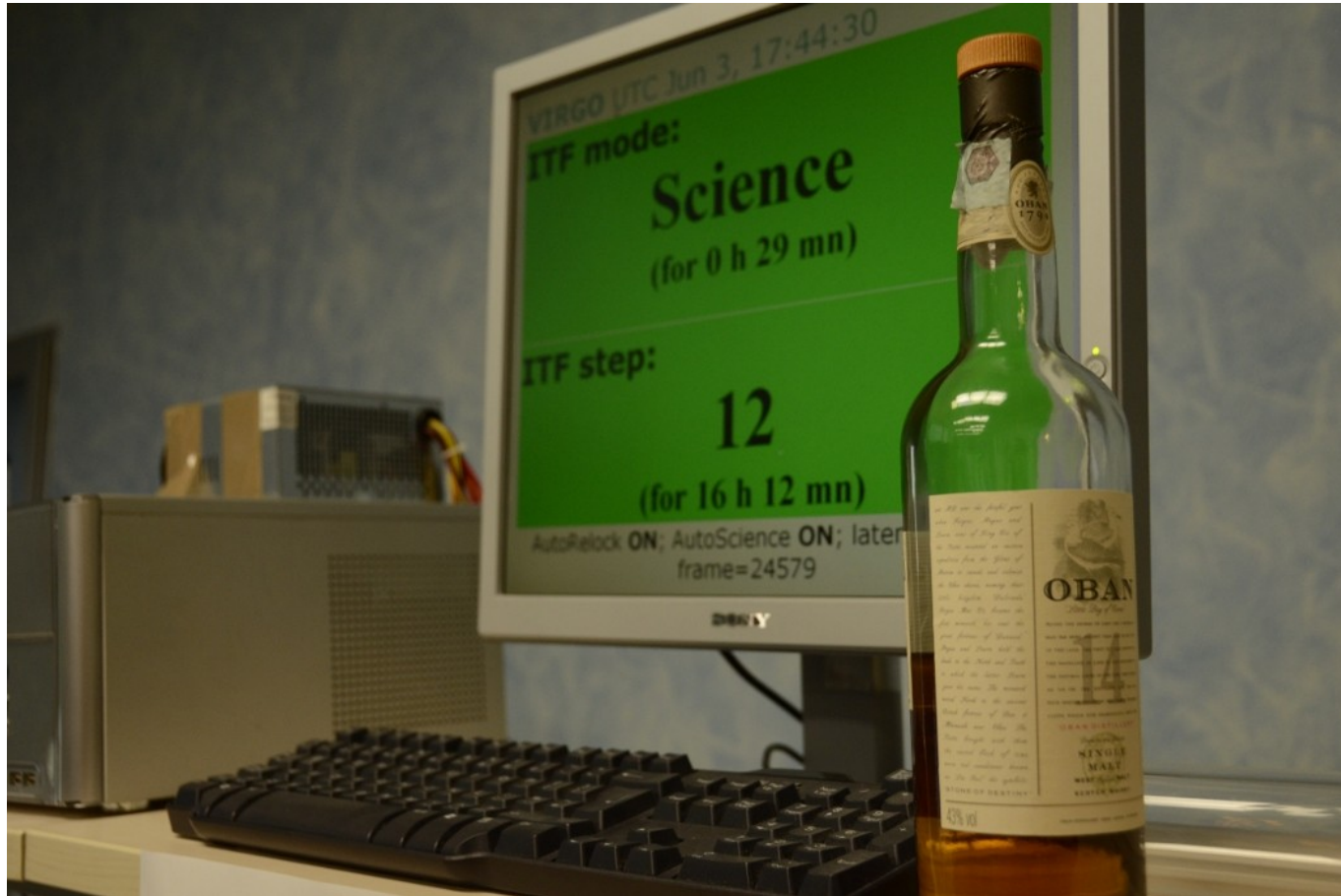
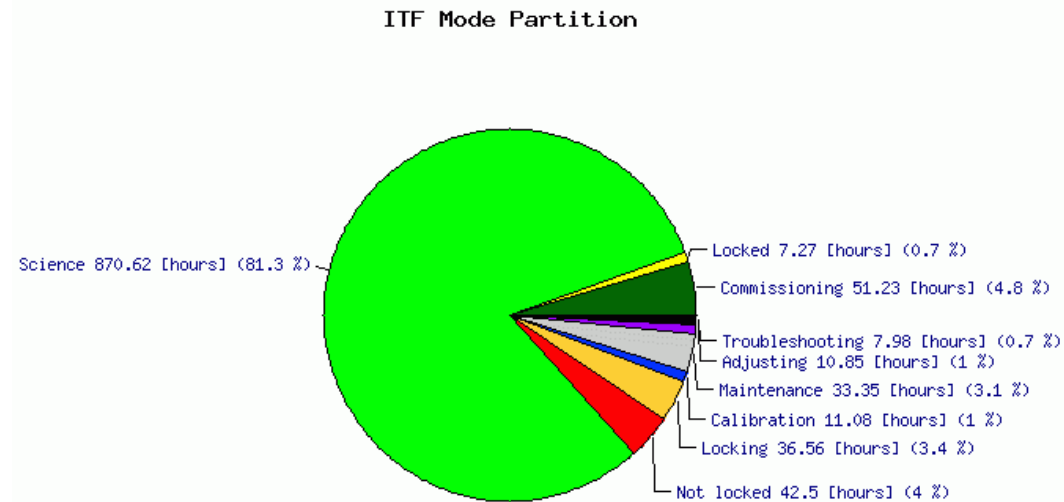


