



Current status of TIGRE:

Technical and observational review of the last
years

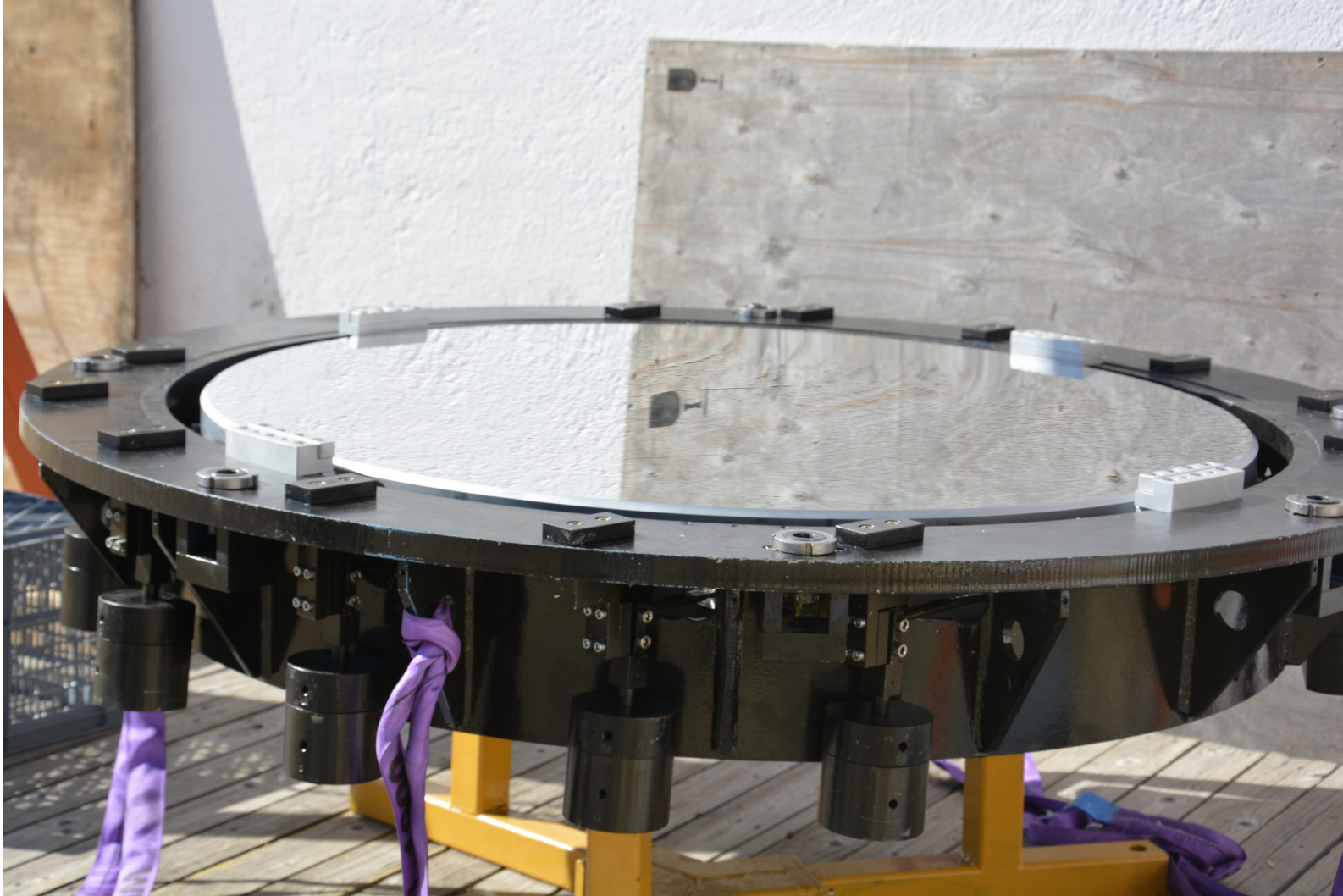
José Nicolás González Pérez
Hamburger Sternwarte



