

ODT and NGC in 2007



General

NGC

Adaptive Optics

Scientific detector systems delivered to LSP

Scientific detector systems in Europe

Research & Development

Social Activities

Comet Mc Naught over Paranal – photograph courtesy



Highlights grow on the shoulders of excellently done routine work



Iris Bronnert

- Soldering
- Testing
- Market monitoring
- Procurement
- Order tracking
- Obsolescence hunting
- Stock keeping
- Incoming quality control
- Repairs
- Preventive maintenance
- Trouble shooting
- Travel & logistics
- ERP (re-)mastering
- Assembling
- Cabling
- Support of La Silla Paranal
- Planning
- Ultra-cleaning
- Web pages
- Safety
- Debugging
- Meetings
- Reporting
- Presentations
- Training
- Documentation
- Facilities management
- Hyper-sensitization



Siegfried Eschbaumer



Christoph Geimer



Stefan Hoetzi



Evi Hummel

ODT and NGC in 2007



General

NGC

Adaptive Optics

Scientific detector systems delivered to LSP

Scientific detector systems in Europe

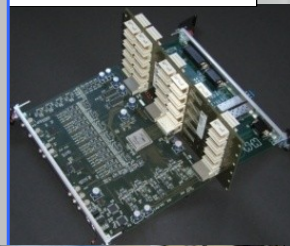
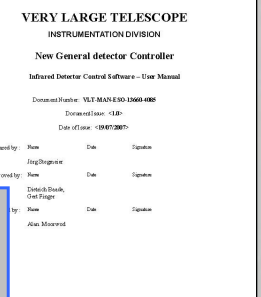
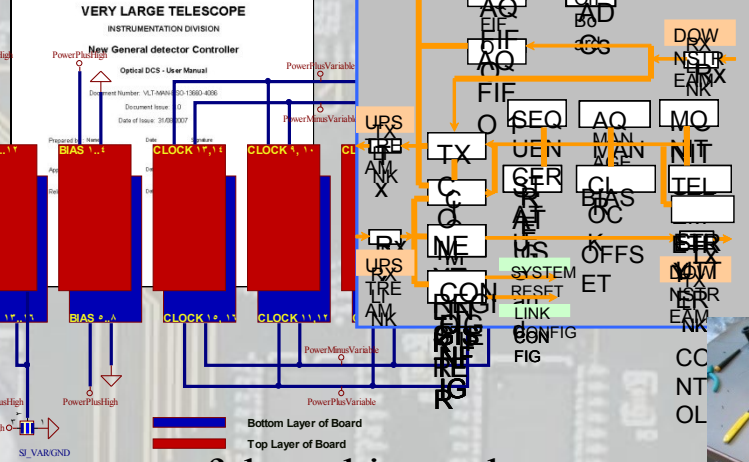
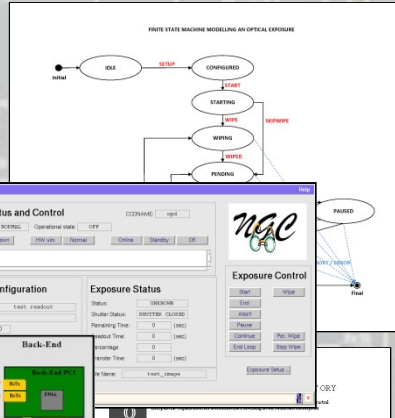
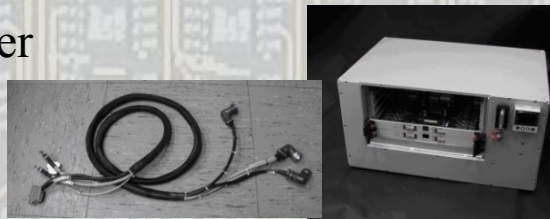
Research & Development

Social Activities



New general Detector Controller (NGC)

- New revision of frontend electronics – tested OK
- Plenty of clocks and biases
- Basic software, IR software, optical software, firmware
- New pre-amplifier
- Shutter control
- Documentation
- Housing, cooling, cables, connectors
- I/F to SPARTA and VLTI
- Twiki with

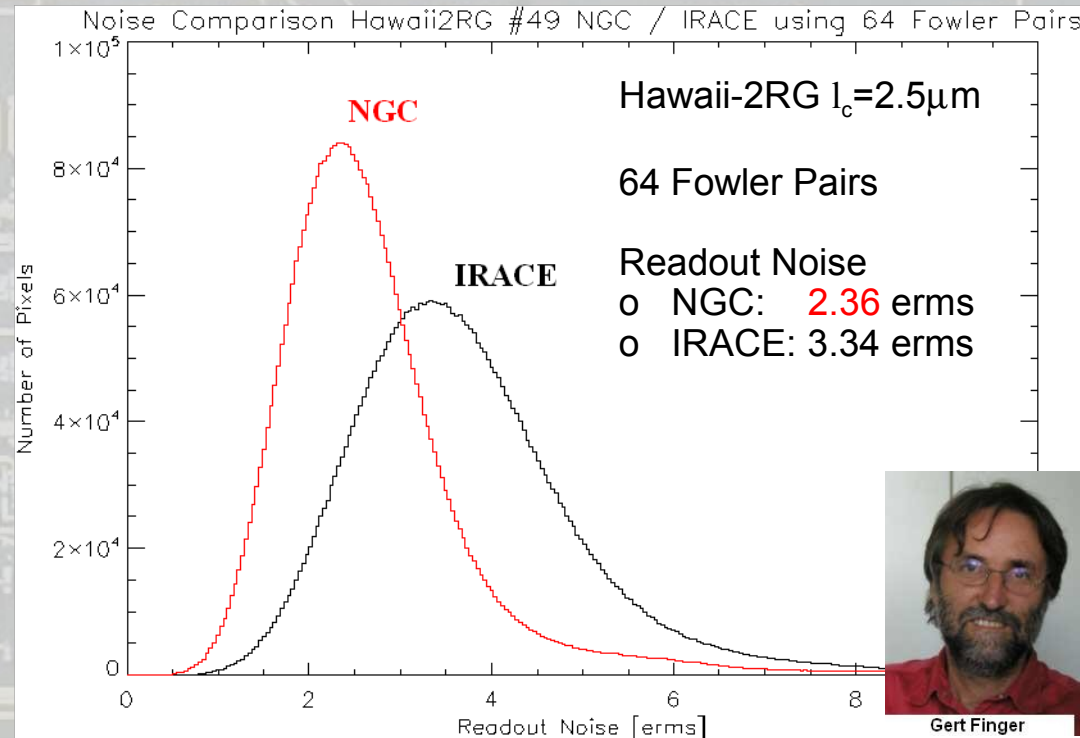


- production manual
- version tracking
- bug lists
- history files for each board
- test reports

