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VERY LARGE TELESCOPE

VLT

Astronomical Site Monitor

ASM Control Software Upgrade (La Silla)

TEST REPORT

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1 INTRODUCTION

1.1 Purpose

This document contains the report of the ASM control-software upgrade at La Silla from 02 to 18 March 1999. The upgraded system is basically a duplicate of the one installed at Paranal before, and includes the DIMM part for seeing measurements and the Vaisala meteorological station.

A commissioning period will follow directly after, in order to verify correct operation, before the system is handed over to the La Silla observatory.

1.2 Reference Documents

Further information can be found in following documents:

[1] **DIMM Upgrade Plan**	VLT-SPE-ESO-17410-1174
[2] **ASM Control Software Functional Specification**	VLT-SPE-ESO-17441-1175
[3] **ASM Control Software Installation Manual**	VLT-MAN-ESO-17441-1774

1.3 Abbreviations and Acronyms

ASM	Astronomical Site Monitor
CCD	Charge Coupled Device
CCS	Central Control Software
CPU	Central Processing Unit
DB	Database
DIMM	Differential Image Motion Monitor
HW	Hardware
I/F	Interface
I/O	Input/Output
LAN	Local Area Network
LCC	LCU Common Software
LCU	Local Control Unit
N/A	Not Applicable
RTAP	Real Time Application Platform
SW	Software
TBC	To Be Confirmed/Clarified
TBD	To Be Defined
TCCD	Technical CCD
TCS	Telescope Control Software
TIM	Time Interface Module
TRS	Time Reference System
VLT	Very Large Telescope
WS	Workstation

2 TEST PLAN

2.1 Preconditions Week 1

- WS (wasm.ls.eso.org) prepared in the ASM control hut with HP-UX 10.20 and FEB99 VLTSW release, plus some special requests related to system configuration (additional users, anonymous ftp area).
- Network set up, all nodes interconnected, with access to outside world.
- ASM system hardware assembled on the ground beside the tower, telescope tube and detector not yet mounted, but everything else connected.

2.2 Week 1 (Tue 02/03 - Tue 09/03)

Integration and test of telescope LCU, motors, enclosure, meteo-station:

- check and complete WS configuration (user setup, environment variables etc.)
- install ASM sw on WS
- verify correct installation of config files for La Silla
- configure lasm1 LCU and test booting
- test telescope motors preset/tracking
- check and adjust encoders if necessary
- check correct motion direction, change motor and tacho wiring if not ok
- if necessary: pre-adjust control loop settings (final tuning can only be done later with tube mounted)
- connect meteo serial line and test/debug sw (keep other serial line connected to old dimm machine)
- check connections to enclosure, verify signal assignments
- test/debug enclosure sw
- check generation of meteo.last files for ftp access
- check generation of asmmet*.paf files for archive i/f (remark that archive machine is not yet installed)

Planned results:

- lasm1 LCU fully tested (remark that there was no test in Garching)
- telescope motors tested
- enclosure i/f tested
- meteo i/f tested
- archive i/f for meteo files checked

2.3 Preconditions Week 2

- The telescope has moved to the tower
- The telescope structure is pre-aligned (hor./north/south direction)
- Integration of the tube with detector done

2.4 Week 2 (Thu 11/03 - Thu 18/03)

Integration and test of CCD LCU, tuning, alignment:

- configure lasm2 LCU
- test CCD in stand-alone mode, take bias frame
- telescope motors control loop tuning
- determine telescope axis offsets (level meter)
- preliminary set of configuration (star catalog etc.)
- assist with optical alignment/focusing
- pointing model
- check pointing and tracking performance
- check seeing measurement
- check automatic operation
- adjust data plot configuration for La Silla
- check generation of asmdim*.paf files for archive i/f
- check generation of dimm.last files for ftp access
- check issues about archive i/f and NTT data access

Planned results:

- CCD tested (system already pre-tested in Garching)
- telescope pointing and tracking tested
- seeing measurement and automatic operation ok
- archive i/f for dimm files checked
- data plots and displays checked
- system ready for commissioning

2.5 Before end of commissioning

- complete operation manual
- complete installation manual
- complete data user manual
- archive configuration files

Planned results:

- data user and installation manual ready for archive
- operation manual ready for archive
- ASM SW release 4 closed

3 DAILY LOGS

The daily logs contain a brief summary of the activities of a day and the system status at the end of the day. Not included here are all detailed logs written by the individual persons, system log-files, etc.

3.1 Week 1 - Day 1

Continuing WS configuration and build ASM software.

3.2 Week 1 - Day 2

3.3 1999-03-03:

WS configuration:
 - slow network access fixed booting the machine.
   From the point of view of the SysMan this could be due
   to some work performed yesterday in the back-bone.
 - added bridge, still to be properly configured by Nelson Mu~noz
 - ASM private subnet to be defined, still using back-bone IP
   addresses
 - ntp server name should be fixed by system manager (waiting for him)

ASM software installation: completed.

lasm1 configuration and booting
 - booted successfully.
 - iser board does not work. Opto led indicates that we are certainly
   receiving data from Vaisala. Still under investigation.

optical alignment:
 - done.
 - prism position checked OK.

air conditioning:
 - installation should wait until 15 March
 - for TCCD cooling system Gerardo Ihle measured for fixed copper
   conduits, flexible ducts connections will be arranged where needed.

ASM team at La Silla

Week 1 - Day 3
1999-03-04:

drives cabling and checking:
 - cabling done

- correct motion direction fixed inverting polarity of:
  eta: motor and tacho
  theta: motor
- found faulty encoder cable ==> actual spare cable is faulty
- eta and theta initialized and presetted successfully
- remains to check tracking and reproducibility of init position for both axes.
- with actual cabinet setup front door cannot be closed (enc cables obstruct). Not clear yet how to fix this problem.

optical alignment:
- installed new housing for focus lens (using now original housing in order to get adjustable focus position)
- M1 cover clamps on preparation (La Silla mechanic)

vaisala communication:
- still with problems, “select” system call always times out. Using CPU serial port reports same problem. Null modem does not help.

enclosure:
- found mismatch between acro bits defined by Manfred and actual wiring. We need to wait for Domingo or some feedback from Manfred.

WS configuration:
- waiting for La Silla Sys Manager to fix bridge configuration and ntp time server name.

3.4 Week 1 - Day 4

1999-03-05

Telescope:
- moved to the top of the tower and clamped.
- proper horizontal alignment of mounting to be done.
- right offsets to be find out after mount alignment.
- initialization and preset of axes working ok.
- encoder adjustment test shown that init reference mark is not always the same. For both axes the gap between limit switch and first found ref mark is 0.1 deg (too small). Nevertheless, the maximum deviation in initialization position after 4 consecutive test is not bigger than 2.3 arcsec (see ramestic.log).
- after all, closing front door of the cabinet is possible

without squashing the encoder connectors. No need of change.

vaisala communication:

- No solution yet, basically I cannot read any thing
  on any serial port (iser nor CPU).

enclosure:

- correct assignment of acro bits found out with the help
of Ricardo Parra
- all input signals work properly
- output signals block manual operation of the enclosure
- in automatic mode pulse protocol to command open/close/stop
  actions does not work. Indeed the hw can be commanded just setting
  to a fixed value the START (direction) and STOP signals. DIR
  signal has no effect.

