Period 32
AiC Report to the NOT Council and STC

44^{rd} STC meeting, April 6, 2006
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Thomas Augusteijn, Astronomer in Charge,
NOT, Santa Cruz de la Palma

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Contents

1 Introduction

This report covers the operations of the Nordic Optical Telescope for period 32: 2005-10-01 to 2006-04-01.

2 Down Time

The down time statistics are based on individual fault reports. In Table 1 I give the general down time statistics for period 32.

A total of 83 fault reports were submitted, with an average time lost of 9 min per fault, for a total down time of 0.7% (0.6% on scheduled observing nights). Of these, 60 reported no time lost, 21 reported < 2 hrs lost, and 2 reported 2 or more hrs lost.

Table 1: Technical down time statistic period 32: 2005-10-01 to 2006-04-01

Night included	Time lost	Nights	Percentage[a]	Last period
All nights	755 min	182	0.7%	2.8%
Scheduled observing nights[b]	435 min	116.5	0.6%	2.3%
Technical nights	185 min	26.5	1.2%	0.7%
Service nights[c]	30 min	17.5	0.3%	1.4%
Visitor instruments	135 min	39	0.6%	6.8%

[a] Assuming an average of 10 hr per night
[b] Excluding technical nights and visitor instruments
[c] Excluding service nights with SOFIN

This compares to a down time of 2.8% over all nights (2.3% on scheduled observing nights) in period 31. For that period 101 faults reports were submitted with an average time lost of 24 min per fault. Of these, 58 reported no time lost, 38 reported < 2 hr lost, and 5 reported 2 or more hrs lost.

The reported down time is at an all time low. One might argue that this is because the reporting period covers the winter period, but the past winter was not particularly bad. For that matter, the typical number of hours that the telescope operates in Summer and Winter is actually not very different. However, given that there are typically only a few big problems causing most of the down time in each observing period there is likely some effect from small number statistics which can appear to make things as for down time look relatively positive or negative. If you look at the total down time over all nights in a year combining consecutive observing periods (i.e., looking from the 1st of April to the 1st of April) one gets: [P25/P26] 2.2%; [P27/P28] 2.5%; [P29/P30] 1.3%, and; [P31/P32] 1.6%.

2.1 Main problems

Below are listed those faults for which 2 or more hours were lost.

- **2005-10-13: Mirror support air compressor**: 2 hr 20 m

  The telescope control system started to complain about the mirror support system at the end of the afternoon. After some investigations it was found that the fan of the air compressor for the mirror support system had broken up and partly destroyed its plastic housing. As this could not be repaired it was decided to replace the compressor with the spare which took a few hours work, affecting the start of the night. A new spare was purchased.

- **2005-11-09: Power switch adapter**: 2 hr 10 m

  During the mounting of and instrument the main power switch of the adapter was switched off by accident. This later caused the telescope control system to not be able to start up the telescope and it took some time before it was realized what the 'problem' was. A bracket protecting the power button was installed.

2.2 General overview

In Table 2 the number of faults and total time lost as a function of the system and kind of fault is presented together with the overall numbers for the previous period (31).

Table 2: Down time statistics for period 32[a]

Syst/Type	Soft		Elec		Optics		Mech		Others		Total		P31	
Telescope	3	00:00	4	02:10	0	–	3	02:35	0	–	10	04:45	39	28:25
Building	0	–	2	00:00	0	–	2	00:10	1	00:00	5	00:10	9	01:30
Computers	22	01:25	1	00:30	0	–	0	–	1	00:00	24	01:55	19	04:00
ALFOSC	8	00:45	2	00:00	0	–	2	01:20	2	00:00	14	02:05	14	02:05
MOSCA	4	00:00	0	–	0	–	0	–	0	–	4	00:00	4	00:00
NOTCam	6	00:00	1	00:00	0	–	1	00:00	3	01:00	11	01:00	6	01:00
StanCam	3	00:25	0	–	0	–	2	00:10	0	–	5	00:35	4	00:30
Others	1	00:00	5	00:35	0	–	4	01:30	0	–	10	02:05	6	03:00
Total	47	02:35	15	03:15	0	–	14	05:45	7	01:00	83	12:35	101	40:30
P31	32	03:45	35	24:40	3	00:00	18	11:10	13	00:55	101	40:30		

[a]For each system-type category the total number of faults and total time lost are given

3 Instrument use

Table 3 lists the number of scheduled observing nights and technical nights for each instrument. This covers all nights, including CAT, CCI and guaranteed time. In this table I have also included the number of observing runs, and the number of nights per observing run for each instrument. Note that in the reports for period 30 and 31 the first column in the corresponding table actually listed the total number of nights each instrument was mounted instead of the total number of scheduled nights as indicated by the column header.