- Team spirit: amalgamation of 2 different successful working cultures

NGC performance

Tests in 2007 January showed excellent noise distribution with a Hawaii-2RG detector



Noise floor of ~ 3 erms @ 50 kHz with scientific CCDs to be revisited in 2008 January.

Analog Clamp & Sample (similar to FIERA) now supported in combination with digital Correlated Double Sampling.

NGC deliveries and production in 2008

Systems are due for:

- MUSE (prototype +)
- KMOS
- SPHERE
- ZIMPOL
- Lab usage

Have produced:

- ten basic (+ transition) boards
- ten 32AQ (+ transition) boards
- six 2-slot back planes
- ten 6-slot back planes
- nine PCI boards
- five power supplies

Stock will last through mid-2008.

Comprehensively tested: OK

New production run initiated.

ODT and NGC in 2007

General
NGC



Adaptive Optics

Scientific detector systems delivered to LSP

Scientific detector systems in Europe

Research & Development

Social Activities

MAD: Multi-conjugated Adaptive Optics Demonstrator

- Three + two detector heads - one FIERA controller
- 3+2 camera heads, 1 FIERA
- Up to 400 frames/s
- With DSP optimization, $\gg 1$ Mpix/s (FIERA spec)
-
- Read noise: $\sim 6-7 e$
- Commissioning in 2007. “A spectacular success”

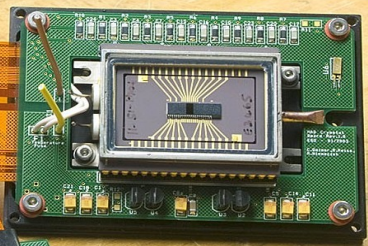
STC: “applauds MAD team”



Roland Reiss



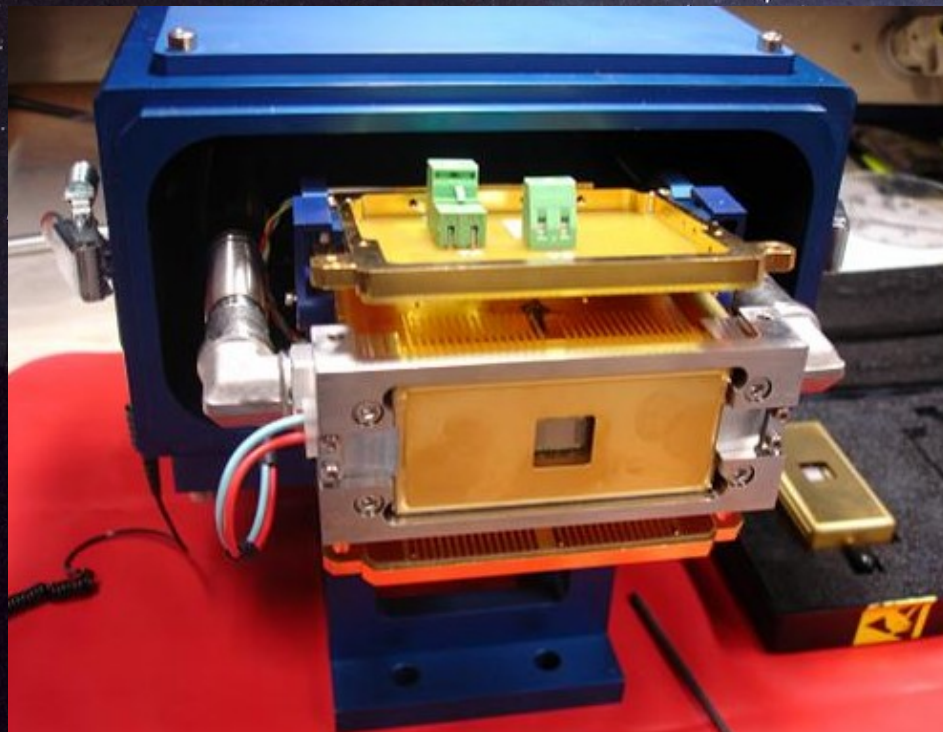
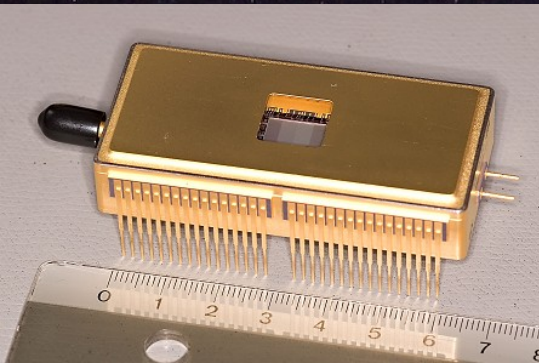
Claudio Cumani



e2v CCD39

(EM-)CCD220 for wavefront sensing @ VLT (or: management at a distance)

- Standard WFS chip for GALACSI/GRAAL/SPHERE
- Development by e2v of CCD package delayed but almost finished
- Development by Marseille of test controller delayed but almost finished
- Delivery to e2v now announced for 2008 January



