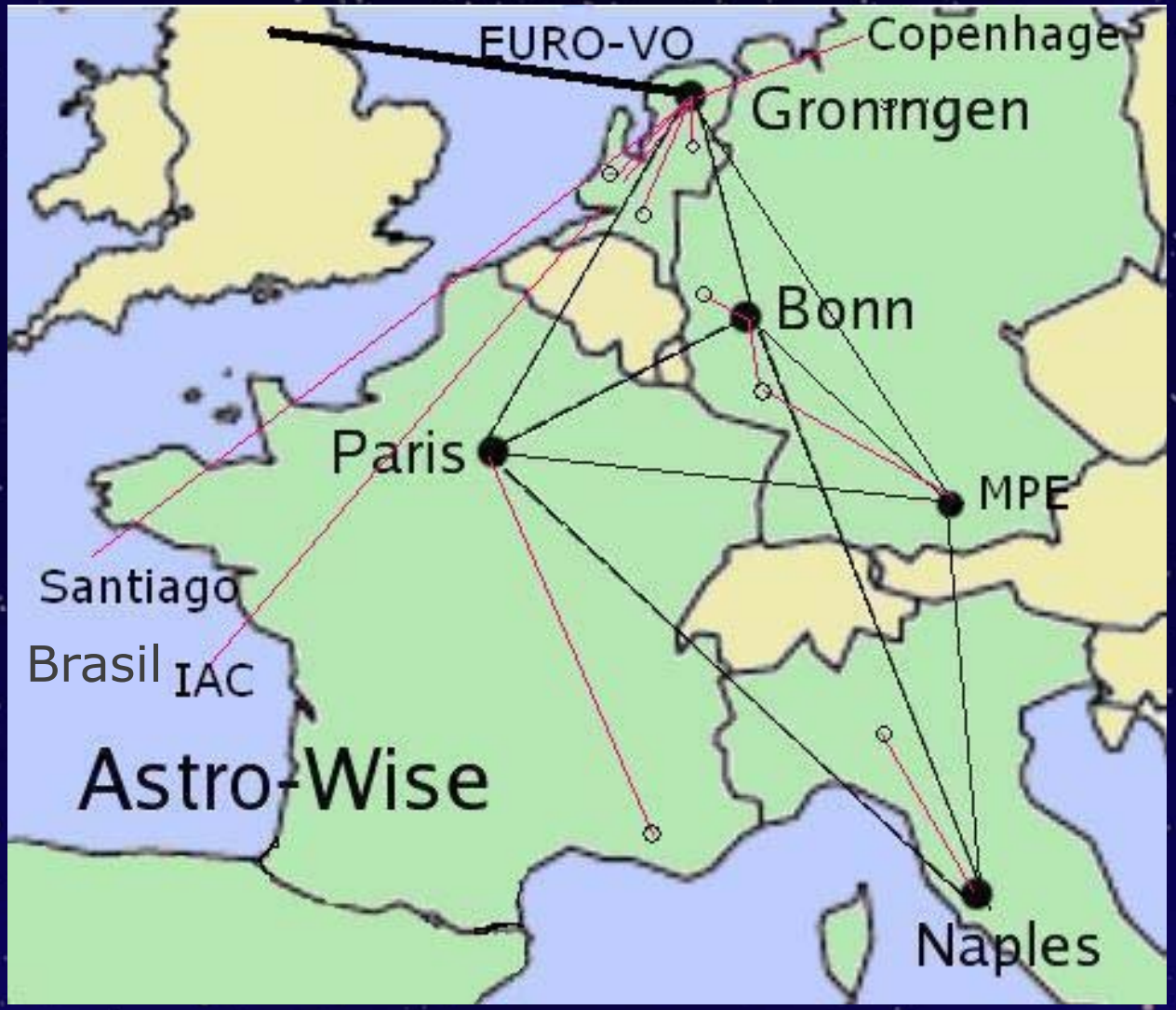
NAS (OmegaCEN)

FileServer Server (Python)

RAC (OmegaCEN)

Oracle Server

Centers – satellites



Home | AWE Information System | Instruments | AWE projects

www.astro-wise.org

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Astronomical Wide-field Imaging System for Europe

a partnership of

- OmegaCEN-NOVA/Kapteyn Institute, Groningen - NL
- Osservatorio Astronomico di Capodimonte, Napoli - I
- Terapix, IAP, Paris - F
- ESO, Garching bei München - D
- Universitäts-Sternwarte München - D
- OmegaCEN-NOVA - NL

co-ordinated by

An on-going project which started from a FP5 RTD programme funded by the EC Action "Enhancing Access to Research Infrastructures".

Astro-WISE Online

Overall storage and user statistics

Online storage: 363 TB
Number of files stored: 1605413
Database accounts: 104
Total queries[1]: 496136