WS configuration:

- no reply from sys man yet for bridge configuration and ASM subnet
  definition
- ntp and printer fixing will come after bridge configuration

3.5 Week 1 - Day 5

1999-03-07

vaisala communication:

- problem fixed. Wrong channel labels on VME/serial flat cable.
- data table updated:

Height	Vaisala Tag	ASM Tag	Dictionary keyword
------	-----------	-------	--------------------
2m	T 1	TA2L	GEN.AMBI.TEMP2
-.1m	T 2	TG1L	GEN.AMBI.TEMP3
30m	T 3	TA1L	GEN.AMBI.TEMP1
2m	RH	RH2L	GEN.AMBI.RHUM2
2m*	TD	TD2L	GEN.AMBI.TEMPDEW2
2m**	P	PA1L	GEN.AMBI.PRES
2m*	QNH	QNHL	GEN.AMBI.PRESQNH
10m	WS1	WS2L	GEN.AMBI.WIND.SPEED2
20m	WS2	WS3L	GEN.AMBI.WIND.SPEED3
30m	WS3	WS1L	GEN.AMBI.WIND.SPEED1
10m	WD1	WD2L	GEN.AMBI.WIND.DIR2
20m	WD2	WD3L	GEN.AMBI.WIND.DIR3
30m	WD3	WD1L	GEN.AMBI.WIND.DIR1

* = height of the sensor used to calculate dew point
** = for Paranal we are using 0m as height.

- special handling for La Silla added: do not check received
  tag names against those in database, interval value 20M --> 1200
  (no way to avoid this since La Silla Vaisala cannot be re-configured.

- meteo.last file support added (not fully tested yet)

enclosure:

- today no time to check change of polarity as explained by Manfred.

3.6 Week 1 - Day 6

1999-03-07

vaisala communication:
- special handling for La Silla and meteo.last generation
  debugged and fixed.
- asmmetTask working Ok.
  asmmetTransfer working Ok.
  asmarcArchive working Ok. (database config updated)

enclosure:
- polarity of signals changed, but got same effect.
  START controls direction, STOP enable/disable motion and dummy DIR.
- checked that voltage acro outputs are really being applied to
  DC/DC stage. OK.
- DGO does not have needed documentation, he told me that this should
  be re-check by Manfred when back at the mountain.
  No way to test the software

CCD lcu:
- ccd tasks started successfully using ccdDcsStart.sh
- some times this lcu looses time bus signal and switched
  to local. To be check.

WS configuration:
- no router available for private ASM's subnet. Must wait until
  back-bone upgrade is ready (2 months).
- bridge does not need to be configured, PGA started DNS using
  kine as server.

3.7 Week 1 - Day 7

1999-03-08

Vaisala communication:

- can open/close connection but received replies makes no sense.
  Changing every com parameter did not help.
  Draft function used for testing sake kept into:

  ~asmmgr/asmmetSendRecv.c

- periodic reception of telegrams working OK

Enclosure:

- Manfred found error in his documentation, START/STOP/DIR wrongly assigned between DC/DC and optocupler. When he tested the system he used terminals only at DC/DC card.
  Wiring between DC/DC converter and ESO optocupler was fixed.
- enclosure software tested, minor bug fixed.
- open/close plus hw status monitoring working ok.
- open/close timeout increased to 80 for La Silla. North half is slower than south side. South half requires less than 60s but the other requires ~65 sec.
- stop command does not work, same for Paranal. Given that every command is being handled as function then is not possible to handle STOP before STANDBY or ONLINE has finished.

ASM sw:

- modules versions freed in Modules.config!!!, for the time being is better in this way because modules are changing its last version very often. If in the mean while Paranal requires re-installation then do not forget to use asmBUILD 4.5!!!
- ASM sw reinstalled successfully.

Telescope:

- optical parts (tube & ccd box) still at optical lab, there was no way today to push it up to the tower (Gurka team not available).
- control loop parameter can not be tuned before complete load is on place.

WS configuration:

- ntp well configured and restarted (PGA), using La Silla gps as prefered server.
- kine DNS to be disable, we must use only /etc/hosts

3.8 Week 1 - Day 8

Telescope:

- serious problem to mount eta drive. Cannot find out a setup that allow complete range of motion of theta at eta init position. (see sent mail on this respect)

Vaisala:

- could not resolve commands sending/recieve stuff. See 19990308/ramestic.log

WS configuration:

- all ok.
- PGA will make a backup of whole disk space (both disks):
- system administration at La Silla wander that wasm should be configured without Rtap env startup at boot time. I think that we need to discuss about it. Major problem is the automatic startup of asmwsControl while system status is not fully known. On the other hand, the automatic START of asmwsControl is needed due to the bloody core-dump feature of our software.

Cooling system:

- the installation of the cooper pipe line for the TCCD & telescope lcu cooling, started (Leonardo Gonzalez).

R.Amestica left today at 16:00 hrs

ASM team La Silla

3.9 Week 2 - Day 1

ASM.log 1999-03-11

jnavarre, ssandroc (from 14:00)

CCD:

- integration of ACE-box, ccd-head, cabling
- test of cooling system
- start-up from ccdCtrl panel ok (switch behind ACE-box panel was off - set on)
- can take exposures, but transfer is 15 times slower than normal suspect network problem, to be investigated.

Telescope:

- INIT for eta tested after re-mounting
- encoder ref-mark distance from init-switches verified
  for both axes 0.10 deg from switch,
  also rotated eta-encoder, but made no difference - unclear why.
  decided to leave this as it is.
- axis offsets determined:
  -95.988675 / 255.903008
- E/W alignment pre-adjusted on the sky (bet-cen)
- tried pointing model, but too cloudy.

Optics:

- finder alignment done, on sky
- focussing pre-adjusted, w/o prisma

WS:
- rebooted at 16:00 because log-system was not working
  (suspect pb due to manual deletion of logFile)

Weather: clouds arrived just in time when we don't need them!
at 01:20 local it even began to rain !!!

3.10 Week 2 - Day 2

ASM.log - Fri 1999-03-12

*** whole day 100% cloudy with scattered rain showers ***

jnavarre (until 16:00), ssandroc

Telescope:

- Oil refilled to drives.
- All pieces re-assembled.
- ACE-box re-mounted and covered with alu-box.
- determined again encoder ref-mark distance from init-switch
  (procedure was wrong before):
  ETA: 0.13 - marginal, but with MRA's comment we accept it
  THETA: 0.35 - ideal!
- checked and adjusted mount horizontal plane adjustment
  tilt around n/s axis.

Enclosure:

- no change, just checked automatic mode - ok,
  only asmei panel indicator for auto/manual not updating.
- note that daylight sensor relais is still disabled.

Meteo:

- was running during last night - file generation and plots ok;
  only min/max shaded WS/WD plots look strange since we do not
  have a Vaisala 'moving' statistics window as in Paranal.