OP 4	Gain Registers				Gain Registers	OP 8
		Image Area	Image Area			
OP 3				Store Area		OP 7
	Gain Registers				Gain Registers	OP 6
OP 2		240x120 24 μ m	240x120 24 μ m			
OP 1						OP 5

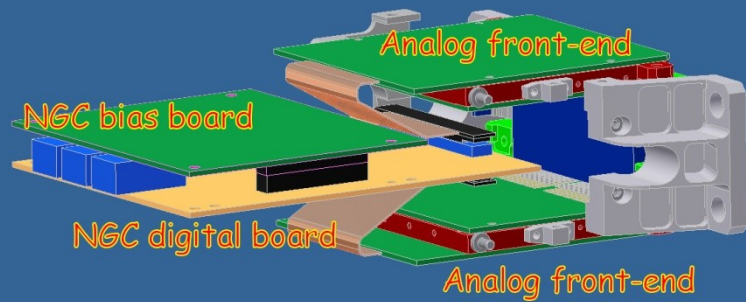


Mark Downing

CCD220 @ NGC

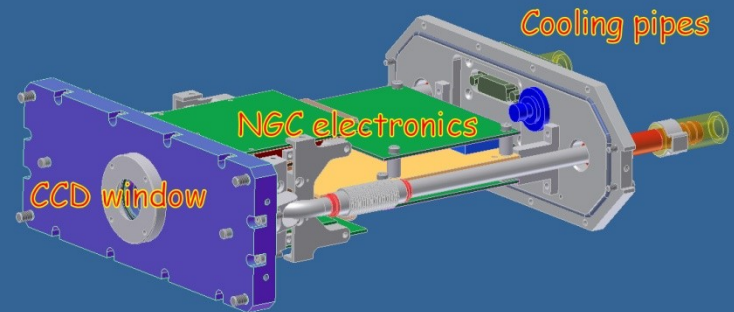
NGC will use adaptations of the

- NGC Basic Board for the digital part (re-design ready)
- analog electronics of OHP/Marseille controller



Standard camera head for GALACSI, GRAAL, and SPHERE

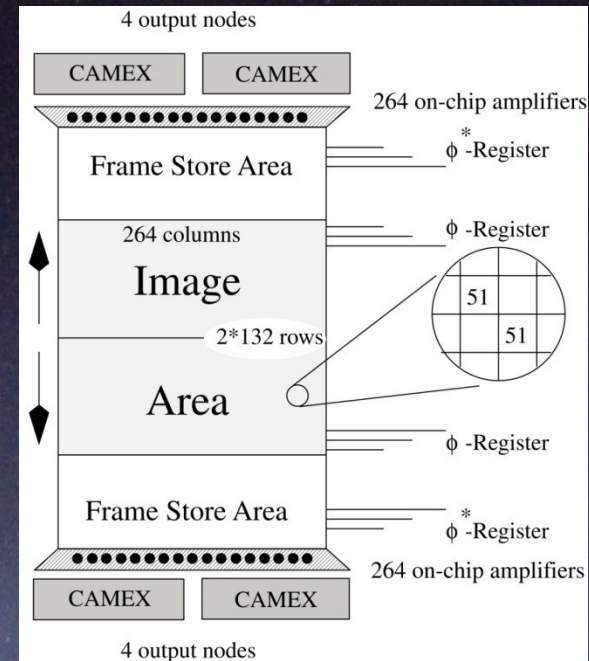
First light expected in mid 2008
Will build 15 copies in 2009/2010



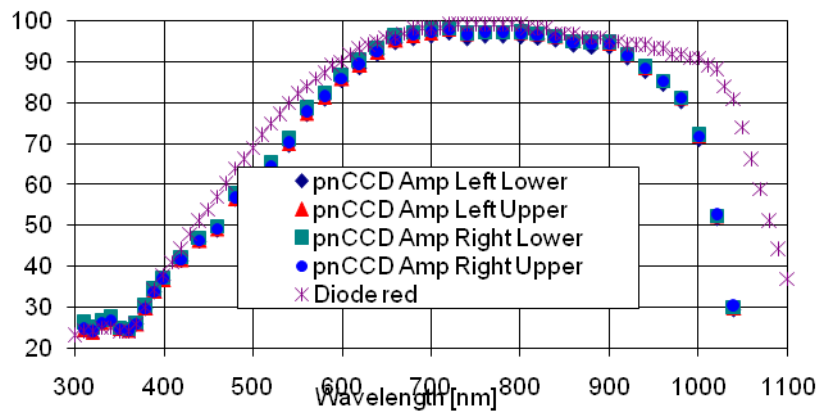
Javier Reyes

Joint tests of pnCCD with MPE-HLL

- 264x264 51- μm pixels
- 450 μm thick
- Split frame transfer
- 528 amplifiers + CAMEX (ASIC)
- 1000 fps
- $\text{RON} < 3e$



QE pnCCD First Test Run



- Plausible back-up for CCD220
- Device too small for SH@E-ELT
- But OK for XAO with pyramid WFS?
- XAO needs 3 kfps – AAPnCCDs?