Table 3: Instrument use

Instrument	No. of nights		No. of runs	Nights/run
	Scheduled	Technical		
ALFOSC	79	13.5	24[a]	2.9
NOTCam	20	4	7[b]	2.4
MOSCA	17.5	2.5	5[c]	3
SOFIN	20	2.5	5	4
TurPol	12	1	3	4
LuckyCam	4	3	1[d]	2
IACUB	3	–	1	3

[a] Excluding 10 service nights
[b] Excluding 3 service nights
[c] Excluding 2.5 service nights
[d] Excluding 2 service nights

4 Comments recorded in End-Of-Night & End-Of-Run reports

As before, most comments written in the reports during period 32 were very positive, especially about the support from the staff.

Apart from comments related to problems that were also separately entered in the fault data base and comments about the weather there were only a few specific comments. It was suggested to have the possibility to have the 'quick-look' post-processing system also look at images that are not specifically saved, but that is not possible in the current system. There were also some suggestions for improving the ALFOSC user interface, and we are already working on a new version. Also, some improvements in the instructions for setting ALFOSC at an arbitrary field angle were suggested.

5 Operations

In previous reports all the things related to operation in the past semester were discussed in the first part and the plans for the coming semester were discussed in the second part. As often these things are related, and hopefully to make the report shorter and easier to read I have decided to combine for each sub-system things related to operations during the past semester and the plans for the coming semester.

5.1 End-Of-Night & End-Of-Run reports

New systems were set-up for the End-Of-Night & End-Of-Run reports which are now integrated in our data-base system. Just providing the starting date and proposal number a report is provided with a listing of the data, a summary of the weather during the night and a listing (including down time) of any fault report that was entered during the night. The down time due to weather has to be provided manually. A special window is provided for any observations that are done for ToO or monitoring programs, and there is also a window for any comments. All the information is entered in our data-base system, and options are provided to print and/or email the detailed listing.

Apart from convenience, the main advantage of the system is that it provides a well define set of data which, e.g., will allow to provide our own weather down-time statistics and a detailed overview of the observations done for ToO or monitoring programs.

5.2 Safety

The installation of the new radios in the cars has been completed, and the system is fully operational.

The issue of the status of the roads to the observatory, especially during the winter, has been improved with the start of a program where during bad weather the staff from the ING and GTC check the situation in the morning and provide a detailed report by FAX and email to all observatories.

5.3 Additional services

5.3.1 Educational activities

A relatively new feature has been school visits to the NOT. We have had a daytime visit by 8 students plus 3 teachers from Norway, and a night time visit by a group of 15 students plus 2 teachers from Denmark. A further night time visit by a group of 26 students plus 2 teachers is planned in early April. In the later two cases we have offered the possibility for the students (sub-divided in smaller groups) to actually use the telescope with the help from our own students.

5.3.2 Service observing

A total of 17 and a half nights of service observing were made, excluding the 20 SOFIN nights done in service mode by Dr. Ilya Ilyin. This also does not include a fairly extensive number of observations done for the various ToO and monitoring programs which were executed during technical nights. The service nights consisted of various more or less isolated observing nights spread throughout the semester.

5.3.3 'Fast-Track' Service Program

A total of 10 service nights for the 'Fast-Track program were spread-out over period 32. During the semester a total of 5 proposals were accepted for execution, all of which requested observations with ALFOSC. There are now a total of 15 accepted proposals of which 4 have been complete and 2 have been half completed. Looking by grade, 3 and a half of the 8 proposals with the highest rating (1) were executed, one and a half of the 5 proposals rated '2' were completed, and neither of the 2 proposals with the lowest (3) rating were executed.

