



**Summary of the special session on
« VLT Operations »
during the UC 37th meeting,
held 26 April 2013**

Markus Wittkowski (ESO/USD)

Claudia Paladini (Université Libre de Bruxelles)

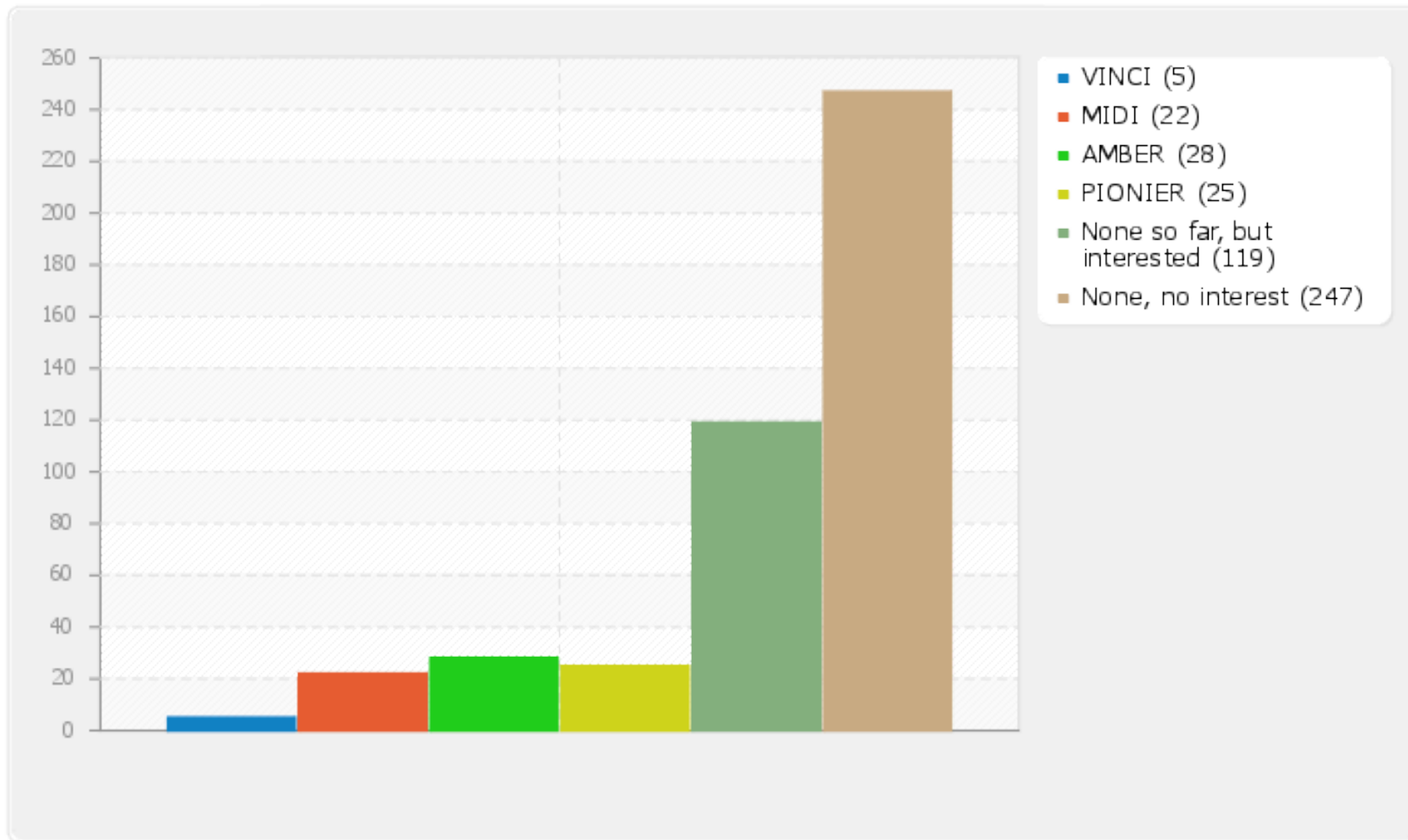
The ESO User's Committee

- One of the ESO's governing bodies
- Made of representatives of the ESO users in each member state
- Advises the ESO DG on matters concerning the use of ESO facilities (telescopes, instruments, computers, etc.)
- Constitutes the main link between ESO and its users community
- Composition, details and agendas available from <http://www.eso.org/public/about-eso/committees/uc/uc2013.html>