Service mission: Jan.-Feb. 2017

- Mirror cell
- M1 + M3 Mirrors
- Dome sealing

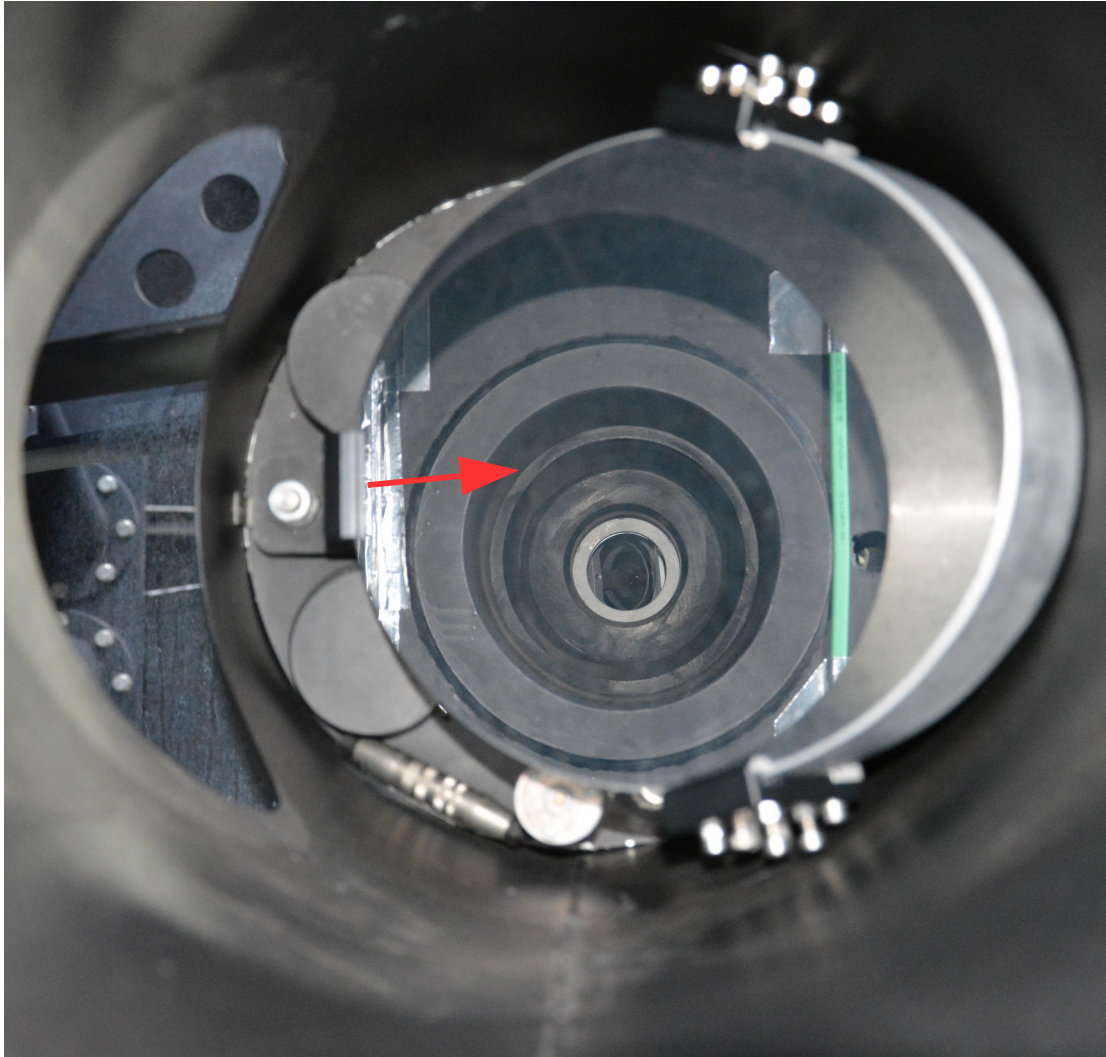
Tigre Installation of the optics



Tigre Installation of optics



Tigre Alignment: problems



- M3 location
- ~1cm too high
- Possible loss of photons
- Mount of the mirror: needs a new concept!

Tigre Sealing of the dome

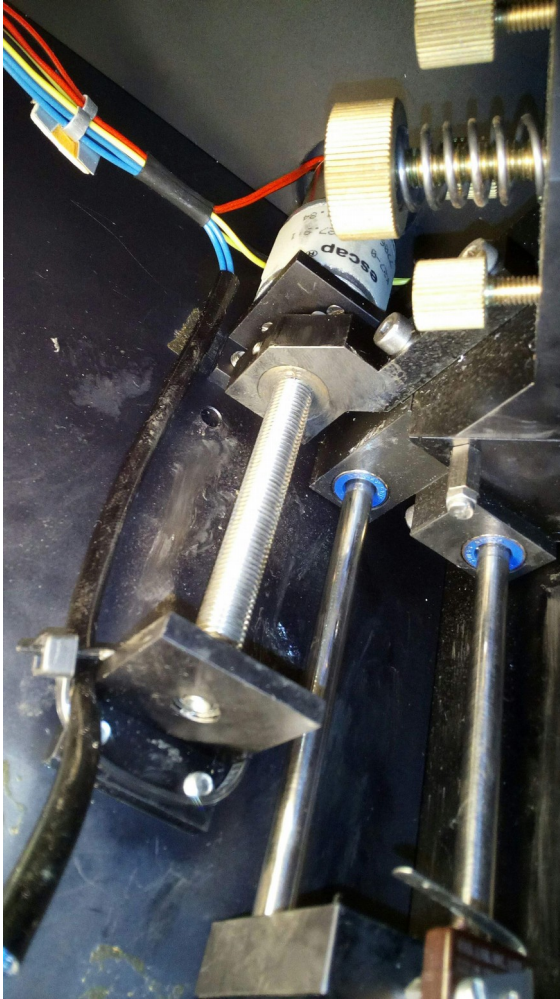


- New rubber O-profile
- No L-profiles
- No traces of water on the mirrors

Tigre Service mission: Jan. 2018

- Reparation of Calibration Unit of the adapter
- Substitution of pellicle beam splitter
- Reparation of the UPS
- Control of the air conditioning of the spectrograph room

Adapter



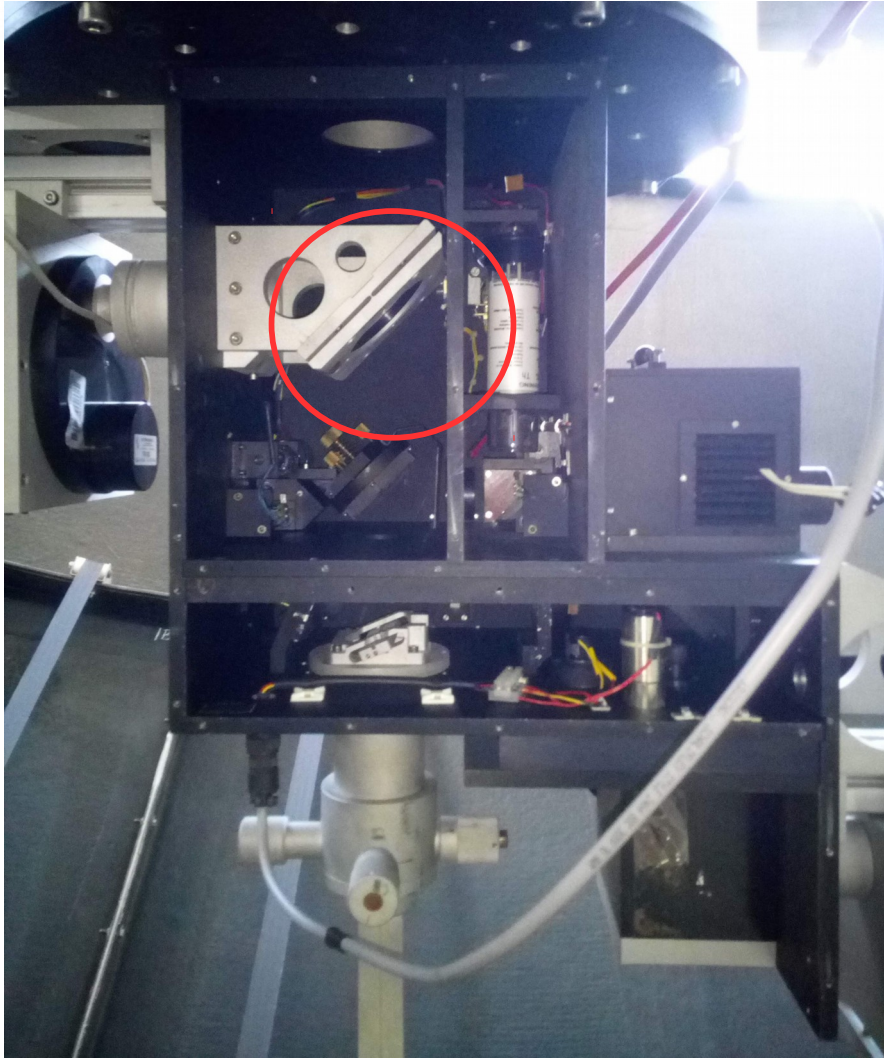
- Calibration unit not working
- 2017 Dec 06 until 2018 Jan 07
- Mirror/prism not placed in right position
- Solution: grease + time-lag fuse

