AiC Report to NOT STC
35^{th} meeting 2002.03.18.

Version for public distribution

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Contents

1 Down Time

Table 1 on the following pages distills all downtime recorded in end-of-night and end-of-run reports for the period 2001-09-13 to 2002-03-12.

- Technical failures on scheduled observing nights: < 22 hr ($< 1.2\%$, assuming an average of 10 hr per night)
- Technical failures on tech nights: < 11 hr
- Technical failures with visitor instruments: < 1 hr

Table 1. End-of-Night Fault Reports, 2001-09-13 to 2002-03-10

System	Severity	Date	Hrs Lost	Observers	Details
ALFOSC	1	2001-09-13	0	Hornstrup	Guide probe blocking FOV. Later attempt in same field was OK.
Telescope	1	2001-09-15	< 1	Hornstrup	Mirror support compressor failure.
Telescope	2	2001-09-19	0	Ostlin, Masegosa Zackrisson	Thunderstorm tripped circuit breaker. Time lost to weather.
Telescope	3	2001-09-25	All night	Lehto, Johnson, Kotoneva	Thunderstorm prev. night caused computer breakdown and loss of communication to the mountain.
Telescope	2	2001-09-28	4	Motch & Guillout	Pointing error caused by 70s wrong UT clock. Guide star server lost.
Telescope	1	2001-10-01	0	Garcia Lopez & Garcia Gil	Telescope out of balance - warnings.
ALFOSC	1	2001-10-05	0	Telting	BIAS gnuplot error.
NOTCam	3	2001-10-06	4	Kaas & Telting	Filterwheel 1 stuck. Changed to ALFOSC. Night lost to weather.
Telescope	1	2001-10-08	0	Solheim	Remote object catalogue out of function.
Telescope	1	2001-10-12	< 1	Solheim	Entrance light path alarm and delayed action causing power down.
ALFOSC	1	2001-10-13	0	Gutierrez & Trujillo	Dark feature on images from dust on entrance window.
Telescope	1	2001-10-14	0	Gutierrez & Trujillo	PSF ellipticity in stars. Telescope stopped during close down.
ALFOSC	1	2001-10-18	< 1	Wold & Moeller	Grism wheel timeouts. One focus timeout. Remedied by s/w restart. 15min lost.
Turpol	1	2001-10-25	0	Leedjarv & Katajainen	Staff investigating a possible problem. No time lost if weather ok.
Turpol	1	2001-10-26	0	Leedjarv & Katajainen	Small diaphragm drift on TV screen. Well known effect of flip mirror which is sensitive to minor deflections.
Turpol	1	2001-10-27	0	Leedjarv & Katajainen	Problem getting one standard in both diaphragms. Probably an observer error.
Turpol	1	2001-10-27	0	Berdyugin / Kaas	Flip mirror repeatedly lost position. Easy to remedy. Later fixed by VP.
Telescope	1	2001-11-15	0	Fynbo, Weidinger, Theuns	Side port handle broke. Fixed by PB.
Telescope	1	2001-11-16	0	Theuns, Weidinger, Fynbo	BIAS command "addtime" doesn't work correctly.
ALFOSC	1	2001-11-18	0	Brand & Rawlings	BIAS command "addtime" doesn't work correctly.
NOTCam	2	2001-11-26	6	Abbott & Kaas	Shutter out-of-sync and focus timeouts.
NOTCam	1	2001-11-27	0	Abbott & Kaas	Shutter intentionally disabled.
ALFOSC	1	2001-11-28	0	Abbott	BIAS gnuplot error.
Telescope	1	2001-11-29	0	Pursimo & Cox	TCS can not store catalogues. BIAS gnuplot error.

System	Severity	Date	Hrs Lost	Observers	Details
ALFOSC	1	2001-12-03	< 1	Gaalfalk & Olofsson	Grism wheel timeouts.
ALFOSC	1	2001-12-05	0	Negueruela & Israel	Grism wheel timeouts.
Computers	1	2001-12-15	0	Grav & Hansen	Data analysis computer hanging.
ALFOSC	1	2001-12-18	< 1	Bejar & Caballero	Grism wheel timeouts. Remedied by s/w restart.
NOTCam	1	2001-12-21	0	Kaas, Pursimo, Heidt	Dome water leakage. Condensation on NOTCam entrance window. All night lost to rain.
NOTCam	1	2001-12-24	< 1	Heidt	BIAS restart problem, of operational character.
NOTCam	1	2001-12-25	0	Telting & Kaas	X-server hanging on Lisa, several s/w problems.
NOTCam	1	2002-01-03	0	Telting & Pursimo	A couple of BIAS read error messages.
Own	1	2002-01-04	< 1	Jordi & Ribas	Problems with own instrument.
Telescope	1	2002-01-06	0	Jordi & Ribas	Mirror support air compressor failure. Night lost to weather.
ALFOSC	1	2002-01-07	< 1	Cardwerr & Giammanco	Tracking lost during exposure.
Telescope	1	2002-01-11	0	Hassall	Dome water leakage. Floor mopping needed several times.
Telescope	1	2002-01-13	0	Grav	Cooling unit 3 failure.
Turpol	1	2002-01-21	0	Gahm & Kaas / Marcha & Anton	Flip mirror repeatedly lost position. Easy to remedy.
Turpol	1	2002-01-22	0	Gahm / Marcha & Anton	Turpol cooler failure by the end of night.
Turpol	2	2002-01-23	2	Gahm / Marcha & Anton	Turpol cooler failure.
StanCam	1	2002-01-25	0	Vilppu, Pursimo, Kaas	StanCam BIAS crashes.
SOFIN	1	2002-01-29	0	Ilyin, Telting, Uytterhoeven	Ghost in 4552 SiIII line with Piskunov Loral
Telescope	1	2002-01-30	0	Ilyin, Telting, Uytterhoeven	TCS balance complaint with counterweights at max position.
MOSAIC	1	2002-02-02	0	Pursimo, Abbott, Clasen, Klougart	NE chip problem.
ALFOSC	1	2002-02-18	0	Karlsson	BIAS stopped once while reading CCD.
Telescope	1	2002-02-21	0	Ilyin, Liseau, Brandeker, Telting	Cooling water leak error messages.
???	1	2002-03-01	0	Ilyin, Brandeker	Control room heater had to be reset.
Telescope	1	2002-03-04	0	Ilyin, Brandeker, Telting	Upper hatch sensor error because of ice. Hatches operated in local mode.

