



## **STELLA Service Manual**

*Release 1.2.0*

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**Apr 25, 2025**



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## **STELLA OBSERVATORY**

The STELLA observatory, located on Tenerife, consists of two telescopes with a single instrument each contained by a common building with a roll-off roof.

- STELLA-I: is the first telescope on site, it is a 1.2m Alt-Az telescope with two Nasmyth foci, one equipped with a derotator. It hosts the wide-field imaging instrument WiFSIP (Wide Field STELLA Imaging Photometer).
- STELLA-II: was the second telescope, it is mechanically identical, but only has one focus position in the prime focus, where the light is fed into a fiber.
- SES: STELLA Echelle Spectrograph
- WiFSIP:



## SERVICE LOGBOOK

Table 1: Service logbook

Date	Action
2025-03-21	STELLA-2:
2025-03-24	STELLA-2: new holder for hydraulic oil-level switch
2025-03-24	STELLA-2: Fixed AZ-Limit guide (2-component glue)
2025-03-21	STELLA-2: Alt encoder cleaned
2025-02-14	STELLA-2: Electronics update (incomplete)
2024-11-05	STELLA-1: New hydraulic Oil filter
2024-11-01	WiFSIP: Overpressure valve at cold head sealed with cap & silicone
2024-10-31	WiFSIP: New hoses, new external filter, filled to 230 psi
2024-10-31	WiFSIP Cryotiger 6: added both pressure sensors
2024-10-31	WiFSIP CCD: unmounted & heated & pumped 24h
2024-10-30	sky: exchanged failed disk in slot 5
2024-10-09	ThAr1 HOK0933 out, HOK0934 in
2024-10-09	ThAr2 HLA1423 out, L74804 in
2024-03-18	WiFSIP Cryotiger 6 ca. 250 psi
2024-03-18	New firewall version & new fire computer online
2024-03-18	IP address of new guider1 set
2024-03-15	WiFSIPv2 in storage
2024-03-15	WiFSIPv3 pumped
2024-03-15	Communication board in Controller changed
2023-11-22	New STELLA weather station (Thies)
2023-03-03	Fixed broken roof control modules
2022-08-18	ThAr1 HLA1421 out, HOK0933 in, Halo1 changed
2022-08-18	re-arranged energy chain WiFSIP
2022-08-17	WiFSIP Cryotiger 4 235 psi, new connector on supply side coldhead
2022-08-16	added some clearance (2/10mm) for calibration stage SES
2022-08-15	STELLA-1 / WiFSIP: Vacuum pumped
2021-10-17	ASIVA restarted
2021-10-17	removed supply pressure sensor from WiFSIP Cryotiger, added gas
2021-10-16	Update Becky-roof software
2021-10-15	installed Cryotiger 4 for Wifsip, added pressure sensors
2021-10-15	discarded Cryotiger 7 (leak)
2021-10-14	WiFSIP pumped
2021-06-22	STELLA-1 M3 cleaned
2021-06-21	STELLA-2 M1 cleaned
2021-06-21	STELLA-1 / WiFSIP: Cryotiger hoses (15m) and external filter exchanged
2021-06-21	STELLA-1 / WiFSIP: Vacuum pumped
2021-06-21	archive (161.72.132.71) finally replaced, old archive is now oldarchive
2021-06-20	filled Cryotiger 7 & replaced its internal filter, re-connected to WiFSIP
2021-06-20	filled Cryotiger 4 & replaced its internal filter
2021-06-18	archive: swapped SSD (drive 0)
2021-05-18	Firewall change (kept old SSD drive) (IAC, GREGOR)

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Table 1 – continued from previous page

Date	Action
2021-03-23	ThAr1 Nr HLA1421 in ( HHL1055 out) (IAC)
2021-03-23	ThAr2 Nr HLA1423 in ( HLA1422 out) (IAC)
2020-12-14	halo2 lamp change (IAC)
2019-10-14	SES shutter & calibration unit connected to serial3, serial2 removed
2019-10-13	STELLA-2 agunit connected to local network (gige2,guider2,serial2)
2019-10-13	new local network switch (Gbit)
2019-10-13	new sky computer, oldsky still online, setup of new archive/wifsip
2019-10-12	STELLA-1 old adapter disconnected (but aux1 still online)
2019-10-11	Gbit switch connected in lounge, cables cleaned up
2019-10-11	New STELLA-2 cable, but no change: module is broken
2019-09-30	WiFSIP CCD pumped Miguel/IAC
2019-05-13	WiFSIP CCD pumped
2019-05-14	Mirror cover drives STELLA1 lubricated
2019-05-13	Mirror cover hitches & drives STELLA2 repaired & lubricated
2019-05-11	Updated STELLA2-rackpc ntp startup script with ntpdate command
2019-05-11	created hwclock command & updated hwclock
2019-05-10	STELLA2-archive network cable exchanged
2019-05-10	new fiber network cable to STELLA2, connected as second uplink
2019-05-10	New bearings in most (except most outward) roof guide wheels
2019-05-09	STELLA1 & STELLA2 hydraulic oil change, oil filter change
2019-05-08	Tightened roof wheels to specs (130Nm), drilled access holes for roof wheel blocks
2019-02-26	ASIVA lenses cleaned, taped temp-sensors cable.
2019-02-26	Halo2 lamp changed
2019-02-25	STELLA2 extraction pump exchanged phases (ran wrong way), cleaned up oil spill
2019-02-15	STELLA2 pump motor-cable changed to shielded (2 short pieces)
2019-02-14	STELLA2 pump motor-cable changed to shielded (long piece)
2019-02-14	STELLA1 M1/M3 cleaned
2019-02-12	STELLA2 M1 cleaned
2019-02-12	topped up Cryotiger 7, replaced WiFSIP external filter unit & female/female coupler
2019-02-12	connected Cryotiger #7 (S/N 1511CHE11116) to WIFSIP (instead of #6)
2019-02-11	STELLA1-focus-drive cleaned & lubricated
2019-02-11	STELLA1 short pump motor-cable changed to shielded
2019-02-11	connected Cryotiger #6 instead of 3, trashed 3
2019-02-09	re-connected dust sensor after repair
2019-02-08	WiFSIP new 15m flex hoses, filled gas, connected Cryotiger 3
2018-11-27	mittlere Längsführungsrollen kontrolliert & nachgezogen
2018-11-27	STELLA-1 pump motor-cable changed to shielded (but not the last 1m at the pump)
2018-11-26	vacuum WiFSIP
2018-11-26	fuse at ASIVA turned on again
2018-11-26	halo2 moved back a bit (same position as halo1)
2018-11-26	ThAr1 lamp changed new HHL1055 (old HHL0229)
2018-10-30	ses PE connections changed
2018-10-30	new version roof control software
2018-10-29	roof serviced (new limit switch positions
2018-10-28	softstarter statt motor relays in stella1 & 2 racks
2018-10-25	Dehumidifier connected
2018-10-25	WiFSIP CCD changed to new STA 4150A
2018-10-25	io3 & io1 moved to calibration switch (io5)
2018-10-25	STELLA roof control changed to individual limit switches
2018-06-01	Power supply for io1 & io2 replaced
2018-04-13	STELLA1 and STELLA2 level adjusted
2018-04-13	big A/C filter cleaned
2018-04-12	STELLA2 alt K80 changed to 1000 (was 2000 or 3000)
2018-04-11	roof drive gear oil changed
2018-04-11	ASIVA drive installed & started

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Table 1 – continued from previous page

Date	Action
2018-01-22	STELLA-1 replaced ETEL Az / Rob-X20 controller with Spare-Az
2018-01-22	STELLA-1 replaced ETEL Az controller with Rob-X20 & power supply
2017-10-14	removed ASIVA roof drive
2017-07-11	removed ASIVA roof drive
2017-07-11	refilled Cryotiger #4 (complete system refill, 225psi)
2017-07-11	WiFSIP new cryotiger hoses (just the two 15m hoses)
2017-07-11	WiFSIP vacuum
2017-05-11	SES vacuum
2017-04-07	WiFSIP vacuum
2017-04-07	ThAr2 Nr HLA1422 in (B68776 out)
2017-04-06	Baycam ethernet via Beckhoff 100Mbit fiber switch, power via roof control
2017-04-06	Old-AGunit (STELLA-1, fiber feed) now power from PDU3 (also auxiliary1)
2017-04-06	New roof control, Beckhoff, weather station electronics
2017-01-09	switch SES calibration from ThAr2 to ThAr1
2016-12-22	ASIVA chain gear fixed
2016-12-20	SES & CCD with new CF-Cards.
2016-12-20	1Gbit uplink
2016-12-20	WiFSIP vacuum
2016-12-19	New firewall hardware, upgraded to leaf-Bering v6
2016-12-17	Debian 8 on sky, archive, wifsip
2016-12-17	Debian 8 on sky, archive, wifsip
2016-08-02	ASIVA cleaned & calibration run
2016-08-01	ASIVA chain gear fixed
2016-08-01	WiFSIP pressure gauge changed & pumped
2016-07-31	Weatherstation 2 - new brightness & additional rain2trigger sensors
2016-07-30	new WiFSIP network-fibre connection Gbit
2016-07-09	STELLA-1 M1 cleaned
2016-07-08	Halo1 & Halo2 changed (Daniel)
2016-07-07	STELLA-1 derotator controller exchanged
2015-08-19	changed ThAr1 (new Photon HHL0529, old HHL0530)
2015-08-17	pumped & baked WiFSIP dewar
2015-08-17	cleaned ASIVA lens, put seals to ASIVA rack, fixed gearbox, fixed sky computer
2015-08-17	cleaned M1 STELLA2
2015-08-17	modified roof control for manual control
2015-08-16	exchanged roof control modules 0C, 0E after lightning
2015-08-16	connected STELLA2 AG-unit via Gbit fiber directly to central ethernet switch
2015-08-16	replaced Cryotiger SES (Cryotiger #2) with new Cryotiger #5 (S/N L12432555)
2015-08-16	pressure before connecting 255psi, after connecting 235psi
2015-08-15	old pressure sensor back to SES, new seal, cleaned seal, pumped & baked SES dewar
2015-08-14	electrical power distribution cleaned up, new PDU4, new fuses
2015-08-13	connected Cryotiger #4 again (instead of #3)
2015-08-13	re-connected Filter unit, swapped hoses back to normal orientation, pressure 220psi
2015-08-13	purged the WiFSIP cold head with ISO-Propanol
2015-07-28	ThAr1 lamp defect, changed to ThAr2
2015-07-08	Rebooted STELLA1-tcc because landolt stars looked like donuts
2015-06-24	pumped SES
2015-06-24	pumped WiFSIP
2015-06-24	replaced SES-CCD pressure sensor & replaced signal cable
2015-06-24	removed filter unit on WiFSIP Cryosystem, switched supply/return on Cryotiger side
2015-06-23	replaced 1wire calib switches with moxa-io switch
2015-06-23	also on this moxa-io telescope 1 & 2 rack reset, lamp control
2015-06-23	attached Cryotiger #3, refilled Cryotiger #4, filter unit, 15m hoses
2015-06-23	moved WiFSIP Cryotiger to E-room, added 5m hoses as extensions
2015-06-23	fixed network issue on STELLA1-aux guider cam, new replacement board in cupboard
2015-05-06	temporarily fixed broken ASIVA hatch mechanism