UPS



- Battery charging voltage too low
- UPS was not supported by batteries
- Switch did not work

Tigre Pellicle beam splitter



- Since the start in operation
- Substituted by a new one

Air conditioning



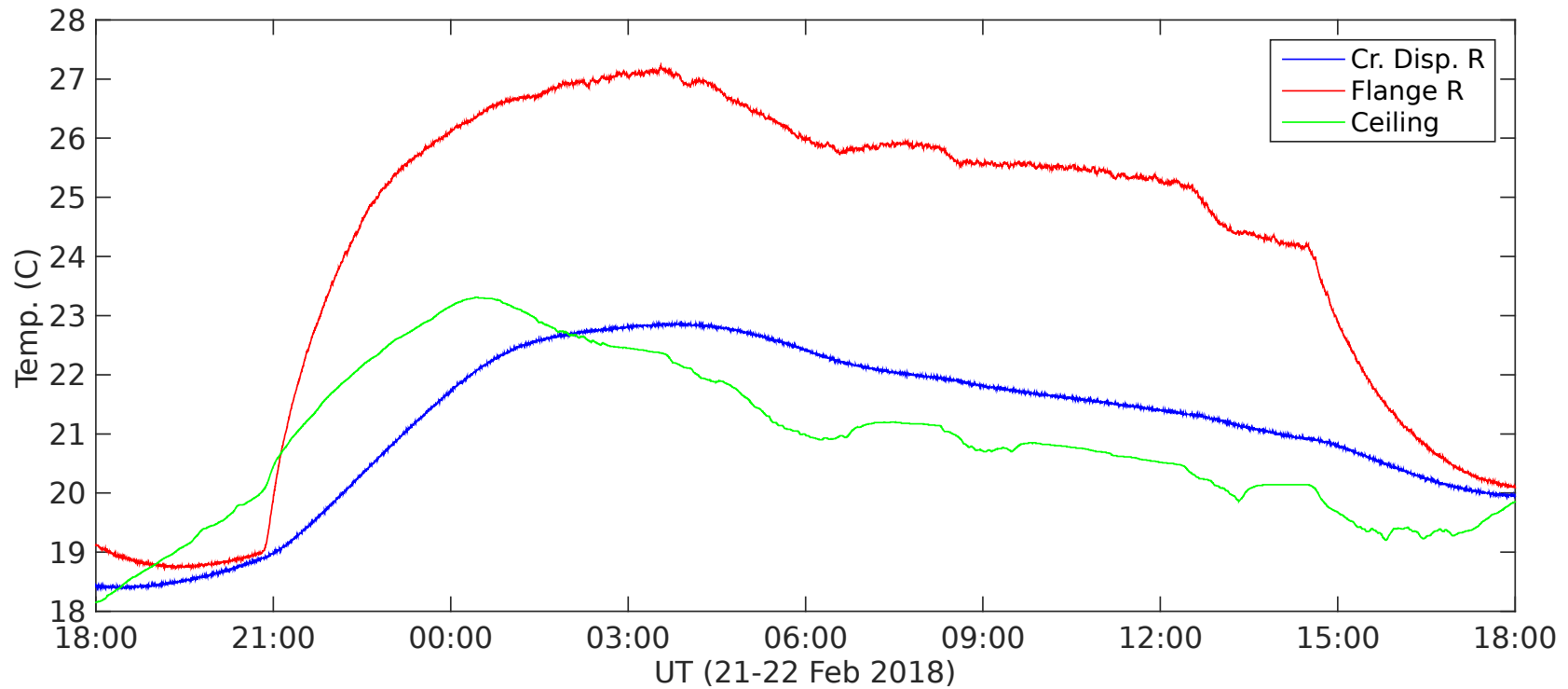
- Basic controller
 - no PID
 - fixed target Temp.
- Now
 - remotely controlled (arduino)
 - Use temperature of spectrograph