System config:

- pending wasm configurations done, details see ssandroc.log, keywords:
  /var/adm/cron/cron.allow
  name service priority
  anon ftp directory
  asmusr account
  crontab jobs for asm and vlt users
- vcsolac - addressed but still pending since not installed here !!!
  mailed to G.Filippi.
- slow transfer of ccd images still pending, waiting for N.Munoz
  to check with diagnostic equipment.
- special vuewmrc config for asm and asmmgr users

ASM code updates:

asm	Dictionary: added GEN AMBI SITE, updated descriptions for La Silla Meteo
asmENV	Enclosure no longer in simulation by default; Added config-file Alarms.dbcfg for operational limits; La Silla related config-file updates (preliminary config)
asmINS	added bias frame for La Silla CCD
asmarc	asmarcArchive: write the site keyword GEN.AMBI.SITE to the PAF asmarcFileTransfer.sh: accept also explicit destination dir (to keep pl and ls separate)
asmdim	better description in seeing-plot; comment-ops-log with unique pseudo-keyword for filtering
asmi	asmiPLOT: use dotted line-style for bad quality, not dashed
asmmet	asmmetDATAHISTORY.ls.class: corrected WDxS -> WDxL
asmws	stand-by log in dimm.log; comment-ops-logs with unique pseudo keyword for filtering
asmBUILD	README build-instructions updated

3.11 Week 2 - Day 3

ASM.log - Sat 1999-03-13

ssandroc

Today rebuild with asmBUILD 4.8

Telescope:

Control loop tuning: present values Kp=4.7 Ki=2.92 are reasonable.
Parameters can be increased to Kp=10 Ki=5 w/o loosing stability.
Took several sample plots. Tracking test on sky pending.

Tracking limits checked. Some problem with cable length when
theta < 120 and eta > -10; should set sw limits for
theta to 120..240, eta -92..0; tried with these - ok.
After init, the axis will then back off when going online.
Tracking “behind zenith” is actually possibly, ie eta may go
beyond -90 deg as far as the sw-limit is not exceeded;
that means one can in principle enable some stars with Dec > Latitude
(with extra care of course).

ETA ENCODER PROBLEM (very time-consuming!):
During the day repeated determination of encoder ref-mark distance
and axis offsets. Found that ETA “drifts” to the north, the vertical
position is not reproducable, always several arcmin off.
The same error value is visible in the encoder ref-mark distance.
-> Reason was a loose coupling of the eta encoder axis.
Dismounted eta encoder (at night, alone, in the gleaming light of my
torch!), tightened loose axis screw, remounted encoder, re-adjusted
proper ref-mark distance and re-determined eta axis offset.
Theta encoder seems ok, but cannot be checked directly w/o
disassembly of the structure (no access) - therefore not done.
Hopefully there the screw is properly fixed.
See ssandroc.log for the procedure of the encoder fix.
New values:
Ref-mark distance: eta=0.35 theta=0.36
Axis offsets: eta=-95.971573 theta=256.542846

MECH ALIGNMENT:
Structure rotation around vertical axis re-adjusted on bet-car
at meridian, centered as good as possible on the CCD
(with no pointing model of course).

POINTING MODEL done with 36 stars in the east from FK5 catalog.
Amazingly the mechanical adjustment seems now so good that most stars
are in the field even w/o any model!
Fitted rms error: 19.63 arcsec.
All stars from east reliably in the field, also most from west.

CCD; Problem with slow img transfer still not fixed.
L/S network support taking care but currently a necessary
diagnostic device is missing.

Automatic operation:

Started up whole system - terrible seeing (>2.5), too much wind
and humidity (had to faked op-limits), but in principle all ok.
RTD transfer must remain disabled for centering due to above problem.
*.last files go to anon-ftp area in /home/ftp/pub/, no more /data/log.

3.12 Week 2 - Day 4

ASM.log - Sun 1999-03-14

Present: ssandroc

Today mostly network trouble-shooting with F.Guiterrez.
Identified the problem with slow CCD img transfer in an obviously faulty network repeater. Replaced by a (largely over-dimensioned) switch, which then works ok. The new switch is a spare part and cannot remain at ASM permanently. Test with other other small repeater box failed, same problem as before. Also transceiver of LCU exchanged, brings marginal improvement together with old faulty repeater box.
It is now planned to replace the current installation with mixed 10Base-T, coax and fiber connections to only 10Base-T.
Procedure to test network performance see ssandroc.log

Presented info about new ASM to J.Miranda.
He requested some short&clear procedures overview in the operation manual, like “what to do when it suddenly starts to rain - press Standby”.

The timebus is still not finally available, currently disconnected for some maintenance acitivity. Note that yesterday’s pointing model had to be done without time reference signal, so it might be slightly incorrect.

The dimm.log and meteo.log files are now copied by a cron-job to “te13:~asm/archive/ls”. The Paranal data should then go to “archive/pl”. These files are currently NOT automatically cleaned up on wasm.

Installed further cron-jobs for cleanup tasks:
- remove data/paf files older than one day, only if archived
- remove data/paf files older than one week, whether archived or not
- remove dhs files older than one week, whether archived or not
- remove any file in /vltdata/tmp older than one month

This should be done also for Paranal, procedure see asmBUILD/README.

This evening auto-started the system, presets to bet-car, ok in the field, but stray light on the ccd initially inhibits centering. Otherwise all ok.

Played with the operations panel. Some impresssions:
- AG target set to ccd-center, but there we have a dead pixel in the window.
- Optical quality still poor.
- Pointing is excellent, compared to Paranal DIMM.
- alf-car (Canopus) should be avoided since it's burning holes into the ccd :)
- theta sw-limit of 120deg is still hard on the end of cable-wrap for low eta!
  TO BE CHECKED IF LIMITS CAN BE FURTHER REDUCED

3.13 Week 2 - Day 5

ASM.log - Mon 1999-03-15

Present: jnavarre (from 14:00), ssandroc

CCD ACE box mounted upside down to give more space for the cable-wrap.
Critical position of eta=0/theta=120 is no more a problem.
Set tracking sw-limits in asmtel to eta=-94..0, theta=120..240;
With latitude of -29d15'30", stars up to declination -26deg
should be trackable, giving some margin for pointing offsets.

Meteo history/plots changed to use the instant value instead of the average.
Unlike Paranal here it is no moving average but only fixed 20-min intervals,
which is not suitable for the plots.
Changed also attributes for meteo operational limits:
- RH instant value
- WS 20min-average
- WS 20min-maximum

Setting of Vaisala clock not yet addressed.

Adapted asmTCS_INTERFACE class (used by tcsmon module) for LaSilla.
Also improved checks for invalid or outdated sensor data.
Not yet moved the whole class into tcsmon, as it was planned.

Fixed the star-selection display in the asmei panel (and database)
in case of fixstar selected; now updating properly.

Revised asmei panel, particularly the Recovery menu should now contain all
hammer tools to put the system back on track in case of some failure.

During night some seeing data, with interruptions for test.

Summary of ASM code updates:

asm	TCS_INTERFACE corrected and adapted for LaSilla
asmENV	Added vuewmrc files for asm and asmmgr; corrections in wasmStart.

asmcat	Fixed database update for FixStar, time displays now in HMS
asmei	asmeiTelescope: Read values from WS db instead of LCU and display axis position in degrees, asmei panel revision of Recovery menu and helptexts
asmmet	LaSilla db config for history/plots and alarms changed - use instant value instead of 20-min-average
asmtel	reduced tracking sw-limits
asmws	enclosure-timeout changed for LaSilla; start-snoopy-log fixed, Corrected update of star selection in db for fixstar

asmBUILD checkpoint with latest versions; generate also wasm0 env

3.14 Week 2 - Day 6

ASM.log LaSilla - Wed 1999-03-16

Present: jnavarre, msarazin (from 14:00), ssandroc

Script on the old dimm machine to ftp dimm.last and meteo.last from wasm, and to append meteo.log every 20 min (name "read_asm"), so that the eso archive interface is still working.

ASM night demo at NTT control room. Showed operation panel and data plots, excercised complete restart with env shutdown, LCU reboot, and restart from remote - all ok. Present: O.Hainaut, V.Doublier, P.Lesaux, J.Miranda.