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Table 1 – continued from previous page

Date	Action
2015-05-06	replaced WiFSIP Cryotiger #4 (70psi) & hoses & filter with spares (Cryotiger #3, > 200psi)
2015-04-08	SES pumped remotely
2015-02-23	Pfeiffer vacuum pump attached to SES permanently, and remote controlled
2015-02-21	ThAr2 Nr B68776 in ( B00876 out)
2015-02-19	STELLA2 guider gige1 (instead of firewire cam)
2014-07-02	WiFSIP shutter/off-axis guider problems, reset of WiFSIP instrument and computer
2014-06-20	SES CCD vacuum pumped - IAC/Ignacio
2014-06-18	new UPS installed (Newave Upscale) - IAC
2014-05-12	(electronics room) A/C repaired
2014-05-11	STELLA-2 M1 cleaned reflectivity was 77/77/75/64, is 89/89/86/74
2014-05-10	STELLA-1 CCD centred a bit better, M2 aligned (less Coma)
2014-05-10	STELLA-1 M1, M2 and M3 cleaned
2014-05-10	STELLA-1 reflectivity was 75/69/71/69, 91/89/88/76, 83/82/81/68
2014-05-10	STELLA-1 reflectivity is (M1,2,3) 82/86/88/81, 91/91/89/77, 95/95/93/80
2014-05-09	VdN lightmeter cleaned
2014-05-09	ASIVA lenses cleaned
2014-05-09	ASIVA new chains in the hatch drive transmission
2014-05-09	Weatherstation 2 new T/H sensor, new analog Rain sensor
2014-05-08	SES readout window changed
2014-05-06	STELLA2 corrector cleaned
2014-05-06	SES pinhole change to 200mu
2014-05-06	SES dewar vacuum gepumpt
2014-05-06	SES slicer installed
2013-12-17	WiFSIP dewar vacuum gepumpt
2013-12-17	SES dewar vacuum gepumpt
2013-12-17	ThAr1 exchange S/N HHL0530 in, S/N B00863 out
2013-12-16	Dust monitor cleaned, filter changed, heater changed, fan changed, checked calibration.
2013-12-02	ThAr1 lamp defect, changed to ThAr2
2013-08-15	SES vacuum
2013-08-15	New CCD control computers (BOX PCs) with dedicated redundant DC power supplies
2013-08-15	WiFSIP dewar v2 installed, 2-channel CCD
2013-07-19	SES magellan controller new software version
2017-07-16	SES magellan controller new software version with communication problems -> useless images
2013-04-17	Using Halo-2 for flatfielding now
2013-03-03	SES dewar vacuum gepumpt
2013-03-03	Cryotiger #2 (SES) 210 psi
2013-03-02	SES shutter vom Tisch isoliert, shutterprogram geändert (ohne xma/xmd)
2013-03-02	STELLA1: M1 and M3 cleaned
2013-03-02	STELLA1: reflectivity was 53/49/51/48, 64/64/61/51
2013-03-02	STELLA1: reflectivity is (M1,2,3) 83/87/89/80, 91/91/89/76, 95/95/93/80
2013-03-01	calibration: Halo-lightbulb-positions moved away from fiber (to dim the light)
2013-03-01	STELLA2 tube balanced
2013-03-01	STELLA2-auxiliary mechanical alt-offset (1.5mm sheet metal on top feet)
2013-03-01	STELLA2: M1 cleaned: reflectivity (BGRIR) was 60/59/55/47, is 89/89/87/75
2013-03-01	SES: new fiber
2013-02-08	IPMI card connected to 192.168.1. network
2013-02-07	STELLA-1 parameters changed (K87) to decrease noise in SES CCD
2013-02-06	Temperature sensores lounge, lab installed and hooked into env database
2013-02-05	air condition filters cleaned (all 3 units)
2013-02-04	New Cryotiger #5 (S/N L12432555) in storage area
2013-02-04	wifsip disk 5 replaced
2013-02-04	wifsip & archive OS update, IMPI card installation
2013-02-03	sky OS update, IMPI card installation
2013-02-03	sky disk 15 replaced
2013-02-03	SES CCD controller: replaced fiber to the dsp board, now fiber exits through hole in box

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Table 1 – continued from previous page

Date	Action
2013-01-07	SES connection to CCD controller lost
2012-12-20	SES Heizung neu, mehr sensoren
2012-12-19	SES CCD format geändert, neuer server mit DATE-OBS
2012-12-19	SES faser ein& auskoppelung neu justiert
2012-12-18	SES dewar vacuum gepumpt
2012-12-17	WiFSIP dewar vacuum gepumpt
2012-12-17	Cryotiger #2 (SES): 210 psi
2012-12-17	Cryotiger #4 (WiFSIP): 200 psi
2012-10-24	11:25 Power meter 243752
2012-10-22	23:50 Power meter 243446
2012-10-22	Webcam2 (VTT) exchanged old Axis 200+ with Axis P1343
2012-10-22	SES exchange Thar2 lamp (new B00876, old B68775)
2012-10-21	heated & pumped SES dewar
2012-10-21	installed optocoupler for SES shutter, now new program on shutter controller
2012-10-21	disconnected rain sensor 2 (repair was not successful)
2012-10-20	STELLA-1 halved P-motor-current drive Parameters (no init possible)
2012-10-19	WiFSIP dewar pumped
2012-10-19	WiFSIP energy-chain split in two parts, cables held in the middle only
2012-10-19	Cryotiger #4 refilled (240 psi)
2012-10-19	WiFSIP Cryotiger #3 refilled (235psi), with new hoses,filter and head refilled
2012-10-19	WiFSIP Cryotiger pressure ca 220 psi
2012-08-30	SES shutter masse Leitungen verändert
2012-08-29	SES dewar neues Fenster/Feldlinse, vacuum
2012-06-06	WiFSIP dewar gepumpt
2012-06-06	SES neue optische & CCD camera
2012-06-06	SES neu justiert
2012-03-19	STELLA-2 rack Batterie gewechselt
2012-03-19	STELLA-1 neue Pollerverlängerungen
2012-03-19	STELLA-1 Strom-P-wert von 600 auf 400
2012-03-17	STELLA-1 derotator fixed holder limit-switch rocker
2012-03-17	vacuum WiFSIP CCD dewar
2012-03-17	WiFSIP computer changed disk 2 (p2)
2012-03-15	Cryotiger #4 190 psi
2012-03-15	WiFSIP repaired energy-chain mounting
2012-03-15	WiFSIP network cable repaired
2012-03-14	STELLA-1 derotator cable repaired (shortened, connector soldered)
2011-12-10	Wifsip neuer Halphal wide filter
2011-12-08	NO-motor hydraulic oil exchanged
2011-12-04	STELLA-1 hydraulic oil exchanged, hydraulic oil filter exchanged
2011-12-03	STELLA-2 hydraulic oil exchanged, hydraulic oil filter exchanged
2011-12-01	ASIVA re-aktiviert
2011-11-30	Windspeed-2 sensor exchanged
2011-09-27	Halo-1 working ?
2011-09-27	removed ASIVA optical camera and sent in for repair
2011-09-27	STELLA-1 M2-Spindel & Führungen gereinigt & geschmiert
2011-09-26	Linear stages AG-unit2 exchanged
2011-09-26	WiFSIP Pilar config changed to M3 mirror default position=2
2011-09-25	WiFSIP slightly changed energy-chain mounting on Az-Ring
2011-09-25	WiFSIP Cryotiger #4 (S/N LO8814101), with hoses, new filter,old (empty) coldhead
2011-09-25	WiFSIP pressure 202 psi
2011-09-24	WiFSIP dewar opened, closed, heated & pumped
2011-09-24	wifsip new computer
2011-09-24	ASIVA Lightmeter installed, new computer sky additionally connected via switch
2011-09-23	SES vacuum
2011-08-25	WiFSIP Cryotiger (nr 3?) offline (gas line pressure = 0dpi)

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Table 1 – continued from previous page