Air conditioning

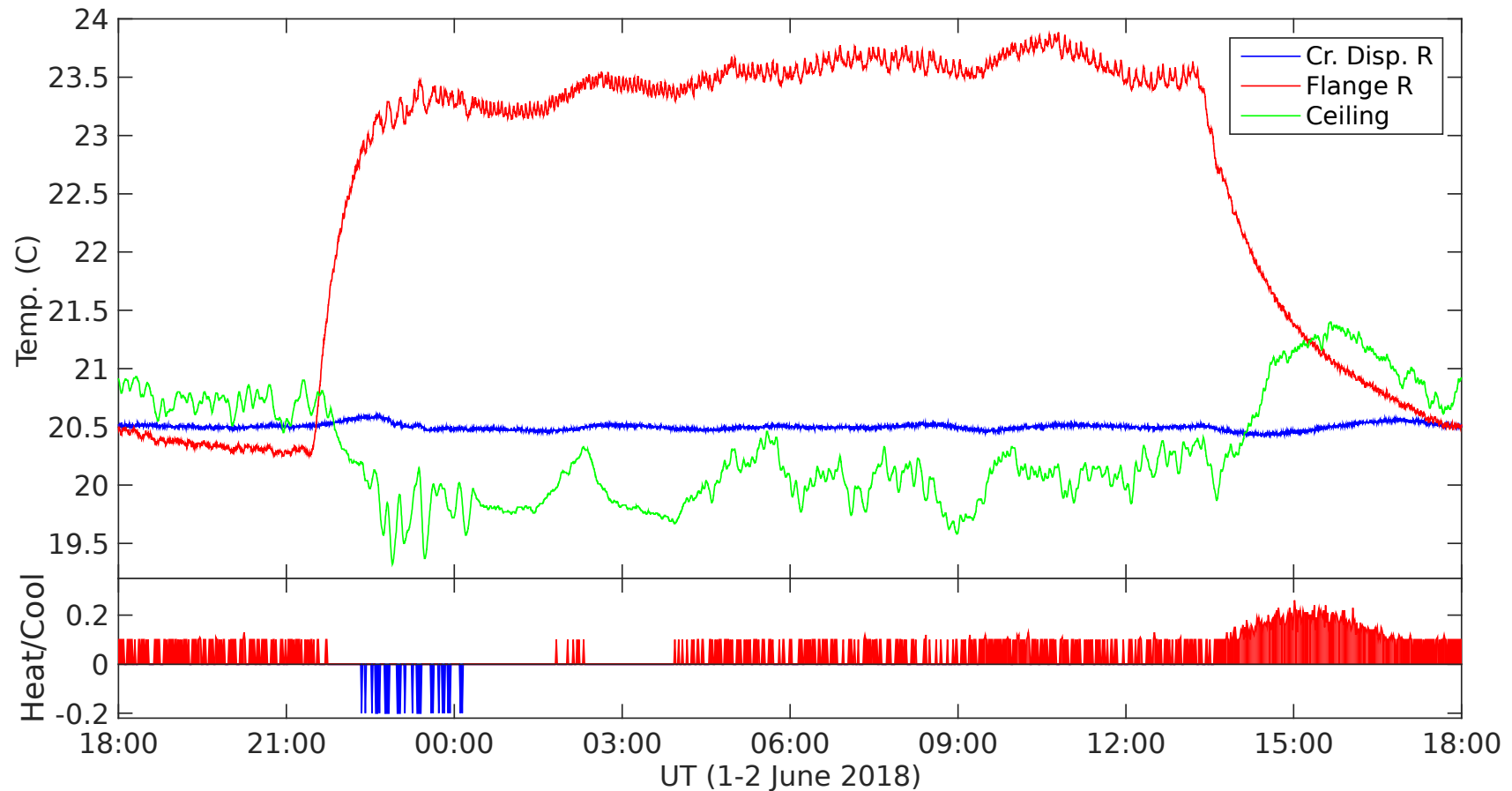


- DeWalt dxh165
- Heater with ventilation fan
- Heating power remotely controlled (arduino)
- Fan always working