Network connection to NTT very slow, to be fixed. Probably the connection to the backbone is not working ok.

ASM rebuild not possible today as planned since network in Garching is down.

Meanwhile bad news from ASM@Paranal - seems that the DIMM enclosure is now fixed but the telescope destroyed ...

3.15 Week 2 - Day 7

ASM.log LaSilla - Wed 1999-03-17

Present: jnavarre, msarazin, ssandroc

Meteo: All attepts to set the time of the Vaisala via serial line
from LCU finally failed. Used a test-program to send the data.
At least we are now sure that:
- it is 7 databits, not 8
- receive is possible with no-parity, but with even-parity (as it should be) we have scrambled characters (but not totally wrong)

- connected laptop to the iser connector at the LCU cabinet - works ok in both directions, with or w/o green box in between
- connected laptop to the Vaisala connector at the LCU cabinet - works ok in both directions, with or w/o green box in between
- connected iser connector back to Vaisala - sent chars obviously do not arrive properly at Vaisala, with or w/o green box in between
- set even-parity and send the OPEN command 100 times - then eventually the Vaisala responds with the "LINE OPEN FOR OPERATOR" but with scrambled chars.
- we cannot use even and no parity interchangeably for send+receive.

Our preliminary conclusion is that the long serial line from the hut to the LCU cabinet jams the signal so that send and receive with parity is not possible. The laptop might then be less sensitive to this condition, so that it works ok with it.

Marc reconfigured the old dimm machine so that it ftp's now the dimm.last and meteo.last from wasm; serial line is still connected to dimm so that the Vaisala time is set from there, but the data reading on old dimm is disabled.
Installed a cron job to check the presence of "read_asm" to transfer the last files from wasm and restart if not.

Network: again some troubleshooting by Flavio, but configuration with a small repeater fails again. Currently still using big 100MHz switch. At least throughput to backbone (and NTT) should be better now.

VLTROOT:

The current installation is not the "official" FEB99 as it was finished after test in Paranal. This version has been installed before that.
In ASM we have problems with the following modules and we install them therefore as patch in VLTROOT:
panel 4.16 (was 4.19 before)
uif 3.10 (was 3.11 before)
Put that in: wasm:~vltmgr:/FEB99-patches/

ASM code:

- asmdim: changed format of dimm.last slightly so that the seeing value is in the same position on the line as it was in the old system; this should facilitate parsing by web-MeteoMonitor etc.
- asmmet: set the limit lines in RH and WS plots as in the web-MeteoMonitor, ie 80+90 % RH, 14+20 m/s WS.

*** ASM rebuild with asmBUILD 4.10 ***

Last minute changes:

Problem with meteo link: when the dimm sets the vaisala time then
the lasm1 task apparently de-synchronizes for indefinite time;
checked of paf files of previous days indicate break of 10..30 min
due to that. Logs about "data not bound properly", no valid telegram
anymore. Reason is a too short taskDelay in asmiComClear() that is
not suitable for the 300 baud line. The reading then does not start
at the beginning of a block. Increased delay from 10 to 500ms,
considering also an extra delay that the Vaisala inserted between
lines; with this it synchronizes immediately. Made conditional
compilation, so no change for Paranal.

The op-limits do not react when the meteo link is down.
Proper solution would be a new alarm "Meteo data not updated",
but don't want to change the database in last minute. Therefore
modified asmmetTransfer to check every minute for valid data,
and after 10 min w/o data it sets all to 9999, which triggers the
alarms.

Alarm for the Vaisala clock drift set to 30 sec, tested ok.

*** ASM rebuild with asmBUILD 4.11 ***

Further last minute change:
Forgot that the startup from scratch takes usually longer than
10 minutes, so that the asmmetTransfer check would trigger the alarms.
Added delay of 20 min before starting the check.
Installed that version over the build.

*** Final version config in asmBUILD 4.12 ***

Operation checks:
- when meteo is off after 10 min system goes standby, showing alarms;
  also visible in plots, though.
- one can force to online while meteo alarms are active; any new
  meteo alarms have no effect then.
- when fixstar is selected and all sequences fail, the max-rejection
  count applies too, it wraps, but returns to the same star.
- restart after core-dump ok

3.16 Week 2 - Day 8

ASM.log La Silla - Thu 1999-03-18

Present: jnavarre, msarazin, sssandroc (until 16:00)

Installed DFS software for archive/vcsolac interface on wasm.ls.eso.org,
is a copy from wasm.pl.eso.org:

```
wasm vltmgr:/vlt/DFS 79 > ll
total 10
drwxr-xr-x   4 vltmgr     vlt         1024 Mar 18 16:53 ./
drwxr-xr-x  14 vltmgr     vlt         1024 Mar 18 16:52 ../
lrwxr-xr-x   1 vltmgr     vlt            9 Mar 18 16:52 dfs@ -> dfs-3_1_1
drwxr-xr-x   6 vltmgr     vlt         1024 Mar 18 16:53 dfs-3_0/
drwxr-xr-x   6 vltmgr     vlt         1024 Mar 18 16:53 dfs-3_1_1/

wasm vltmgr:/vlt/DFS 81 > which vcsolac
/vlt/DFS/dfs/bin/vcsolac
```

Currently vcsolac is NOT running.

PENDING for DFS installation on wasm.ls.eso.org:

- auto-startup/shutdown with machine, necessary files still missing:
  >> - the /sbin/init.d/vcsolac and the links:
  >>   ln -s /sbin/init.d/vcsolac /sbin/rc3.d/S170vcsolac
  >>   ln -s /sbin/init.d/vcsolac /sbin/rc2.d/K810vcsolac

- correct setup in /vlt/System/config/wasm.cshrc.
  currently the Paranal settings are used, which are wrong here;
  possibly only the archive target host must be changed:
  >> setenv DHS_HOST wu1dhs<--- adapt for La Silla !!!

- entry in the ~archeso/.rhosts file of the archive machine,
  when it is available: add there a line "wasm.ls.eso.org asm".
  and verify that rlogin works without password.

- to test vcsolac:
  "start-vcsolac" to start
  "cleanup-vcsolac" to shutdown
  "show-vcsolac" to show info
  When running links from $DHS_DATA (/vlt/dhs) should be automatically
  removed when files are successfully transferred to the archive machine.
  Logs are also produced in $DHS_DATA.

4 TELESCOPE AXIS CONTROL LOOPS

The following plots show the position error (in *radian*) and partly also the velocity reference output (in *volts*) during tracking and the response to different tracking offsets.