Date	Action
2011-08-18	using Halo-2 now, Halo-1 dead - wooz
2011-07-13	tele2 mediaconverter exchanged (died after a power cut on July 11 2011) - Ignacio
2011-05-21	new pinhole mirror (120 or 100µm)
2011-05-21	ThAr1 lamp exchanged (old S/N B00860, new B00863)
2011-04-28	ThAr1 lamp defect, changed to ThAr2
2011-04-15	Halo1 & Halo2 exchanged. Are now again 20W (but still on external power supplies).
2011-04-15	pinhole pos 335,308
2011-04-15	AG-2 new pinhole mirror (140µm), fiber adjusted, new calibration focus (65000)
2011-04-15	AG-2guider cam re-focused, new ADC-wheel offset, new exposure times for calibs
2011-04-14	WiFSIP CCD new pressure meter, fixed videoboard AD-3© problem
2010-11-18	AGunit-2 newly adjusted, fiber newly adjusted, new focuspositions etc.
2010-11-16	New PDUs for computers in Rack, new DC supplies in Rack
2010-11-16	STELLA-1 provisorische Streulichtblenden im Tubus
2010-11-12	WiFSIP CCD vacuum (for 3 days)
2010-09-29	Halo-1 lamp exchanged (IAC)
2010-09-27	Using Halo-2 for flatfielding now
2010-09-13	Halo-1 dark
2010-08-21	Auxiliary 1 & 2 cleaned
2010-08-21	ASIVA computer relocated to rack & power from UPS via 1wire switch
2010-08-21	STELLA-1 M3 cleaned
2010-08-21	STELLA-2 M1 cleaned
2010-08-20	STELLA-2 spider aligned
2010-08-19	SES neu justiert (fasereinkopplung, fokus, kollimatorausleuchtung)
2010-08-19	STELLA-2 Niveau korrigiert (war ca. 0.04mm off)
2010-08-19	STELLA-1 Niveau korrigiert (war ca. 0.06mm off)
2010-08-19	STELLA-1 PE-cable to AGunit-1 (old SES AGunit) changed(no connection to Az-ring any more)
2010-08-18	STELLA-1 oil extraction pump relay & motor exchanged
2010-08-18	WiFSIP power now through 1wire switch
2010-08-17	calibration light positions optimized
2010-08-17	Halo1 & Halo2 exchanged. Are now 50W.
2010-05-11	Fibers switched to STELLA-2 (old fibers still in place)
2010-05-11	ThAr2 lamp exchanged (old S/N B00857, new B68775)
2010-04-14	CryoTiger #3 (WiFSIP, S/N CM06241-0405) installed and connected, pressure is 215 psi
2010-03-31	ThAr2 lamp defect, changed to ThAr1
2010-03-10	replaced both Halogen lamps (without real need to...)
2010-01-03	Cryotiger #1 (SES, S/N CM05569-0903) replaced with Cryotiger #2 (SES, S/N CM05568-0903)
2010-01-03	Cryotiger SES Pressure is 225 psi
2009-12-16	SIGRIST dust monitor dismantled -> Spider invasion
2009-12-16	SES Korrektorplatte leicht gekippt -> Geister nun an hoffentlich günstigerer Position
2009-12-15	STELLA-2 Phasenwächter auf STELLA-1: 220 statt 230V, 30 statt 5 sec
2009-12-15	STELLA-1 motorkabel-Schirm von Stecker entkoppelt
2009-12-14	SES Faser neu justiert
2009-12-14	STELLA-1 M1,M3 cleaned
2009-12-14	AG-unit-1 Seitenwechsel - Fokus sollte nun -10mm sein
2009-12-14	Derotator Teleskop I, Seitenwechsel
2009-06-30	E-Raum Klimaanlage Filter gereinigt
2009-06-30	Drehstifte der großen Klappen v. STELLA-I abgeschliffen & geschmiert
2009-06-30	Softwareupdate STELLA-II (M. Ruder)
2009-06-26	Softwareupdate STELLA-I (M. Ruder)
2009-06-26	Kabel X12 und X6, STELLA-II getauscht
2009-06-25	Kabel X12 und X6, STELLA-I getauscht
2009-05-28	STELLA-1 Fokus-Führungen gereinigt
2009-05-28	STELLA-1 defekte Ader Ölrücklaufpumpe überbrückt
2009-05-28	STELLA-1 Scharnier Spiegelklappe klein geschmiert/geschliffen
2009-05-28	STELLA-1 Öl nachgefüllt (nach Verlust großer Mengen)

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Table 1 – continued from previous page

Date	Action
2009-04-24	STELLA-2 corrector position corrected with 3.5mm Spacers
2009-04-24	STELLA-1 M2 drive cleaned
2009-04-24	temp[0] = -118.001373 2780
2009-04-23	STELLA-1 M1,M3 cleaned
2009-04-21	SIGRIST dust monitor installed
2009-03-02	STELLA-2 Niveau korrigiert (war ca. 0.08mm off)
2009-03-01	Entfeuchtungs-Granulat SES ausgeheizt
2009-03-01	SES cover geöffnet (AKF gesucht)
2009-03-01	Klimaanlage E-Raum Filter gereinigt
2009-03-01	STELLA-1 Niveau korrigiert (war einige 0.1mm off)
2009-02-28	STELLA-1 Azimut ETEL controller exchange (defect)
2008-11-02	Cleaned A/C filter & Dehumidifier filter
2008-11-02	ThAr1 exchange S/N B0080 in, S/N B00220 out
2008-10-31	Entfeuchtungs-Granulat SES ausgeheizt
2008-10-29	SES dewar temperature back to normal (-188/-120)
2008-10-27	SES vacuum pumped, Cryotiger pressure is 210 psi
2008-10-09	ThAr1 lamp defect, changed to ThAr2
2008-07-31	STELLA-2 Niveau korrigiert (war ca 0.1mm off)
2008-07-30	STELLA-2 Hydraulik-Oel nachgefüllt (ca 40 Liter)
2008-07-30	STELLA-2 Kabel getauscht (Kabel wieder defekt)
2008-06-02	STELLA-2 Kabelbruch repariert (ungenutzte Ader statt gebrochener verwendet)
2008-06-02	Klimaanlage E-Raum Filter gereinigt
2007-11-21	Optimized calib-light alignment in CalibUnit and AGunit
2007-11-21	New exposure times are 13 sec for both flat lamps and 20 sec for both ThAr
2007-11-21	Wasser in UPS nachgefüllt
2007-11-21	CalibUnit neu justiert, Motor Parameter geändert
2007-11-20	ThAr Netzteile nun mit Strom-Ueberwachung versehen
2007-11-20	ThAr2 Lampe getauscht
2007-11-20	ThAr-Lampennetzteil 2 getauscht (das alte nr.1)
2007-08-24	Klimaanlage E-Raum Filter-counter reset
2007-08-23	Cryotiger not at correct temperature
2007-08-23	Ethernet wire from archive to TelescopeRack1 (to run Pilar on archive)
2007-08-23	Update archive to Debian 4.0/ Java 1.5,downgrade to 1.4 because of xml problems
2007-08-22	Power to Cryo etc. (see reset switch) now from Gallaxy UPS
2007-08-22	Reset switch for Cryotiger/Allsky/shutter/calibration unit installed
2007-08-22	Reset switch of AGunit correctly wired
2007-08-22	ETEL Controller Alt STELLA 2 Motor-current-P parameter decreased
2007-08-21	ETEL Controller Alt STELLA 2 exchanged
2007-08-20	ThAr Power supply connections checked
2007-07-24	ETEL Controller Alt STELLA 2 defekt, zur Reparatur nach D
2007-07-24	Cryotiger at normal Temp. again
2007-07-20	CUO CCD pumped
2007-07-19	ThAr-Lampennetzteil 1 getauscht
2007-07-19	ThAr1 & ThAr2 Lampen getauscht
2007-07-17	Klimaanlage E-Raum Filter gereinigt
2007-03-30	ThAr2 defekt, stellen auf ThAr1 um
2007-03-21	STELLA-I port 2&3 vertauscht (kabel lt. Schaltplan-Aenderung getauscht)
2007-03-21	SES cryotiger pressure 210 psi
2007-03-21	SES cryotiger cleaned
2007-03-21	CUO CCD pumped
2007-03-20	STELLA-1 software update
2007-03-20	STELLA-2 encoder tuned
2006-12-14	AG-I Beam splitter flipped
2006-12-14	AG-I & SES Fiber coupling adjusted
2006-12-14	Fan exchange & air filter exchange on master/ses/fire

continues on next page

Table 1 – continued from previous page

Date	Action
2006-09-09	STELLA-I M1 and M-3 cleaned
2006-01-31	SES cryotiger pressure 210 psi

## FITS FILES REVISION LOGBOOK

Date	In-str.	Description
2023-05-25	SES	Every second <i>WOFFSET</i> in bias files wrong since 21st Jan 2023. Changed in fits files on stella-ext.
2023-05-23	SES	A handful of flats and a single calib has wrong <b>XORGIN_</b> . Marked as failures=65535

Due to unknown reasons, every second bias file has a wrong WOFFSET in its main header. Instead of [819,0] it read [819,2336]. This may be linked to another behaviour seen around the same date, which rendered every second image as a blank.

Affects flat20230208B-0262, flat20230208B-0316, flat20230214B-0018, flat20230309B-0044, flat20230324B-0237, calib20230326B-0001, flat20230330B-0127, flat20230415B-0253, flat20230428B-0282, flat20230502B-0052 and flat20230512B-0054. On reopening of the camera just prior to recording of these images, either setting of the window or setting of the binning was not answered with OK, though the read-out window and binning are obviously correctly set (also the immediate query after the set operation returned a correct size).