Tigre Temperature before



Temperature after

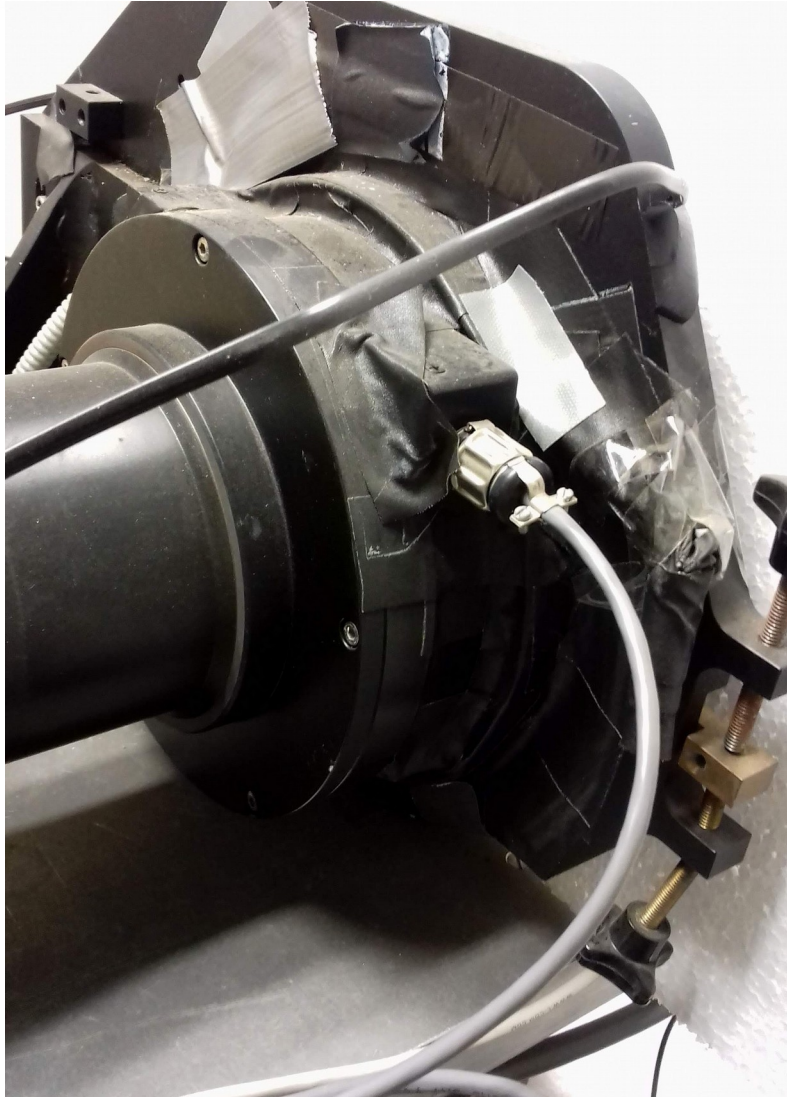


Internet Antenna + Lightning arrester



- Lightning strike Aug. 2017
- New antenna
- New lightning arrester

Additional problems: shutter of blue CCD

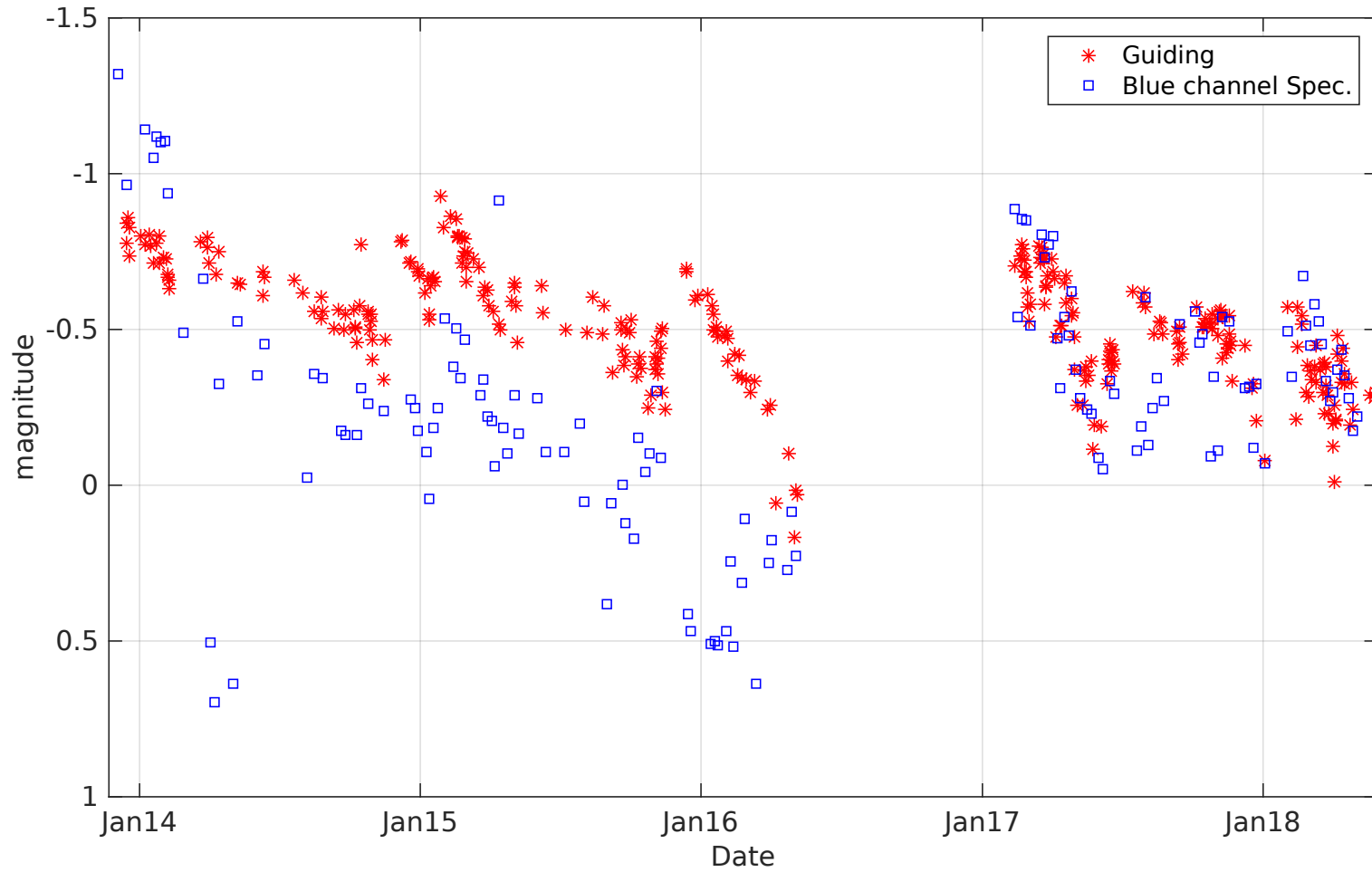


- 2018 Feb 04 until 2018 Mar 02
- ~30% of science images affected
- Problem: corrosion in cable contacts
- Solution: interchange with cable of red CCD

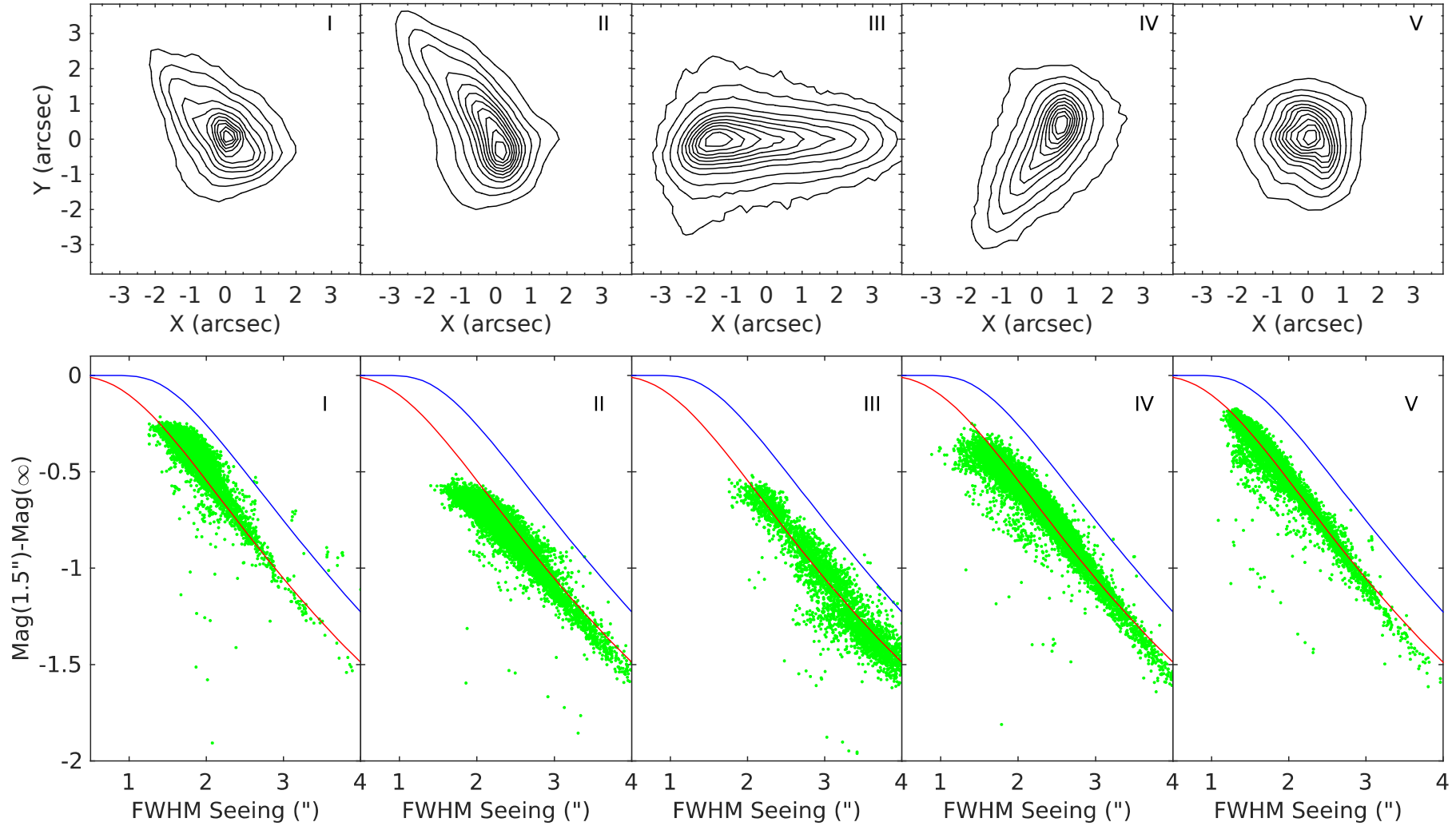
How the optics has been doing

- Plot with the photometry of guiding images:
 - It shows mainly the reflectivity
 - No influence of the seeing
 - Best nights /photometric
- Spectra
 - Here there is a strong influence of the seeing.
 - No color correction, but only stars with similar colors to the sun