With the used configuration of the *axis* module, the controller enters the PI algorithm when the position error is below 0.0002 rad = 41 arcsec. Step responses have therefore been recorded for three different step sizes:

- 10 arcsec (within PI controller range)
- 1 arcmin (leaving PI controller range)
- 1 degree (with speed reference limitation)

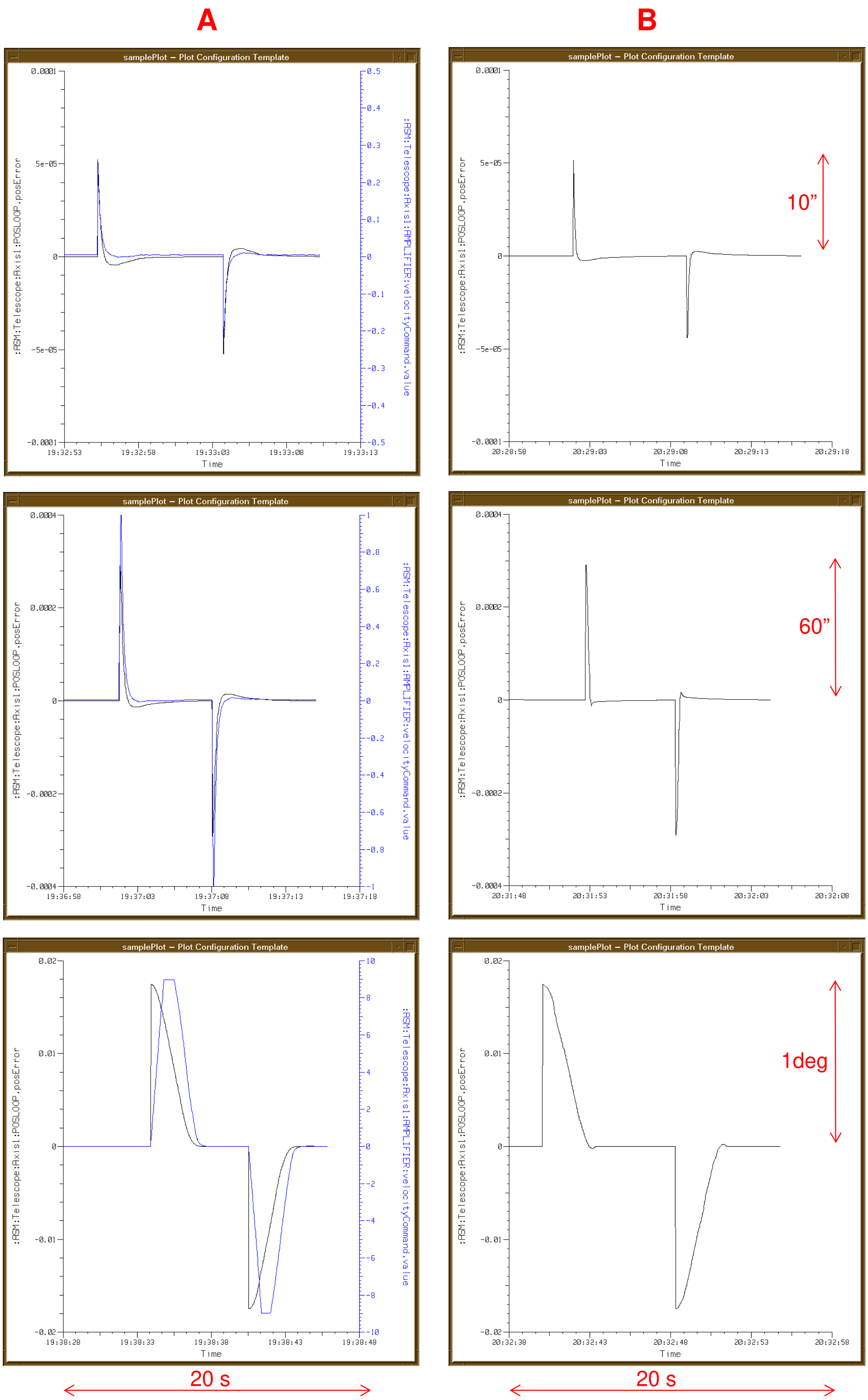
Each plot has been recorded for two sets of control-loop parameters, proportional gain Kp, integral gain Ki:

- **A** (left side): Kp = 4.7 Ki = 2.92 (as used at Paranal)
- **B** (right side): Kp = 10.0 Ki = 5.0 (near stability limit)

Although 'B' shows faster settling time in the step response, it has larger overshoot, which can be critical with a possible backlash in the drives. Therefore 'A' has anyway been chosen for operation.

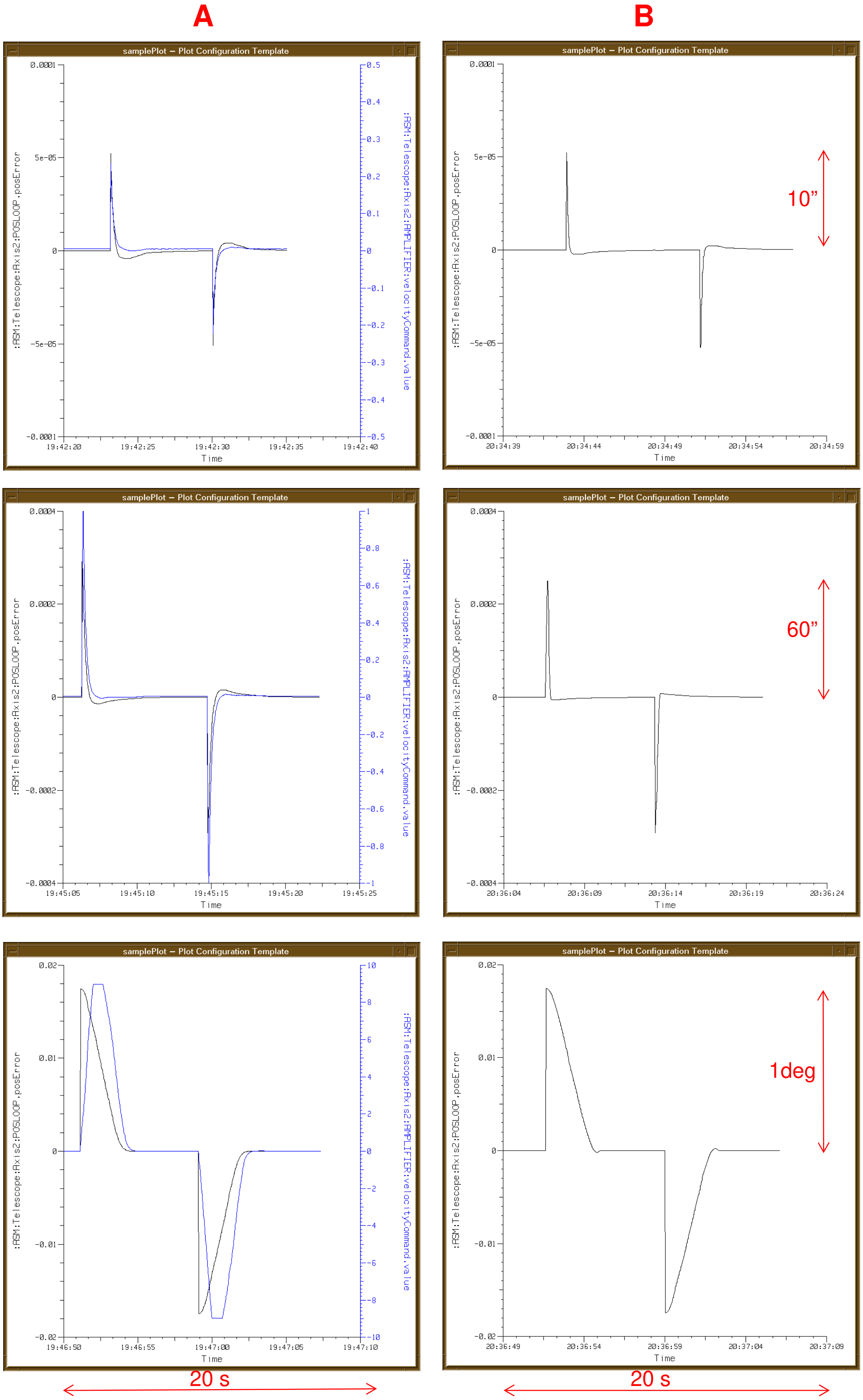
4.1 ETA step response

Fig. 1 Eta preset offsets (10 arcsec, 1 arcmin, 1 degree)