5.3.4 Publications

The annual lists of publications that use NOT data have been updated further, to hopefully acceptable levels of completeness. Using full text searches and various search strings (e.g. instrument names) approximately 30 more publications were found for the lists of 1998-2005.

Also, a preliminary list of MSc and PhD theses (partly) based on NOT data have been made. See:

`http://www.not.iac.es/news/publications/theses.html`

and

`http://www.not.iac.es/news/publications/msc.html`

5.4 Observing conditions

Finally the computer with the software needed to run the dust meter arrived. However, the system does not work yet and there is an issue concerning the integration of the computer in our network.

5.5 Building

5.5.1 Cooling system

The new rotary valve was installed and the new cooling system was taken in operation. For safety, lightning protection was installed.

Beyond some fine-tuning issues, no major problems have occurred and the system works extremely well. The official handover of the system has not occurred yet, but we expect this to happen in the near future after which the old system will be dismantled.

5.6 Telescope

5.6.1 New TCS

The adapter and mirror control hardware has been finished while the user interface was finished in parallel and there were no additional delays. There are still a few minor issues with the hardware, but these are non-critical.

Currently a full system "burn-in" test is made with all extensions and I/O cards connected but not mounted and connected to the telescope. The purpose of this test is to verify the long term reliability of the hardware.

The new user interface also been completed, and there is now also a remote user interface which (with some restrictions) allows to operate the TCS from practically any computer. Test versions for both user interfaces have been set-up to allow off-line tests. We currently are planning the on telescope commissioning of the new TCS in a period at the end of May/start of June.

One issue remaining for the new TCS is the handling of (standard) object catalogs. For up to 50,000 objects there is no problem, but if we want to have many more objects more or less instantaneously available we need to consider having something like a object catalog server similar to the guide star server. To decide this we should first get an approximate idea about how many stars with their position we would like to have readily available. The questions being what kind (infra-red and optical photometric standards, spectrophotometric standards, astrometric standards, radial-velocity standards, etc) from which kind of catalog (Landolt, USNO, etc.) we want and how many stars this would include.

5.6.2 Amplifiers

In the end a suitable company was found for the amplifiers, and they actually were able to repair the units. These have been found to work well and we now have the required spares.

5.6.3 Wavefront sensing

There is still is some uncertainty in the proper calibration between the test results and the applied corrections in the TCS. Some tests were planned but could not be executed due to the weather. When the calibration is made the active optics corrections will be directly implemented in the new TCS.

5.6.4 Mirror cleaning

In the winter it is has not been possible to wash the mirror, but the mirror has been CO_2 cleaned a few times. Some stains have appeared on the main mirror, which likely occurred during a bad weather spell in January. A mirror washing is planned for the near future.

5.6.5 Tracking

Several tracking tests were made which seems to indicate that the periodic errors in the azimuth drive are not fully corrected. This might cause some problems with (slightly) elongated stars depending on the precise position on the sky. However, the tracking tests are not fully understood and this will have to be sorted-out first to be sure if there is a problem and what to do about it.

5.6.6 Pointing

Recently there have been some reports about the pointing of the targets and the guide star to be somewhat off. The current pointing model is actually already in place for several years, and a full pointing test will be made soon and the pointing model will be updated if need be.

5.6.7 Adapter

In that past problems occurred due to a power cable being damaged when FASU was mounted which cut the power to the adapter. The cables were rerouted but a more permanent solution will be made.

5.6.8 Autoguider

Given the efficiency of the new camera and the increased number of guide stars provided by the new guide star catalog it has been decided to limit the area covered by the guide probe where to look for guide stars. This will limit any problems when doing offsets where one wants to keep the same guide star as the guide star is less likely to fall out of reach of the guide probe. The area will be chosen such that at least ~10 stars will be found above the detection limit of the system over the whole sky.

With the guide stars falling in a similar area on the sky with respect to the instrument in use, one would expect any relative distortion to be similar. We plan to implement a system in which the guide star will be automatically detected and centered on the camera, which combined should improve the effective pointing of the telescope significantly.