UC Special Topic

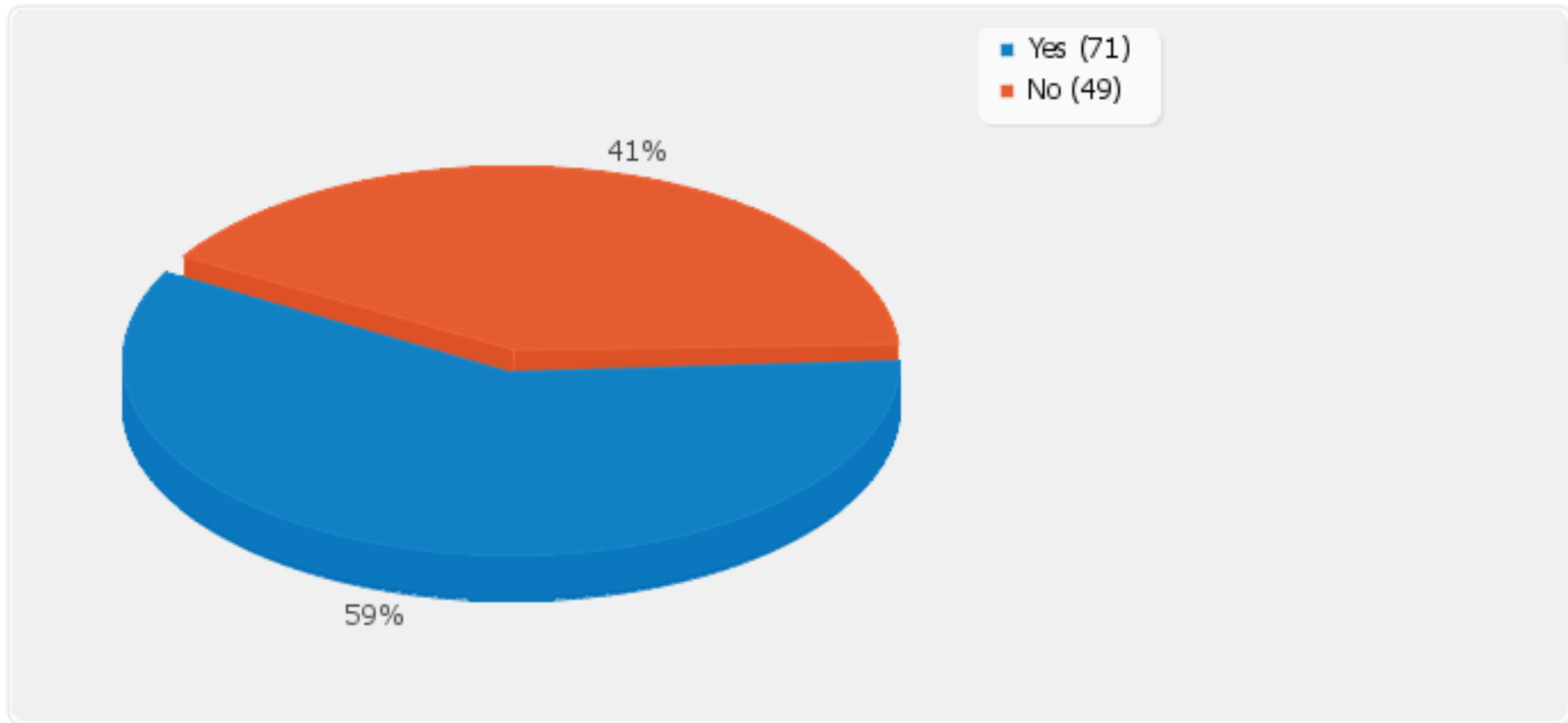
- Each year a different “Special Topic”
- For 2013, the “Special Topic” was “VLT Operations”. Previous years: “Public Survey Data Products” (2012), “APEX Operations” (2011), “ALMA Operations” (2010)
- 2h session on the 2nd day, with a short introduction to the topic by ESO followed by two presentations from VLT frequent users
- Before the UC meeting, the UC runs its annual Users' Poll, which normally includes 6-8 questions on the Special Topic.
- Questions for the poll and ‘expert users’ selected by UC (chair) (based on suggestions by ESO)
- Presentations: “VLT Operations at ESO” (Merand/Wittkowski), “The Future of VLT at ESO (Berger), Feedback from Expert Users (Kervella, Paladini). Presentations are available on the web.

Which VLTI instruments have you used?