4.2 THETA step response

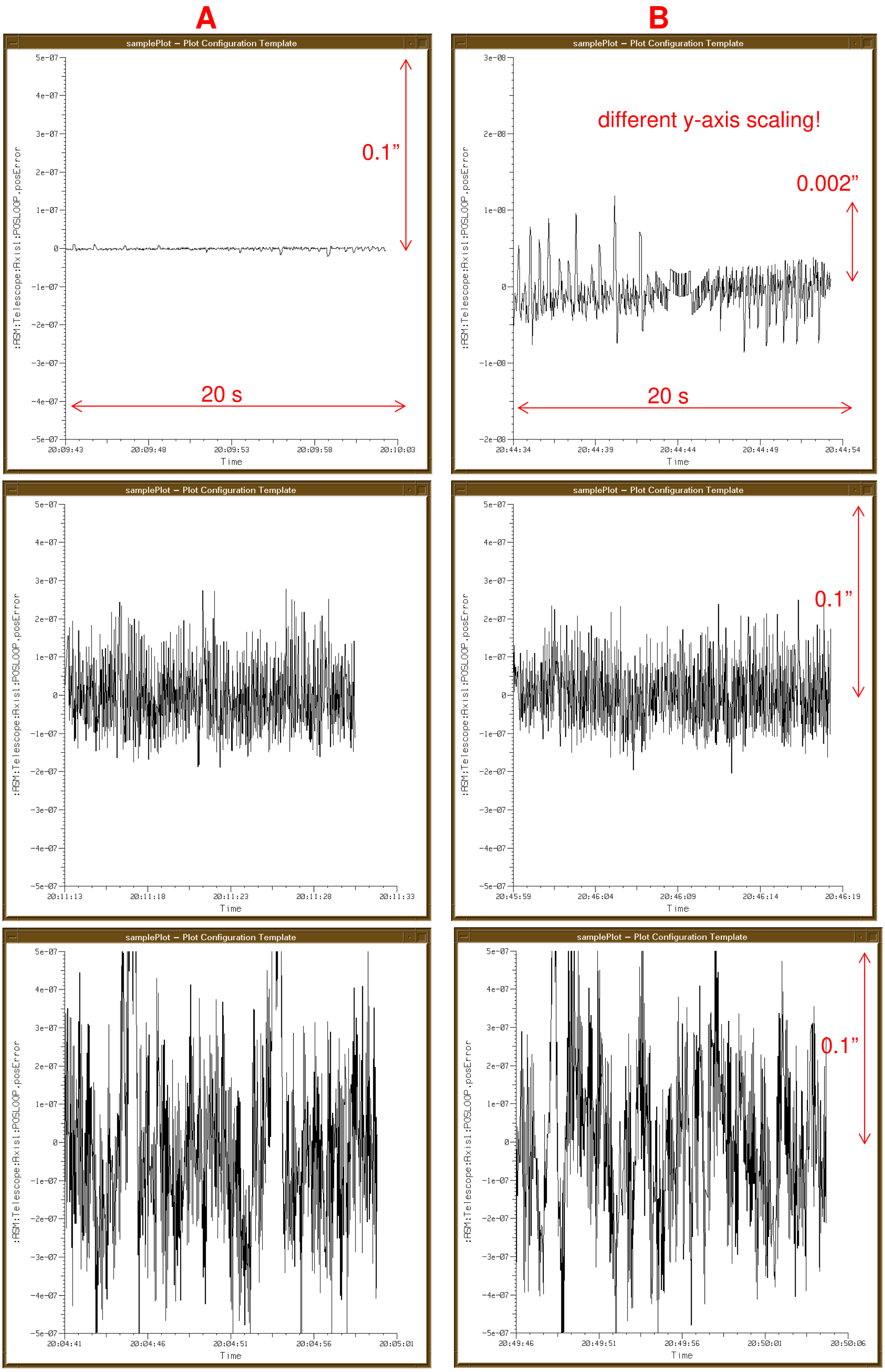
Fig. 2 Theta preset offsets (10 arcsec, 1 arcmin, 1 degree)



4.3 ETA tracking

The tracking speed of eta is dependent from the hour-angle, therefore the plots have been recorded for different negative hour-angles between 0 and -3.

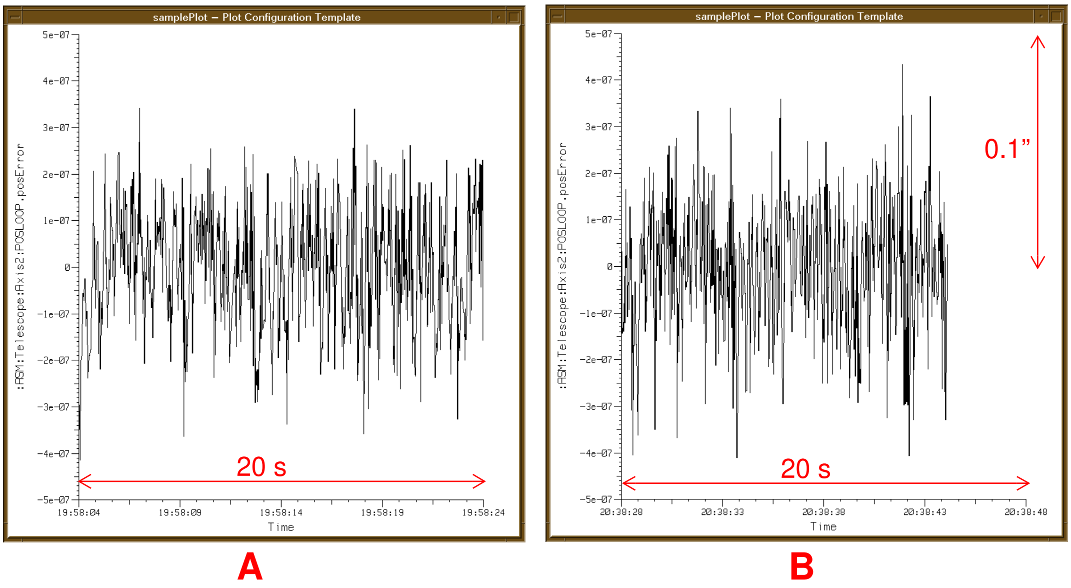
Fig. 3 Eta tracking (HA 0, -1, -3 hours)



4.4 THETA tracking

The tracking speed of theta is always constant, therefore there is only one plot.