Status of commissioning



Bas Swinkels for the commissioning crew
Virgo week, 18 Jul 2011, Cascina

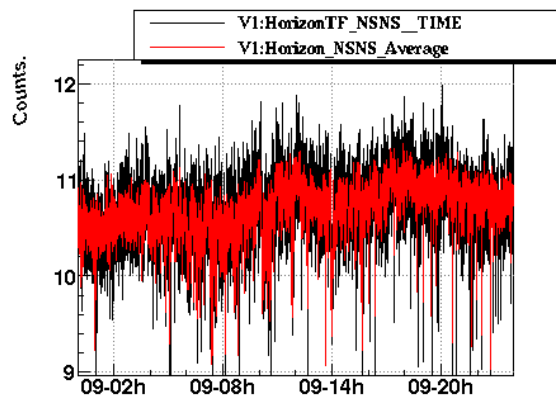
Start of VSR4



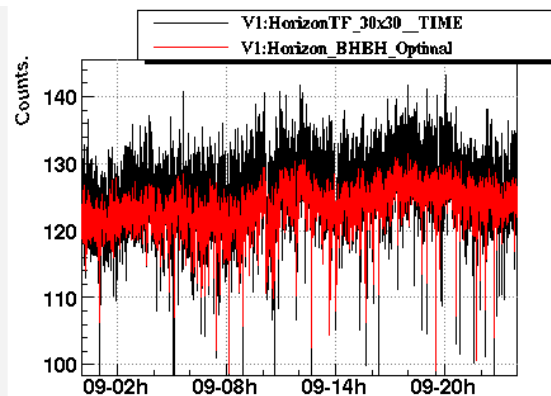
- Tuning of CHRoCC and TCS was left the same
- Lot of work to prepare for science run: OMC, alignment step 1, 8 Hz...
- Started VSR4 on June 3
- Duty cycle $> 80\%$, biggest loss due to post-maintenance troubles
- No major problems due to hardware failure



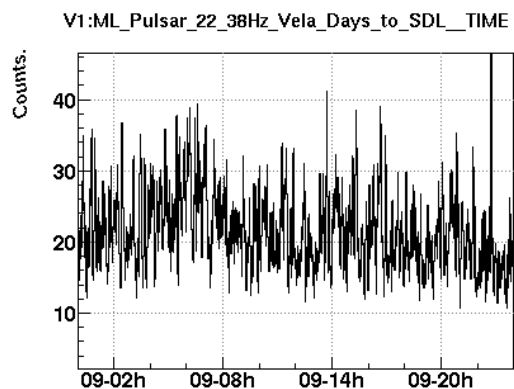
Start of VSR4



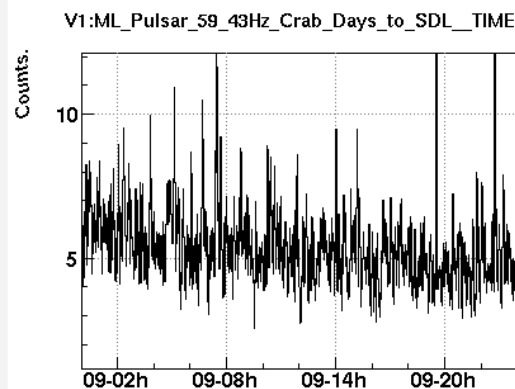
994204815.0000 : Jul 9 2011 00:00:00 UTC