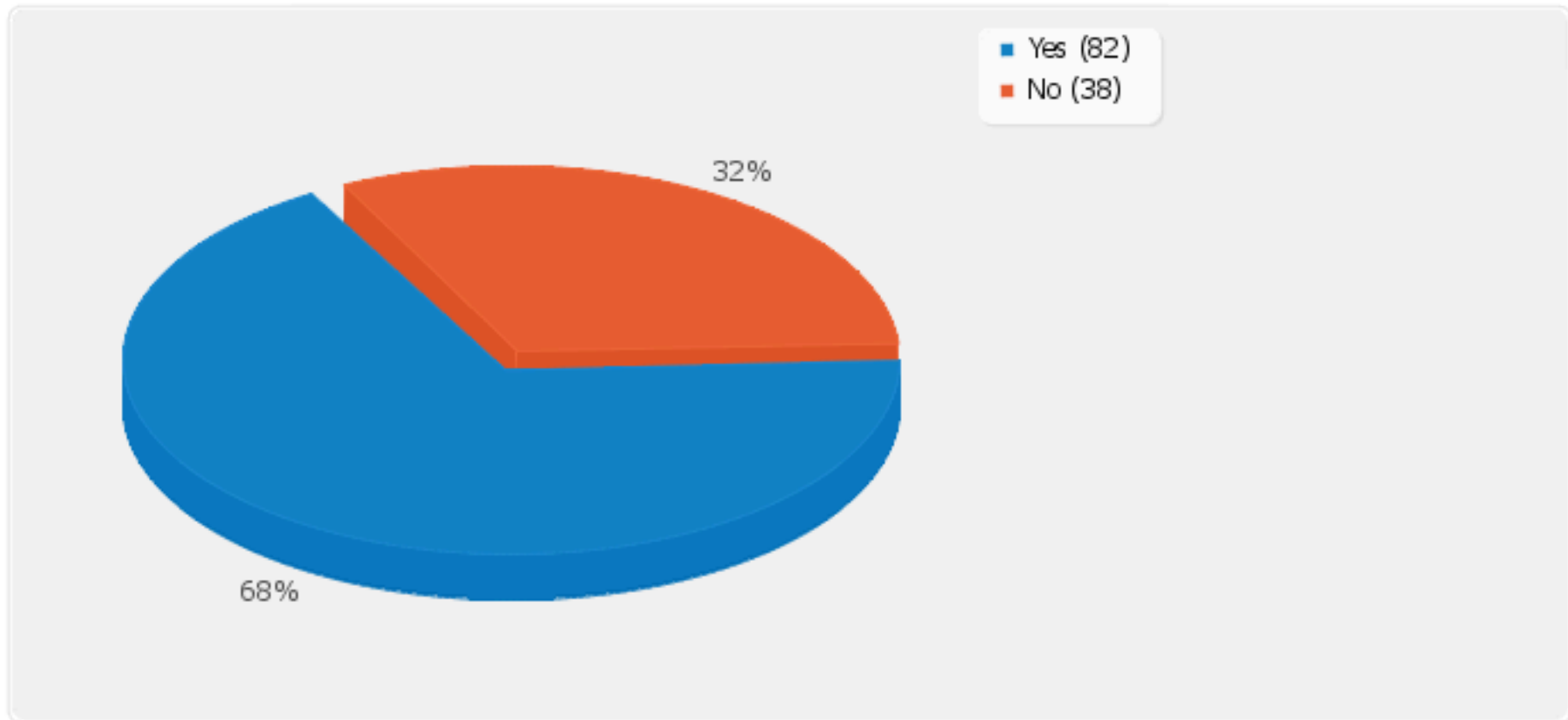


1.2% 5.1% 6.5% 5.8% 27.5% 57.0%

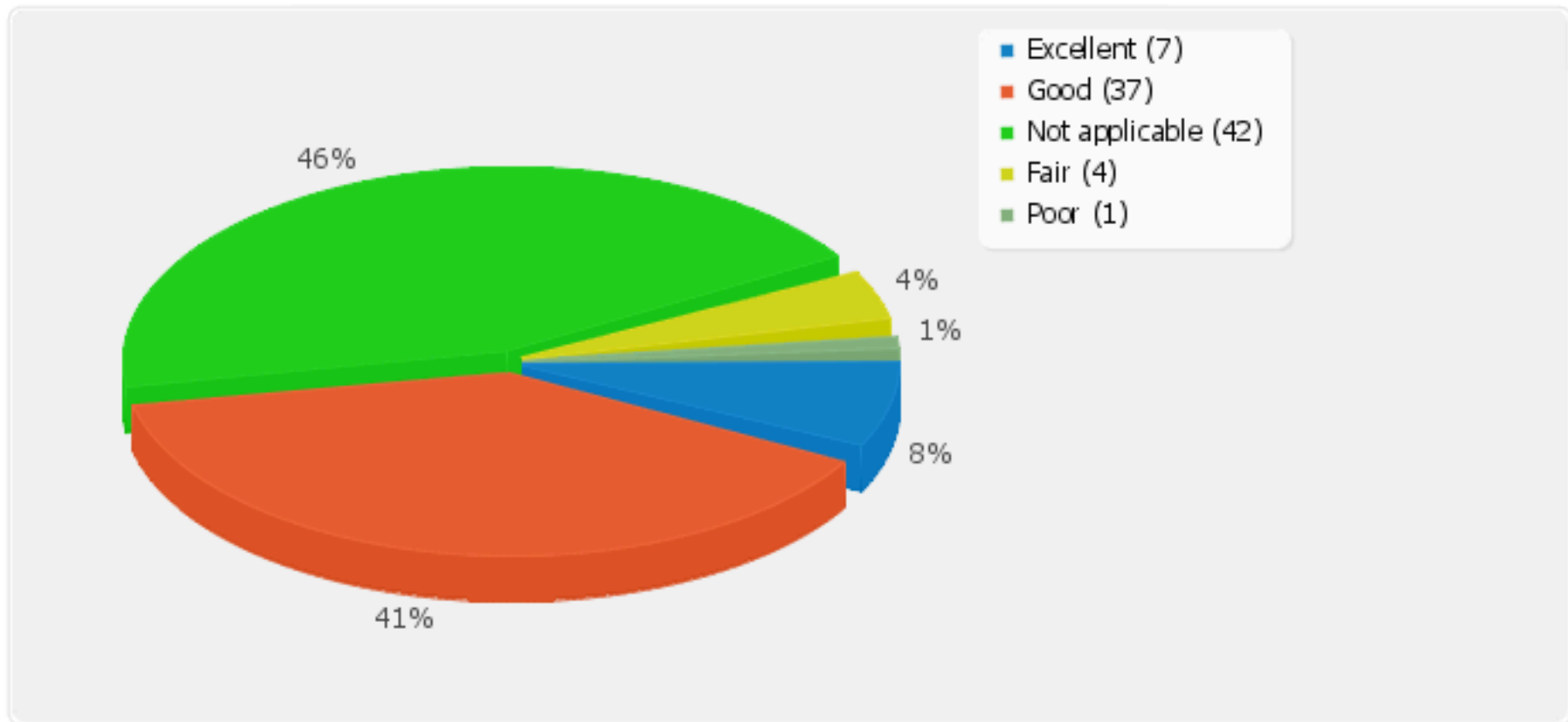
Were VLTI observations your first experience in optical interferometry?