In any case, at all times guide stars from the whole area available to the guide probe can be selected which should avoid any problems in case of bad weather or special (e.g, offset) requirements.

It was found that the 'blue' filter position listed for the guide camera actually did not contain a filter but was effectively blocked. A new blue-green filter was installed which can be useful when doing spectroscopy in the blue (to counter the effects of atmospheric diffraction).

5.6.9 Thermal Monitoring System

The Thermal Monitoring System which, e.g., provides the telescope structure temperature to the TCS needed to keep the telescope focused, was ported from an MSDOS to it to a Linux computer. One big advantage of porting the system is that the temperature data are stored in a database which allows for easier access and much more refined analysis.

5.6.10 Control room

After the arrival of the new TCS there will be many of the old computer equipment that can be removed from the control room. Also, after the old cooling system is dismantled there will be a lot of storage space in the machine room. This provides a good opportunity to remodel and improve the control room.

5.6.11 Web-cams

The web-cam viewing the telescope was moved as the fans of the new cooling system was blocking the view. A second web-cam was installed on the weather mast, looking down on the loading ramp and the FIES building. This gives a much better view of this area, which is especially of interest during periods of bad weather. Currently, the mirror lift which is only used when the main mirror is aluminized, partly blocks the view but it will be moved a bit further away from the telescope so that specifically the stairs going down to the entrance of the FIES building can be seen better.

5.7 Weather station

For the web-cam at the weather station a new network connection is installed. We are now considering if the connection from the instruments in the weather station should be changed to also use the network connection which will allow a more versatile use of the measurements, and for the instruments themselves we will check if adequate spares exist and/or if new units should be purchased.

5.8 Student projects

A web-page was set-up to define and keep track of the projects which are being done by the students. Also, a check list is being made as to what are all the things the students need to learn about the operation of the telescope and the instruments.

5.9 Technical tests

It was noted that it was not always clear or easy to know what specific tests were needed to be done during tech nights. For this a web-page was set-up which lists the tests that need to be done with appropriate links where one can find more details information. This list also include the tests that are part of quality control (beta light test, standard star observations, etc.). The tests themselves are specified by instrument or system (telescope, computers), and/or if it should be done on a specific date (e.g., the first tech night after an instrument was mounted, etc).

5.10 Instrument controllers

The connection between the instrument controllers at the telescope and the computers in the control room have been converted from RS232 control to Ethernet control for NOTCam and MOSCA. In the near future, this will also be done for ALFOSC and StanCam. This should improve the reliability of the communication and make the system more flexible as no separate cables are needed.

5.11 ALFOSC

5.11.1 Camera

The camera and CCD entrance window were send to Copenhagen to get new optics with a better coating. The original new camera did not have a proper coating which caused a large dip in efficiency in the B-band with an overall decrease toward longer wavelengths. The new optics with the new coating did improve the efficiency in the B-band, but the efficiency toward longer wavelength decreased as well. It was found that this was because the company that made the optics did not dare re-try the multilayer coating that had failed before, but put on a single-layer coating. The overall change from the old optics with the old (Loral) CCD to the new optics with new coating and new (E2V) CCD range from +8% in the U-band to -30% in the I-band, where the biggest part is due to the coating of the optics.

The overall increase in the U-band is due to the new CCD, and also the optical quality in the blue has improved as the E2V CCD does not suffer from the charge-diffusion present in the Loral CCD. Tests with a pinhole mask has shown that with the new optics the distortions as a function of distance from the CCD center are within one pixel.

Possible improvements to the current situation should be considered.

5.11.2 Spectroscopy

As part of the calibration plan a script has been developed to automatically reduce and plot data taken of spectrophotometric standards. A new, non-IDL version, of the software to align slits and grisms is being developed.

New high-quality slits have been purchased, specifically to provide smoother and more regular slits. Holders are being prepared, after which they can be tested. Considering the high efficiency achieved with the new VPH grism we should consider to purchase more grisms.

Quite a few calibration lamps broke down during the past period. New spares have been ordered and the power supplies were checked for possible problems.

5.11.3 Multi Object Spectroscopy

With the new optics a new distortion map was made for use with the MOSPLATE program to make masks. This map is only valid for masks that are going to be made in Copenhagen.