Fault Severity: 1 = minor, 2 = severe, 3 = night lost

2 Telescope

2.1 Pointing

Pointing modelling in December 2001 gave 5.4" RMS using 72 FK5 stars explicitly through dedicated pointing model observations. Other pointing modelling is built on on-the-fly data collected from presets to objects. This usually gives a higher RMS value (about 9") with more objects.

2.2 Mirror aluminisation

Both of the NOT mirrors will be aluminised during the technical period at the end of May 2002. The coordination of this is being handled by Graham Cox, who reports:

The ING have been contacted and it has been agreed that the mirrors can be taken down to the WHT for aluminisation on Monday 27th May. Michael Andersen has accepted to do the alignment when the mirrors are remounted.

In conjunction with Anton Norup Sorensen in Copenhagen, Michael has produced a preliminary plan for an alignment procedure which includes some work in advance at the NOT. Michael wishes to machine the telescope entrance aperture, directly above M1 (while the mirror is out). A possible method is being investigated by Carlos Perez and Peter Brandt at the telescope. The work will involve bring the mirror cell back to the NOT from the WHT while the mirrors are being aluminised. A cutting tool will be mounted on a special frame that is fitted to the rotator. The rotator will be be controlled by the new TCS, Ingvar Svardh is handling this part.

As well the correcting of the skew of the spider is being checked out.

A timetable for the whole aluminisation and machining procedure has been drawn up. Also the English version of the manual for dismounting and mounting of the mirrors has been completely retyped, since no electronic version existed. This new version includes some hand written comments made by Hugo Schwarz during the previous aluminisation of the primary mirror.

2.3 Mirror Damping

Graham Cox reports:

About a year ago a student (Anders Magnusson), supervised by Graham Cox, started work on a new mirror damping system for the NOT primary mirror. The main part of the work was to replace an old analogue filter with a new digital one running on a DSP development board. Magnusson succeeded in getting a filter design to work, though not satisfactory, it was unstable and lacked resolution because it was implemented with only 16-bit accuracy. Work has now started to improve the performance using 32-bit functions. Also a design is required to interface this new filter to the load cells and old voice-coils.

2.4 Mirror support

The Atlas Copco SF2 air compressor motor for the M1 support broke down after 42600 hours, or approximately 10 years of running. The spare was installed immediately. The broken compressor was sent to Tenerife for repair, but it is now so worn out that repairing will be more expensive (4800 euros) than buying a new one (4064 euros). An in hand spare is the recommended solution to avoid weeks of down-time if the running one must be sent for repair.

2.5 Guide TV FOV

Large raster-scans or mosaics can be done by writing macros in BIAS using the command *teloffset* which stops autoguiding, moves the guide probe correspondingly and restarts autoguiding. It has been realized, however, that there is no guarantee that the guide probe does not eventually enter the FOV of the instrument, depending on its start position and the step size and direction.

Large mosaics are therefore recommended without auto-guiding, which is OK for NOTCam short exposures. For optical imaging the raster-scans/mosaics are recommended done manually. A future solution involves searching for the best guidestar for every offset. Discussion has started.

2.6 Old TCS

A few modifications to the old TCS have been implemented in order to improve observing efficiency (total time spent: 13 hours).

- A new preset command for spectroscopic observations with the slit aligned along the parallactic angle. For a typical SOFIN night efficiency improvement is a gain of 15 minutes per night.
- An annoying TV filter bug, which confused observers and caused efficiency losses, has been corrected.
- An extra command called "Stop-Telescope" is implemented to stop all telescope and building motions. It is an alias of the previous "idle-mode" command, which is not so obvious.

2.7 TCS II

Ingvar Svardh reports:

Development short summary:

- September 1, 32% was done of part 1 (that one excludes new solution for adapter and active optics). End date July 2003.
- March 1, 44% was done. End date September 2003.

In November/December, I used 72 hours for design, manufacture, documentation and test of OptoExtraOutput, a set of modules needed to solve the problem with DC outputs caused by our implementation in the telescope hardware. This saves us the trouble of going thru the ancient hardware documentation for the involved signals.

In December, the big 60 x 90 cm, 30 kg heavy plate with all screw terminals, mating connectors and OptoExtraOutput modules was mounted on rack 22 in the electronics room. The advantage with this is that all signals are collected in one place and can all be measured without any extra effort.

Switching between the old and new TCS takes about 25 minutes, by moving about 25 connectors from their original place to the mating connectors in the big plate. Then all is ready to run with the new system. Switching back also takes 25 minutes. This way all tests can be done during day time during normal observing scheduling. Of course the final adjustments has to be made with stars during technical time.

There are only a few hardware details left to be checked/modified to have this part ready.

All software for the new TCS I/O hardware that we have installed is implemented and ready to be fully tested on the real hardware (some are already tested). Extensive simulations have already been performed. What we can do now is to control Building, Azimuth, Altitude, Rotator, Pointing (course), MirrorCovers, CounterWeights, Hatches and Hydraulics.