Optical efficiency



PSF + aperture



Time statistics:

	Dates	Total Sci. Time (h)	% HH	% Gto	% Liège
AO0	Aug 13-Jul 14	892.84	70.0	18.1	11.9
AO1	Aug 14-Jul 15	1166.64	73.0	17.0	10.0
AO2	Aug 15-May 16	1051.22	74.7	15.6	9.7
AO3	Feb 17-Jan 18	1349.35	68.0	15.3	16.7
AO4	Feb 18-present	711.36	75.1	12.5	12.4

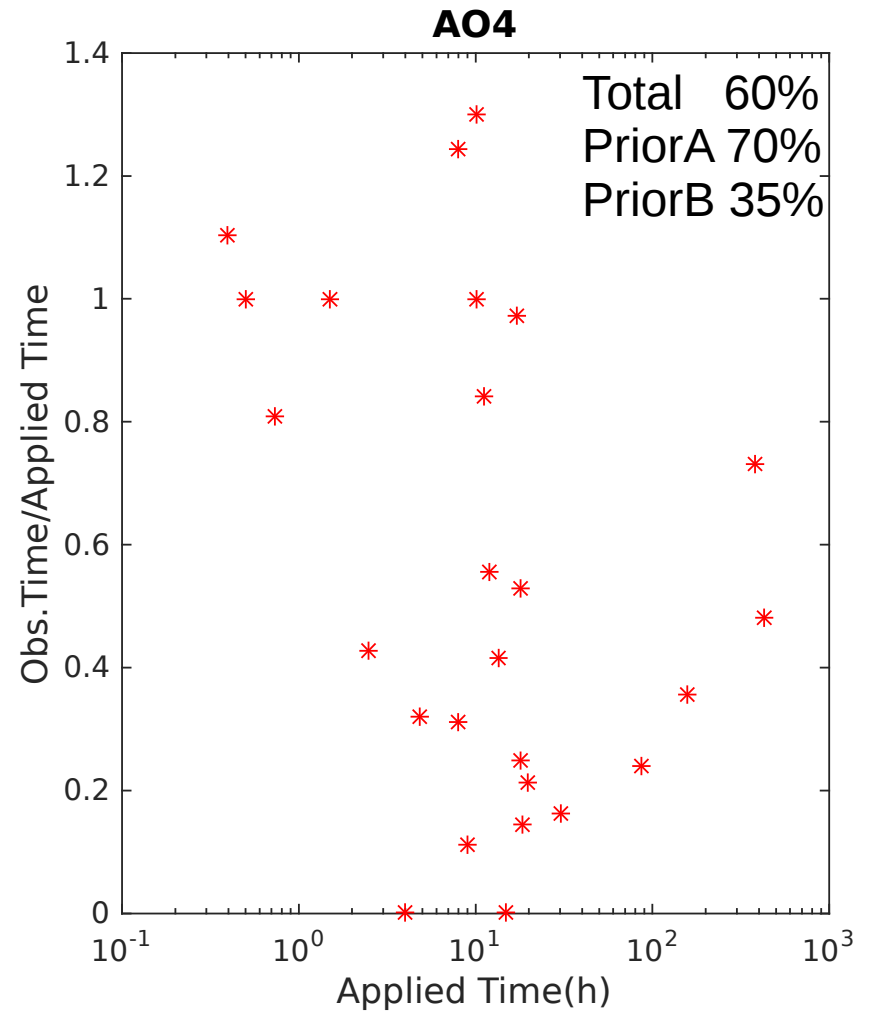
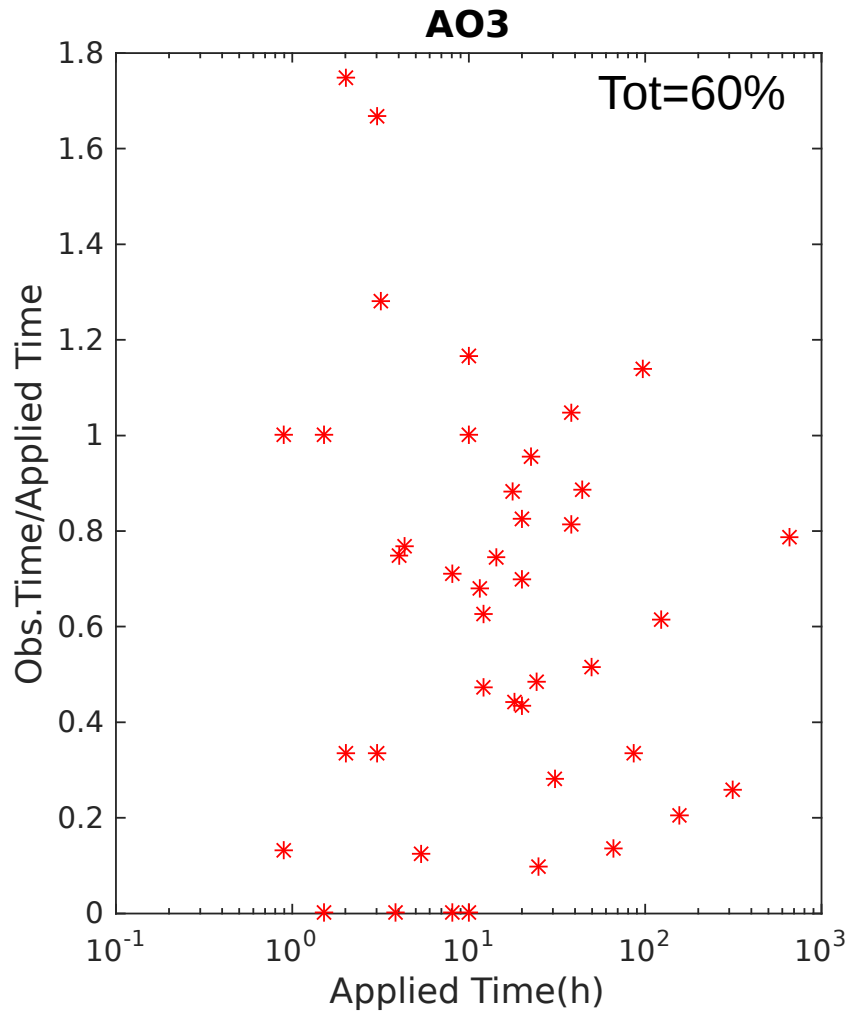
Tigre Best months / best year