5.11.4 Grism wheel

Some problems occurred with time-out of the grism wheels which is somehow related to the balance of this wheel, though it is not clear how this can cause the problem. Later models of FOSC's have a different design in the way the wheels are driven and they do not seem to have this problem. It was checked with Niels Michaelsen in Copenhagen what the difference are, but it turns-out that modifying the current wheel to a similar design would be a major operation.

5.11.5 Detector

The ALFOSC CCD was noted to have a higher RON than before. After an extensive investigation it was found that the noise is caused by the pressure sensor. Disconnecting the sensor lowers the noise to levels even lower than before the recent rise, now being comparable to levels measure in the lab.

An upgrade version was made of the multi-window photometry program to do polarimetry. The program was successfully commissioned and used in an observing run.

A plan has been defined to solve the remaining problems with using the CCD control card with the normal BIAS CCD control program, but this depends primarily on Roy Østensen. He is leaving La Palma soon, but he is going to work in Leuven (Belgium) and he is expected to regular come back to La Palma (in connection with Mercator).

The possibility to readout the CCD using both amplifiers (basically gaining a factor 2 in readout speed) has been investigated. The tests indicate that the data can be reduce properly and provide reliable results. However, the data provided by the CCD controller requires some manipulation of the data before it can be reduced and the current post-processing system can not provide the data in proper MEF format when the CCD is windowed or binned.

5.11.6 Instrument set-up

A GUI-based tool to edit the instrument definition files for ALFOSC and MOSCA in a consistent way has been tested and commissioned. The system is based on a revised list of filter names, with central wavelength and width information for all filters, plus pass-band and photometric system for the standard wide-band filters, and addition comments (with redshift information if applicable) for narrow-band filters.

5.11.7 Data acquisition

A new data acquisition computer will be installed, and improved version of the BIAS program will be installed and commissioned together with the NOT2MEF program (the software that changes data formats into MEF and writes additional FITS headers). Also a new, non-IDL version, of the instrument user interface for ALFOSC is being developed and will be installed and commissioned at the same time.

5.11.8 Focus script

A script is being developed which saves relevant info (current focus, filter name, zenith distance, telescope temperature, etc) to a data base every time the focus is measured. Having such a script permanently running will provide data over extended ranges in all parameters which should improve our knowledge of the focus variations and define better the correction that need to be applied. A similar script will be made for seeing measurements which should help us to maintain and further improve the image quality.

5.11.9 Post-processing system

The quick-look post-processing system has been further improved and an option has been added to run the processes on any image on disk. We are still working on a quick-look reduction script for linear polarimetry observations.

5.11.10 Exposure time calculator

Improvements are being made to the Exposure Time Calculator including the new grisms and the latest sensitivity values with the new CCD and optics.

5.12 NOTCam

5.12.1 New detector

The science array for NOTCam was installed in October. Apart from the much better cosmetics compared to the engineering grade array mentioned in the previous report, we have since been able to check the efficiency of the science array in more detail. Overall it was found that the new array is 30% more sensitive than the engineering array ever was at its best ($\sim$June 2002) in J and H, while the quantum efficiency is about the same around 2 mμ. Furthermore, the sensitivity of the engineering array seems to have decreased over the last few years. Lack of zero-point monitoring points (few and non-photometric NOTCam tech nights) makes it difficult to study when and how quickly it deteriorated, but we are currently looking into old NOTCam data from the archive. All in all, the new array gives about 0.6 magnitudes deeper zero-points in all bands than the engineering array provided in August 2005. Details on this can be found at

`http://www.not.iac.es/instruments/notcam/sensitivity.html`

Data has also been obtained to check the photometric scatter across the FOV for the YnJHKKs filter, but this still needs to be analyzed.

5.12.2 Dark current

After exchanging the NOTCam engineering grade detector for the science device it was noted that we still have an apparent very high dark current and excessive readout noise, in particular in the ramp sampling mode. From information obtain both from the ING LIRAS group and the manufactures of the detector, Rockwell, it became clear that the detector is not been operated in the optimum way and proposed changes to the wiring of the chip have been suggested to Preben Nrregaard. Currently we are waiting for his reaction.