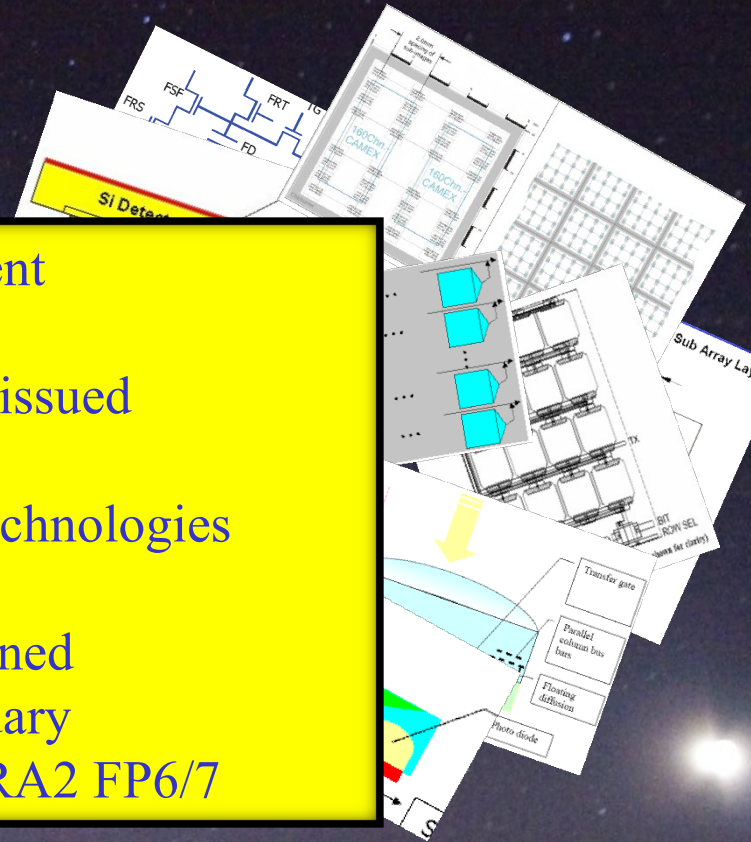


Mark Downing

Design studies for E-ELT AO WFS detectors

Signal of Data Receiver	MILMux	100.4	100						up to ~400	MILMux and Ccd specifications were established assuming a 100 Mbit/s data rate for a 10000000 and 20000000 array size, respectively. Receiver data rates of ~400 Mbit/s are very realistic. For a 100 Mbit/s CAMEX camera, the receiver gate may require additional design effort for data synchronization. For a 100 Mbit/s CAMEX camera, receiver and gate data rates are 200 Mbit/s and 500 Mbit/s, respectively.
Forward from 2D Sub-Array pixel controller	MILMux	100.35	100						100	MILMux rates to 10000 sub-pixels also and 70000 sensor rate, Ccd rates to 100000 sub-pixels also and 100000 sensor rate. Receivers/arrays are good signal processing and normally throughput is.
Forward compatible binary, not an array	FC	10	10						10	Yes, commercial image is available. In order used for additional memory and signal processing. Architecture is flexible enough to incorporate other sensors. Ccd detectors can be used for other sensors.
Receiver for WFS System	Industry standard									
FC	FC	100.1	100.1						100.1	Very 100.1 degree of scaling. MILMux available can then be used at a frequency slightly higher than 100.1 C, and gate specifications at approximately ~100 C.
Forward from 2D Sub-Array pixel controller	FC	100.1	100.1						100.1	Does not apply to a CAMEX based image sensor
Forward from 2D Sub-Array pixel controller	FC	100.1	100.1						100.1	Does not apply to a CAMEX based image sensor

- Detailed requirements document
- 7 offers received
- Contracts for 4 design studies issued
- One bidder gave up
- Very differing concepts and technologies
- Extremely detailed reviews
- Requirements iterated and refined
- CfT after FC meeting in February
- Support of/through Opticon JRA2 FP6/7



	Front Side	Hybrid	3D	Backside
QE	Red	Green	Green	Green
Dark Current	Green	Red	Green	Yellow
Noise	Green	Yellow	Green	Green
100% Operability	Green	Red	Green	Green
Size/Stitching	Green	Green	Red	Green
VLSI capability	Green	Green	Red	Green
Manufacturability	Green	Green	Red	Yellow

■ may not achieve requirements
■ feasible
■ demonstrated



Mark Downing



Johann Kolb



Olaf Iwert

ODT and NGC in 2007

General

NGC

Adaptive Optics



Scientific detector systems delivered to LSP

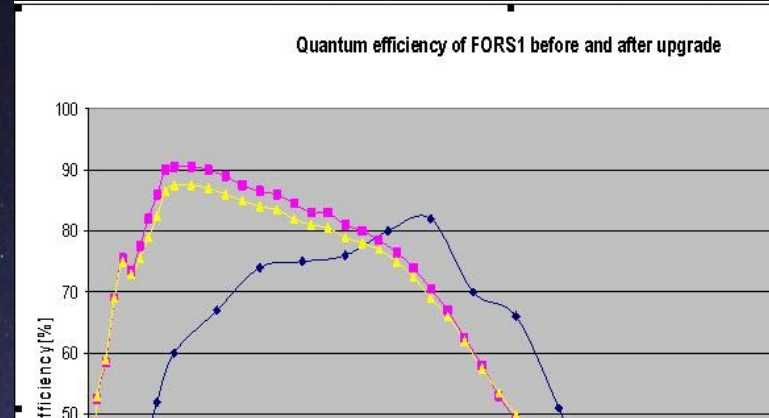
Scientific detector systems in Europe

Research & Development

Social Activities

FORS1 Blue Upgrade

- To replace Tektronix 2k x 2k
- Mosaic of two 2k x 4k e2v CCD44-82 devices for extra-high UV sensitivity
- Successfully commissioned in 2007 January and March/April (The Messenger No. 128, p. 9)
- High fringing
- Well-starred – but necessitated ...



Thanks, Ulli, for this not otherwise KÄUFLich inspiration!

New INS first responder unit
(swiftly commissioned by Gero)



ODT and NGC in 2007

General

NGC

Adaptive Optics

Scientific detector systems delivered to LSP



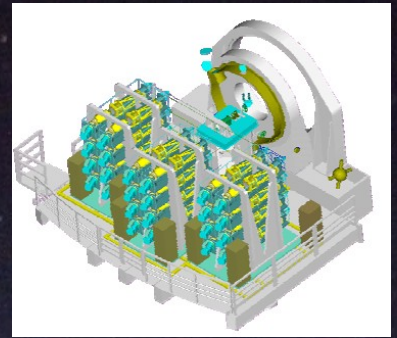
Scientific detector systems in Europe

Research & Development

Social Activities

Multi-unit Spectroscopic Explorer (MUSE)

- Twenty-four separate 4k x 4k CCD systems
- PDR in 2007 July
- Hope to sign contract for CCDs in February
- MAIT plan – preliminary agreement with AI Potsdam on cooperation
- 2008 January – July for prototype: delays have erased January already
- Relatively heavy management formalisms
- Basic temperature-control and pressure-monitoring unit (“Tee Pee” ©)
be offered to SPHERE, ZIMPOL, Integration Dept., ODT test bench, etc.