In an earlier staff meeting, Johannes Andersen suggested that me make a user interface that looks just like the old one which is proven very simple and reliable. The original thought was to have fully integrated graphical control of both instruments and hardware but our staff resources are somewhat limited to aim too high.

2.8 Temperature Monitoring System

The TMS project is on hold.

2.9 Building crashes

No building crashes at all during the last 6 months. Problem solved.

3 Instruments

3.1 NOTCam

For background information I refer to the previous report to the STC on *NOTCam commissioning during the summer 2001* by Tim Abbott.

3.1.1 Short summary of the last commissioning runs

The 4th NOTCam commissioning run in October (two nights) was lost to useless weather and an irremediably stuck filterwheel. Subsequently NOTCam was warmed up and opened. The cause of the stuck filterwheel was the nut of a screw in the motor gear.

During the 5th NOTCam commissioning run in November (two nights) it was realized that the shutter was more unreliable than ever. Observations were repeatedly interrupted during the first night. For the second night we decided to run without the shutter and disabled it. Some of the NOTCam commissioning proposal targets were done.

The 6th NOTCam commissioning run around Christmas (5 nights) was practically all lost to bad weather. The good news is that the instrument behaved perfectly: no timeouts on any wheels (neither the focus mechanism) and no shutter problems! In fact, we haven't seen the shutter fail since. Domeflats and darks obtained. First reliable noise and linearity test data.

The 7th commissioning run in early January (2 nights) lost 1 night to weather. The second night was not photometric but photometric standards were observed, as well as psf testing across the FOV, and testing for ghosts.

The 8th commissioning run in late January (3 nights) lost 70 % to thick clouds, but some narrowband filter commissioning was started through thinner clouds.

3.1.2 NOTCam cold shutter - problem solved

The shutter problem was not fully realized during the first commissioning run as it was difficult to separate this effect from other features because of the preliminary state of the data acquisition system. The first time the shutter hung completely open we believed it was due to a bug in the dark command. It is now evident that the problem was there all the time. First investigations in August showed that the spring holding the microswitch down was sufficiently strong to push the shutter back a short distance after initialising. The effect this would have on the observations could clearly explain the obtained images. The microswitch spring was weakened in an effort to cure the problem. Also, a "LED box" diagnostic device was connected to the control circuit to monitor the shutter behaviour. The next time NOTCam was cold (September) we found that the shutter still lost syncronization with the controller on several occasions, but less frequently. Upon the next warm-up and opening of NOTCam, the spring was weakened a bit more and the shutter was thoroughly excercised without ever failing once (while warm). During the 5th commissioning run, however, it was realized that the cold shutter was more problematic than ever. Repeated interruptions and aborts of the observations during the first night prompted us to continue the second night's observations with the shutter disabled. To avoid another thermal cycle a software solution was first sought. The speed of the rotating shutter was modified. Increasing the time it takes to rotate the shutter 90 degrees from 100 to 150ms seems to have solved the problem. We have not seen the shutter fail since this modification. A closed loop solution is now being looked into where the shutter position verification is done automatically.

3.1.3 NOTCam cooling: PTR & LN2

In its storage position on the dome floor NOTCam can be kept cold by the PTR only, which is gratifyingly keeping it stable at around -185 to -190 degrees. NOTCam has now been kept cold since the end of November. A back-up solution with Peltier coolers in the case of power cuts is being looked into. The PTR itself is on the no-break, but the required water cooling isn't and that system will shut down. The situation is only critical if power is lost for a longer time or if it is impossible to get to the telescope (weather).

Pending the arrival of the long hoses for the PTR, the PTR is currently disconnected whenever NOTCam goes on the telescope, and LN2 must then be filled every day to keep the instrument cold. During observations some action must currently be taken against spilling of LN2 at given orientations of the rotator and telescope altitudes. This limits observations to airmass smaller than about 2. Extended vacuum jacketed hoses will be mounted to each of the fill and vent tubes, oriented to minimize this problem, as soon as the ordered hoses are in hand.

3.1.4 NOTCam BIAS

The remaining fixes to the BIAS data aquisition software will be made when Jens Klougart visits the NOT during mid-March.

3.1.5 NOTCam observing modes

NOTCam is offered to visiting astronomers in imaging mode from April 1st. So far broad-band imaging through both the wide field (WF) camera (3.9'x3.9') and the high resolution (HR) camera (80" x 80") have been commissioned with the engineering grade array installed. The science grade array will be installed when we have a stable system and the need for thermal cycles can be minimized. Switching between the WF and HR cameras is done in less than two minutes. Turning the filter wheels one full turn takes 30 seconds. All wheels can be moved simultanously.

There are two read-out modes available. The first is a standard *reset-read-read* mode (also called Fowler sampling) which resets the capacitor, makes a non-destructive read immediately after, then integrates for as long as wanted and reads again after end of integration. Subtracting the first readout (the reset frame) from the end-of-integration frame provides the final image. The second is a *sample-up-the-ramp* mode which reduces the noise by multiple non-destructive readouts during the exposure upon which a linear regression analysis applied to the data points provides a mean flux rate. The first mode is needed for brighter targets observed with broad band filters, but the shorter the individual integration time, the larger the overhead factor (total time/integration time). For a series of 1s integration the overhead factor is 10, while for 5s exposures it is 3. For the *sample-up-the-ramp* mode the overhead factor is around 1.3 only, but this mode can be used only for longer exposures. The separation between the N non-destructive read-outs can not be smaller than the read-out time which is currently 3.6s. A maximum of $N = 5$ readouts is allowed currently (limited by the 16Mb PC card buffer).