5.12.3 Data acquisition

The data acquisition computer was replaced. At the same time the instrument control user interface was replaced by a non-IDL version. The computer upgrade was also combined with the transition to MEF format with new updated FITS header keywords.

Since the introduction of MEF format we have had problems with data files written with zero content. This is because the NOT2MEF program does not allow an image to be written which has a faulty header. The reason for the problem is that telescope information is lacking in the FITS header, likely because image acquisition and storage is faster than it takes to get the info from the TCS.

The problem only happens on rare occasions, but a preliminary back-up solution was made to avoid the loss of valuable data. A simple permanent solution which lets the data acquisition program only start the NOT2MEF program after the telescope information has arrived is being made.

The Quality Control reduction script was modified to accept the MEF format.

There are various issues in the BIAS acquisition program which should be improved, and there is the need of a time-efficient clean-array command for NOTCam to take care of memory effects. We have asked Jens Klougart to look at these issues, and he is coming to La Palma in the second week of April.

5.12.4 Condensation entrance window

Some problems have occurred with condensation on the entrance window of NOTCam during a period of high humidity. The presence of condensation can easily be checked by taking an image (in the afternoon before observing), but to remove it is not straightforward as the instrument needs to be lowered to be able to access the window. Instructions were provided on how to check for condensation and what to do in case there is condensation.

5.12.5 Holding time

The long lasting problems with loss of vacuum and short holding time were studied and finally fully understood. The vacuum losses are caused by temperature stresses around the junctions between the inner and outer tubes of the fill and vent openings of the LN2 tank. The temperature stresses were caused both by spilling of LN2 (i.e. when observing at low altitudes at certain rotator positions) and also when filling with LN2. Both the filling mouthpiece and the way the fill tube is blocked (to avoid spilling) have now been modified. So far we are using a temporary solution while waiting for some material that was ordered. Testing since December 2005 shows that we now do not have such vacuum losses. In addition, the charcoal getter is baked now at a higher temperature and installed hot in NOTCam which seems to provide a better starting vacuum. We have strong reasons to believe that we are going to be able to keep NOTCam cold using the PTR (permanent cooling unit) only during storage, compared to filling it every 3-5 days. Tests of the holding time has shown that it can last at least 10 days, but some cooling water problems (see below) which switched the PTR off has not allowed us to find the PTR stabilization temperature yet.

5.12.6 PTR

We had some recent problems with the PTR which has turned itself off on various occasions. Adding a temperature detector to the PTR cooling water shows that the water temperature was above the allowed 30 degrees when the PTR turns itself off. Currently the reason for this warm water is being investigated. The PTR has also been running for 26000 hours and we will have to do a check-up of the system in the near future.

5.12.7 Filters

All filters are now measured cold inside NOTCam using the NOTCam grism. The filter table has been updated with the new bandpass wavelengths (slightly different from the values at room temperature provided by the manufacturer). For more info see:

`http://www.not.iac.es/instruments/notcam/filters/index.html`

The Paschen Gamma filter (1.094 mμ) finally arrived as the last of the filters ordered through the "Gemini Infrared filter consortium" in 1999. It will be mounted the next time we open NOTCam and its transmission curve will be measured.

We suggest to upgrade NOTCam with the two broad band filters Z and Y which are part of the standard set (ZYJHK) for the UKIDSS survey. In view of the high sensitivity in the "blue" part of the NOTCAM QE curve (compared to for instance NICS/TNG which has an array with a steep decline in the "blue" part) it would make sense to exploit also this region both for imaging and spectroscopy.

5.12.8 Imaging calibration plan

A document describing the calibration plan for NOTCam is close to ready. Its main content is a NOTCam Imaging Quality Control proposal with suggestions of implementation. It also describes the currently existing Detector Quality Control, as well as a proposed upgrade (e.g. including reset level monitoring, new quadrant naming convention to agree with the x-flipped MEF format images, rewrite the script to a non-IDL language etc.).

As part of the calibration plan a number of standard reduction scripts are being development.

5.12.9 Motor Controllers

We have also asked Jens Klougart to modify the motor controllers such that it detects when the different wheels of NOTCam pass the init-switch on every pass of the wheels. This to detect if the wheels gets misaligned.