994204815.0000 : Jul 9 2011 00:00:00 UTC



994204815.0000 : Jul 9 2011 00:00:00 UTC

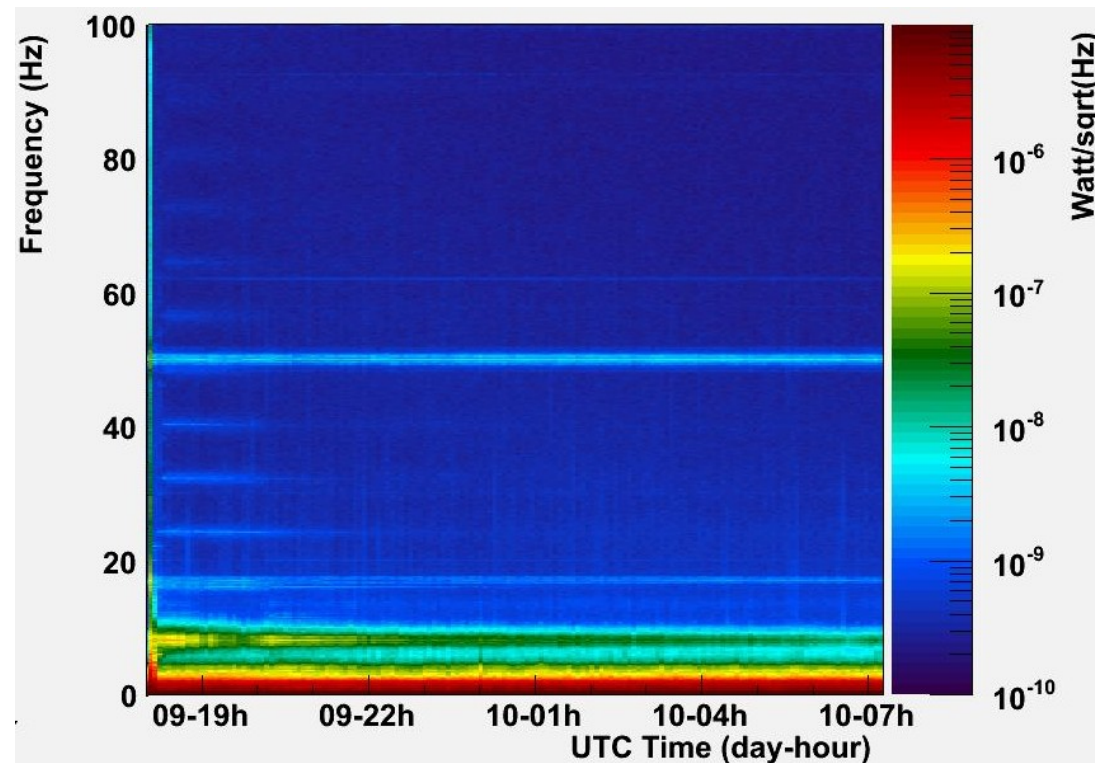


994204815.0000 : Jul 9 2011 00:00:00 UTC

- Horizon 10 – 11 Mpc NS-NS, ~120 Mpc BH-BH
- Time to beat spin-down-limit: Vela ~20 days, Crab ~5 days
- Glitch rate: more or less as VSR2



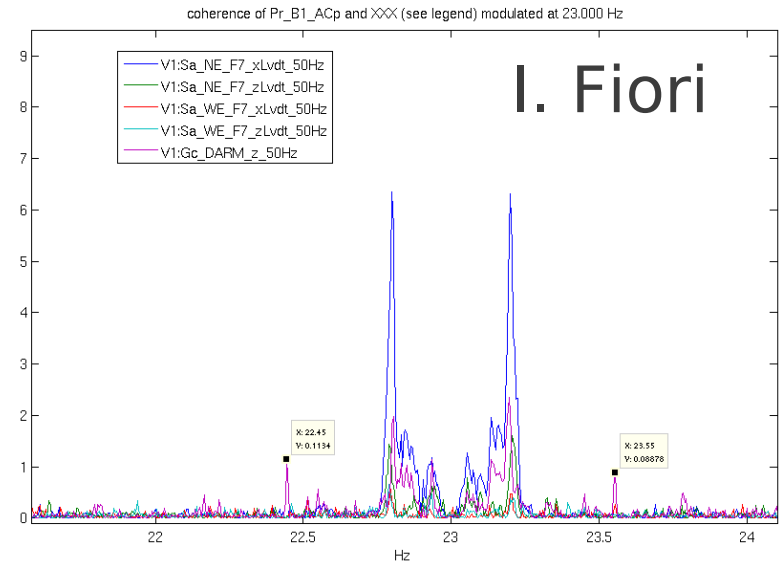
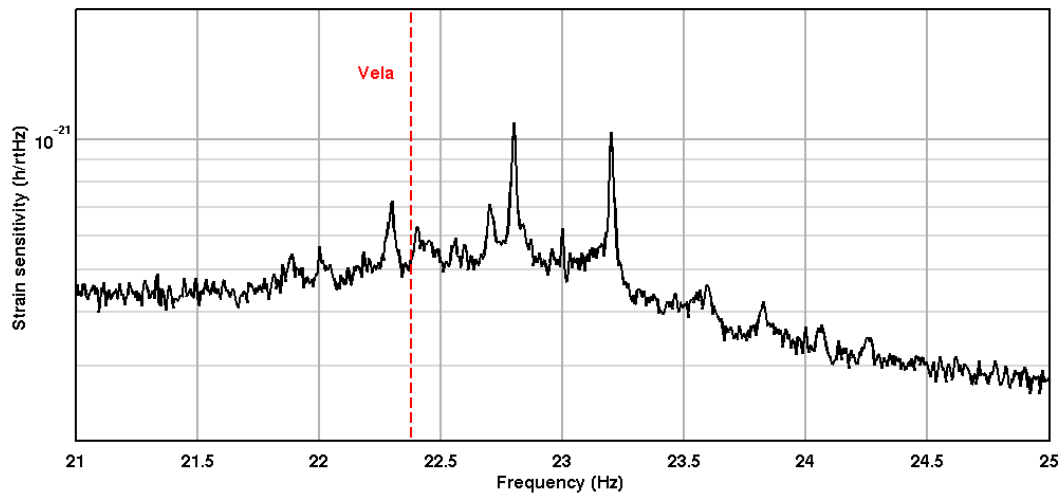
Non-linear noise



- Indications that ADC noise was contributing between 70 and 100 Hz
- Dark-fringe is now acquired both with and without shaping filter, automatic switch if signal is not saturating
- Clear harmonics when 8Hz is excited at beginning of lock
- Vela bump ...