## SPARE PARTS

### 4.1 Spare parts cabinet

#### 4.1.1 Weather

- 3 T/H 10V sensors
- 1 analog Rain sensor
- 3 digital Rain sensors rainguard 5.4106.00.000
- 2 Wind sensors
- 1 Brightness
- 1 Masthalterung
- 1 pt-100 indoor
- 2 1m Pt100 Klebe-Pad
- 4 5m Pt100 Klebe-Pad
- 2 +2 used 1m Pt100 cylinder

#### 4.1.2 Moxa Remote I/O

- ioLogik 1240 (Analog IO): 1 (+3 used ones)
- ioLogik 1260 (RTD): 1 (+1 used)
- ioLogik 1212 (digi io): 1

#### 4.1.3 Power

- Logo power 24V/1.3A: 3
- Logo Power 24V/2.5A: 1
- Draco 5V/5A: 2
- Draco 12V/2.1A: 1
- TSP 090-124: 1 (used as test PS)
- TSP XXX-124: 2
- TSP 070-112: 3
- TSP 90-148: 1

#### 4.1.4 Computer

- Fan-Einschuebe f. RAID-Rechner: 2
- Fan 120x120 Enermax: 3
- Fan 80x80 Papst 8412 N2/GM: 3
- Fan 80x80 Coolermaster: 5
- Fan 70x70 EKL Papst 712 F/2 L : 2
- Fan 60x60 Papst 612 F/2: 1
- Fan 50x50 Papst 512 F/2: 2
- PDU: 1
- Firewall: 1

#### 4.1.5 Network

- AT-X230-28GT: 1
- Moxa EDS 208: 2
- Moxa EDS 205 mini-ethernet switch: 1
- Moxa TCF-142-M fiber ethernet converter: 1
- AT-MC1008/SP Gbit SFP ethernet converter: 1
- AT MC101XL Multimode ethernet converter: 2
- AT MC103XL Singlemode ethernet converter: 1 (+1 used)
- Moxa INJ-24 PoE Einspeisung: 3
- Moxa EDS G308: 1
- Moxa Gbit MM SFP: 4
- Cisco Gbit MM SFP: 5 (GLC-SX-MM)
- Cisco Gbit SM SFP: 3 (GLC-LH-SMD)
- CN2610 terminal server (16 ports): 1
- NPort 5210 (2 ports): 1
- NPort IA5250A (2 ports): 2
- 3 FC-ST SM patch fibers
- 3 MTRJ-ST MM patch fibers
- 2 LC-ST MM patch fibers
- 5 LC-ST SM patch fibers

#### 4.1.6 Div

- Halo Tungsram 20W G4 380lm 2900K 2000h (13850) : 2
- ThAr: 5
- Basler GigE: 1 1600, (1 2k in Potsdam)
- 1 Softstarter ABB PSR6-600-11
- 1 pump
- 1 Phytron Stepper controller MCC-2
- PC for CCD controller incl Magellan card

- Magellan card
- Power board Magellan
- CCD-power supply modules je 1 Stk C30.0,5, C15.1,5 C5.3, 2 Stk CAA 48.0,5
- Faulhaber Motor controller & motor for SES calibration stage
- Relay: 4x Finder 55.34.8.230.0040 mit Sockel
- Roof-Motor protection: 1

#### 4.1.7 Beckhoff

- CX 5120: 1
- EL2008 Digital Output: 3
- EL3052 Analog in: 1
- EL3054 Analog in: 1
- EL3202 RTD: 5
- EL3164 analog in: 1
- EL9410 PS: 1
- EK1100-0000 Bus interface: 4

#### 4.1.8 Roof Control

- Koppel Relays: 4x CWC07-01-30C03
- Motorschutz: 2x RW17-1D3-U004
- Motor: 1
- Connection Electronics for Motor: 1

### 4.2 Storage room

#### 4.2.1 Cryotiger

- Cryotiger #6, slightly used (old PEPSI), S/N I0921179, 250psi
- Cryotiger #8, new, S/N 1511CHE10855, 250psi
- 1 filter unit new
- 1 filter unit with broken valve (almost new & full), plus 1 old filterunit full with Pt-14
- 2 15m hose, slightly used (old PEPSI)
- 2 15m hose, new
- 1 4.5m hose new
- 1 1.5m hose new
- 1 1.5m hose for filling (connected to bottle with pressure reducer)
- 1 Pt-14 bottle (75psi, almost empty), plus 2 new Pt-14 bottles
- 1 refilling tool
- 1 valve
- 1 Vacuums hose -> Cryo hose, incl valve
- 1 N2 -> Cryo hose incl valve

- spare valves from old units/hoses
- 1 female-female connectors (1 for repair)

Old systems

- Cryotiger #3, S/N CM06241-0405, used for spare parts (manometer missing)
- Cryotiger #7, leaking, used for spare parts (filter missing)
- Cryotiger #4, empty, to be repaired in Potsdam

## POWER DISTRIBUTION

### 5.1 Main power connector box

This is located in the electronics room in the far right corner as you enter the building. The UPS is standing in front of it, and the main connector box actually consists of 4 boxes, one for the main switch, one with the UPS switch, one for all the fuses, and a fourth one which houses the fuses of the extension buildings and air conditioning systems.

#### 5.1.1 Input:

100A Fuses of main uplink, NH 125A fuses on the other side of the line

1. 80A -> UPS IN
2. 40A -> fuse box

#### 5.1.2 UPS

63A fuse -> 63A FI (0.5A)

1. 32A fuse 3Phase 3F-roof,3F-bay
2. 16A 3F1 -> Sockets UPS in Bay/ Weather stations 1-3
3. 25A 3F2 -> Computer rack
4. 16A 3F3 -> PDU3
5. 16A 3F4 -> Moxa modules dust/UPS/CCDpressure
6. 16A 3F5 -> PDU4
7. 16A 3F6 -> Sigrist Dust monitor

#### 5.1.3 Normal 3-phase

1. FI 0.5A -> 230V (1F 1-5)
2. FI 0.5A 3phase -> 16A 3phase (Sockets 3P Telescope bay)
3. FI 0.5A 3phase -> 20A Teleskop1,2 (2F-tele1, 2F-tele2)

#### 5.1.4 Normal 1-phase:

1. 1F-1: lights
2. 1F-2: <del>Computer Rack 230V (screen etc.)</del>
3. 1F-3: Power sockets electronics (left of this sign) & spektrograph room
4. 1F-4: Power sockets telescope bay
5. 1F-5: Power sockets electronics-room (to the right of this sign)

### 5.1.5 UV1: Building extension

1. Klima1 (A/C pump1)
2. Klima2 (A/C pump2)
3. Klima3 (A/C electronics room)
4. condensate pipe - heating A/C 3
5. WestWing (Lounge) - Sockets left (outside)
6. WestWing (Lounge) - Sockets right (building side)
7. WestWing (Lounge) - Sockets general (not in channel)
8. EastWing (Storage) - Sockets
9. Light WestWing
10. Light EastWing

## 5.2 Switchable power distribution units

### 5.2.1 PDU1

Located in the computer rack

1. Connector strip - Fans, KVM
2. Ethernet switch
3. Serial port server
4. Fire
5. 24V for ses & ccd (redundant setup)
6. BeckyPC
7. free
8. free

### 5.2.2 PDU2

Located in the computer rack

1. Wifsip-1
2. Wifsip-2
3. archive-1
4. archive-2
5. sky-1
6. sky-2
7. free
8. 12v/24v power supplies (redundant setup)

### 5.2.3 PDU3

Located above the door to the telescope bay

1. WiFSIP
2. ASIVA

3. AG-Unit telescope 2 (SES fiber injection)
4. SES shutter
5. SES calibration unit
6. free (SES CCD controller?)
7. Aux1/AGunit1Old
8. Cryotiger WiFSIP

#### **5.2.4 PDU4**

Located above the door to the telescope bay

1. Isolating Transformator SES heater
2. Heater Control SES
3. Vacuum pump SES
4. Vacuum valve SES
5. free
6. free
7. free
8. Cryotiger SES



## ELECTRONICS

### 6.1 Roof Control & Weather station

Roof control and weather station reading (including dust monitor and some of the indoor environmental sensors) is handled by a bekhoff PLC in the roof control cabinet.

#### 6.1.1 Electronics room

A Ethercat fiber connects the box above the STELLA-1 rack with the roof control PLC. Here the calibration light switches are operated, Hollow Cathode lamps checks are also read in (TBC). Temperatures from the Lounge, Oil pump rooms, and other room temperatures and humidity

The SES shutter is controlled by a serial-connected stepper controller.

#### 6.1.2 SES room

A Ethercat cable connects this with the calibration box in the e-room. Here the temperatures from the SES spectrograph are recorded, as well as an additional indoor pressure sensor.

Temperature sensors: 1 - SES cover, 2 - inside SES cover, 3 - optical bench inside of cover, 4 - floor, 5 - optical bench outside cover, 6 - e-box Analog input: channel 1, pressure sensor 700 .. 900 hPa

An Eurotherm temperature controller is located in the room and regulates the room temperature and the floor temperature below the optical bench. Above sensor readings duplicate these two sensors

### 6.2 Moxa-I/O-modules

Few components are controlled or read out using Ethernet-connected Moxa I/O modules.

#### 6.2.1 io5

Reset of Beckhoff STELLA2 control PLC

1. io5, ip=161.72.132.99:

#### 6.2.2 io6

Reset of Beckhoff roof control PLC

1. io6, ip=161.72.132.97: port 1 (not 0 !!!) to ON stops the 24V power supply to the PLC.