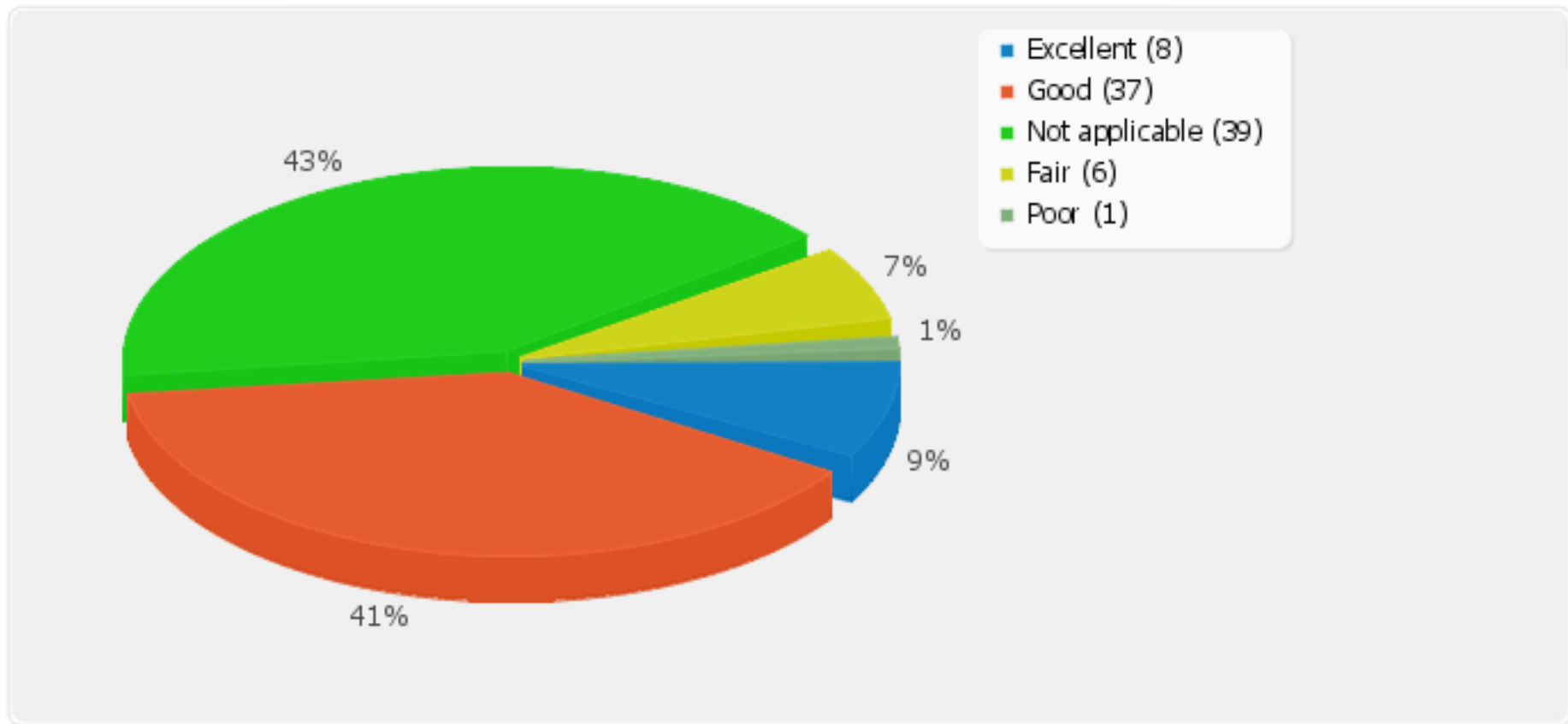
Do you think that ESO provides sufficient support specifically to newcomers to optical interferometry and/or the VLT?