Vela bump



- 'Horns' at distance of ~ 0.2 Hz around 22.5 and 23.0 Hz exactly
- Up-conversion of noise of WE (22.5 Hz) and NE (23.0 Hz)
- But we have no lines around those frequencies ...



Vela bump

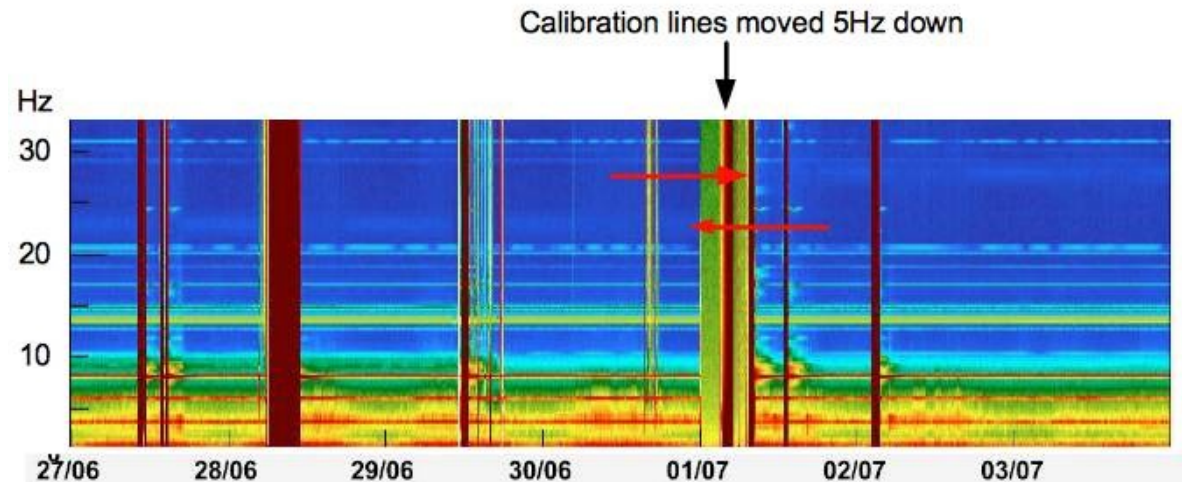
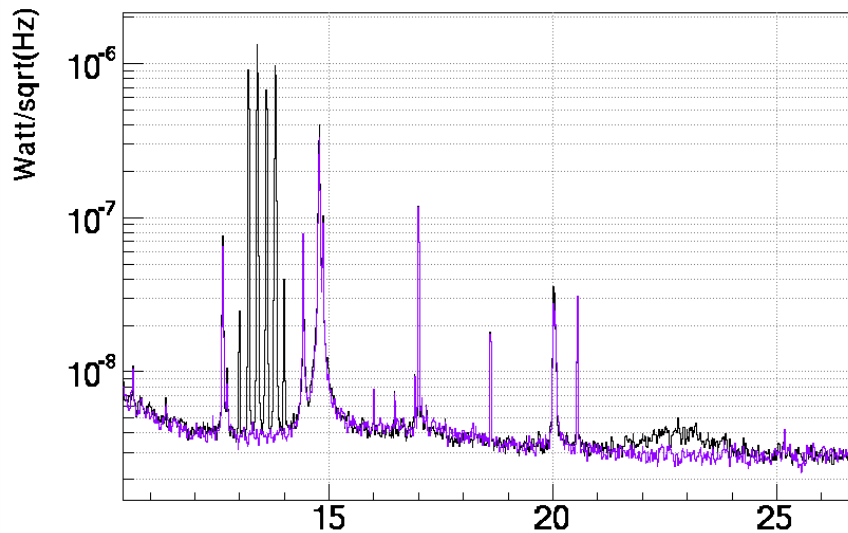
22.4 Hz =	13.0 +	9.4 (Ca_PR_zMir + Sc_NE_tyPSDm)	
22.4 Hz =	13.6 +	8.8 (Ca_NE_zMar + Sc_NE_txPSDm)	
22.5 Hz =	13.4 +	9.1 (Ca_WE_zMar + Sc_WE_txPSDm)	
22.5 Hz =	379.0 -	356.5 (Gc_DARM - Ca_WE_zMirUD)	same actuator
22.6 Hz =	13.2 +	9.4 (Ca_WE_zMirUD + Sc_NE_tyPSDm)	
22.6 Hz =	13.8 +	8.8 (Ca_NE_zMirUD + Sc_NE_txPSDm)	
22.7 Hz =	13.6 +	9.1 (Ca_NE_zMar + Sc_WE_txPSDm)	
22.8 Hz =	13.0 +	9.8 (Ca_PR_zMir + Sc_WE_tyPSDm)	
22.8 Hz =	13.4 +	9.4 (Ca_WE_zMar + Sc_NE_tyPSDm)	
22.8 Hz =	14.0 +	8.8 (Ca_BS_zMir + Sc_NE_txPSDm)	
22.9 Hz =	13.8 +	9.1 (Ca_NE_zMirUD + Sc_WE_txPSDm)	
23.0 Hz =	13.2 +	9.8 (Ca_WE_zMirUD + Sc_WE_tyPSDm)	
23.0 Hz =	13.6 +	9.4 (Ca_NE_zMar + Sc_NE_tyPSDm)	same actuator
23.0 Hz =	379.0 -	356.0 (Gc_DARM - Ca_NE_zMirUD)	same actuator
23.1 Hz =	14.0 +	9.1 (Ca_BS_zMir + Sc_WE_txPSDm)	
23.2 Hz =	13.4 +	9.8 (Ca_WE_zMar + Sc_WE_tyPSDm)	same actuator
23.2 Hz =	13.8 +	9.4 (Ca_NE_zMirUD + Sc_NE_tyPSDm)	
23.4 Hz =	13.6 +	9.8 (Ca_NE_zMar + Sc_WE_tyPSDm)	
23.4 Hz =	14.0 +	9.4 (Ca_BS_zMir + Sc_NE_tyPSDm)	