Roland Reiss



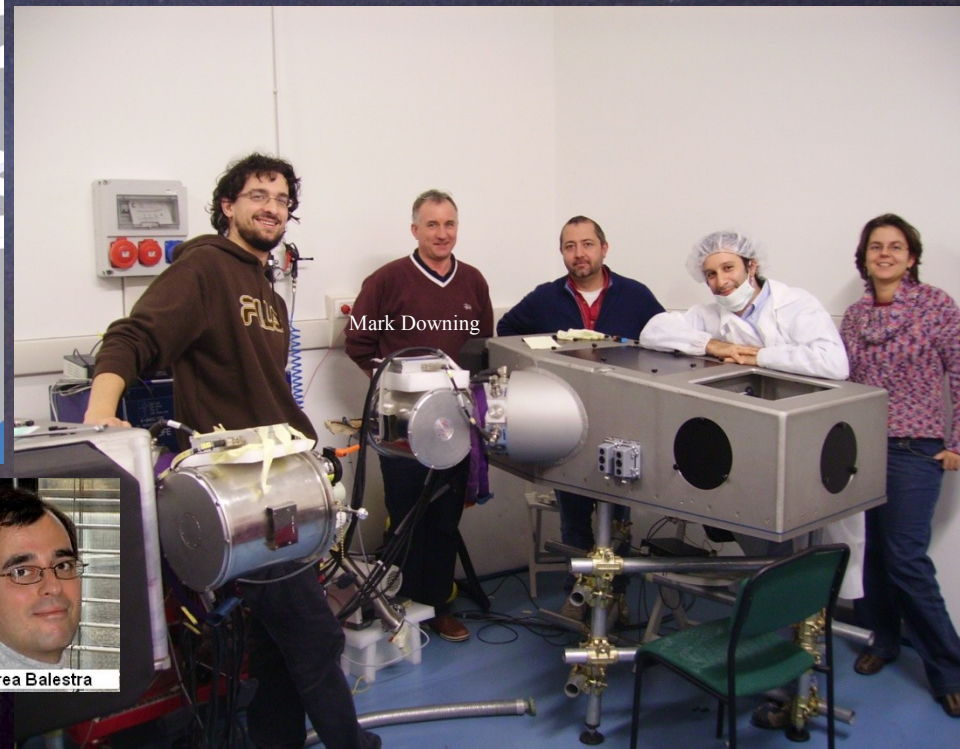
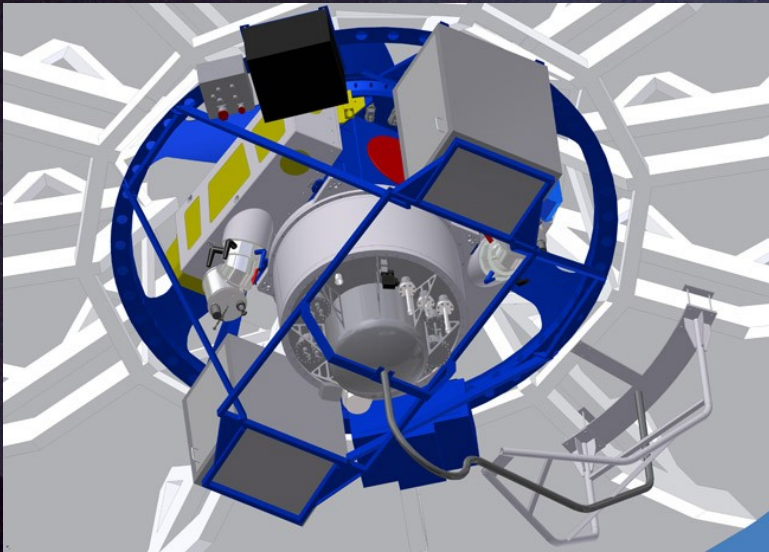
Gero Rupprecht



Mechanical sample of 4k x 4k e2v
CCD231-84 for prototype

X-shooter

- **FIERA software defines 2 nearly fully independent virtual cameras on one common front-end electronics**
- **VIS system (with MIT/LL CCID-20) delivered in 2007 July**
- **UVB system (with e2v CCD44-82) installed in 2007 November**
- **Performing nominally (most of the time)**