[1] *sum for all databases since their last restart*

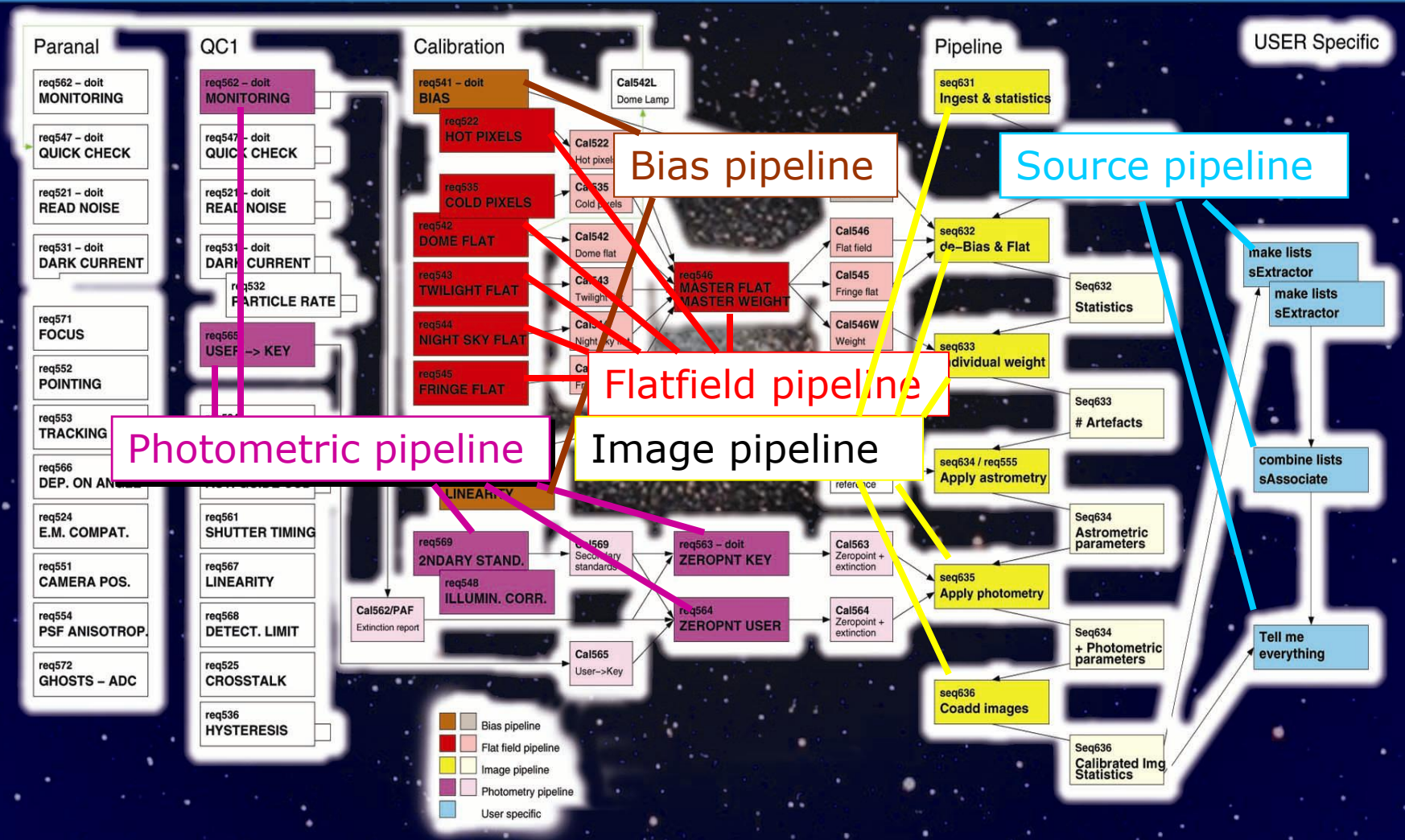
Status of services at Astro-WISE nodes

Bonn
Groningen
München
Napoli

poll details

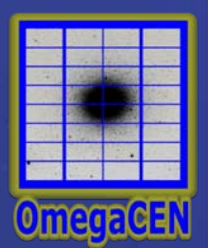
Updated: 14 Jun 2008 18:10:02

Astro-Wise Pipelines



QC - calibration scientist monitoring

Web services
Target processor



Astro-WISE Processing

Contact
wjvriend@astro.rug.nl

DB User
awevalentyn

Help
Getting Started

Project
WFI@2.2m

Instrument
WFI

Single host

Parallel host
test.hpc.rug.astr...
status queue

Processing
- (•) Image pipeline
- ( ) Depth 0
- ( ) Full processing

Target
MasterBias
MasterFlat
RegriddedFrame
CoAddedFrame
SourceList

[ ] Advanced

Querying
- ( ) Target only
- ( ) Image pipeline
- ( ) Depth 0
- (•) Full

Filter #842 JohnsonB
Chip ccd50

Date	Time	<<	Date	Time
2002-03-17	23:48:24	select	0000-00-00	00:00:00 select

Object	RA	DEC	+/-
select	10.684625	+41.26927	0.5 select

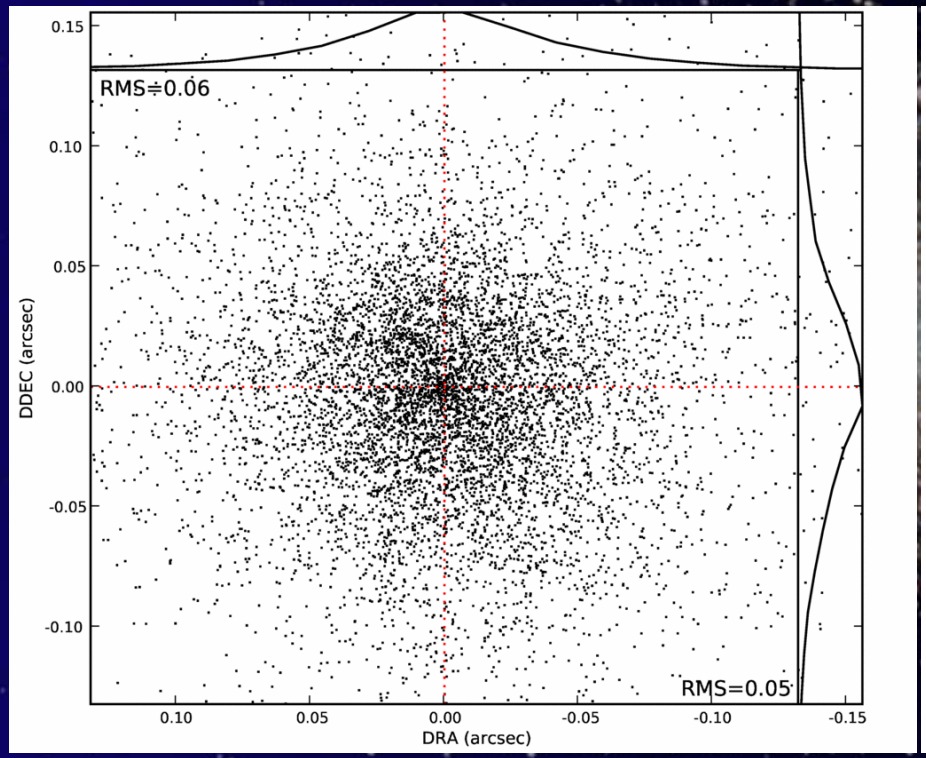
Search

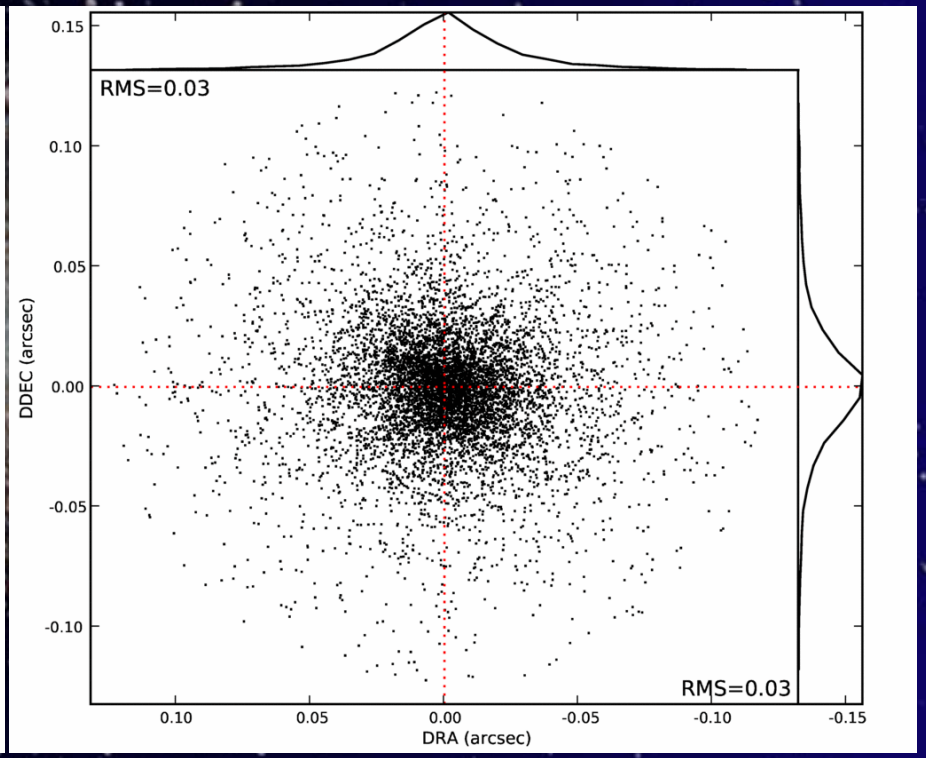
Possible targets

0	Filter #842	Date 17 Mar 2002 23:48:24	(process) (all chips)
(+) (-)	⊟ RegriddedFrame (to be build)		✓ ⬇
	⊟ AstrometricParameters (outdated)		✓ ⬇
	⊞ ReducedScienceFrame (outdated)		✓ ⬇
	⊟ GainLinearity (not checked)		
	▪ BiasFrame (null)		
	⊟ PhotometricParameters (outdated)		✓ ⬇
	▪ AtmosphericExtinctionCoefficient		