- ... but we do have many combinations of frequencies
- Most dangerous seem those applied to same actuator



Vela bump

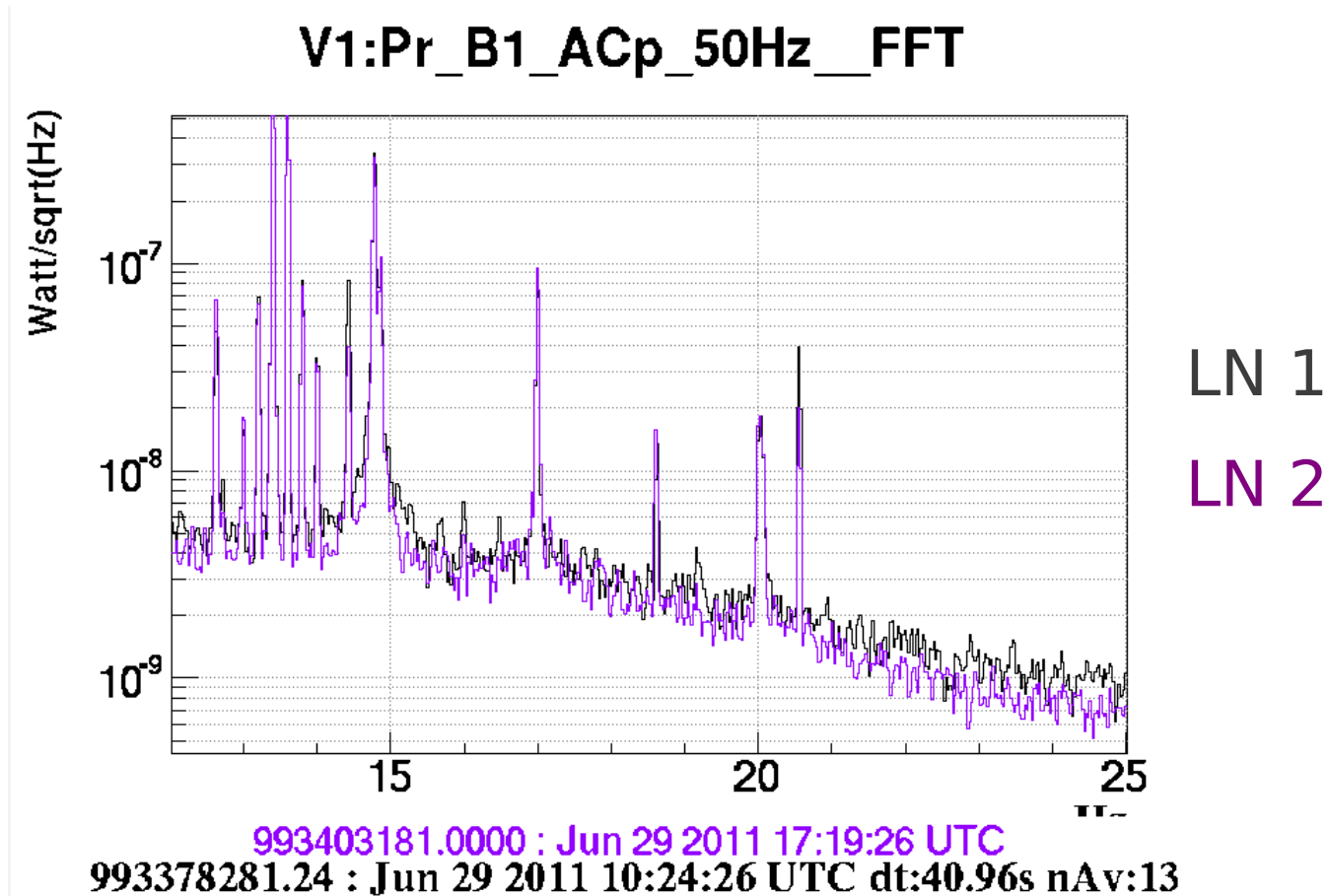
V1:Pr_B1_ACp_FFT



- Switching off all calibration lines, the bump disappears
- Combination of 356.x Hz calibration lines + 379 Hz DARM line responsible
- Actions:
 - Angular lines around 9 Hz reduced in amplitude
 - All 35X Hz calibration increased by 5 Hz → bump moved to 28 Hz
 - DARM line decreased by factor 10 → bump no longer visible
- Result: time to spin-down-limit for the Vela reduced from ~40 days to ~20 days