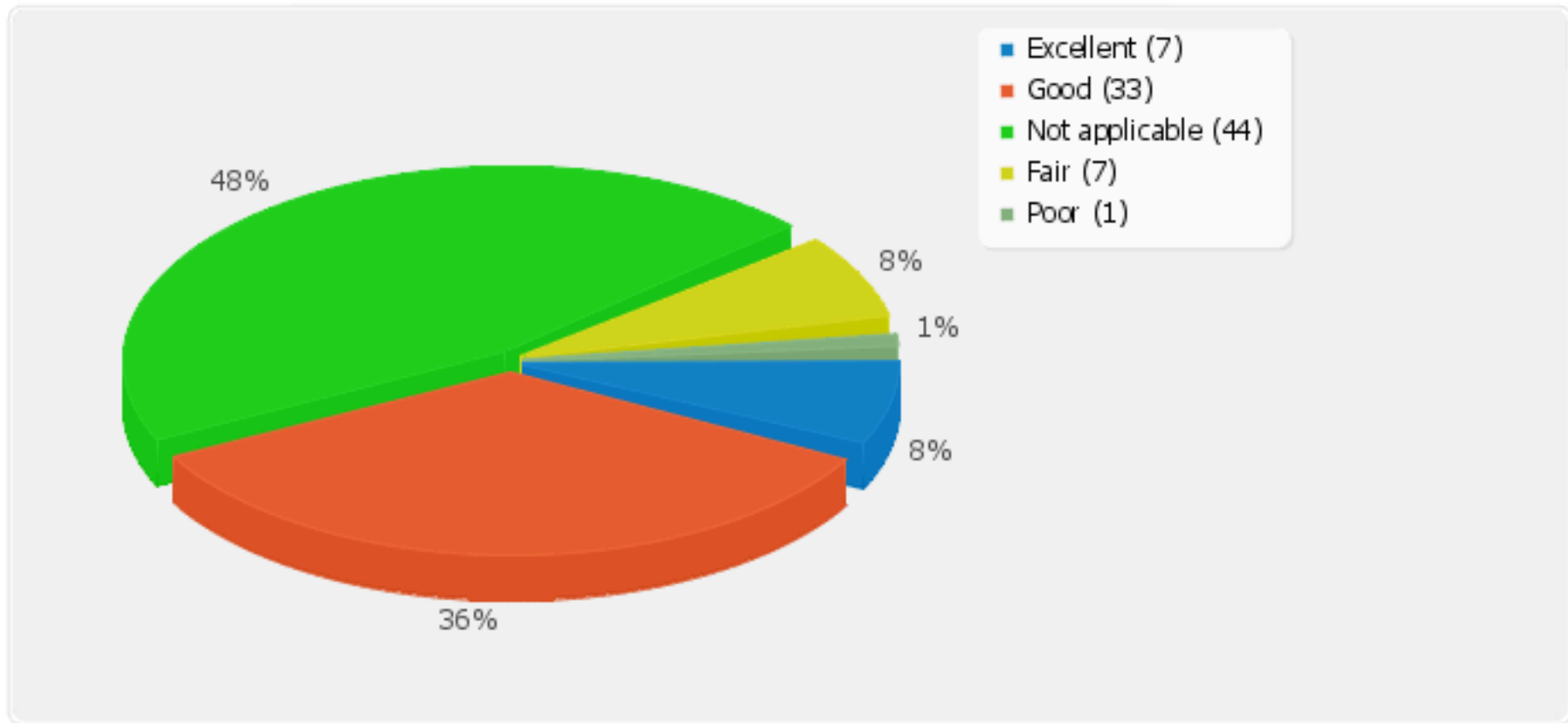
If you think about the preparation of your own VLT observations, how do you rate the ESO webpages, user manuals, and preparation tools? Phase 2 pages?