Note that overhead to dithering is not included in the above overheads. All data must be obtained by dithering to provide proper sky subtraction, the dithering step size being determined by the type of target. Extended or crowded fields demand off fields (or beam-switch observing) to estimate sky, which means an overhead factor of 2 times that of sparsely populated stellar fields. To accomodate a best combination of dithering, type of readout, individual exposure times and number of repetitions, observing macros are being made for each target. Large mosaics must be done without autoguiding to avoid the risk of having the guide probe entering the field of view.

A NOTCam User's guide will be made available to the observers. A commissioning report is under development, and the first version will be made public soon.

3.1.6 NOTCam engineering grade array

- Bad pixel level (hot and cold) about 2%. A small increase has been noted from June to December.
- Gain is 3 electrons per ADU.
- Readout noise is 24 e for the *reset-read-read* mode and 14 e for the *sample-up-the-ramp* mode.
- Dark current is 1.5 e/s.
- Linearity good to 99% up to 20000 ADUs.
- Saturation effects start at 40000 ADUs.
- The memory effect in terms of positive and negative ghost images of a close to saturation target is not properly quantified yet. Normally the array recovers after a couple of readouts.
- No cross talk between the four quadrants has been seen.

3.1.7 NOTCam optical performance

- WF camera platescale and optical distortion is currently being investigated.
- WF camera lateral color distortion between J (1.25 μm) and K (2.2 μm) is centrosymmetric and amounts to 1 pixel in the edges.
- HR camera platescale, optical distortion and lateral colour distortion to be tested.
- PSF stability across the field to be analyzed both for WF and HR camera. Data in hand.
- Focus travel with wavelength measured for both cameras. Less than expected from the optical design.
- Ghosts are expected to be minimized by tilting the filters. Quantitative test data to be analysed.

3.1.8 NOTCam sensitivity and throughput

- Preliminary zero-point magnitudes (J=22.3, H=22.3, K=21.5) to be confirmed when photometric weather allows (hopefully during the next commissioning run by the end of March. Note! Preliminary results obtained with the "unreliable" shutter.
- Photometric scatter over the WF camera field $< 3\%$.
- The sky backgrounds are around J=15, H=14, and K=12 mag/arcsec^2, but variable.

3.1.9 NOTCam upgrades for the future

- Allow for binning and windowing readout commands
- Faster controller needed to beat the long readout time (3.6s)
- Grisms for the spectroscopic mode

3.2 ALFOSC

ALFOSC has continued to serve the community as a reliable observing facility.

3.2.1 ALFOSC grism wheel timeouts

Grism wheel timeouts can apparently be avoided by keeping the grism wheel installed with the heavier grisms equally spaced for best balance.

3.2.2 ALFOSC folding prism

By the end of November a minor damage to the folding prism resulted from an erroneous installation of a calcite plate. There is a small chip in one edge with the appearance of a classic semi-circular stress fracture with a diameter of about 8 mm. The broken glass has not fallen away. Because the damage is near a focus the effects are localised and there is a narrow dark area in the upper left edge of the CCD. The effect on scattered light is unknown.

3.2.3 ALFOSC zero-point monitoring

More samples have been added to the UBVRI zero-points and colour terms. This information is accessible on our WWW pages.

3.2.4 ALFOSC long-slit spectroscopy

John Telting reports:

Many updates have been made to the WWW documentation of ALFOSC spectroscopy. For all grisms the second order contribution and fringe levels have been investigated and documented. Arc maps of the three most used comparison lamps have been published on the WWW, for all grisms. See http://www.not.iac.es/new/technical/astronomical/instruments/alfosc/ .

The necessity of purchasing second-order blocking filters has been investigated: for optimal use of the red part of the various wavelength regions offered by the grisms, five cut-on filters have been identified. These filters will be ordered soon.

A program to observe standard stars for all grisms will be started whenever the observing schedule allows. The standard star information will be incorporated in the WWW-based ALFOSC S/N estimator. This will allow potential users of ALFOSC in spectroscopic mode to estimate the required observing time when applying for time.

3.2.5 ALFOSC multi-object spectroscopy (MOS)

First normal visitor run scheduled for June 2002.

3.3 FASU

3.3.1 FASU B filterwheel gear

The gear on the end of the dc motor that turns the wheel had come loose and it was impossible to make it engage with the other gear connected to the wheel. The problem was solved the next time ALFOSC/FASU was dismounted from the telescope. The connection pin between an axis and a gear had become worn out. A new steel pin was built up. No observing time was lost.

3.3.2 Filters

Seven new 100mm round filter holders for FASU have been manufactured on-site for the new MOSCA filters. Also 2 new 75mm square holders were made for a specific observing run.

3.3.3 FAPOL

The remotely-controllable retarder plate mount for FASU (FAPOL), manufactured at CUO/IJAF, arrived at the NOT in December 2001. Some minor machining was made to make it fit in FASU, and an elegant solution is being sought which automatically disables the calibration mirror movement whenever the waveplates are in position. (The function for the previously used manual device does not apply for the new device.) Also, the handling procedure must be clarified. Probably no switching between half-wave and quarter-wave plates is recommended during an observing run. The software for rotating the wave-plate is currently being made.

FAPOL is scheduled for commissioning on April 14th. By then a new 50x50 mm quarter-wave plate will also be available. Thus, both linear and circular imaging and spectropolarimetric modes will be tested.

3.4 TurPol

3.4.1 Cooler unit

The Turpol cooler caused some problems during the last run in January, although it had been stable for a long time before that. The cause of the problem was ice forming inside the capillary tube, a part of the cooling circuit. After very wet periods leakage of water seems unavoidable. New hoses are in hand, however, and will be installed before the next Turpol run. Also the dryer will be changed. This will presumably lead to an equally stable system as the one at the KVA 60cm telescope.