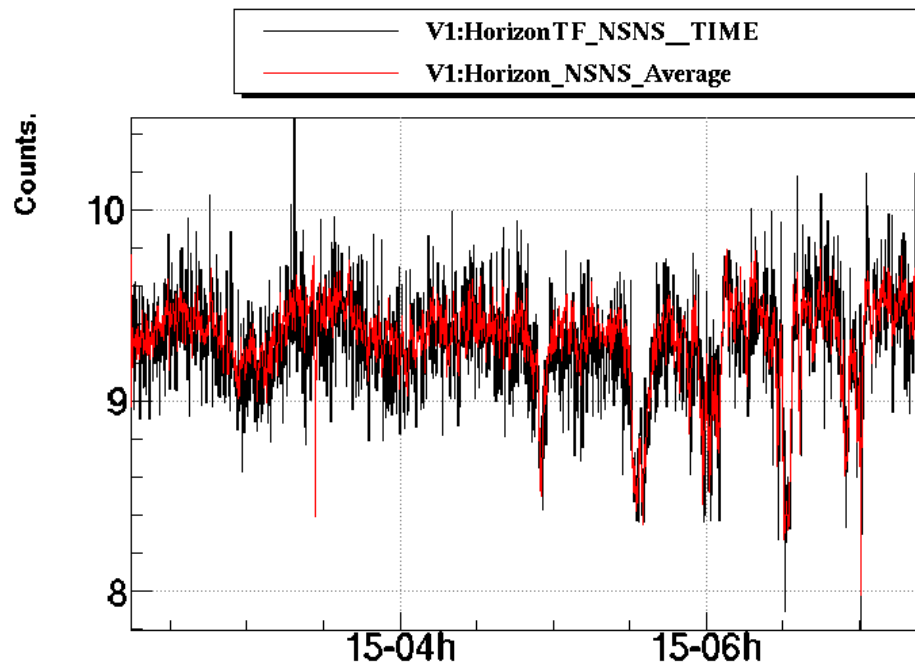
Switch from LN1 to LN2



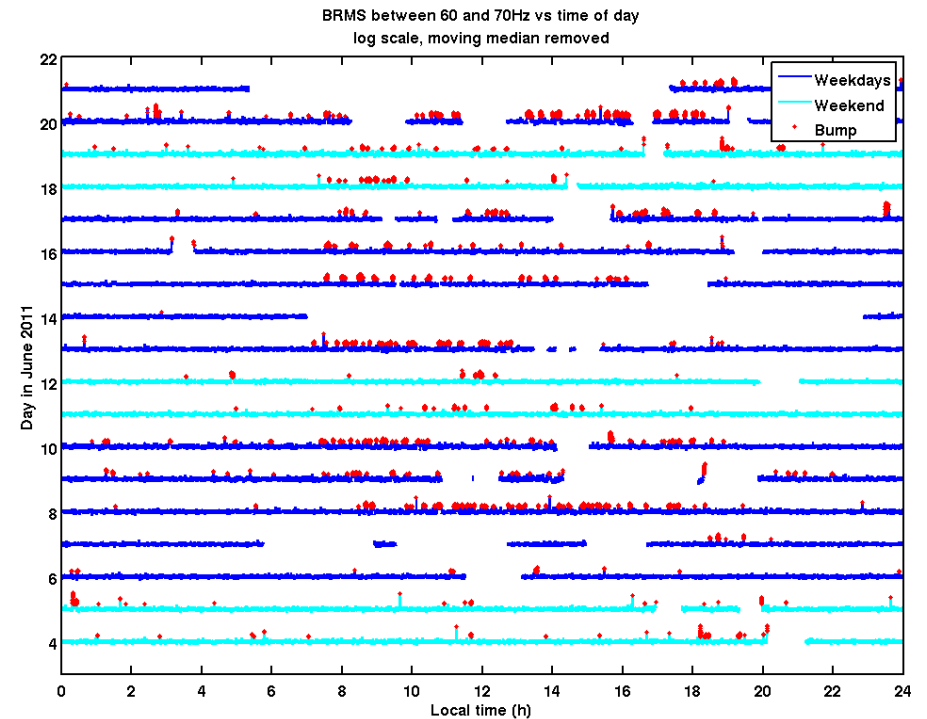
- With Vela bump gone, finally some evidence that LN2 helps
- Now the standard situation at step 12
- Required lots of work on calibration, retuning of alpha/gamma



Baffle noise?