#### 6.2.3 io7

Reset of Beckhoff Stella1 control PLC

1. io7, ip=161.72.132.77:

## 6.3 Network

### 6.3.1 List of IP addresses

IP	name	long name	comment
161.72.10.174	stella-gw	stella-gw.stella.iac.es	
161.72.132.1	fire	fire.stella.iac.es	
161.72.132.66	serialX	serialX.stella.iac.es	OBSOLETE
161.72.132.67	serialY	serialY.stella.iac.es	OBSOLETE
161.72.132.68	serial3	serial3.stella.iac.es	in rack
161.72.132.69	stella-sw	stella-sw.stella.iac.es	
161.72.132.70	kvm	kvm.stella.iac.es	in rack
161.72.132.71	archive	archive.stella.iac.es	
161.72.132.72	wifsip	wifsip.stella.iac.es	
161.72.132.73	becky-pc	becky-pc.stella.iac.es	
161.72.132.74	sky	sky.stella.iac.es	
161.72.132.75	gige2	gige2.stella.iac.es	in LOCAL
161.72.132.76	stella1	stella1.stella.iac.es	in LOCAL
161.72.132.77	io7	io7.stella.iac.es	STELLA1
161.72.132.79	ses-sw	ses-sw.stella.iac.es	OBSOLETE
161.72.132.80	wifsip-sw	wifsip-sw.stella.iac.es	OBSOLETE
161.72.132.81	pdu1	pdu1.stella.iac.es	
161.72.132.82	pdu2	pdu2.stella.iac.es	
161.72.132.83	ses	ses.stella.iac.es	ses ccd
161.72.132.84	oldguid	oldguid.stella.iac.es	OBSOLETE
161.72.132.85	guider1	guider1.stella.iac.es	
161.72.132.86	guider2	guider2.stella.iac.es	in LOCAL
161.72.132.87	guider3	guider3.stella.iac.es	OBSOLETE
161.72.132.88	ccd	ccd.stella.iac.es	
161.72.132.89	baycam2	baycam2.stella.iac.es	
161.72.132.90	pdu3	pdu3.stella.iac.es	
161.72.132.91	baycam	baycam.stella.iac.es	
161.72.132.92	pdu4	pdu4.stella.iac.es	
161.72.132.93	galaxy	galaxy.stella.iac.es	
161.72.132.94	pdu5	pdu5.stella.iac.es	FREE
161.72.132.95	wap	wap.stella.iac.es	
161.72.132.96	wap2	wap2.stella.iac.es	
161.72.132.97	io6	io6.stella.iac.es	ROOF
161.72.132.98	gige1	gige1.stella.iac.es	
161.72.132.99	io5	io5.stella.iac.es	STELLA2
161.72.132.100	becky	becky.stella.iac.es	in LOCAL
161.72.132.101	guest1	guest1.stella.iac.es	
161.72.132.102	guest2	guest2.stella.iac.es	
161.72.132.103	guest3	guest3.stella.iac.es	
161.72.132.104	guest4	guest4.stella.iac.es	
161.72.132.105	guest5	guest5.stella.iac.es	
161.72.132.106	guest6	guest6.stella.iac.es	
161.72.132.107	guest7	guest7.stella.iac.es	
161.72.132.108	guest8	guest8.stella.iac.es	
161.72.132.109	guest9	guest9.stella.iac.es	
161.72.132.110	guest10	guest10.stella.iac.es	
161.72.132.111	guest11	guest11.stella.iac.es	
161.72.132.112	guest12	guest12.stella.iac.es	
161.72.132.113	guest13	guest13.stella.iac.es	
161.72.132.114	guest14	guest14.stella.iac.es	
161.72.132.115	laserjet	laserjet.stella.iac.es	

continues on next page

Table 1 – continued from previous page

IP	name	long name	comment
161.72.132.116	oldarchive	oldarchive.stella.iac.es	OBSOLETE
161.72.132.117	oldwifsip	oldwifsip.stella.iac.es	OBSOLETE
161.72.132.118	oldsky	oldsky.stella.iac.es	OBSOLETE
161.72.132.119	sip	sip.stella.iac.es	CISCO-IAC
161.72.132.120	sip2	sip2.stella.iac.es	FREE
161.72.132.122	io1	io1.stella.iac.es	OBSOLETE
161.72.132.123	io2	io2.stella.iac.es	OBSOLETE
161.72.132.124	io3	io3.stella.iac.es	OBSOLETE
161.72.132.125	io4	io4.stella.iac.es	OBSOLETE
161.72.132.126	AT-switch	AT-switch.stella.iac.es	

### 6.3.2 internal ethernet network

the two telescopes and the ASIVA share a common private network. It is connected through a small ethernet switch in the rear part of the rack. The IPMI interfaces of the servers are also connected to this network.

Local IP	description
192.168.1.11	guests: 11=JW, 12=MW, 13=AJ, ...
192.168.1.32	asiva_core (Asiva instrument = cloud monitor)
192.168.1.71	archive (STELLA2 control), 2nd interface
192.168.1.72	wifsip (STELLA1 control), 2nd interface
192.168.1.74	sky (new asiva control computer), 2nd interface
192.168.1.101	sqm_teneriffa (Lightmeter at the ASIVA)
192.168.1.136	becky-pc, 2nd interface
192.168.1.143	ipmi-interface becky-pc
192.168.1.145	ipmi-interface spare fire
192.168.1.146	ipmi-interface fire-spare
192.168.1.147	ipmi-interface oldarchive
192.168.1.148	ipmi-interface fire
192.168.1.151	STELLA1 telescope becky
192.168.1.152	STELLA2 telescope becky
192.168.1.153	Roof becky
192.168.1.160	STELLA2 auxiliary guider (guider2, FLIR)
192.168.1.161	STELLA2 serial server Moxa (serial4)
192.168.1.162	STELLA2 EthCam Basler (ethcam2)
192.168.1.171	ipmi-interface archive
192.168.1.172	ipmi-interface wifsip
192.168.1.174	ipmi-interface sky
192.168.1.232	asiva_console (terminal server connecting to asiva_core console)

### 6.3.3 uplink

The uplink is a SM fiber connected to the Residencia on the other side, while at STELLA it is connected to a media converter, which is connected to the firewall. Uplink gateway is at 161.72.10.173/30, broadcast .175. .. We also run the BMK network from here, this is directly connected to the main switch through a single mode fiber. Both STELLA2\_AG and WiFSIP are also connected directly via fiber to the SFP panel on the main switch.

## 6.4 STELLA serial devices

### 6.4.1 serial1

Located in AG-unit of STELLA-1. Controls the filter wheel and the shutter.

### 6.4.2 serial2

Located in AG-unit of STELLA-2. Controls the two linear focus stages and the adcwheel.

### 6.4.3 serial3

Located in the main rack.

1. Eurotherm; Connected to serial3 port server as port 8, modbus device, see Eurotherm doc for details; ttyr00
2. SES calibration unit; ttyr01
3. SES shutter; ttyr02
4. free; ttyr03
5. free; ttyr04
6. DAIKIN control; ttyr05
7. Pfeiffer vacuum pump; ttyr06
8. free - used for connecting the diode-lightmeter in the spectrograph room for alignment work; ttyr07

Port Application Mode Description/more setting

- 01 [Dialin/out ] [DYNAMIC ] [Auto Term/SLIP/PPP identification]
- 02 [Reverse Terminal] [RTELNET ] [Reverse Telnet mode ]
- 03 [Reverse Terminal] [RTELNET ] [Reverse Telnet mode ]
- 04 [Reverse Terminal] [RTELNET ] [Reverse Telnet mode ]
- 05 [Reverse Terminal] [RTELNET ] [Reverse Telnet mode ]
- 06 [Reverse Terminal] [RTELNET ] [Reverse Telnet mode ]
- 07 [Reverse Terminal] [RTELNET ] [Reverse Telnet mode ]
- 08 [Reverse Terminal] [RTELNET ] [Reverse Telnet mode ]
- 09 [NT Real COM ] [ASPP ] [Async Server Proprietary Protocol]
- 10 [NT Real COM ] [ASPP ] [Async Server Proprietary Protocol]
- 11 [NT Real COM ] [ASPP ] [Async Server Proprietary Protocol]
- 12 [NT Real COM ] [ASPP ] [Async Server Proprietary Protocol]
- 13 [NT Real COM ] [ASPP ] [Async Server Proprietary Protocol]
- 14 [NT Real COM ] [ASPP ] [Async Server Proprietary Protocol]
- 15 [NT Real COM ] [ASPP ] [Async Server Proprietary Protocol]
- 16 [NT Real COM ] [ASPP ] [Async Server Proprietary Protocol]

## 6.5 SES calibration unit

### 6.5.1 Location

The SES calibration unit is situated on top of the STELLA-1 telescope control rack. It is a black box about 1x1 m in size. To open it, about 8 screws need to be loosened on top of the unit.

### 6.5.2 Inside the calibration unit

Inside the unit are 4 lamps. 2 ThAr-hollow cathode lamps (the big glass tubes towards the front of the unit) and 2 Halogen lamps. Currently, 20W halogen lamps are in use.

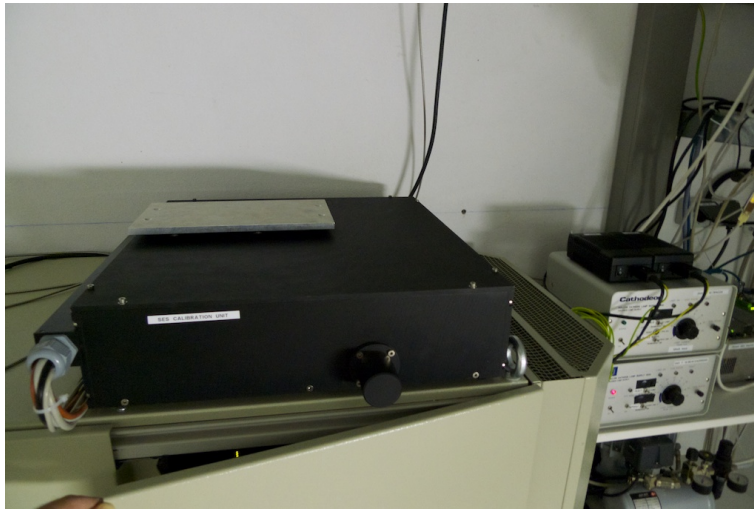


Fig. 1: SES calibration unit



Fig. 2: SES calibration lamp locations

### 6.5.3 Where are the spare lamps



Fig. 3: SES spare lamps

The spare lamps are in a cupboard in the electronics room (where the calibration unit is also located). The Halogen lamps are 20W, 12V Osram lamps, several of those are located in a small cardboard box in that cupboard (see picture). Please do not touch the glass of the halogen lamp with your fingers when exchanging it, its best to wear gloves or use the wrapping of the lamp to hold it.

There are also spare ThAr lamps on site.