	⊞ PhotSrcCatalog (outdated)		✓ ⬇
	⊟ ReducedScienceFrame (outdated)		✓ ⬇
	⊞ BiasFrame		⬇
	⊞ ColdPixelMap		⬇
	⊞ MasterFlatFrame (outdated)		✓ ⬇
	▪ FringeFrame (null)		
	⊞ HotPixelMap (outdated)		✓ ⬇
	▪ IlluminationCorrectionFrame (null)		

ASTRO WISE

Global Astrometry
reproducibility





Local solution

Global solution

(Internal regrid-to-regrid residuals of one WFI N=4 dither)

File Edit View History Bookmarks Tools Help

http://quality.astro-wise.org/QualityWISE?object_str=RegriddedFrame&object_id=4A5A1A6C90048502E0407D

Google

Quality of RegriddedFrame:

Sci-EVALENTYN-WFI------#842-ccd50-Regr---Sci-54566.3131050-f56144d965b5e765b40bdec3d685fe595215d52b.fits

AstroWISE DEVIew CalTS Process

no previous comments

DBname: awgvertices project: WFI@2.2m

is_valid = 1: valid | Enter comment her | Submit

Processing Details

creation_date	2008-04-10 07:31:02
is_valid	1
quality_flags	0
Privileges	4

Image Statistics Details

mean	+9.327e+01
median	+8.887e+01
stdev	+2.945e+03
min	-6.036e+06
max	+3.727e+06

Local Astrometry Details

creation_date	2008-04-10 07:30:42
is_valid	1
quality_flags	0
RMS	0.252
SEEING	0.856
NREF	317
SIG_DRA	0.209
SIG_DDEC	0.178
MEAN_DRA	-0.001
MEAN_DDEC	0.002

Photometry Details

creation_date	2008-03-29 20:15:06
is_valid	1
quality_flags	0
zeropoint	24.759
zp_error	0.000
zp_origin	derived
num_sources	173