992139305.0000 : Jun 15 2011 02:14:50 UTC

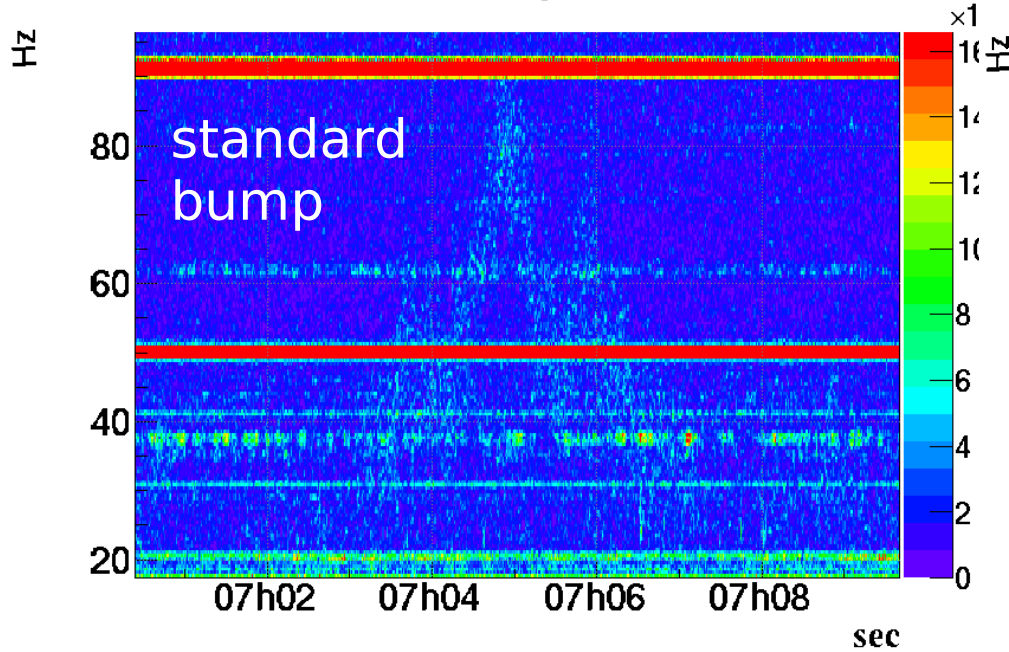


- Many annoying bumps in horizon
- Only during working hours: human activity



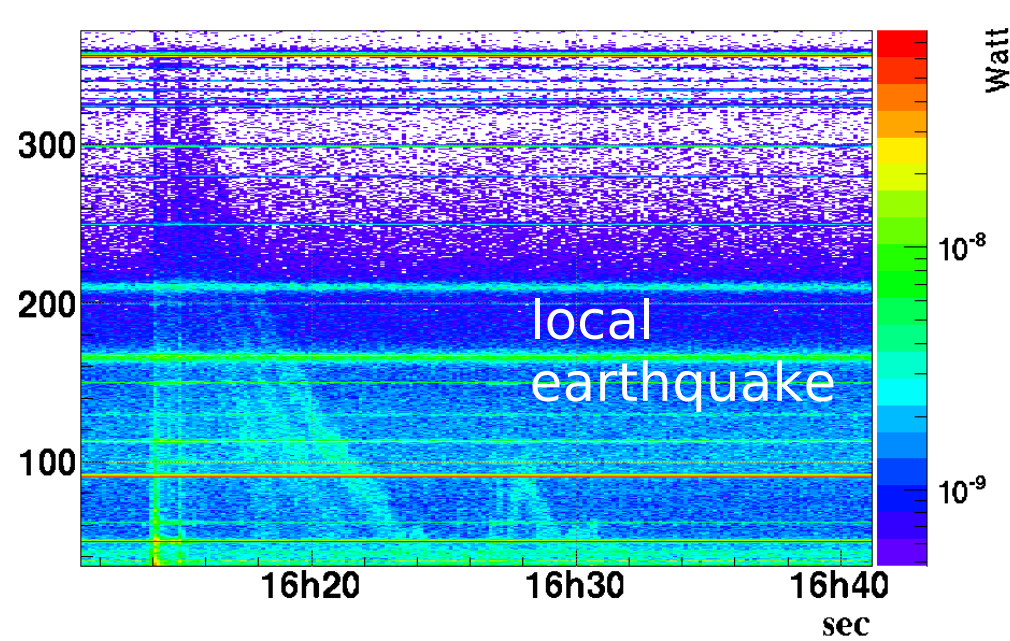
Baffle noise?

V1:Pr_B1_ACp_FFTTIME



994662039.0630 : Jul 14 2011 07:00:24 UTC dt:2.05s nAv:2

V1:Pr_B1_ACp_FFTTIME

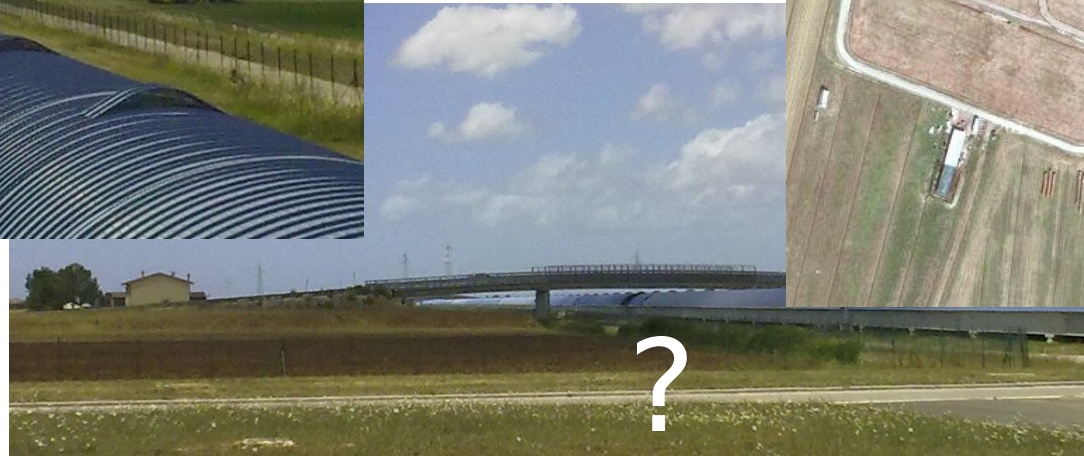


991239015.00 : Jun 4 2011 16:09:59 UTC dt:4.10s nAv:20

- Noise appears like a bump increasing in frequency
- Typical of scattered light by excited baffle