- Best 12 consecutive months
2017 May – 2018 Apr: 1563h

Month	Best	Median	Month	Best	Median
Jan	203.35 (2014)	139.48	Jul	60.73 (2017)	41.49
Feb	241.02 (2014)	161.24	Aug	85.56 (2017)	73.00
Mar	224.07 (2018)	136.12	Sep	100.22 (2015)	62.28
Apr	194.28 (2018)	168.13	Oct	167.54 (2017)	99.85
May	153.05 (2017)	72.85	Nov	180.45 (2017)	90.04
Jun	95.99 (2017)	37.40	Dec	126.57 (2014)	101.88
	1832.83	1183.76			



Proposal statistic



Tigre Futur: TIGRE goes green

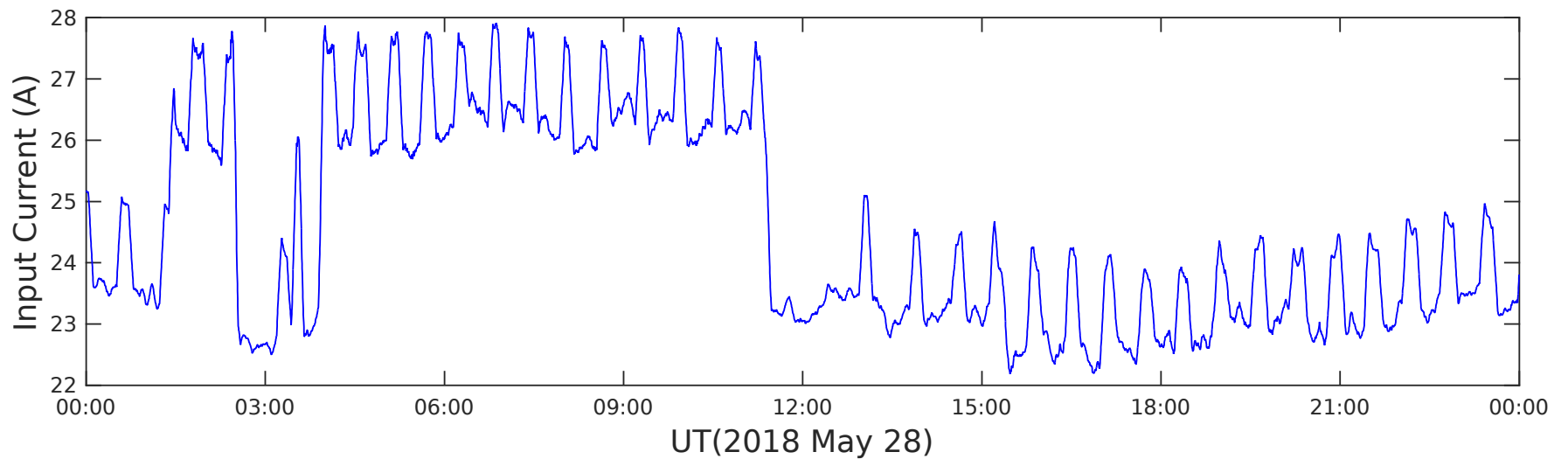
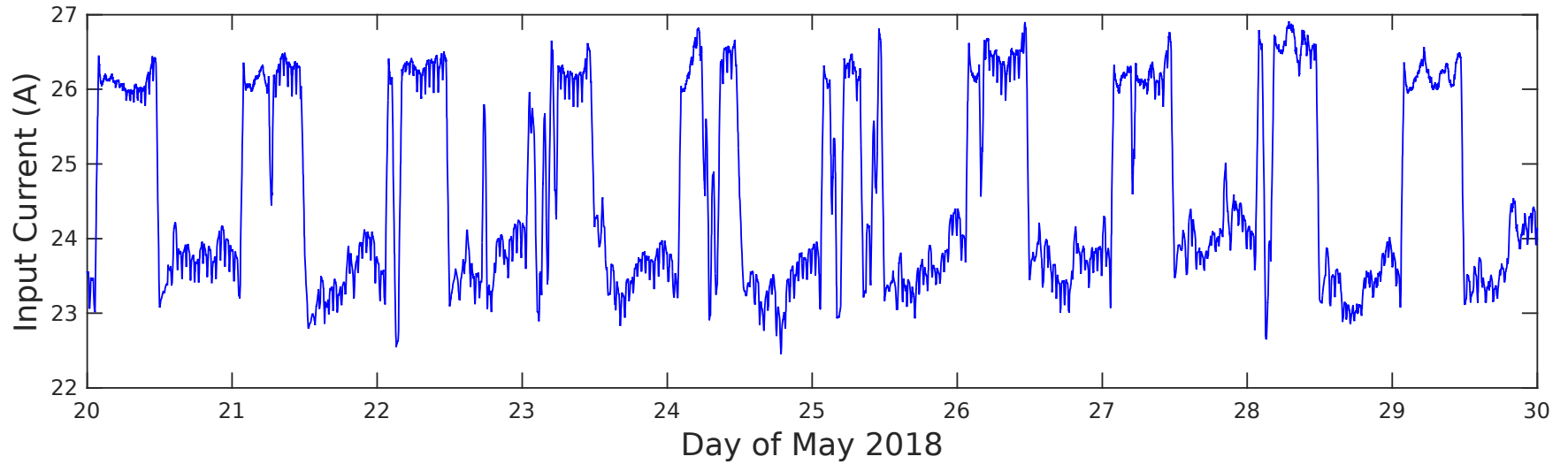


Problem

- Power supply not reliable
- UPS not working properly
 - Now batteries support only for <2 hours (should be ~8 hours)
 - High power consumption



UPS





Solar energy as main power source

Solar module

- Avancis 140Wp (1587x664mm)
- 105 W nominal power at ideal conditions
- Thin-film module
- Advantages over conventional solar cells
 - No loss of efficiency due to aging
 - Higher efficiency at non-ideal angles
 - Higher efficiency with indirect radiance
- 50 modules offered by Avancis (data in return)