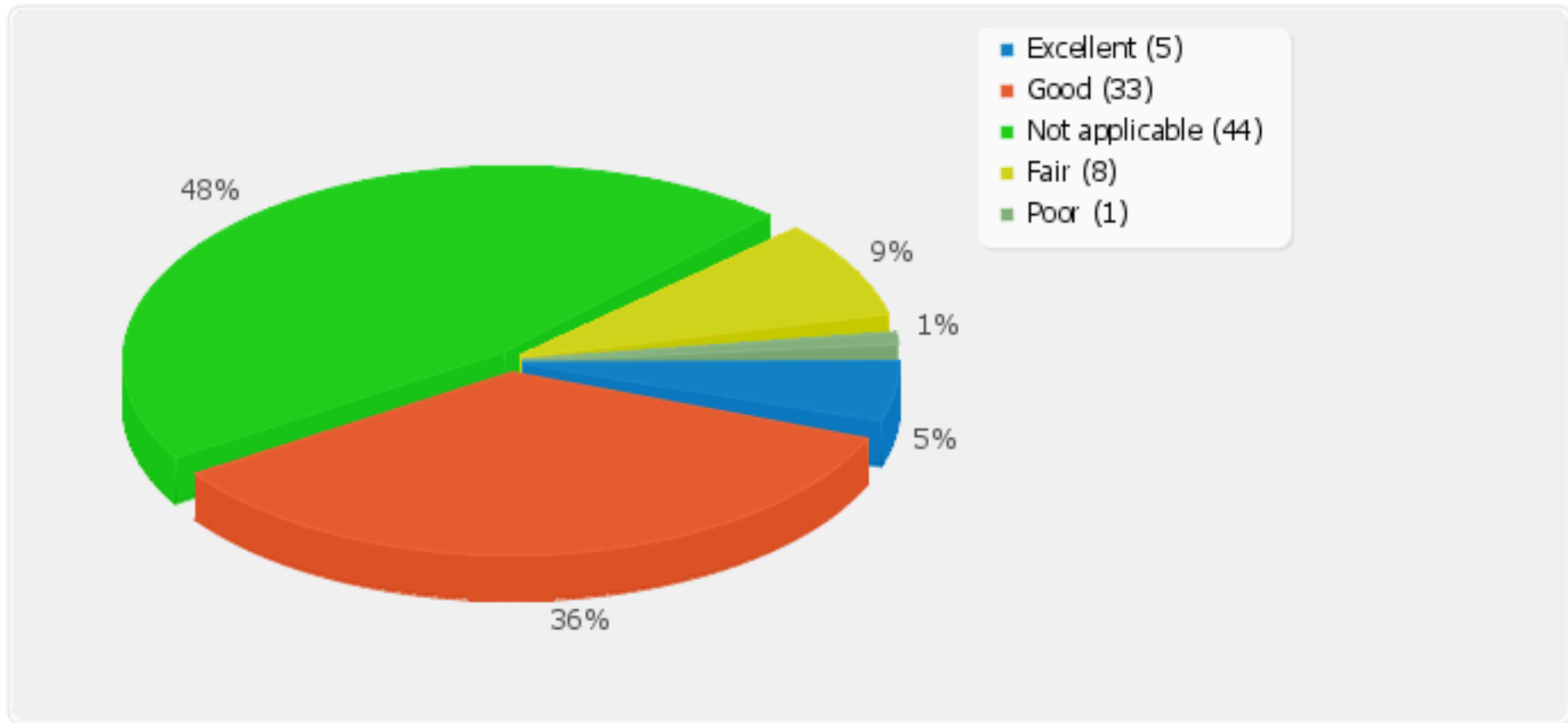
User Manuals



VisCalc



CalVin



How do you agree to the following statements on the way ESO offers and schedules different baselines ? (1:agree ; 5 disagree)

- **My science goals require better imaging capabilities: 1.81**
- **My science goals require longer baselines: 2.12**
- **Better support for monitoring programs: 2.59**
- **Pre-defined AT baseline configuration time slots: 2.60**
- **Alternative baseline configurations for better eff.: 3.07**
- **Better support for survey/snapshot: 3.14**
- **My science goals require shorter baselines: 3.26**

Is the calibration plan adequate for your science projects, or which parts should be improved/added?

- Adequate: 41 (9.47%)
- Spectral calibration should be improved: 8 (1.85%)
- More flexible or longer sequences of science and calibrator observations: 7 (1.62%)
- Spectro-photometric calibration should be supported: 4 (0.92%)
- Other calibrations are missing: 4 (0.92%)