## CCD CAMERAS

### 7.1 SES

#### 7.1.1 Pumping SES

- turn cryotiger off, port 8 on pdu4 = 161.72.132.92
- turn on power for vacuum pump and valve, port 3 and 4 on pdu4.
  - This is easiest with vncviewer to wfsip/archive, open a browser there and type in the IP address in the URL line.
  - If asked for password, user is apc. Not the standard password.
- set temperature to 40, temperature sensor to 1 as `root@ses`
  - `cd src/sci-ccd231-ses`
  - `./set_temp localhost 40 40 40 40`
  - `./set_tsens localhost 1`
- no need to wait until temperature is rather high.
- turn pump on on archive.
  - `~/bin/pfeiffer-test.py --switchon`
- watch pump speed.
  - `~/bin/pfeiffer-test.py ;`
  - output like
  - 001500 0011030906001500026
  - 000000 0011001206000000011
  - 001 0011003003001121
  - first number is pump speed (1500). It will take a few minutes to reach full speed.
- open valve when pump speed is approaching 1500, on archive
- `~/bin/pfeiffer-test.py --openvalve`
- speed will decrease immediately, pressure will jump up (the sensor is on the pump side of the valve)
- watch pressure and pump speed, pressure should never go up, pump speed should go back up to 1500 after some time. It helps to close the valve for a few time for a few minutes until the speed settles
  - watch pressure: archive: `~/bin/ses_readpress.py`
  - output like
  - SES: 0.009172 mbar Pump: 14.151923 mbar | T\_CCD: -120.04K T\_CAR: -117.44K T\_X: -146.66K T\_COLD: -162.60K

- first number is pressure (0.0012)
  - watch pump speed: archive: `~/bin/pfeiffer-test.py`
- wait until temperature is 40 for some time and pressure  $\leq 10^{-5}$ . This will take some hours to reach.
- set temperature to -120, on ses
  - `cd src/sci-ccd231-ses`
  - `./set_temp localhost -120 -200 -120 -120`
  - `./set_tsens localhost 0`
- turn cryotiger on at pdu4
- wait as long as possible (coldhead temp at least -60)
- close valve:
  - `~/bin/pfeiffer-test.py -closevalve`
- turn off pump
  - `~/bin/pfeiffer-test.py -switchoff`
- turn off power to vacuum valve and pump on pdu4

## 7.2 WiFSIP



Fig. 1: The STELLA-I telescope during operation with the WiFSIP instrument in front.

## 7.2.1 WiFSIP CCD

### Voltages of the WiFSIP CCD power supply

- 15V: V1=15V, V2=15V
- 5V: V1=5.35V, V2=5.20V
- 30V: V1=30.5V
- 48V: V1=48V

## 7.2.2 Pumping WiFSIP CCD system

The vacuum in the CCD dewar needs to be maintained. Especially after extended power outages, pumping the dewar is necessary. The following steps are necessary:

### Preparation

1. AIP - The cooling system (the Cryotiger / PCC compressor) needs to be turned off, and the CCD should be heated to room temperature to avoid condensation on the CCD (it could otherwise end up being the coldest spot in the dewar)
2. AIP - move the STELLA1-derotator so that the vacuum flange points downwards.

### Pumping

1. put the vacuum pump onto the table next to the telescope as seen in the picture. Connect the vacuum hose.
2. Turn on the vacuum pump. Wait until it reaches about  $1.E-3$
3. Open the Valve
4. Keep pumping for as long as possible.
5. Please alert AIP personal at least 2 hours before stopping. The cooling system need to be started then.
6. Make note of the final pressure. Should be around  $1.0 E-6$
7. Close Valve
8. Turn off pump
9. Wait for it to stop moving, then disconnect

### Cleaning the WiFSIP cold head

If the cooling performance degrades, a possible cause can be contamination in the cold head.

This is an experimental recipe for cleaning the coldhead:

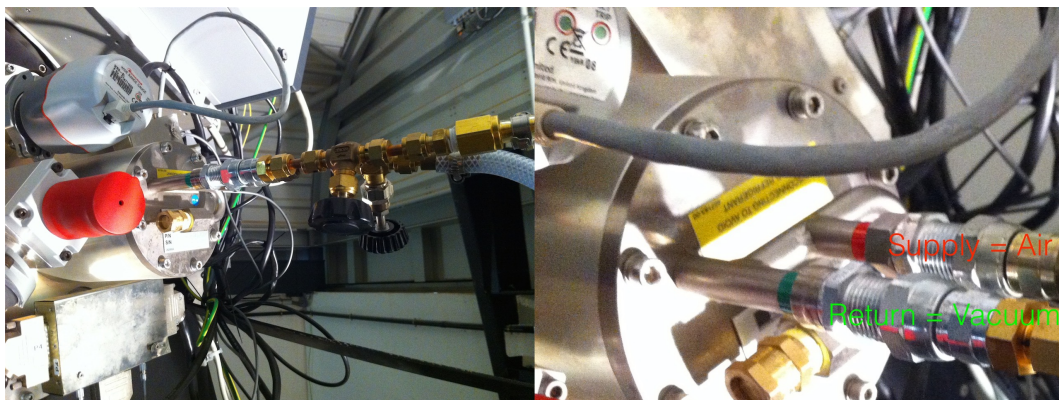


Fig. 2: Attaching the two external valves with the N2 hose on the supply side and the vacuum hose on the return side.

1. Turn off the cooling system (Cryotiger / PCC compressor)
2. Note system pressure
3. Set the CCD temperature to room temperature to avoid condensation and let system warm up for several hours
4. Remove gas tubes at the CCD cold head, put protective covers on valves.
5. Connect valve with pressured air hoses to supply, valve with vacuum hose to return
6. Open valve on return side, gas will escape audibly
7. Connect N2 at the supply side, and flood the cold head with N2 gas for about 1 minute.
8. Close valve on supply side, turn off N2 at bottle
9. Connect vacuum pump on return side and vacuum the cold head. Reachable pressure is about 1mbar.
10. Close return valve, disconnect vacuum pump and long hose, connect short hose instead (keep valve in place)
11. Attach short pressured air tube on supply side (instead of long one, but keep valve in place!), fill it with ISO-Propanol / Ethanol or mixture
12. Slowly open valve on supply side, re-fill ISO / Ethanol when needed - total volume is about 150ml, the solvent gets sucked into the cold head
13. Let sit for at least 30 minutes
14. Switch valves, connect long pressured air hose (remove short one first) at return side and connect N2
15. Open supply valve (where short vacuum hose is connected), then open return (N2) valve
16. Flood system with N2 for at least 30min. Carefully rotate derotator while flooding. No fluid should be visible at the short vacuum tube on the supply side.
17. Close valve on return side, then close valve at supply side.
18. Attach long vacuum hose on supply side (remove short one first), connect pump, turn on, open supply valve, and vacuum the cold head.
19. Close valve on supply side
20. Remove vacuum tube & pump, remove valve on supply side
21. Attach PT-14 bottle on supply side and open it's valve. Head will fill with PT-14.
22. Remove PT-14 bottle
23. Remove pressured air hose, N2 bottle, remove valve on return side
24. Re-attach hoses to cold head
25. Note system pressure
26. Pump CCD system and re-start cooling system

## TELESCOPES

### 8.1 Bedienungsanleitung Handsteuerung

Für alle nachfolgenden Punkte ist es notwendig, dass die Leistung auf “ein” steht und der Wahlschalter der Handsteuerung auf “Manual”.

1. Klappe 1 (bei RoboTel und STELLA-2 nicht vorhanden)
2. Klappe 2
3. Klappe 3
4. Nasmyth/M3: Enable/Reset öffnet und schließt Bremse
5. Fokus: Enable/Reset öffnet und schließt Bremse
6. Derotator
7. Elevation
8. Azimut
9. Dome
10. Filterrad (noch nicht implementiert)
11. reserviert
12. reserviert
13. reserviert
14. reserviert
15. Hydraulik: Enable = Hydraulik start; Reset = Hydraulik stop; Auf = Bremse auf; Ab = Bremse zu: Links zeigt Betrieb der Vorlaufpumpe an; Rechts = Betrieb Rücklauf

**Vor Programm 7 oder 8 Bremse lösen!** In Programmen 1-9 löscht “Reset” etwaige Motorfehler. (Fehleranzeige an Handsteuerung defekt)

### 8.2 STELLA Troubleshooting

#### 8.2.1 Quickstart

Most problems can be noticed and solved using just one terminal on archive. Use the following command (NOTE: will change in the near future) :: `arto/show_status.sh` to get an overview. For seeing all logfiles at the same time each in it's own window :: `arto/openall.sh`

There is another possibility to get up a GUI and have some control on the light and webcam inside the building: Start with `java stella.jview.JOffLimit --wait some time` There are two, wrongly-labeled buttons STELLA and WIFSIP. (STELLA shows STELLA-1, but everything else in the left part refers to SES). Pressing one of these button updates the webcam composite image of the telescope. Turn on the light with the button to the left of STELLA, if Lights off. Again, wait some time for the button to get active. Otherwise, you see green buttons, yellow and sometimes red ones, that tell you about some conditions that are out of specks.

Is the MasterMind doing fine? type `m1tail` on archive or `m2tail` on wifsip and watch the output for a bit. Either the last line is 'no new targets after...' or 'resetting exposure time...' Is the telescope server fine? Type `t1tail` or `t2tail` and look for unusual messages.

Thing to watch out for, most probable problems:

1. Is the master-mind running? It stops after a fatal error.
2. Telescope hangs: use `vnc` or `x-via-ssh` to manually reset the errors. Note that Pilar is by default running without gui. You need to restart Pilar without the `no-gui` option. Use the startup-script in `~/bin` to start it with the correct options again. You need to restart the telescope server `stella-telescope1-start.sh` afterwards!

There is also a command line option doing similar things::

TA (aliased to `java stella.telescope.TelescopeAccess`) `-m` (put telescope in manual mode, only then the following commands are allowed) TA `-err` (get list of errors currently on) TA `-clear` (clears all non-fatal errors. Fatal errors are cleared only on the first try (or after 1-24 hours). Check the log file, if successful). TA `-wipe` (wipes out the history of errors, meaning that now a TA `-clear` will try to clear a fatal condition "once".) TA `-a` (put the telescope back into automatic control)

Other things possible in manual mode (do a TA without anything to get a list)::

TA `-init` (initialize the telescope, if not on) TA `-park` (Parks the telescope - power off) TA `-azalt` (moves the telescope to a position. Good thing to check after a wipe/clear of fatal errors)

1. Filter wheel is stuck: reset the power to the ag-unit, restart the java-guider-server, and then restart the MasterMind. This error does usually not occur any more.
2. CCD controller hangs: reset the ccd controller, possibly also either restart the ses-server on the ses computer or reboot the ses computer

## 8.3 What where

All computers involved run a `rmiregistry` server to handle communications.