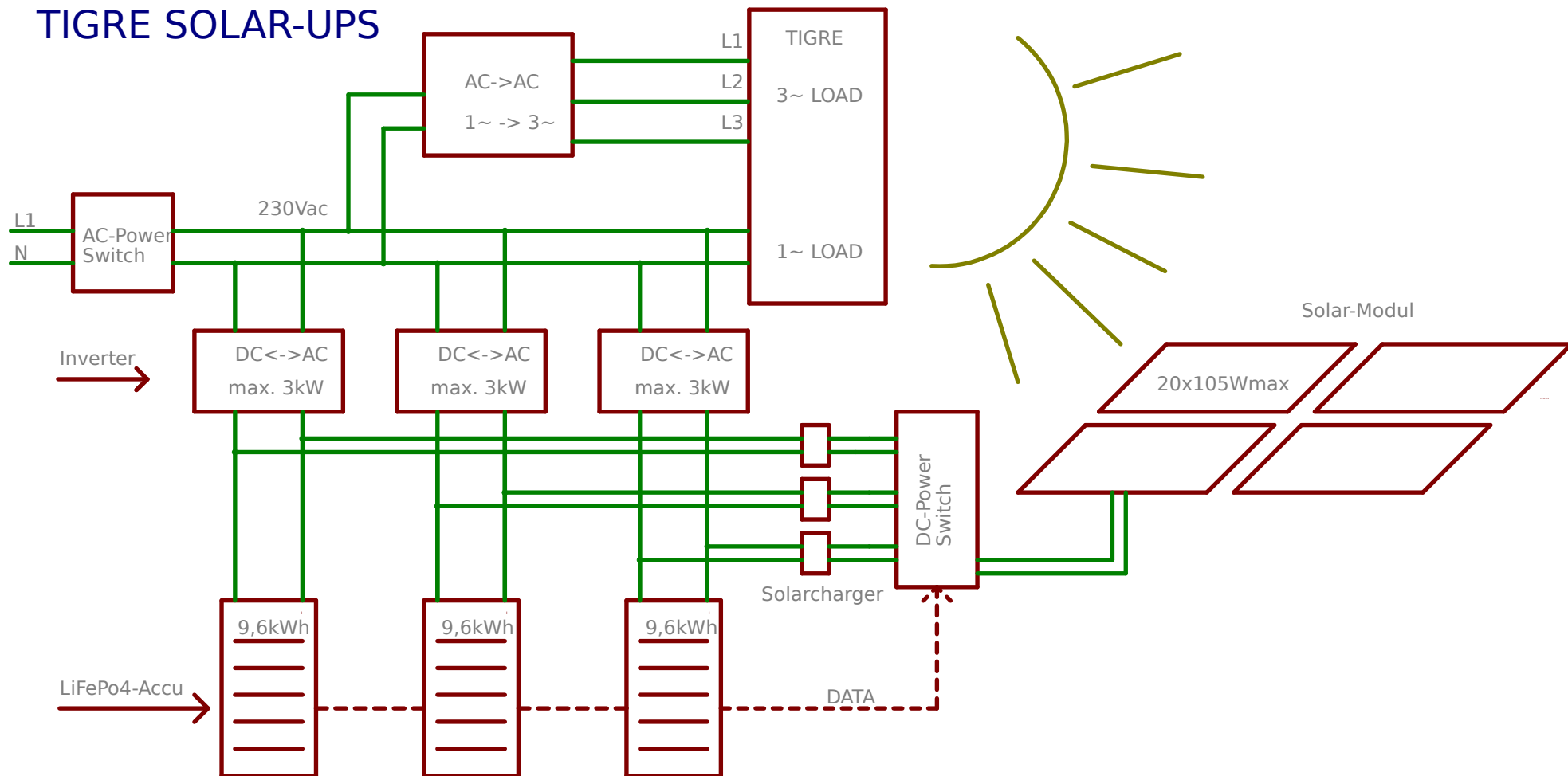
Tigre___ Inverter + Batteries



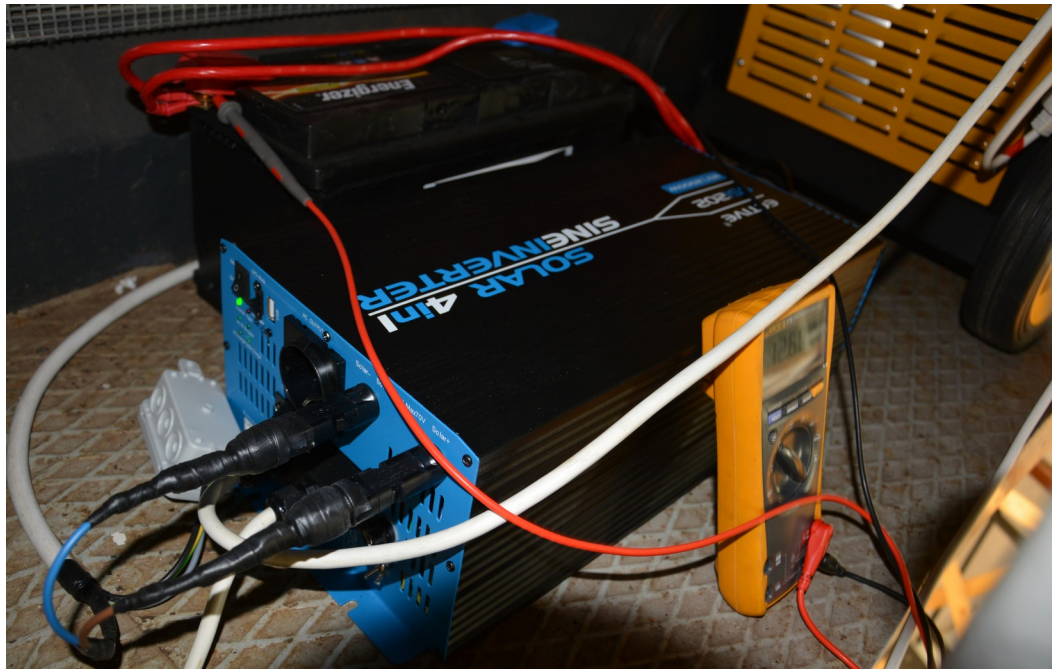
- LiFePo4 batteries
- Inverter: Dowell iPower. 3KW maximum power
- 3x (inverter + batteries)
- Capacity for 3 days of normal operation
- Charged on a normal sunny day

Tigre Scheme: solar plant

TIGRE SOLAR-UPS



Small solar plant



- Backup for the dome
- Car battery (100Ah)
- DC/AC Inverter
- Solar / Shore power
- Charged in 1 normal sunny day
- Testing in Hamburg since May

Tigre Festives: 5 years of TIGRE

- April 2018 five years since installation
- August 2018 five years since the start of regular observations
- December 2018 five years since the start of full robotic observations
- > 50000 raw spectra
- > 5500 hours of exposure time



end

Regulation failed