3.4.2 Diaphragm viewing

The new STV camera was tested in January. Its high sensitivity is a major improvement in observing efficiency for faint targets. Extended 14 mag targets, impossible to see with the previous ST4 camera, were centred in the diaphragms within a couple of minutes, the exposure time being around 5 seconds.

3.5 HiRAC

Effectively retired.

3.6 StanCam

Continues to operate well.

3.7 SOFIN

John Telting reports:

In January 2002 a new 2kx2k CCD, Piskonov's Loral, has been commissioned for use on the second camera of SOFIN. Standard-star observations reveal that the new CCD has up to 6 times better QE in the blue than the previously used EEV. Fringing starts to become noticeable from 6600Å redwards in the extracted spectra; at 9000Å the fringe level is 50% peak-to-peak in the extracted spectra.

The AB magnitudes and system efficiency resulting from the standard-star observations are published on the WWW (see http://www.not.iac.es/new/technical/astronomical/instruments/sofin/). These numbers show that, with the new CCD, the efficiency of the instrument is comparable to that of similar high-resolution spectrographs at other telescopes.

3.8 FIES

No news.

3.9 Mosaic

Tapio Pursimo reports:

The first commissioning run of MOSCA took place in the beginning of February 2002 upon its arrival to the NOT.

The day time tests by Jens Klogart and Jacob Clasen indicated that Mosca should work fine. However soon after dark some problems occurred, mainly with the NE (North East) chip of the camera. The images indicated some pick-up noise in the NE chip when mounted at the telescope. The tests suggested that slewing the telescope caused the noise and especially when rotating the field. Later during the night the NE L (Left) amplifier malfunctioned. Due to bad seeing and some clouds, only some of the commissioning tasks were done, namely the observations to determine the pixel scale, the gap between the chips and alignment of the chips, preliminary focus values for UBVR filters and ghost & cross talk tests.

Next day when Jens and Jacob tried to identify and fix the problems more problems occurred. Some components were burnt out due to a shorted power supply cable in the mosaic controller. After this the instrument was dismounted and later sent back to Copenhagen.

3.10 FRed

I defer to the director's report.

3.11 CCD Procurement

An order has been placed with Marconi for the purchase of two 2kx4k, 15μ CCDs with the new anti-fringing technology (ccd44-82). Latest news from Marconi (per 8/3-2002) is that they can not provide two full-specification fringe-suppressed devices so far, and will not have any more of these in the near future. Instead they came up with an offer of 2 "not full-specification devices but otherwise grade-1" to a reduced price, of which one has 4/5 e- deferred charge (spec=3 e-), and the other has "some structure seen in 350nm and 400nm flat-fields". Or, alternatively, they can deliver two normal (non fringe-suppressed) devices.

3.12 High speed CCD controller serial link

Graham Cox reports:

The status of the interface board, proposed for the new Copenhagen array controller, is now in a state ready to be converted to a printed circuit board and components ordered. Before any further expenditure is made it has been requested that the board be tested first, but since there is no new controller to test it with, the project is on hold. Also the specification has been changed by Copenhagen for the optical link making the original design incompatible with the new ideas, though the revised functionality can be added to the board.

4 Computers

Jacob Clasen & Markku Verkkomieni report:

The network infrastructure started to change in summer of 2001. The equipment for the firewalls was installed in August, and they became fully operational in September. Our infrastructure is now protected against unauthorized access like a cocoon as in Fig. 1. A technique called VPN, Virtual

Private Networking, is used to facilitate transparent access between our two subnets at SLO and ORM, so that all protocols, even insecure ones, work between the subnets as before. The firewalls have been operational since August 2001 without problems. No instrusions have been detected after this time.

Our new instruments, first of all NOTCam, need much more data storage space for the images than previous instruments. A RAID system is now operational for the new needs: 300 GB mirrored storage. Mirroring means that we get fast throughput and security against disk faults by doubling the physical storage space.

Making copies of images to transportable media needs automation. The new instruments require typically several CD-ROMs to be created morning after the observing run. A CD carousel jukebox automates this task, so that CDs are created as soon there are enough images to fill one during the observing. The RAID system will also be used to hold the users home directories. The implementation of this has been delayed somewhat due to a recall of the RAID controller cards. Currently, we are waiting for the last controller card to be replaced. It is expected that the implementation of the new home directories will happen over the next months in parallel with a reconfiguration of the electronic mail system.

5 Infrastructure

The 10 years old pick-up has been replaced with a new Izuzu pick-up. New snow chains were purchased, as well.

We are considering a proposal to ventilate the dome machine room which becomes too warm during summer months. No further progress.

5.1 Safety

A safety day for staff was organized at the ORM on March 1st by the NOT Safety Officer, Graham Cox, to cover the safety and emergency aspects for staff at the NOT.

Two lone worker alarms systems have been purchased by Graham Cox, these are to provide extra safety to the visiting observer when alone at the telescope, and to Peter Brandt when working in the machine workshop. The systems work by receiving an alarm signal sent from a pendant carried by the user, via a radio link. In case of an emergency the user presses a button on the pendant and the receiver unit automatically starts making a sequence of phone calls to pre-programmed telephone numbers (four in total), until it receivers an acknowledgement from one of the numbers. It is then up to the person who took the call to respond accordingly.

5.2 Dome water leakage

Dome water leakage is a problem in rainy conditions and requires hours of mopping to avoid the water running down through the mid-deck to the machine room. A short term *lead-water-away* solution is planned implemented for this summer to be prepared for the coming winter. This solution will guide the water out again through the side ports. It is not known exactly where through the dome roof the water first enters. Sealing the dome from the outside is not trivial (PB gave it a try a few years ago). Possible long term problems to ponder are the effects of wet rubber foam all over the building.