Observational Details

DATE_OBS	2000-03-18 03:38:21	OBSERVER	UNKNOWN
MJD_OBS	52351.1495509	EXPTIME	299.9176
OBJECT	Sns-W	AIRMSTRT	1.246
R.A.	13:25:30.0000	AIRMEND	1.246
Dec.	-31:35:44.6808	Filter	#842
		mag_id	JohnsonB

Chip ccd50 of instrument WFI

RegriddedFrame
2439 X 4873 pixel
8.13 X 16.24 arcmin

WeightFrame
2439 X 4873 pixel
8.13 X 16.24 arcmin

AstrometricParameters

Done

Infrared' Eyes i... | Featured Image: Coronet -- A Star-Formatio... | What's Happening: Cosmic Neon Lights the ... | NASA Space Telescopes Find 'Lego-Block' Gal... | Water Vapor Seen 'Raining Do

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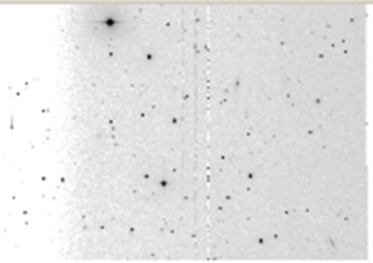
Edit View History Bookmarks Tools Help

http://quality.astro-wise.org/QualityWISE?object_str=RegriddedFrame&object_id=4A5A1A6C90048502E0407D

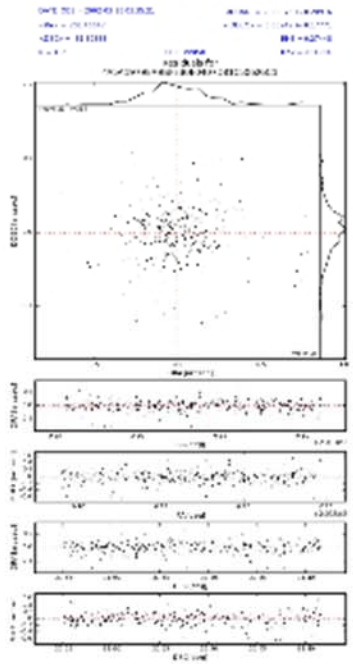
Google

Photometry Details

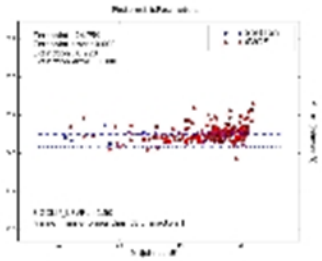
creation_date	2008-03-29 20:15:06
is_valid	1
quality_flags	0
zeropoint	24.759
zp_error	0.000
zp_origin	derived
num_sources	173
extinction	0.220
ext_error	0.000



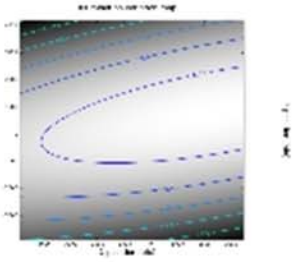
AstrometricParameters



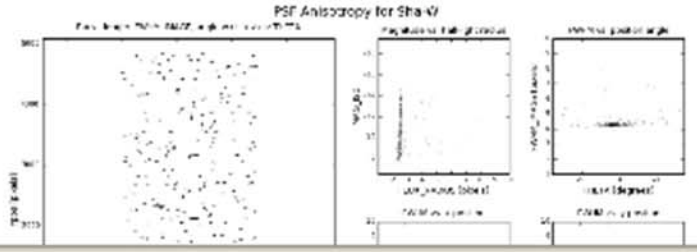
PhotometricParameters



IlluminationCorrection



PSF Anisotropy



ASTRO WISE

Quality control- flags

- Quality flags
  - System quality_flags (method verify)
  - User is_valid (method inspect by user)
    - 0 = bad
    - 1 = OK
    - 2 = Qualified - ready for delivery
- Context - privileges
  - 1 Mydb — user_CalFile
  - 2 Project, eg KIDS
    - Project favorite flag — project CalFile
  - 3 AstroWise — Awe Calfile
  - 4 World
  - 5 VO

Supported data sources

Here you can find quick links to different subsets of all public data in our database.

WFI@2.2m data

raw science | reduced science | coadded science | sourcelists | world

Find data for the WFI instrument.

MEGACAM@CFHT data

raw science | reduced science | coadded science | sourcelists | world

Find data for the MegaCAM instrument.

WFC@INT data

raw science | reduced science | coadded science | sourcelists | world

Wide-Field Camera on the Isaac Newton Telescope at La Palma.

SUP@Subaru data

raw science | reduced science | world

Suprime-Cam data from the Subaru telescope on Mauna Kea, Hawaii.

HST ACS data

reduced science | sourcelists | world

Data from the Advanced Camera for Surveys instrument aboard the Hubble Space Telescope.
Only Drizzled images (in the form of ReducedScienceFrames) are currently supported. See this note on ACS data for more information.

SDSS DR7 data

SDSS-Photoz-DR7 | SDSS-SpecObjAll-DR7 | SDSS-PhotoObjAll-DR7 | world

Browse the SDSS DR7 catalog locally as SourceLists.

2MASS PSC data

2MASS PSC SourceList | world

The 2MASS Point Source Catalog is available as a SourceList in our database.

UKIDSS DR3

UKIDSS DR3 SourceList | world

The WFCAM Science Archive Large Area Survey sources are available as a SourceList in our database.