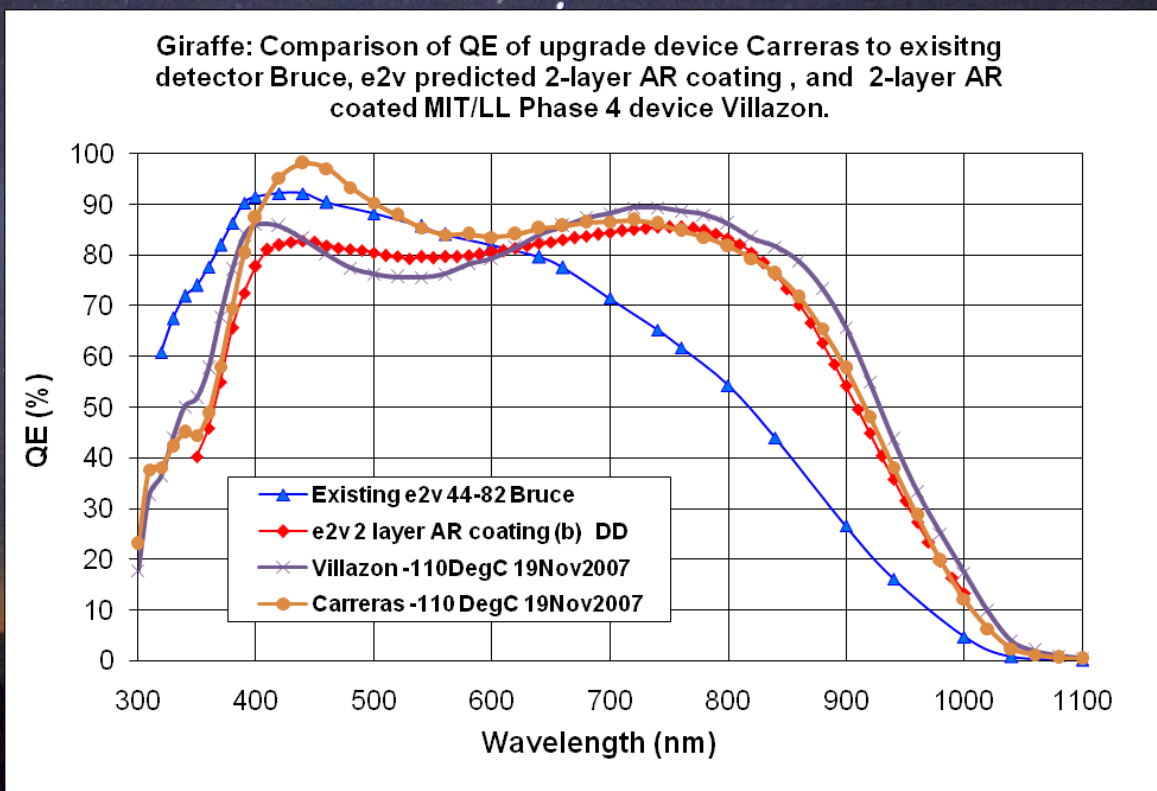


Andrea Balestra

Mark Downing

Giraffe upgrade

- Deep-depletion CCD with double-layer AR coating received from e2v: excellent device
- Expect significant red upgrade and little blue downgrade
- Commissioning in 2008 May (e2v delivery was too late for 2007 October)



Mark Downing

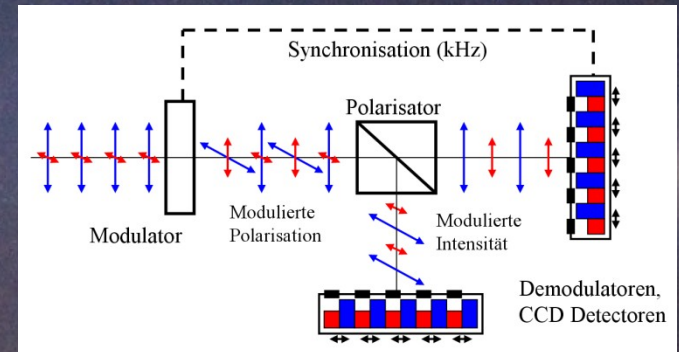
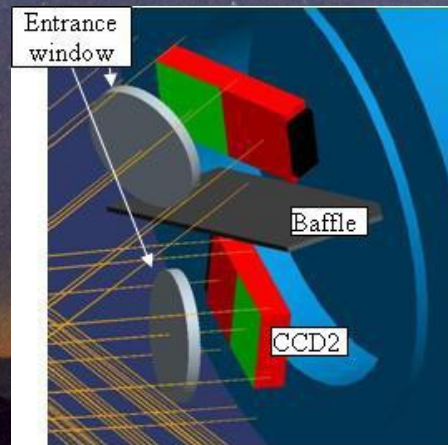
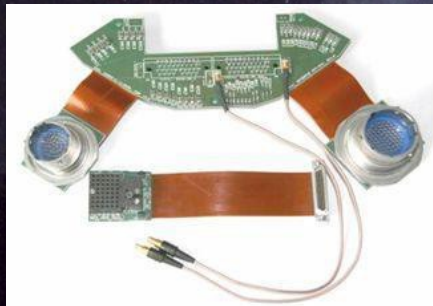


Sebastian Deiries



ZIMPOL (SPHERE)

- Originally, ZIMPOL was supposed to provide a VLT-compliant detector system. Now, the ODT may more nearly be supplying a ZIMPOL-compliant detector system.
- Very detailed analysis of observing modes and shutter requirements
- Support of evaluation of candidate CCDs with ODT test bench
- PDR passed in 2007 September



Mark Downing

UVES red upgrade



- Probably in 2007 September/October
- Contacts about detector procurement strategy with OPI

CODEX

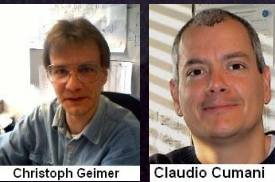


- Conducted very broad detector market survey
- Investigated SiC packaging (w. A. Swat from TSD)
- Studied precision thermal control (w. H. Dekker)



- 2007 + 2008 releases of VLTSW (incl. enhancements)

FIERA



- Multiple clean-ups after upgrade attempts on LSP

Pulpol



MIT/LL Phase 4



- Received and tested one chip with dual AR coating
- Project still not closed → not a highlight



European Southern Observatory
Optical Detector Tests
VST-TRE-ESO-23150-0045
Last modified: 29 November 2006



Instrument
for head



FIERAs

Cooling controller
Drawings
PAE
Test reports
Spare parts



St

**OMEGACAM DE
CCD CLOCK FILTER
MEASUREMENT**

Mark Downin
European South



ESO
European Organisation
for Astronomical Research
in the Southern Hemisphere

**OmegaCAM Detector
Cooling Control
Design Description**

Doc. No.: VST-TRE-ESO-23150

Issue nr 3.0

Date: 12.03.2007

Author(s): O. Iwert, M. Zaehring
Name Date

Approved: D. Baade
Name Date

Released: D. Baade
Name Date

page:

ESO, Karl

ESO, Karl-Schwarzschild-Str. 2, 85748 Garching b

Document Nu
Issue Number
Issue Date:

Approved:

Released:



VST PROGRAMME

EUROPEAN SOUTHERN OBSERVATORY

Organisation Européenne pour des Recherches Astronomiques dans l'Hémisphère Austral
Europäische Organisation für astronomische Forschungen in der südlichen Hemisphäre

ESO	OmegaCAM Verification of EMC & Safety of Electrical Systems	VST-TRE-ESO-23100-0043 Issue 3.0 Date: 16.02.07, Page 1
------------	--------------------------------------------------------------------------	------------------------------------------------------------



ESO
European Organisation
for Astronomical Research
in the Southern Hemisphere

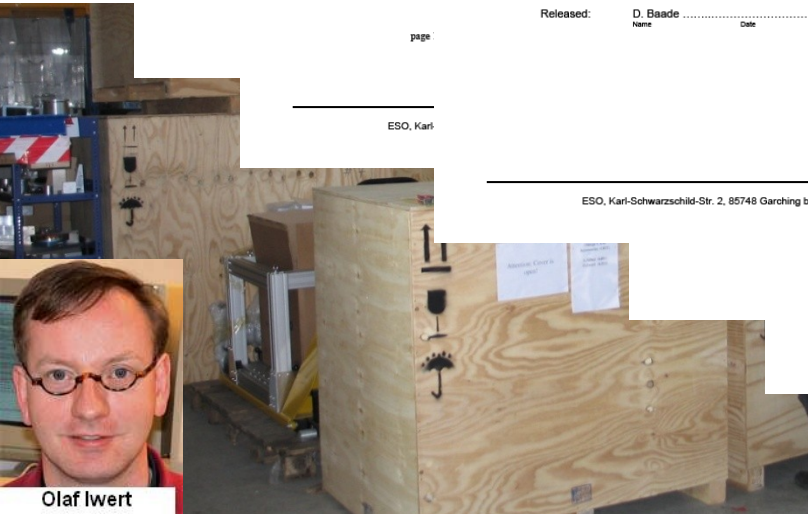
**OmegaCAM Detector System
Operation and Service Manual**

Doc. No.: VST-MAN-ESO-23150-0052

Issue nr 1.0

Date: 14.12.2007

Author(s): O. Iwert with input of A. Balestra, C. Cumani, S. Deiries, C. Geimer, J. Reyes, A. Silber



Olaf Iwert

ODT and NGC in 2007

General

NGC

Adaptive Optics

Scientific detector systems delivered to LSP

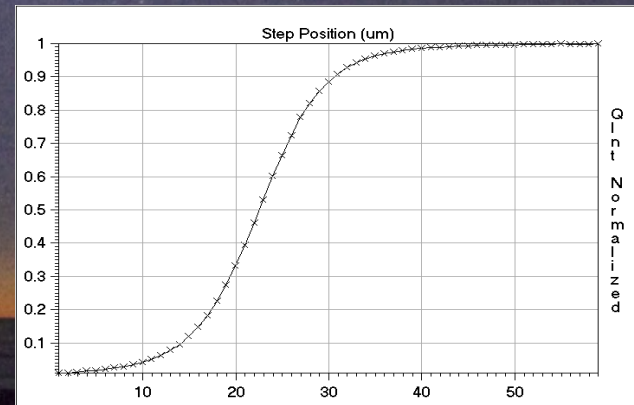
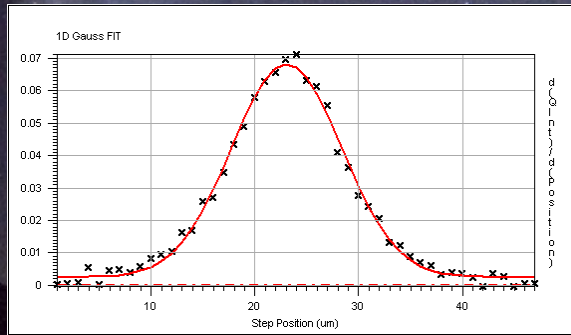
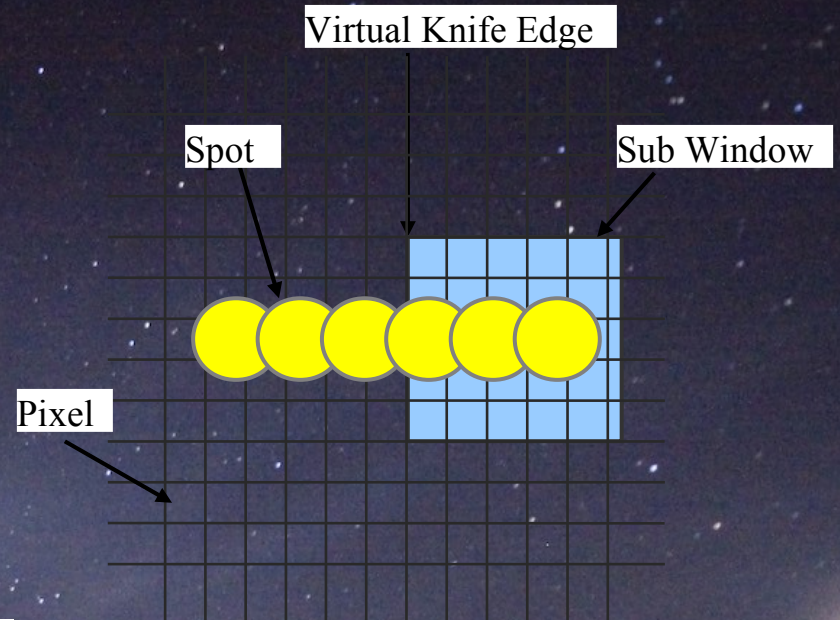
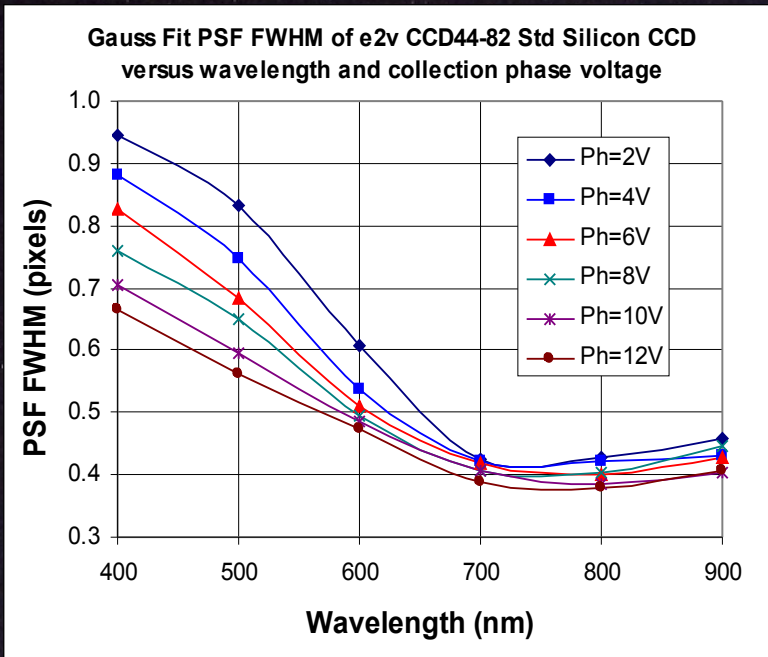
Scientific detector systems in Europe