### 8.3.1 archive (161.72.132.71)

This hosts the main STELLA SQL database. It also operates the "second" telescope, STELLA-2 (the one in the East part of the building, no M2/M3). All startup-scripts have a "2" in it (`stella-telescope2-start`, `stella-auxiliary2-start`, `stella-adapter2-start`), if not unambiguous.

1. SesMaster (the CCD camera server): connects to ses
2. CalibrationMaster (the Calibration & AG-unit control server)
3. AdapterMaster (the guider server): connects to "firecam server" and to focus unit (later also ADC)
4. AuxiliaryMaster (the auxiliary telescope): connects to TFs guider.
5. MasterMind (the robotic control system)
6. TelescopeMaster

Note that the MasterMind should not be started before the other programs are running "and in automatic mode". Recommended startup-procedure: `telescope,ses,calibration - auxiliary,master`

The logfiles are in `/var/log/stella/`: `ses.log`, `adapter2.log`, `auxiliary2.log`, `telescope2.log`, `master2.log`, `calibration.log`

### 8.3.2 wifsip (161.72.132.72)

1. AuxiliaryMaster (the guider server): connects to guider1
2. WifsipMaster (connects to the 4k CCD and filter wheel)
3. MasterMind (the robotic control system)
4. TelescopeMaster (connects to Pilar1).

Note that the MasterMind should not be started before the other programs are running “‘and in automatic mode’”. Recommended startup-procedure: pilar - telescope - auxiliary,wifsip.

The logfiles are in /var/log/stella/: auxiliary.log, master1.log

### 8.3.3 Power cycle the telescope cabinet

Using the MOXA modules that also switch the ThAr and Quartz lamps, a reboot of either telescope rack can be achieved::

```
cd stella/environment/properties java stella.net.modbus.ModbusSwitch$Turn rack[12].switch modbus_io5.driver true
```

in archive:stella/environment/properties to switch the cabinet for STELLA-1 (rack1.switch) or STELLA-2 (rack2.switch) off (true). Issue again with false to turn it on. Note that the logic is Normally-Closed, so true turns the power off.

### 8.3.4 Reboot the telescope rack computer

From the archive or wifsip computer (the one running pilar) log into the rack computer (TCC)::

```
telnet 192.168.1.151(STELLA-1)/192.168.1.152(STELLA-2) (user root) reboot
```

If you need to hard reset the computer rack for the telescope STELLA-1 or -2, you need to access the moxa-io module of the calibration unit: ports0-3 are for lamps, port4 is STELLA-1, port5 is STELLA-2. Sometimes it is necessary to wait 20 minutes or so for the UPS inside the rack to run out of power. A combination of the two beforementioned methods should circumvent this (unless you can't log into the computer because it really hangs).

### 8.3.5 Reboot the AG unit, reset calibration unit, shutter, Asiva, ccd controller

This can be done by accessing the PDU3 unit.

### 8.3.6 IPMI errors

If possible, log in to archive or sky via VNC. Then use firefox <http://192.168.1.141> and open a console. Use the ADMIN account, IPs are 192.168.1.141,142,144 for archive, wifsip, sky.

### 8.3.7 Reboot a computer

All computers in the rack are controlled via two APC Power Distribution units: PDU1 (archive, wifsip,sky) and PDU2(fire, becky, ccd/ses)

### 8.3.8 Temperature control in spectrograph room and table

This can be accessed via the serial server.

### 8.3.9 SSH Connections drop off after some time

Add/Edit file ~/.ssh/config with content::

```
Host * ServerAliveInterval 45
```

This keeps the connection alive even when there is no traffic on the line.

## 8.4 E-Mails

### 8.4.1 AcknowledgeTimeOut

Signaled if one of the peripheral masters (Telescope, Adapter, Auxiliary, Ses, Wifsip, Calibration) did not immediately respond to a command sent.

This is normally an indication that the corresponding master was left in “‘manual mode’”. Fix with -a (TelescopeAccess, WifsipAccess, SesAccess, AdapterAccess, AuxiliaryAccess, CalibartionAccess), restart MasterMind.

Other possibilities are severe crashes in the periphery. Check if master is running, check also log file. Try to restart the peripheral master with the appropriate start script in ~/bin.

### **8.4.2 AmbiguousStarPattern**

Sent if more stars are seen than stated in the target input file. Other than too little stars, this can only happen if the input file does not reflect the on-sky reality. Check target-xml file, FieldOfView section.

### **8.4.3 CannotCloseMirrorCover**

### **8.4.4 CannotCloseRoof**

This error signals the most severe case that can happen: The roof cannot be closed. It never occurred so far, but if this is a true case and not just sent to a software bug “‘immediately contact somebody on site’”.

### **8.4.5 CannotFocusMirror**

Sent only in STELLA-1, where the focus is attained by moving M2. Directly related to the TCS software (Pilar). Can (thus ;-)) be a spurious error, go to manual mode -m, try to set a new focus, restart pilar once the telescope master has been killed (-q or kill). Try to restart pilar in GUI mode (cd Pilar1, java -jar Pilar.jar). If nothing helps, bring down a repair team.

### **8.4.6 CannotInitXXX**

Initialization of a peripheral service failed. Sometimes spurious. Check reason in log file, try to restart. If persistent, bring in repair crew.

### **8.4.7 CannotMoveDome**

Only possible in RoboTel, possibly the dome control ceased to exist. Log in to the Artilla dome server (141.33.54.246) as root, check if /disk/bin/portmap and /disk/bin/dome\_server are running. If so, check if dome can be moved in manual mode. If not, have a look.

### **8.4.8 CannotMoveTelescope**

In various situations, it might happen that the TCS is not able to move the telescope. Most of the errors are spurious and the user does not even notice it. Only if moving the telescope fails for three times in a row, or produces a time-out this mail is sent. It still might go away if you go to manual mode, but it might mean a persistent error in the ETEL drive system. See also [[Pilar]]

### **8.4.9 CannotOpenMirrorCover**

An error reported by pilar. Occurred once, was not recoverable from remote (See engineers log). As always for pilar-related errors, you might want to check out [[Pilar]]

### **8.4.10 CannotOpenRoof**

The bus/switch system used for controlling the roof or the motors failed. Never reported so far. See section on CannotCloseRoof, but this error is not as severe, except if opening failed in an intermediate phase, leaving the roof almost-open.

### **8.4.11 CannotParkTelescope**

Pilar related error, if not curable according to [[Pilar]], try to close at least the mirror covers. Bring in repair crew.

#### 8.4.12 CannotWriteFile

No disk space left to write the science data

#### 8.4.13 CcdParametersOff

Normally reported, if temperature or pressure in the dewar went aloof. Might also indicate that a sensor is broken or somehow quit reposting. Only in the latter case, rebooting of the CCD-controller might help. Currently only implemented in Wifisp, see wifisp.master section ::

```
# We check for the right carrier temperature enablewatch = 600000 ccdwatchminimum = TEMP_CCD,TEMP_LN2
watchminvalues = -100,-120.
```

#### 8.4.14 CommandAborted

#### 8.4.15 CommandConflict

#### 8.4.16 CompletionTimeOut

Sent if a peripheral master could not complete a command in time. For new commands, this might indicate that the time-out was simply set too low, but in an evolved system this points into some failure in the periphery. Check the log files and try to investigate the reason. This is a very general error, so no good guidance can be given on how to resort from it.

#### 8.4.17 ConfigurationError

Only sent during startup or at first action of a master, means some of the configuration files are contradictory.

#### 8.4.18 IncompleteDone

Should not happen unless the software in the peripheral server has a severe bug. contact T. Granzer

#### 8.4.19 LateReply

Similar to completion time out, this error signals that some command was not finished within the specific time-out to this command. Will always be preceded by a completion time out (see there).

#### 8.4.20 MissingParameter

Only sent during startup or at first action of a master, means some of the configuration files have been changed, leaving out essential knowledge required for the peripheral master.

#### 8.4.21 NoCalibration

Reported if the ThAr lamp has not been detected in the guider image taken as proof, or was considered too faint. Check the aux-file on pera to see. if there was truely now light, and also check the calibration frames. If the lamp went out, you have to active the [[ActivateSpareLamp]]

#### 8.4.22 NoCatalogStars

#### 8.4.23 NoCcd

Communication to the CCD controller died. Happened quite frequently when the SES controller was not hooked up to the UPS.

#### 8.4.24 NoDiskSpace

Free some hard-disk space by deleting log files etc.

#### **8.4.25 NoFilterWheel**

Means the the serial driver controlling the filter wheel controller (Phytron) has not reported back. Sometimes spurious, e.g. can be cured by re-initializing the master (or restarting it). If persistent, send in a repair crew.

#### **8.4.26 NoFlatField**

Reported if the Halogen lamp has not been detected in the guider image taken as proof, or was considered too faint. Check the aux-file on pera to see, if there was truly now light, and also check the flatfield frames. If the lamp went out, you have to active the replacement lamp according to [[ActivateSpareLamp]]

#### **8.4.27 NoGuiding**

The auxiliary or adapter CCD did not report. Check firewire camera and guider CCD server.

#### **8.4.28 NoRoof**

Means that the RS485 bus that controls the roof is out of order. Happened once after a EMP of a lightening struck in a close-by building, but never occurred thereafter, as copper wires had been replaced with optical ones.

#### **8.4.29 NoSuchFilter**

A target xml file specified an unknown filter. Fix input file.

#### **8.4.30 NoSuchReadoutMode**

The target xml file specified a CCD read-out mode that is not supported. Fix input file.

#### **8.4.31 NoTelescope**

Communication to Pilar through the pilar server port died, or could not be opened. Check if Pilar is running and also check telescope log file.