USNO-B1.0

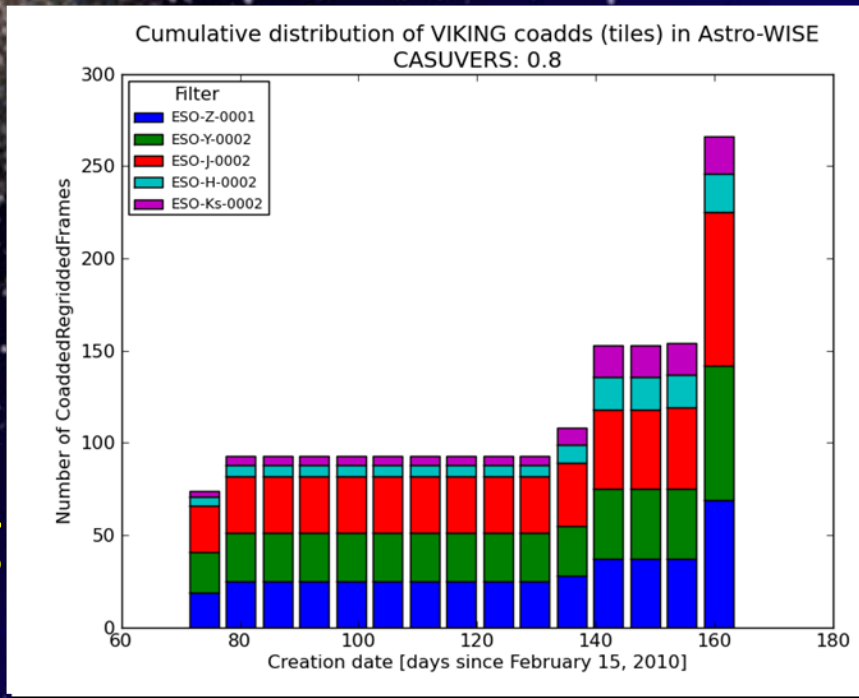
USNO-B1.0 SourceList | world

US Naval Observatory B1.0 catalog, accessable as a SourceList.

+ WFCAM, LBC, ISAAC, **LOFAR, VISTA**

AWE processing of VIKING

- Run our pipeline on CASU reduced "jitters" = "pawprints"
  - Processing: masking satellite tracks, CRs and saturation, astrometric + photometric calibration, regridding, coadding, catalogs
- Produced : coadds and multi-band catalogs (including non-VIKING)
- CASU keep on ingesting
  - CFHTLS-W1
    - coadded+
    - 13-band catalogs. (Also UKDSS)
  - For ~150 sq deg on-going



Example survey operations monitoring plot via data lineage

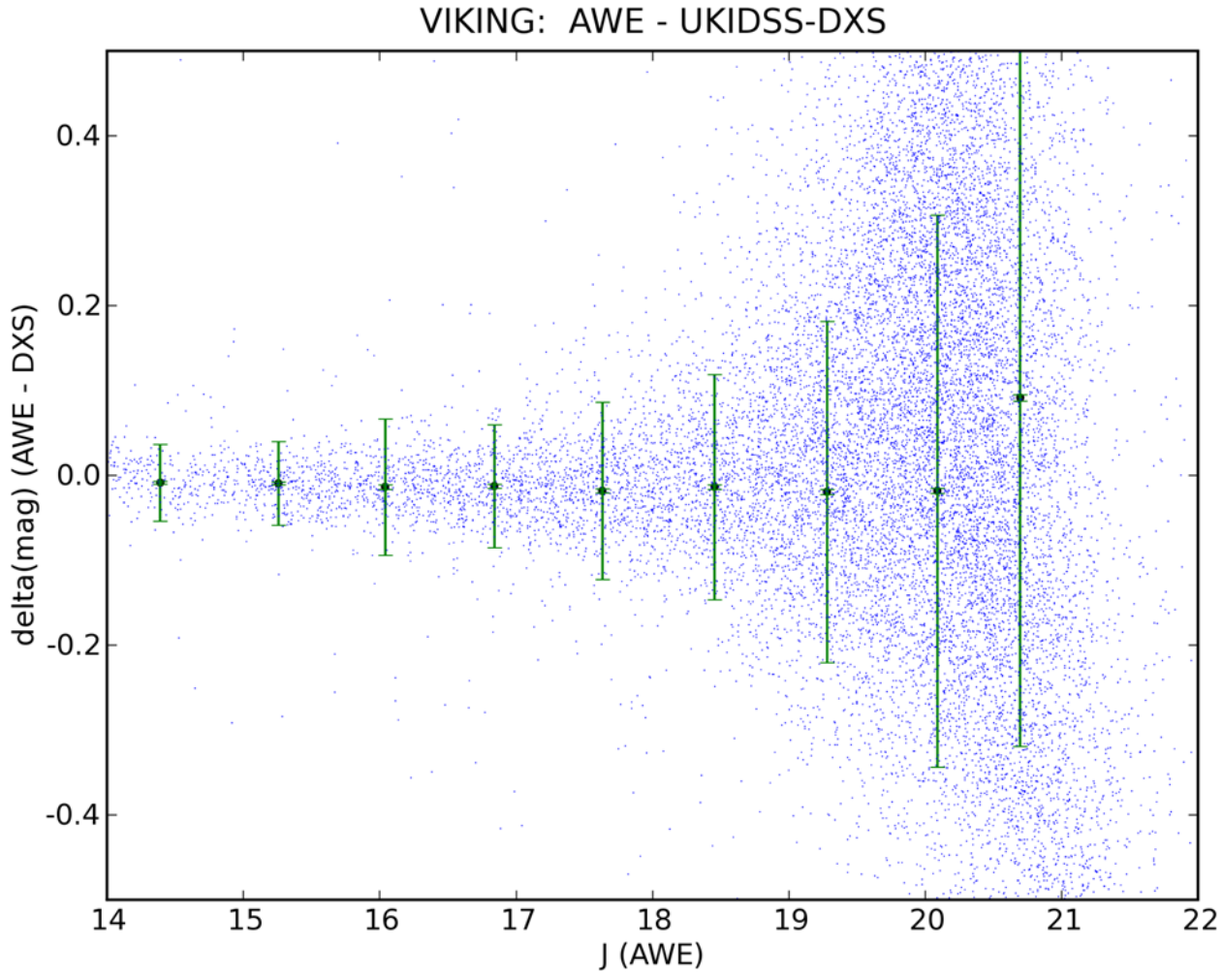
VIKING processing
13 square degrees (~2 weeks of data)