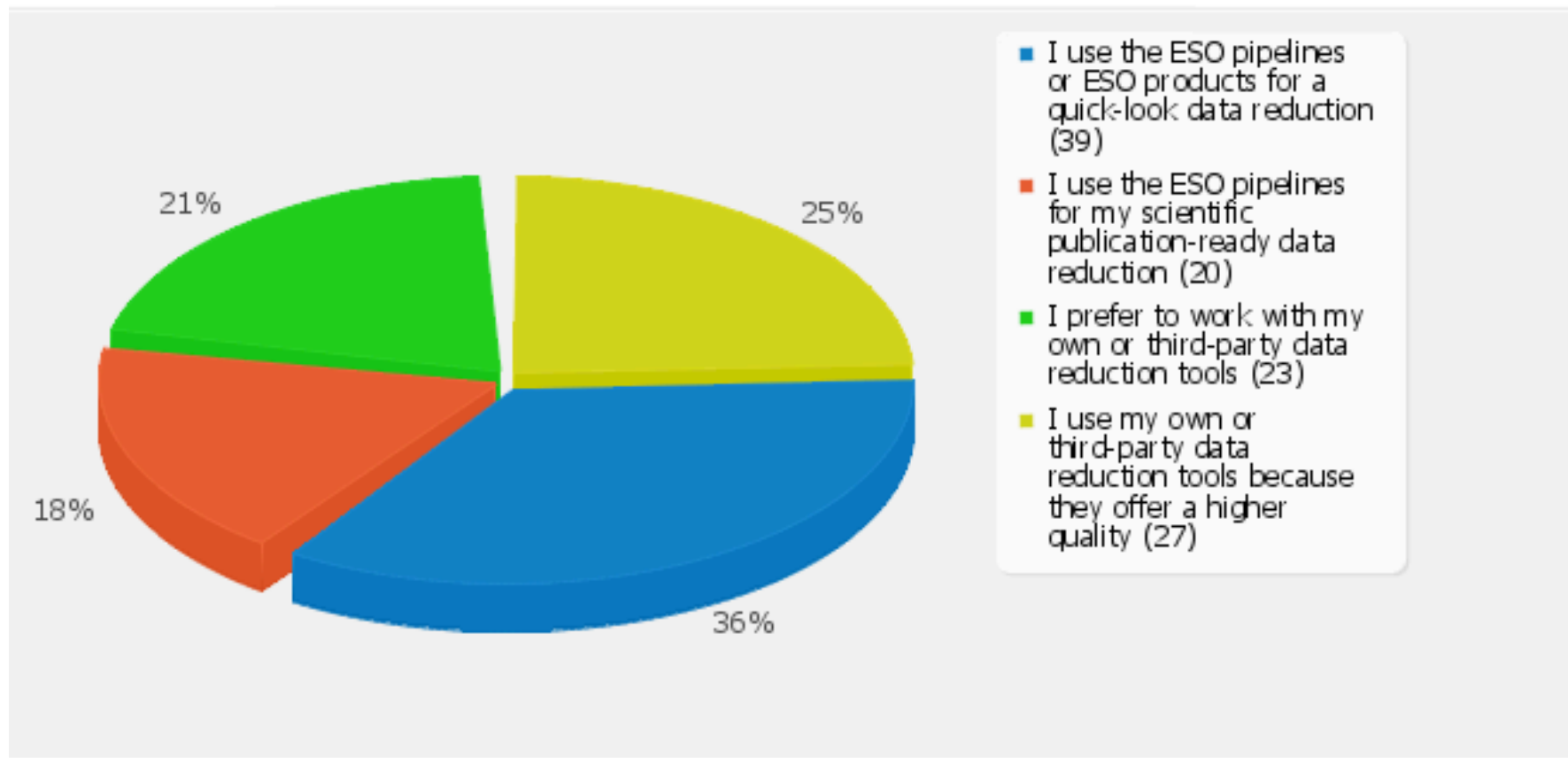
How do you rate the overall efficiency of VLT observations in terms of reaching your science goals?

- Overall: 1.65
- In SM: 1.43
- In VM: 1.51
- With ATs: 1.95
- With UTs: 1.97

If (some of) your observations were not efficient in reaching your science goals, please mark the most common difficulties

- Terminated runs in SM, weather or technical downtime in VM: 27 (6.24%)
- Problems with the data reduction and/or calibration: 11 (2.54%)
- Correlated flux fainter than expected/fainter than the announced limit: 5 (1.15%)
- Other: 8 (1.85%)

Do you use ESO pipelines to reduce your VLTI data?



Other software: MIA+EWS: 20; amdlib: 24; PIONIER: 18; Other tools/scripts: 15

Priorities for data reduction:

- **High quality data reduction up to averaged visibilities: 2.73**
- **Calibration of the interferometric transfer function: 2.89**
- **Interactivity / Possibility to visualize intermediate results: 3.41**
- **Spectral calibration 3.74**
- **Documentation 3.87**
- **Imaging 4.11**
- **Support for auxiliary data such as FINITO data 4.49**
- **Support 4.52**

Summary of the Poll (following the UC Chair)

- 40% of respondents were VLTl users or interested in VLTl.
- Of these, 69% were VLTl users, for 60% of which VLTl was their first experience with optical interferometry.
- 69% of VLTl users find that ESO provides sufficient support for newcomers to optical interferometry and/or the VLTl. Several users noted that JMMC does a good job in helping newcomers, and that primers/tutorials from JMMC would be very useful to all VLTl users.
- For those that use the Phase 2 or user manuals, a majority find these to be satisfactory; this is also true for VisCalc and CalVin.

- Currently-offered baselines were considered to be, on average, to be insufficient for users' science goals, with longer baselines and better imaging capabilities greatly desired, with better support for monitoring programs and pre-defined AT baseline configuration time slots also being welcome by users.
- The calibration plan is (by-and-large) considered to be adequate. Improved spectral calibration of AMBER and longer or more flexible sequences of science and calibration observations are desired by several users.
- The efficiency of VLTI was considered to be very good for meeting users' science goals, on average. However, terminated runs in SM and weather and technical downtime in VM compromised several programs. Further, UT vibrations were pointed out as being problematic.

- ESO VLTI data reduction pipelines were used by 40% of the respondents, while other tools (which depended on the instrument used) were used by the other 60%. A priority ranking for the use of VLTI data reduction software was given.
- Finally, several positive reactions from VLTI users are noted, although each indicates that although great progress has been made, the use of the facility is still not exactly at a “common user” state.