Research & Development

Social Activities

Research & Development: Intrinsic CCD PSFs



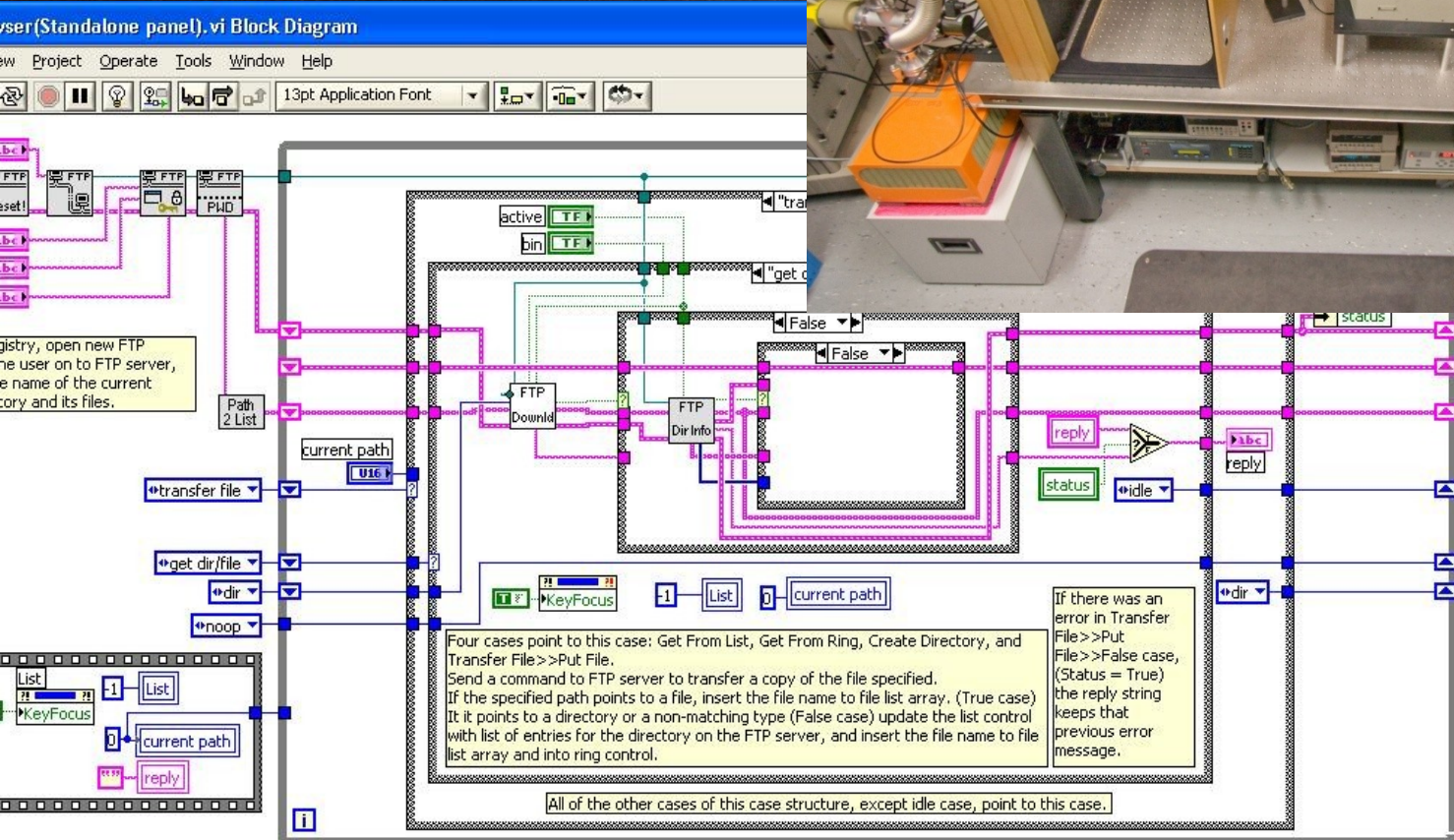
Complementary study suggests only mild effect on full-well capacity

Research & Development: New ODT test bench for AO systems

- Device control based on LabView
- Replacement of PRiSM (for data analysis) TBD (IDL?)



Eric Müller



Sebastian Deirie

ODT and NGC in 2007

General

NGC

Adaptive Optics

Scientific detector systems delivered to LSP

Scientific detector systems in Europe

Research & Development



Social Activities



Team building efforts





Happy holidays!

NGC 2264