5.12.10 Focus pyramid

The focus pyramid calibration for the HR camera was tested on a few times under not very stable seeing conditions. Some inconsistencies between the use of the pyramid and manual focusing was found for both cameras. More tests are planned.

5.12.11 Shutter

Data from the detector Quality Control indicate that the shutter may not be very accurate for exposure times of 2 seconds or less. Tests are being made to look at this in detail.

5.12.12 Polarimetry

A polarimetric upgrade of NOTCam using a Wedged Double Wollaston should be investigated in view of the good polarimetric performance of the NOT.

5.13 MOSCA

5.13.1 Data acquisition

The data acquisition computer was replaced. Also, a quick-look facility has been installed which scales the mosaic image such that all quadrants/CCDs are properly visible when displayed.

5.13.2 Light leak

The cause of the light leak seen in images taken in the I- and Z-filter with MOSCA was identified to be scatter light coming in to the adapter through a transparent “garden hose” protecting a set of cables. The hose was covered with black tape and the problem has disappeared.

5.13.3 Web-page

The instrument web page is still very rudimentary and needs to be developed further. The idea is to model it on the ALFOSC main page.

5.14 StanCam

5.14.1 Pick-off mirror

Due to the poor reflectivity of the Standby pick-off mirror ($\sim$60% measure at 4700Å) and the fact it was not possible to get it re-coated by the ING a new mirror was acquired with a bare aluminium coating, so it can be re-coated at the observatory. Initial measurements show an overall improvement in sensitivity of StanCam of $\sim$45% in V, $\sim$30% in R and $\sim$0% in I. Comparing to other instruments, the reflectivity of the new mirror appears to be what is expected for the aluminium coating, but that makes the reflectivity curve of the old mirror hard to understand.

5.14.2 Filter mechanism

The filter mechanism was checked and realigned, but no specific cause was found for the problems experienced before, though no problems have been reported since. It should also be noted that the software was modified such as to limit any filter movements when the instrument is not in use.

We are considering including the filter mechanism under the control of the new TCS instead of the old PLC. One could then add a mechanical alignment switch to the filter mechanism to properly align the filters at all times.

An Hα-wide filter has been was added to the permanent StanCam UBVRI filter set.

5.14.3 Web-page

The information on the StanCam web-page has been improved and expanded. Among other, this includes now information about the flat field patterns, bias frames and dark current. However, the web-page still needs further improvement with the idea to model it on the ALFOSC main page.

5.14.4 CCD camera

The StanCam detector is the oldest CCD at the NOT, a Tektronix's TK1024 1K pixel square device, and has a very poor quantum efficiency compared to other NOT detectors, especially in the blue. A report titled "StanCam Detector Options" has been written proposing several alternative camera systems including replacing the detector with a better device such as the old ALFOSC

Loral CCD or an optimized E2V CCD, a commercial camera option or even a LuckyCam type instrument.

5.15 Turpol

We had some problems with the MSDOS computer which is needed to run TurPol, where it is no longer possible to boot it from disk but only from diskette. A replacement is being prepared.

5.16 LuckyCam

Suggestions were compiled concerning the possibility of a LuckyCam as a NOT common-user instrument. This was driven by the desire to have such an instrument on the telescope and from discussions with Craig Mackay. In summary it was proposed that a new version of the existing LuckyCam be acquired from Cambridge, and a cost estimate and work distribution was presented.

5.17 FIES

5.17.1 Building

The installation of the instrument in the building was completed and lightning protection was installed.

Temperature and humidity sensors were installed in the instrument room and the front room. The first results over the past few months indicate that when limiting the number of visits to the instrument room, it should be possible to keep the temperature stabilized to well within 1 degree. The humidity varies by up to +/-10%, but the avarage has slowly decreased from ∼40% to ∼30%. At the end of the summer we expect to have a proper view of the overall variations in both temperature and humidity.

It will likely take until after regular work in the instrument room has finished before more detailed tests can be made to check the effect on the stability of the spectrograph.