The point of view of the users

Users

The expert user: Pierre Kervella

- 71 ESO proposals submitted as PI from 2001
- 73 ESO proposals as Col
- 13 ESO instruments exploited



The young user: Claudia Paladini

- PI of 7 successful proposals from 2009
- 1 Large Program (as PhD)
- Co-I of 24 proposals
- 8 ESO instruments used



*numbers updated to P90

Proposal preparation

- Proposal preparation is in generally smooth
- Interaction with ESO/ USD very useful
- ESO form to be updated
- SearchCal, VisCal, ASPRO, CalVin
- How to judge data quality in phase 1? No “exposure time calculator” for VLTI
- Submission is smooth



Proposal preparation at the VLTI school 2008 Hungary.

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Proposal preparation at the VLT school 2013 Barcellonette.

OPC step

- Train the OPC members to understand interferometry with one-page sheet
- In many cases, VLTI proposals are evaluated "mildly" as experts do not feel competent, and they are therefore penalized

Scheduling

- Complex and gives problems to some programs (Kervella yesterday; Patat today)
- Inefficient to change baseline once a week
 - But we need this for imaging... more telescopes? Intermediate configurations?
- Regular time sampling is not accessible right now

Observations/Visitor Mode

Great experience, thanks to the VLTI/Paranal team 😊

- Pierre:- more service, no short visit.
- Claudia:- send students to Paranal to learn (not many interferometers around the world)
- ESO:- delegated visitor mode
- Community:- VLTI school



Students @ VLTI school 2013
J. Surdej practical session (Credits F. Millour)

Data reduction:

“I shall make users
pay dearly for their
data”



Data reduction: MIDI

Pipeline used in the community: MIA+EWS.

The way to judge the data quality is not straightforward.

Reduction for SCI-PHOT mode not very stable.

Differential phase crucial for some scientific topics.

Can't we use just one stable pipeline?!
Possibly written in an open source language?

AMBER amdlib

A bit easier compared to MIDI:

- Data reduction workshop were available; newsletter through OLBIN
- Eventually, I identified collaborators who were able to reduce the data, and I visited them to learn this.

Pipeline desired that can extract all the information: visibilities, closure phase, spectra and differential phase for all the observing modes!

There is possibility of improving precision with FINITO. However, nothing mentioned in the manuals so far...

PIONIER

- @ User committee time it was a black box
for me
- VLT/PIONIER days data reduction software explained
- I like the idea of having an “ARC” center to support the data reduction

Overall happy with PIONIER experience

Data reduction

Data reduction is not straightforward. Two solutions:

1. ESO provides pipelines, while collaborating closely with consortia
2. Consortia provide a standard pipeline able to extract all the quantities (visibility, spectrum, phase, images?!) for all the modes offered.

In both cases:

- Data reduction pipeline in open source language (no IDL!)
- Schools or data reduction workshops need to be organized regularly (every 2 years?).
- ARC-center or something similar needs to be clearly indicated on the webpages of the instruments. Manuals!



Wish list

- Higher spatial resolution (longest baseline, shorter wavelengths)
- More efficient scheduling
- Science-grade processing pipeline
- Instruments:
 - AMBER mid- and high resolution are unique!
 - Consider carefully removing MIDI, without VISIR you close up an entire wavelength range until 2018 (i.e. science!)
 - PIONIER allows to prepare for the next generation of imagers
- Data reduction is a pain:
 - workshops every 2 years
 - ARC-center or something similar needs to be clearly indicated on the webpages of the instruments
 - Manuals!
 - Risks in the imaging era

Recommendations for VLTI (draft version)

- The UC recommends that ESO should further develop the VLTI observation preparation tools to assess the feasibility and requirements for VLTI observations.
- The UC recommends that ESO should provide users with high-quality VLTI data reduction up to averaged calibrated visibilities.
- The UC recommends that ESO should continue to engage the user community in VLTI through data reduction workshops and interferometry schools and other activities.
- The UC recommends that ESO should endeavour to continue to improve the efficiency of VLTI observations, for example to increase the use of Service Mode.
- The UC recommends that ESO should endeavour to maintain broad wavelength coverage in VLTI, for example maintaining MIDI until MATISSE arrives.
- UC places an action on itself to continue to poll its communities on VLTI issues.

Discussion on the VLTI current status

- Long-term scheduling of AT and UT baselines
 - AT and UT baselines scheduled upon OPC outcome
- Aperture synthesis
 - Observations with different baselines configuration and at different LST intervals (in SM defined at OB level, in VM planned at the telescope)
- Calibration strategy
 - PI prepares science and calibrator OBs (in SM sequences of CAL-SCI/CAL-SCI-CAL/CAL-SCI-CAL-SCI-CAL, in VM any seq)
- Observation preparation tools (VisCalc/CalVin; Aspro/SearchCal)
- Data reduction/ Scientific data products
 - ESO pipelines for MIDI and AMBER
 - Community/consortium data reduction software (MIA+EWS/JMMC/amdlib package)
- Support to Newcomers/ Increasing the user community
 - Manuals/tools/User support at ESO and JMMC
 - VLTI schools organised by the community / Introductions at Workshops
 - Collaborations
- Lessons learnt from AMBER and MIDI
 - Commissioning/ Science Verification/ GTO
 - Interactions between consortia/ESO/community