6 Studentships

Discussions and plans are made to improve information about the NOT to the nordic community of astronomy students in order to attract more attention to our studentships. A continuous presence of 2 students at the NOT should be aimed at.

7 Souvenirs

New T-shirts are being designed and purchased to be in hand by next summer and the "Open Days".

A Comments recorded in EON & EOR reports

The following table extracts comments made in End-of-Night and End-of-Run reports over the past 6 months. Only comments about observatory operations are included but no attempt has been made to edit or select on the basis of positive or negative comments.

Table 2. End-of-Night Report Comments, 2001-09-15 to 2002-03-10

Date	Observers	Comment	Response
2001-09-16	Hornstrup	It has been, as always, a pleasure to work with this telescope, its instruments and the people supporting it!	
2001-09-17	Ostlin, Masegosa, Zackrisson	A quite mediocre run! Two first nights were good, but 75% of night 3, and the entire nights 4,5 and 6 were lost due to high humidity. Telescope worked well when weather allowed it to, and we got some very nice deep images of blue compact galaxies. Thanks! Goeran.	
2001-09-18	Ostlin, Masegosa, Zackrisson	It would be usefull an alarm when the exposure has finished in order to awake the sleeping observers.	Point taken.
2001-09-23	Lehto, Kotoneva, Johnson	Staff very helpful and apparently quite over loaded with work. We wish to thank Jacob, Tim, John, Tapio and the invisible-to-us day time workers.	
2001-09-25	Lehto, Johnson, Kotoneva	No data tonite either. In any case, we would like to thank Jacob for doing all that was possible under these circumstances. At 5.30-6.00 AM on 24/09/01 a thunderstorm raged above the NOT. It caused a range of problems to the computers, phonelines, cellular phone and internet connections plus the TCS and the weather station.	
2001-09-27	Motch & Guillout	We enjoyed the skill of the technical staff. Problems were swiftly fixed.	
2001-10-01	Garcia Lopez & Garcia Gil	It would be very nice to have the guide star server back again. On the other hand, NOT continues as a very friendly and efficient telescope.	
2001-10-05	Telting	the BIAS command 'abort' is really a wonderful feature! it works deliciously. the Moon was a bit too bright for comfort; difficult to detect the fainter, but not less important, emission lines. guide stars all over the place! thanks for fixing this. i am using ALFOSC with a slit offset to y=460. Excellent stuff, and it is a great result of Jacobs effort to get some slits made. Had to change the instrument focus to 10350, i guess to account for the lump of grism material (i focussed with the grism in the beam). One day, i will check if focus offsets due to the grisms are significant.	
2001-10-08	Solheim	ALFOSC in windowed read out mode works really nice. Great data obtained for pulsating white dwarf campaign.	

Table N. End-of-Night Report Comments, 2001-09-15 to 2002-03-10

Date	Observers	Comment	Response
2001-10-17	Moeller & Wold	As always the telescope and instrumentation worked perfectly, and we received great, friendly and competent support from the NOT staff. We both got great data, and had a wonderful time. The only problems we had were related to the interpretation of the questions in the end of run report form. Thanks a lot, Palle and Margrethe	
2001-10-17	Moeller & Wold	The weather display on the NOT web page doesn't work... The grism wheel timed out a couple of times, but could be fixed by restarting the ALFOSC user interface.	Fixed by support.
2001-10-18	Wold & Moeller	The grism wheel timed out a few times, but by restarting the alfosc user interface, the problem was fixed. However, this takes 3-4 min to do, so in total we lost perhaps 15 min. We found out that by changing to grism #6 before opening the grism wheel, the problem with time out was avoided (we were using grism #4 for observations). We also had one 'camera focus time out'. There were no other problems, and we had a great night.	
2001-10-22	Kaas	Everything worked fine and smooth.	
2001-10-25	Leedjarv & Katajainen	For LL this was the first time to observe with the NOT. Wonderful telescope! And a kind staff, of course. Weather perhaps was not so good, but still we got a lot of data.	
2001-10-25	Leedjarv & Katajainen	Good support, thanks C & A!	
2001-10-30	Berdyugin & Kaas	Repeated mirror cell bellow alarms. Checked the bellow readings on the TCS, it seems that it is the same one which is anomalous. Under LC2, the second row under 1.	
2001-11-01	Berdyugin & Kaas	A TV in the service building would have been nice. I have stayed here 5 nights in a row this week and 4 nights last week, trying to work from the staff computer in the service building (Cassandra). It is painfully slow ... Amanda.	Will be replaced eventually as part of the computer upgrade.
2001-11-03	Ilyin, Tautvaisiene	It is nice to see that the instrumentation at the NOT is under development continuously. Best wishes for a success!	