5.17.2 Instrument

A new multi-fiber unit is being made with the help of G. Avila from ESO. The coating of the mirrors is expected to be finished soon, and depending on when they are finished we are preparing a more detailed planning for installing, aligning and testing of things. We are currently aiming for a visit from S. Frandsen (Aarhus) and Bo Lindberg (Lens-Tech AB) at the end of April.

The ThAr lamp on the old calibration unit (in the instrument room) is now under computer control. It was found that the split fiber that leads the light from the new calibration unit (on the adapter) to the fiber-unit entrance, gave rise to interference fringes at all wavelengths. A new type of bifurcated fiber was ordered to remedy this.

5.17.3 Reduction software

After the installation and tests Eric Stempels will come to La Palma to test and optimize the reduction software. After that the final reduction package can be prepared for distribution.

5.18 SOFIN

5.18.1 Cross-dispersion prism

The new cross-dispersion prism has been successfully re-polished and is now permanently replacing the old one. This enhances the polarimetric capabilities as it allows for simultaneous exposures of ordinary and extraordinary polarized spectra

5.18.2 Data acquisition

A new Linux-based user interface has been installed. The system includes the control command console, quick look and analysis facility, and a number of real-time process displays to monitor the CCD status and the photon counter.

Work is now in progress to implement a data pipeline reduction facility. This is especially important for the spectropolarimetry mode where the results of observation cannot be viewed in a simple way.

5.19 Observing scripts

The plan is to optimize and improve the NOT observing script generator to include more detailed checks of the parameters entered in the scripts to avoid incorrect user input. To not make the program to complicated and difficult to manage, the idea is to make separate versions for NOTCam and for the optical instruments (ALFOSC, MOSCA and StanCam) as they have different exposure commands and different checks that should be made. Also, the generator for the optical instruments can include the possibility of windowing (except MOSCA) and binning the CCD.

5.20 Detectors quality control scripts

We will investigate the possibility of rewriting the current detector quality control scripts to versions that do not require IDL, and can be integrated with our data base system.

5.21 Computers and software

5.21.1 Operating system upgrade

The upgrade of the operating system of the computers in the sea level office has practically been completed. Some issues arose due to the long time passed since the last upgrade, where the way that part of the software works and its functionality had changed significantly.

The file server that contains all the staff mail and home directories has also been replaced with a new one with 10 times the space (from $\sim$60GB to $\sim$600GB).

We are currently also evaluating the steps that need to be made to replace or upgrade the computers at the observatory, as most of those are critical for the telescope operation and can't be upgraded or replaced individually. Most of the time we find there are subtle inter-dependencies and this has to be planned carefully.

5.21.2 Network access

There is now wireless access to the network provided by the IAC for everybody in the area close to the computer room in the residencia.

5.21.3 Network link

Related to the new 34Mb link provided by Telefonica a new network link between the sea-level office and the observatory is being installed.

5.21.4 DVD Jukebox

Some software has been written as an interface to let the users schedule the burning DVDs using the DigiMatic DVD Jukebox. This will be extended to allow the scheduling of automatic burning (i.e.: every night observer's data), and some scripts have to be written to do the real work. We plan is to have this running at the end of the semester.

5.21.5 Web server

A new web server has been set up to replace the current one, with a more modern version of the web server, web scripting language and database engine. It's now been tested and will be installed in a few weeks.

5.21.6 Firewalls

A server has been installed as a testbed to build a new firewall setup both for ORM and SLO, to substitute the old one that is based on the very first Linux firewall infrastructure (some 8 years old), which greatly limits its capabilities.

5.21.7 Shutdown/Power-up procedures

Some procedures must be written to define what to do when re-powering the servers and other critical machines after maintenance, to avoid problems later. This is especially important as some things that are important for operations of the telescope and instrument might depend directly or indirectly on these machines without this being very obvious.

5.21.8 Spam filter

The current, relatively old spam filter will be upgraded to a current version.

5.21.9 General Backup & Archive server

We're looking for proper storage for an incremental backup server off the hard disks used for daily work (our home directories), and a way to put the more stable data on DVD. Our current file-server is already very secure against failure (it has 8 disks, organized in pairs, and we can lose one disk from every pair before losing real data), but it's preferable to have some way to put the user's data on removable, non-erasable media.