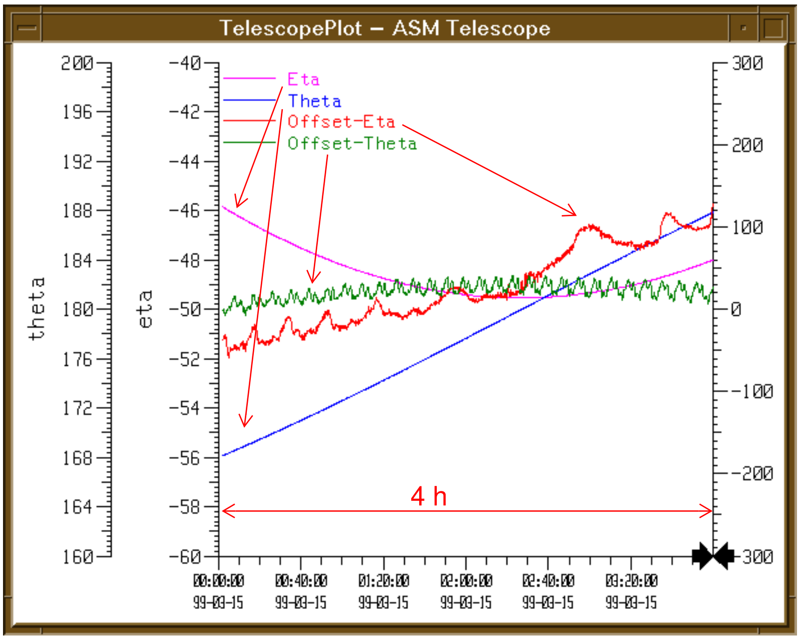
Fig. 4 Theta tracking



4.5 Tracking with autoguiding

The following plot shows the eta/theta offsets over 4 hours (HA -2 to +2) while tracking a star (bet-car, RA 09h13'11", Dec -69d43'01") with autoguiding through the meridian. No pointing model has been used during tracking, but only for presetting.

Fig. 5 Tracking with autoguiding

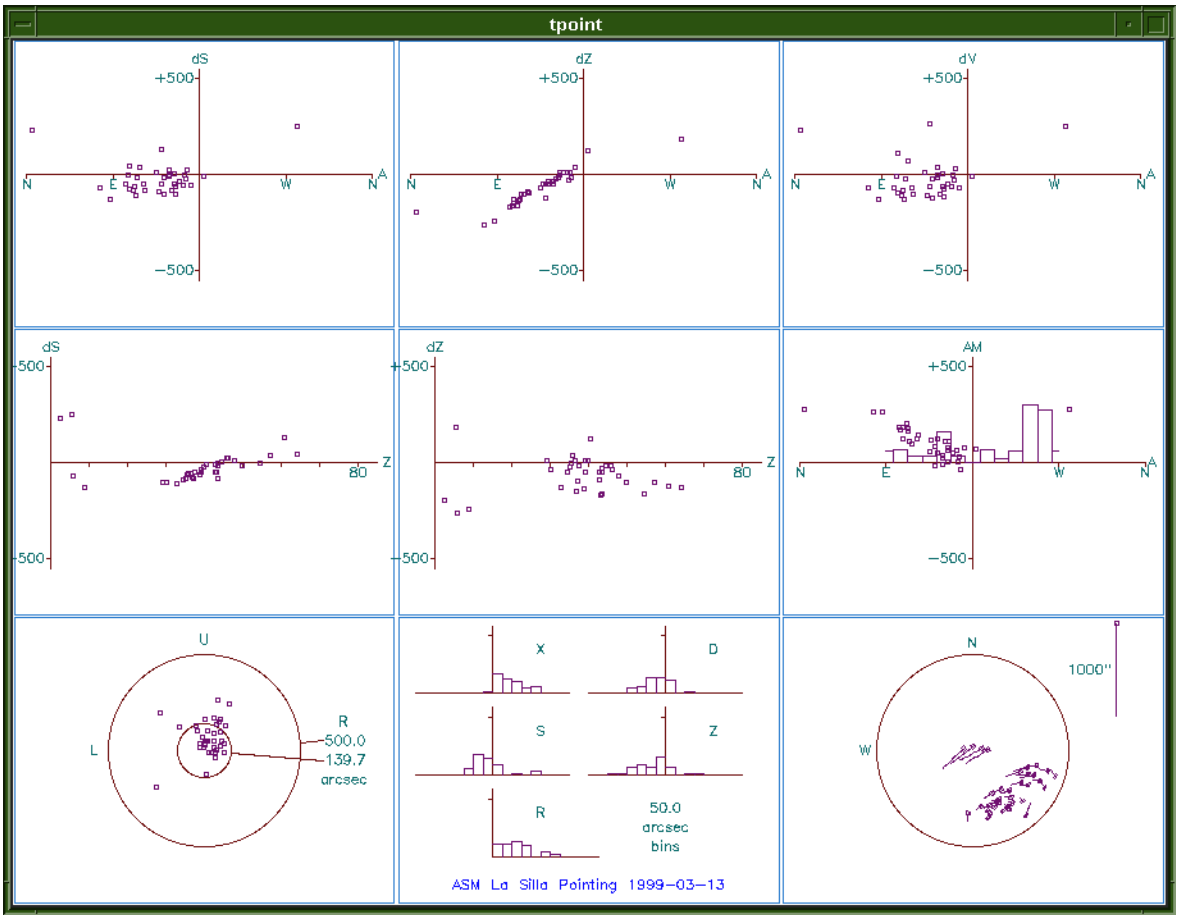


5 TELESCOPE POINTING MODEL

A first pointing model has been determined in the night of 1999-03-13 on 36 stars mainly from the eastern part of the south half-sky. The following plots show the pointing data of the ASM telescope before and after the fitting process.

With the data of all measured stars the Sky RMS error is *139.7 arcsec*.

Fig. 6 Raw pointing data before fitting



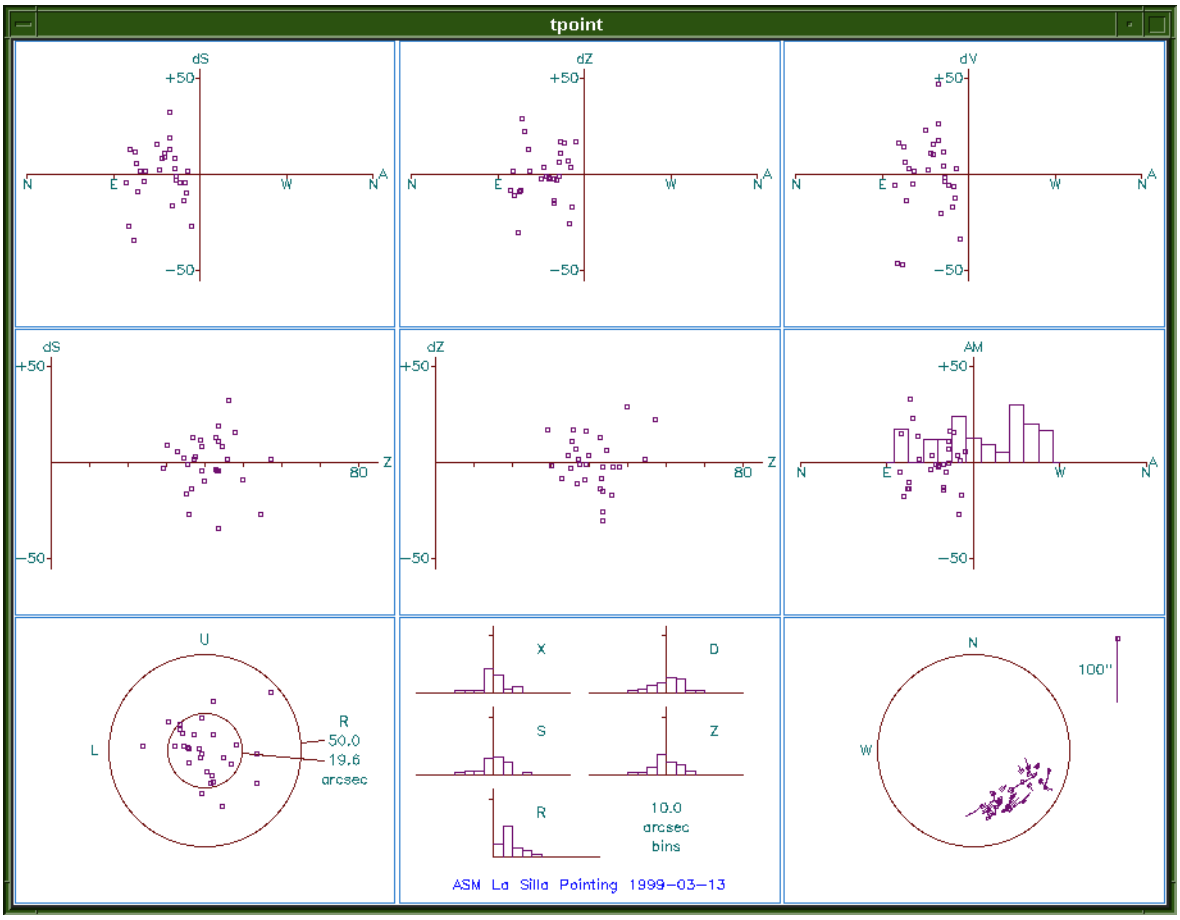
After masking of some samples near zenith the sky rms is reduced to *101.8 arcsec*.