Table N. End-of-Night Report Comments, 2001-09-15 to 2002-03-10

Date	Observers	Comment	Response
2001-11-13	Verdes-Montenegro & Perea	Very friendly and nice staff, as usually!	
2001-11-15	Fynbo, Weidinger, Theuns	As always the support was good and friendly and the telescope worked smoothly. Thanks. However, the weather was much much less cooperative. Better luck next time...	
2001-11-18	Brand & Rawlings	All worked well whern the weather cooperated!	
2001-11-23	Casares & Zurita	Since we are doing time-resolved imaging polarimetry with 1 min integrations it would be extremely useful to alternate the calcite plates automatically with a script. Otherwise, is extremely painful to change the calcite plate manually by clicking with the mouse every 1 min during the whole night!	This was not asked for in proposal nor NIRF. Otherwise it is a planned project to make the ALFOSC UIF talk to the BIAS program whenever resources are available.
2001-11-30	Gaalfalk & Olofsson	Small problems with Alfosc grism wheel fixed rapidly.	
2001-12-01	Gaalfalk & Olofsson	We had two TCS alarms 1. 'Coolers 3/4 failure. Check them!' was fixed by support. 2. 'Mirror bellow alarm!' resulted in no problem.	
2001-12-05	Negueruela & Israel	IMPORTANT: there is a big defect in the camera affecting columns 980-1020. Spectra taken with long slit 1".0 fall exactly on top of that. PLEASE REALIGN THIS SLIT SO THAT IT CAN AVOID THE DEFECT IF AT ALL POSSIBLE.	Slit position changed by support.
2001-12-05	Negueruela	We managed to observe for about 25 minutes on the second night. We would suggest that some data reduction system other than IRAF is available (MIDAS, Starlink, ...) to visiting astronomers. We have not all converted yet.	
2001-12-12	Grav & Hansen	Telescope performed very well!	
2001-12-15	Grav & Hansen	Thanks for great support throughout a rather miserable run :-)	
2001-12-18	Bejar & Caballero	It will be very interesting to have a similar program to that one to move an object into the slit, in order to move the objects into each one of the four choronographic masks.	Fixed by support.
2001-12-19	Telting	When pointing at Sirius, the guide star server did not anser the request from the TCS to come up with guide star coordinates.	Must be a problem in the GSC itself.
2001-12-20	Kaas & Svärd	Ingvar redefined the rotator centre, which has moved by only 1 arcsec since the last check about one year ago.	

Table N. End-of-Night Report Comments, 2001-09-15 to 2002-03-10

Date	Observers	Comment	Response
2001-12-21	Kaas, Pursimo, Heidt	This was the first night of the 6th NOTCam commissioning run, and NOTCam has behaved perfectly for the first time! Even though the weather did not permit opening the dome, we had the following successes: 1) No timeouts on any wheels, 2) Shutter behaving correctly all the time, 3) Obtained noise/linearity test data. This is great stuff! Thanks to all!	
2001-12-23	Kaas	We need a PC with internet connection in the vivienda, or at least the possibility of making a phonecall to an answering machine to get the most important facts about the weather.	Under discussion.
2001-12-25	Telting & Kaas	A LOT of basic (low-level) software changes and upgrades are needed to make the notcam operation user friendly and efficient. We need to fix the LN2 spilling problems with high priority	Project under way.
2002-01-02	Pursimo & Telting	NOTcam behaved very well. We tested some of the notcam bias commands, and all commands we tested failed to function properly. A report will follow separately.	Project is under way and bugs are being fixed.
2002-01-04	Jordi & Ribas	Excellent support by the technical and astronomy team.	
2002-01-07	Cardwerr & Giammanco	No problems other than the tracking (tracking lost twice), but the weather conditions were poor so little usefull data was taken. Very poor seeing on both nights due to bad weather rather than the telescope. Hopefully some of the data will be useful.	The tracking lost incident has not repeated.
2002-01-11	Hassall	The weather was so bad that that I didn't even open the dome. But the instrument worked a dream for all the calibration images! Support good. See End of run report for more details.	
2002-01-11	Hassall	The only problems with the run were the bad weather. I found the support to be excellent - starting with an unannounced visit at the SLO, where I was quickly fixed up with access to my home institute. This friendly competent support continued at the NOT itself. I found Alfosc easy to use (it's only my 2nd time with this instrument) and well documented. I was impressed with the Quick Reference for Observers and the Web pages, which really are usable by observers new to the instrument and telescope. The Real Time Weather page is an excellent facility, and has been compulsive viewing for the last two nights. Thanks to everyone who has ensured that a scientifically unsuccessful run was as pleasant and efficient as possible under the climatic circumstance.	

Table N. End-of-Night Report Comments, 2001-09-15 to 2002-03-10

Date	Observers	Comment	Response
2002-01-12	Grav	Thanks for great support! I look forward to returning to use this great telescope again!	
2002-01-13	Grav	Thanks for great support and finally one good night :-) All we need now is that weather machine.	
2002-01-14	Ramsay	First 2 nights got data all night. night 3 didnt open dome because of low cloud/rain. i think we got what we wanted.. many hundreds of frames to analyse! telescope and support were all first rate.	
2002-01-15	Ramsay	excellent stuff!	
2002-01-17	Nilsson & Rekola	What can one say when everything works perfectly and even the weather co-operates and not a single minute is lost to any kind of problems. A great run... got around 280 images of interesting looking galaxy clusters, Rami's Cepheids and a GRB (we don't know yet if we caught it). Thanks a lot for everything, it's nice to go home with all this.	
2002-01-21	Gahm, Kaas, Marcha, Anton	Time consuming to centre a 14th magnitude extended object (Galaxy) on the Turpol diaphragms.	This problem is gone with the new sensitive STV camera.
2002-01-21	Marcha & Anton (2nd half)	We thank Amanda for all the help, and support, even after her night on duty. We thank also Carlos and Graham for their quick response.	
2002-01-26	Kaas, Pursimo, Egholm	NOTCam commissioning. No timeouts. No shutter failure. Clouds.	
2002-02-01	Ilyin & Telting	The new Loral (for SOFIN) makes a big difference! A factor 6 improvement at 4550AA.	
2002-02-06	Weidinger	As always, there was kind and useful support to take care of all problems.	
2002-02-06	Weidinger	The stability of the NOT is legendary. In spite of a extremely bad seeing, we obtained great spectre of the hypernova SN2002ap and of a possible LEGO at z=2.04. The kindness of the NOT staff is legendary as well. Thanks for very friendly and helpful support.	
2002-02-13	Egholm	I've gotten a lot of data, and I'm very satisfied with the run. The NOT worked perfectly during the whole run.	
2002-02-14	Jerjen, Takalo, Rekola	What a shame, this weather... We had to "evacuate" from the telescope down to Residencia every night between midnight and 1 am because of ice forming on the roads.	