Action	Total time (hours) for 16 jobs in parallel	Individual time 1 unit (sec)	#units	Total volume on fileserver (GB)
Data transfer to	13	12	2.250	-
Ingestion	24	60	36.000	590
Regridding	12	42	48.000	2.200
Coadding	<=20	5.400	63	530
Source Extraction	<=2	1.800	63	-
Association+co-mbining	TBD	-	13	-
TOTAL	71+TBD	-	-	3.2TB

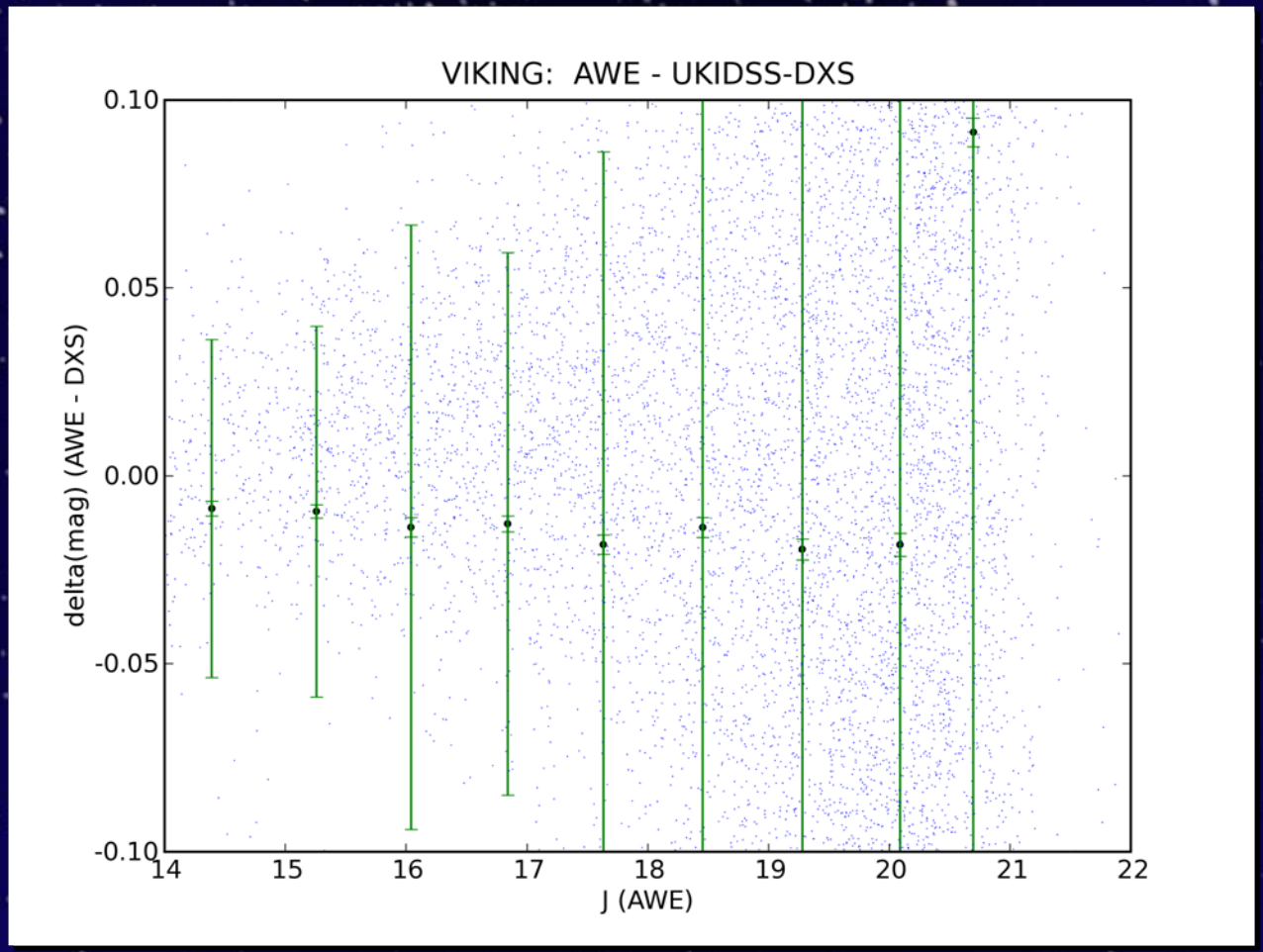
2 weeks = 336 hours

Aperture photometry for point sources

2Mass vs 2Mass

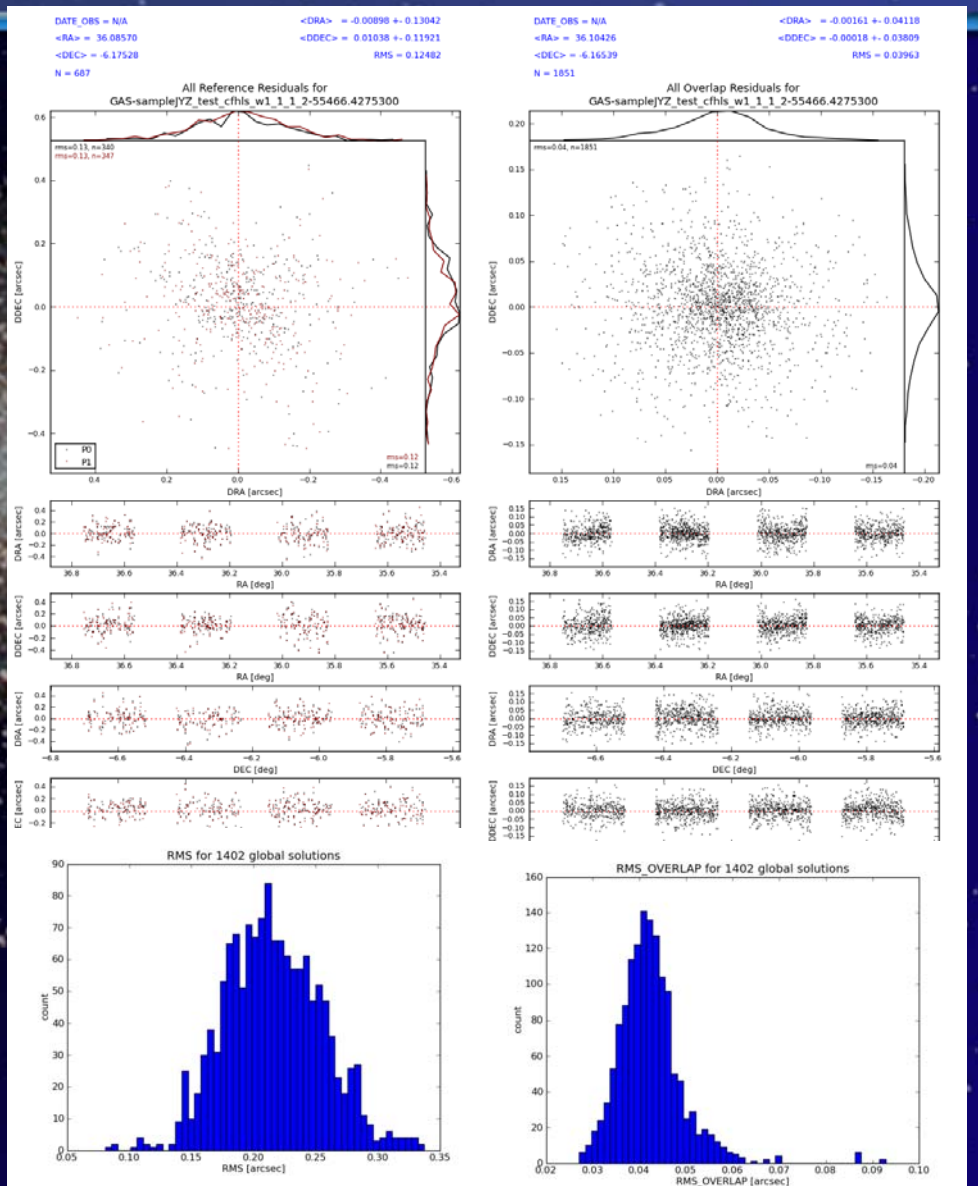


Aperture photometry for points sources
Zoom in



VIKING Astrometry- global

- work in progress
- Challenging due to poor spatial sampling in dithers
- Only close jitters can be solved globally
- RMS~0.21”, RMS_OVERLAP~0.04” using 2MASS-PSC



Identifying z>5.8 QSO candidates in CFHTLS+VIKING

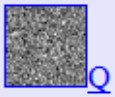
Bestand Bewerken Beeld Geschiedenis Bladwijzers Extra Help

http://www.astro.rug.nl/~bout/cutout/cutouts142-sel.html

Most Visited | Google Calendar | The Dark Energy Surve... | start [OmegaCEN] | ARTICLES | ABSTRACTS | de.arXiv.org e-Print ar... | Groningen Graduate S...