After fitting using alt/az terms (only those are supported by the TCS trk module), the resulting model terms are as follows:

```
ASM La Silla Pointing
T  29  19.6297  44.367  -0.0502
  AN    +155.5849   12.56219
  AW     -61.4800   12.38230
  CA    +164.9789   32.98024
  IA    -349.3889   46.53357
  IE     -86.5248   33.25541
  TF     +69.9747   45.97585
END
```

The Sky RMS is now ***19.63 arcsec***.

Fig. 7 Pointing data after fitting

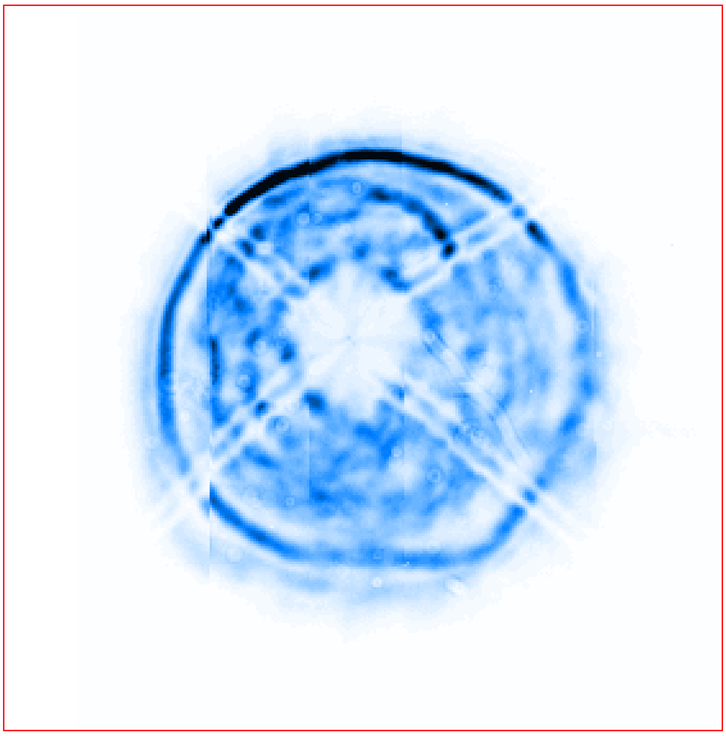


Note that no time-bus signal was available during recording of these pointing data. Furthermore the optical alignment had not been completed at this point.

6 DIMM CCD IMAGE SAMPLES

The first sky image with the DIMM technical CCD has been taken in the night of 1999-03-11. The picture of alf-car, with unfocused and unaligned optics, showing decentering coma, is shown below.

Fig. 8 First-light image of alf-car



7 ASM RELEASE 4 MODULE VERSIONS

The asmBUILD is the bootstrap module containing all versions to build up the complete software system. The versions below represent the status at the end of the commissioning period (1999-03-26). Minor adjustments may follow due to alignment with the Paranal system. Baseline is the VLTSW release FEB99.

```
#-*-Tcl-*-
#******************************************************************************
# E.S.O. - VLT project
#
# "@(#) $Id: Modules.config,v 4.13 1999/03/18 08:41:42 vltsccm Exp $"
#
# who       when      what
# --------  --------  ----------------------------------------------
# ssandroc  09/06/97  created
#

#************************************************************************
#   NAME
#
#   SYNOPSIS
#
#   DESCRIPTION
#           This file contains the modules and versions to build the
#           ASM software. The order is significant.
#
#           Lines are interpreted as follows:
#
#           #...                    - comment
#           -<group-name>- there are 5 groups: CCS, LCC, CCD, TCS and ASM.
#                                     using this syntax the buildModuleConfig.tcl script
#                                     it's able to determine wich modules should be
#                                     included into the output string and which not.
#           modname                 - use extract last version
#           modname     version     - extract this version from the archive
#
#   FILES
#
#   ENVIRONMENT
#
#   RETURN VALUES
#
#   CAUTIONS
#           This module (asmBUILD) itself shall not be in the list!
#
#   EXAMPLES
#
#   SEE ALSO
#
#   BUGS
#
#------------------------------------------------------------------------
#

#============================================================
# BASELINE: VLTSW FEB99
#============================================================

#========
# CCS
#
-CCS
# we want to keep the NOV97 version of ccseiMsg!
ccsei       2.4

#========
# LCC
```

```
#
-LCC


#========
# CCD
#
# NOTE: do not change the order of modules!
# Otherwise it will take some headers from VLTROOT resulting in run-time error.
#
-CCD

#========
# TCS
#
-TCS
acm         1.27
axis        1.58
trk         1.98

#========
# ASM Base level
#
-ASM
asm         4.2
asmi        4.4

#========
# ASM Device level
#
asmcat      4.1
asmdim      4.3
asmmet      4.11
asmtel      4.2
asmten      4.3

#========
# ASM Top level
asmarc      4.5
asmlcu      4.1
asmws       4.4
asmei       4.5
asmbb       4.1

#========
# ASM Global level
#
asmINS      4.2
asmENV      4.16

# ___oOo___
```

After completion of commissioning (end of March 1999) and alignment with the Paranal system, release 4 shall be closed. Any change in the ASM control software shall then be requested by a corresponding SPR.

Functional changes in the control software introduced during this integration period:

- asmmet: after 10 minutes break in reception of valid Meteo data, all data are set to 9999, which trigger the operational limit alarms and forces the system to stand-by. This is to inhibit the system from opening when the meteo is on failure.

8 CONCLUSIONS

This chapter summarizes the most important problems encountered during the test, together with possible future solutions.

- The Vaisala clock has a large drift and must therefore be set every day. During the integration period it was not possible to solve the setting of the clock from the controlling lasm1 LCU. Currently the old dimm machine still takes care of setting the clock via the second serial line to the Vaisala.

- The alignment, particularly the pointing model should be repeated after optical alignment is finished.

- The VLTSW installation in VLTROOT is not in official FEB99 version. Currently a pre-FEB99 is installed with patches for *panel* and *uif* modules.

- A regular (e.g. monthly) check of the mechanical alignment is recommended, according to the Alignment chapter in [3].

___oOo___