#### **8.4.32 ParameterError**

Somebody changed the configuration of a peripheral master in a way that it might not operate as intended. Closely linked to MissingParameter

#### **8.4.33 ParseError**

#### **8.4.34 QueueError**

#### **8.4.35 SoftwareError**

The program reached a line of code where it should never end up. Notify the software engineer (in most cases T. Granzer).

#### **8.4.36 StageStuck**

Serial communication to the Faulhaber controller of the lamp compartment selector failed. Can only happen in the calibration master. Occurred only a few times (not as often as filter wheel errors) and could be cured by most of the times by restarting the calibration master. If this error is persistent, it could mean that the sledge slight moved beyond the Hall switch and is thus not able to reference. Try the following ::

Stop the calibration master (CA -m, CA- q) In stella/calibration/properties/ locate the file calibunit.driver. After setting the inithome=false property, query the status with

```
java      -Djava.library.path=/usr/lib:/usr/lib/jni      -Dgnu.io.rtx.SerialPorts=/dev/tty_dgrp_bb_0:/dev/ttyr09
stella.calibunit.CalibUnit$Status calibunit.driver
```

The output should be something like:

Actual position (POS): -17820000 Current speed (GN): 0 Actual current (GRC): 80 Actual temperature (TEM): 21 Limit switches active (HS): 0 Bit mask actual status (GAST): 0110 Status bits (GST): 1001111 Fault status bits (GFS): 0000 Configuration bitmask (GSCS): 00000001 Enhanced status bits (GES): 00000 Homing status (GAHS): 15540 Present mode (GMOD): D Upper position limit (GPL): 2000000000 Lower position limit (GNL): -2000000000 Maximum speed (GSP): 10000 Homing speed (GHOSP): -5000 Acceleration (GAC): 25 Limit on current (GCL): 10000 Step width (GSTW): 1 Number of steps/revol. (GSTN): 1000 Encoder resolution (GEN-CRES): 2048

In case of a power loss, the position might still show up as negative, although it is in reality undefined. A step in positive direction can help here:

```
java -Djava.library.path=/usr/lib:/usr/lib/jni -Dgnu.io.rxtx.SerialPorts=/dev/tty_dgrp_bb_0:/dev/ttyr09
stella.calibunit.CalibUnit$Relative calibunit.driver 10000
```

This command can also be issued with `inithome` left unchanged as it is forcefully set to skip over the init procedure normally commenced at startup. If this seems to be fine (returns fast), query the status again, now with `inithome=true`. It might take 2-3 minutes for the homing to succeed, so watch the output.

### 8.4.37 TelescopeStalled

blabla

## 8.5 Limit switches

### 8.5.1 Electrical Connections

All the limit switches are exposed in the connection box, see [Figure](#).

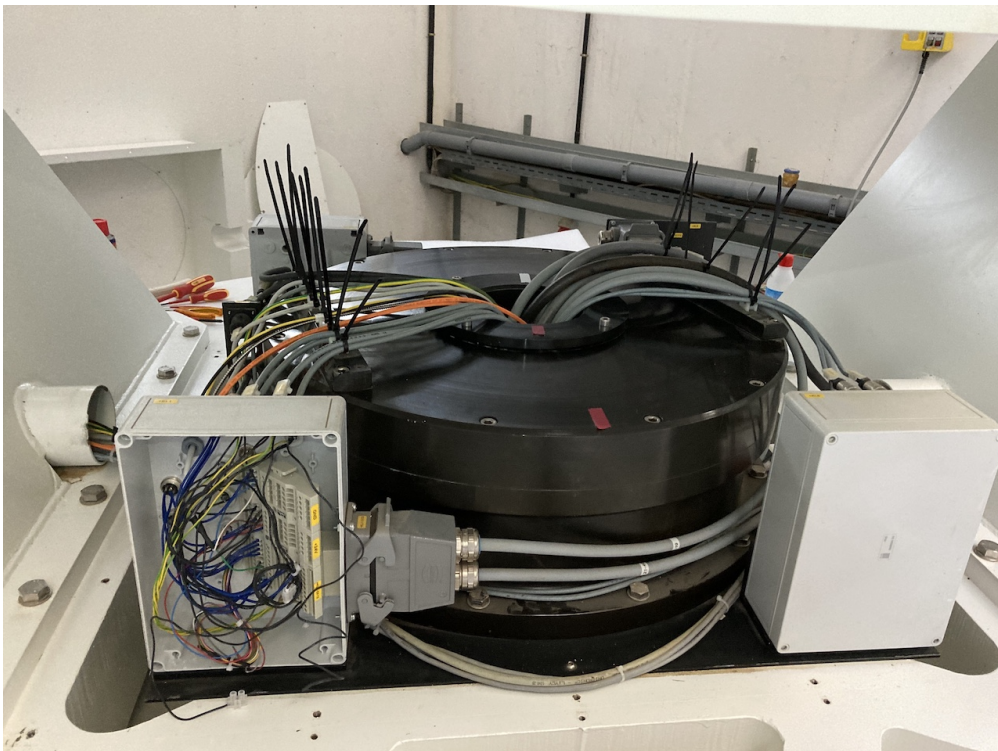


Fig. 1: Connection box of the limit switches.

The following table describes which pins belong to which limit switch. Altitude has 2 limit switches only, left and right. The axis runs into a hard stop afterwards. Azimuth has 2 limit switches on each side, a regular one (LI1 and RE1), and crash switches.

Table 1: STELLA-2 limit switches at box/cable X12. Left/right as seen from above/front, right is clockwise

Limit	PIN	NO/NC	comment
Left1	C7	NC	Azimut limit
Right1	C8	NC	Azimut limit
Left	C9	NC	Alt limit
Right	C10	NC	Alt limit
Left2/Right2	D1	NC	Release Break, both AZ-crash in series
Left2/Right2	D2	NO	Hard limit reached, both AZ-crash parallel

### 8.5.2 Azimut limit switch implementation

To allow for more than 360 degrees rotation, the azimuth limit switches are mounted on a vertical slider which is moved by a spiral track in the central tube of the telescope drive. Reaching the crash switches by hand is dangerous, it is very likely that the momentum of the telescope breaks the small shaft which holds a bearing that rolls inside the spiral guide track.



Fig. 2: Vertical slider which triggers the azimuth limit switches.



Fig. 3: Spiral track in the central tube, which translates the rotary movement to the sliding motion.



**SOFTWARE**

## **9.1 What where**

### **9.1.1 On archive**

- Debian 12
- postgresql 15
  - main DB, synchronised to Potsdam
- npreal ttyS

### **9.1.2 On wifsip**

- Debian 12
- GRB Socket server receiving triggers from GCN

### **9.1.3 On sky**

- Debian 12
- docker containers of mqtt, telegraf, influxdb, and grafana
- matterlog logs to mattermost
- lightmeter SQM software

### **9.1.4 On stella.vm**

- debian 12/13
- postgresql 17

### **9.1.5 On stella-grafana.vm**

- debian 12
- docker containers of influxdb and grafana
- check at <http://stella-grafana.aip.de:3000>

### **9.1.6 Others**

papaya is still running Debian 8.11

## 9.2 Things to watch out for

### 9.2.1 rebuild moxa drivers

A very common error is that the kernel has changed and no moxa driver modules have been built yet.

Hints are errors in the log files of problems accessing ttyS devices.

On each of the 3 computers (archive, wifsip, sky) there under /root/moxa is the current driver set, which needs to be rebuilt by running ./mxinst. Options to look out for is [n] for ssl.

restarting /etc/init.d/npreals will fix things, but all services need to be restarted.

### 9.2.2 SMART and RAID status monitoring

Currently used are 8-port megacli RAID cards: Reference: <https://wikitech.wikimedia.org/wiki/MegaCli>

Example commands are

```
* megacli -help
* megacli -CfgDsply -aALL
* megacli -LdPdInfo -a0 | less
* megacli -CfgDsply -aALL | less
* megacli -EncInfo -aALL
* megacli -AdpAllInfo -aALL | less
* megacli -AdpSetProp AlarmSilence -a0
* megacli -AdpAllInfo -aALL | less
* megacli -CfgForeign -Scan -aALL
* megacli -pdInfo -aALL
* megacli -pdInfo -a0
* megacli -pdInfo -PhysDrv [252:0] -a0
* megacli -pdLocate -PhysDrv [252:3] -a0
* megacli -pdLocate -start -PhysDrv [252:3] -a0
* megacli -PdGetMissing -a0
* megacli -PDList -aall | less
```

To replace a drive, do the following:

```
* megacli -PDOffline -PhysDrv [252:6] -a0 (if not already dropped out)
* megacli -PDMarkMissing -PhysDrv [252:6] -a0 (optional, did not work for me)
* megacli -PdPrpRmv -PhysDrv [252:6] -a0
* replace drive
* megacli -PDHSP -Set -PhysDrv [252:6] -aN (set new drive as hot spare)
```

To check SMART status

```
* megacli -PDList -a0 | grep "Device Id" (find ID for the drive in question)
* smartctl -a -d megaraid,12 /dev/sda
```

## 9.3 Firewall

Bering uClibc 7.x firewall running also the wireguard VPN server.

[https://bering-uclibc.zetam.org/wiki/Bering-uClibc\\_7.x\\_-\\_User\\_Guide](https://bering-uclibc.zetam.org/wiki/Bering-uClibc_7.x_-_User_Guide)

Workflow

- ssh fire
- edit /etc/shorewall/rules|policy or wireguard settings
- exit lrcfg and test the rules with /etc/init.d/xxx restart

- if no errors, can start lrcfg again and \_s\_ave settings, maybe \_c\_heck first what is being saved
- can also run `upgrade -c -vvv` to check if upgrades are available

#### Interfaces

- eth0 is uplink, fixed IP, ip\_proxy\_arp=1
- eth1 is loc, public IPs, dhcp, no natting
- eth2 is lab, dhcp, NATted, and currently offline



## INDICES AND TABLES

- `genindex`
- `modindex`
- `search`