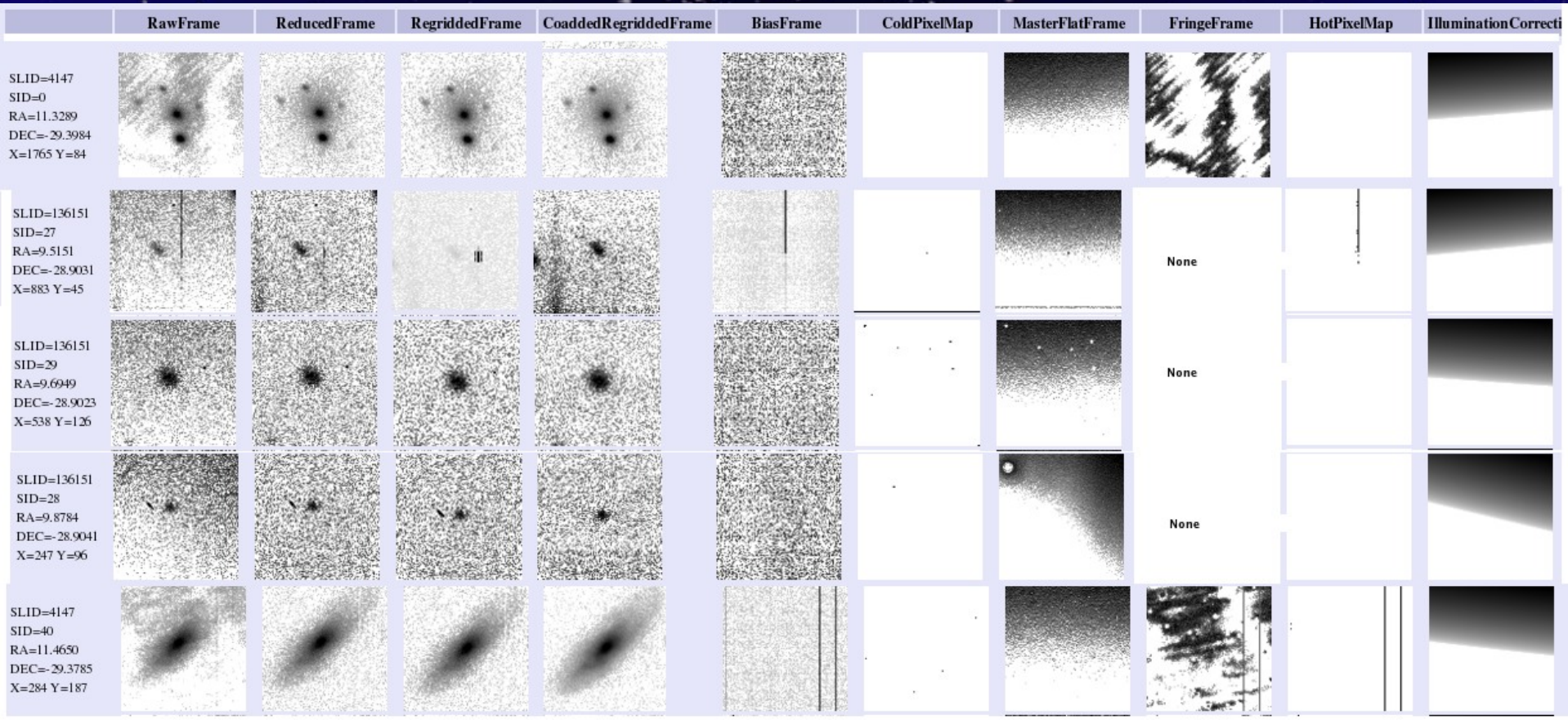
Sources Cutouts

Sources Cutouts

	u	g	r	i	z	Z	Y	J	H	K
Source: (1598441, 12197) RA: 35.51481, DEC: -6.53301	 Q	 Q	 Q	 Q D	 Q D	 Q D	 Q D	 Q D	 Q D	 Q D
Source: (1598451, 8418) RA: 36.12444, DEC: -6.57637	 Q	 Q	 Q	 Q D	 Q D	 Q D	 Q D	 Q D	 Q D	 Q D
Source: (1598841, 71665) RA: 36.27163, DEC: -6.34563	 Q	 Q	 Q	 Q D	 Q D	 Q D	 Q D	 Q D	 Q D	 Q D
Source: (1598951, 66841)										

Klaar

Extreme data lineage



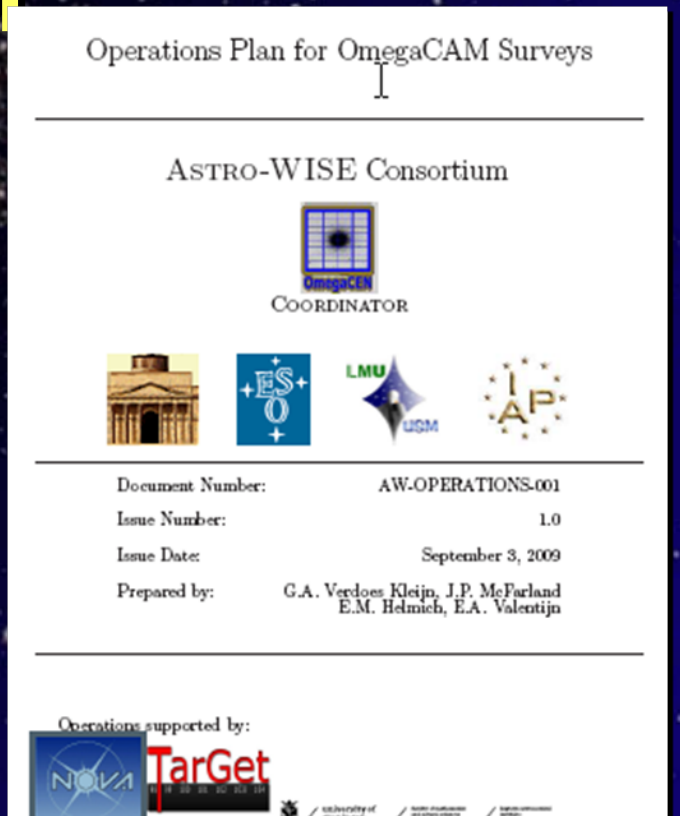
Comp. science journals

Readiness review report-05 -12-2008

On "OmegaCEN scientific data system for OmegaCAM"

William O'Mullane, Pascal Ballester, Marco de Vos

- Very positive
- need for operations plan
- Delivered sept 2009
  - Based on CFHT-LS reductions


Operations Plan for OmegaCAM Surveys

ASTRO-WISE Consortium

COORDINATOR

Document Number: AW-OPERATIONS-001
Issue Number: 1.0
Issue Date: September 3, 2009
Prepared by: G.A. Verdoes Kleijn, J.P. McFarland E.M. Helmich, E.A. Valentijn

Operations supported by:

Personnel

- Target /OmegaCEN Groningen
  - Ample hardware support staff
  - ~5 Calibration/survey astronomers
    - GVK, JMcF, EH, NN, JB
  - ~3 Scientific pr., DBA
    - GS, DB, KGB
- Leiden
  - Proposal for 3 production staff
- Bonn, Napoli, MPE ~1-2 node

Hardware

Groningen- Target

- 3000 core Linux Cluster 30 Tflop
- New Grid cluster
- Oracle DB servers -> Exadata-2
- 4 -> 10 Pbyte Storage

Bonn

Leiden

MPE

Napoli

Thanks!

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