Table N. End-of-Night Report Comments, 2001-09-15 to 2002-03-10

Date	Observers	Comment	Response
2002-02-17	Karlsson	It could have been worse. Most of the data are probably not high quality mostly due to a lot of clouds passing by. Although time loss to diffrent weather fenomenon I acctually have only one object of 33 that was not observed at all, but many objects were much less observed than planed.	
2002-02-20	Karlsson	It would be useful with a "down wind" button in the TCS to be used when moving the telescope in strong wind	TCS moves telescope automatically away from the wind.
2002-02-21	Ilyin, Telting, Liseau, Brandeker	Excellent run, good support. A pity that the weather wasn't better with such a nice telescope and instrument (median seeing > 1.5" during the period).	
2002-02-21	Ilyin, Liseau, Brandeker, Telting	It would be nice if the definition of the rotator angle on sky (i.e. the position angle) was clarified.	Clarified by support.
2002-02-24	Ilyin, Liseau, Brandeker	A mini-torch would be useful when entering the telescope floor during exposure (the big torches are too luminous).	Point taken.
2002-03-04	Ilyin, Brandeker, Telting	Thanks for clearing the ice Ingvar! Ingvar's TCS enhancements work very nice.	
2002-03-05	Ilyin, Brandeker	I noticed that the NOT-current-weather display has two different times for UT and local time. To make things worse they differ by approx 90 seconds, which may be confusing...	
2002-03-06	Caon	I find the NOT an excellent telescope, very easy to control even when working alone. Also I liked the introduction and the support during the first hours in the first night.	
2002-03-09	Vilchez	Everything OK.	

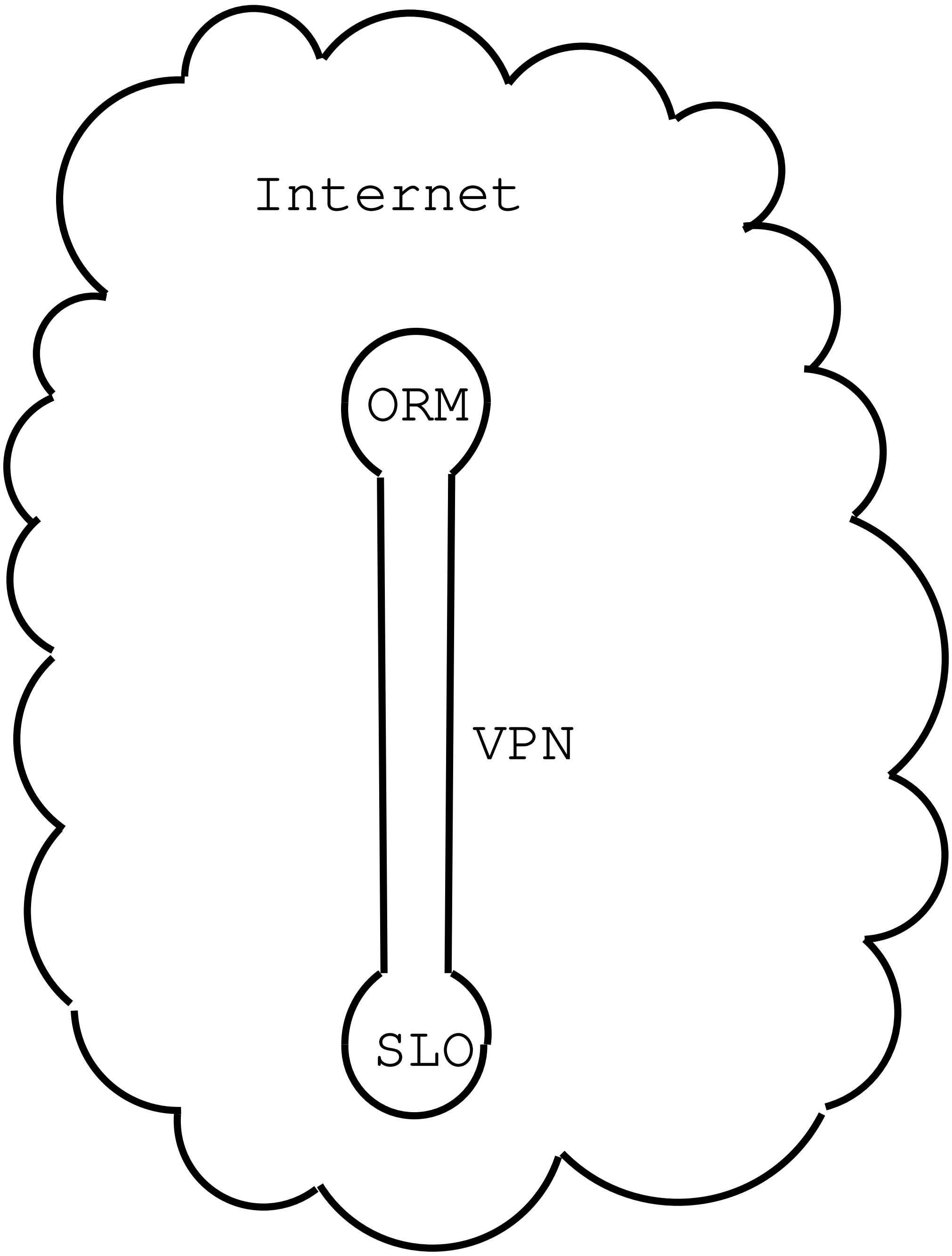

Figure 1: The NOT network infrastructure.