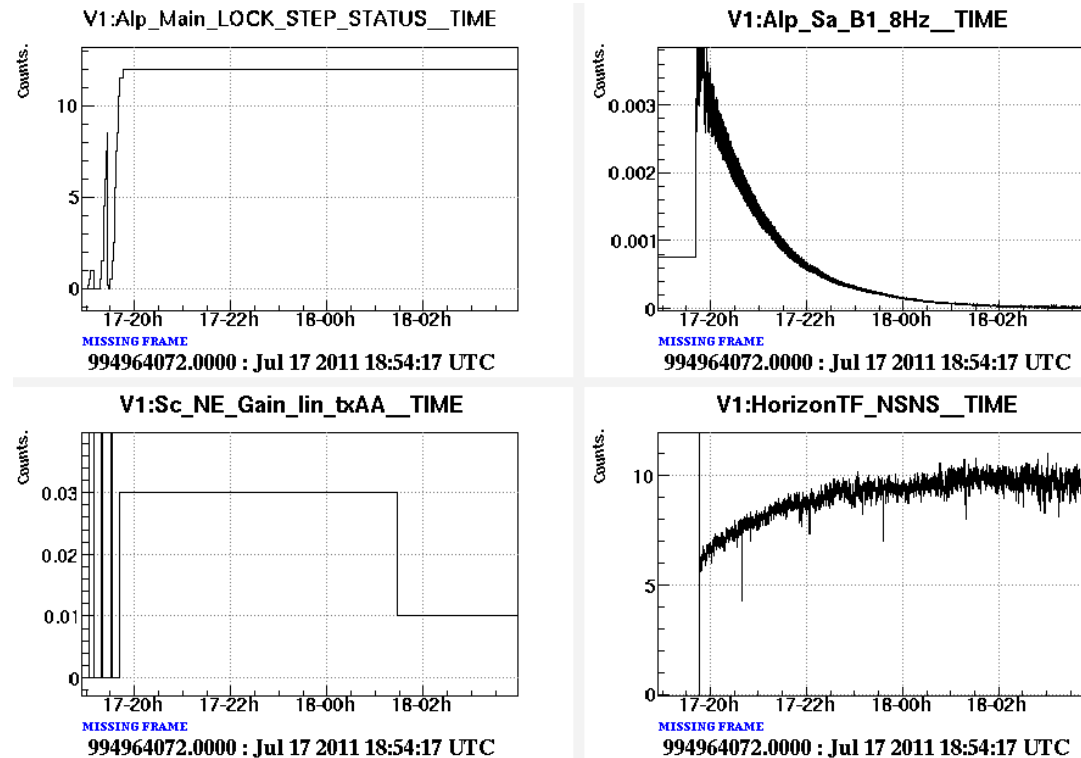
Baffle noise?



- Only in few cases a clear culprit was found
- In general, no correlation with seismic noise
- Might be some baffle along tube
- Studies with portable seismometer ongoing



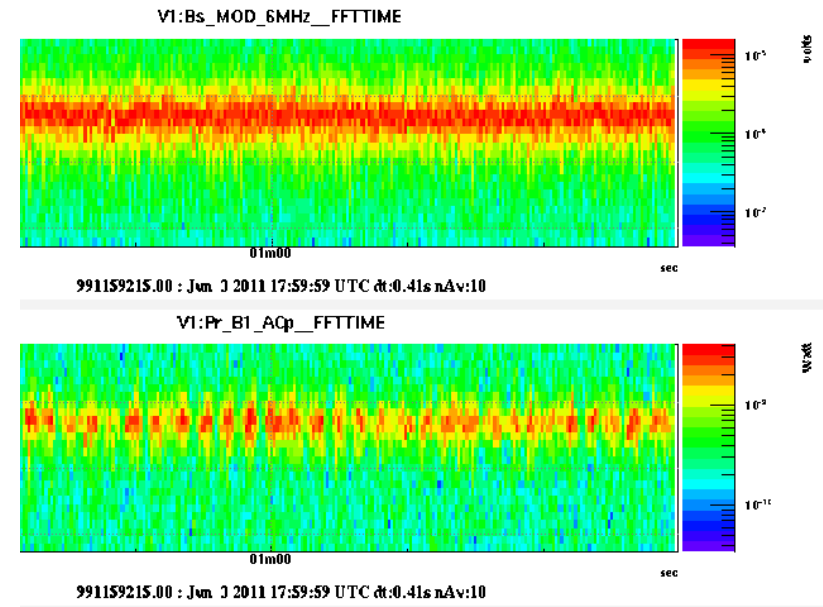
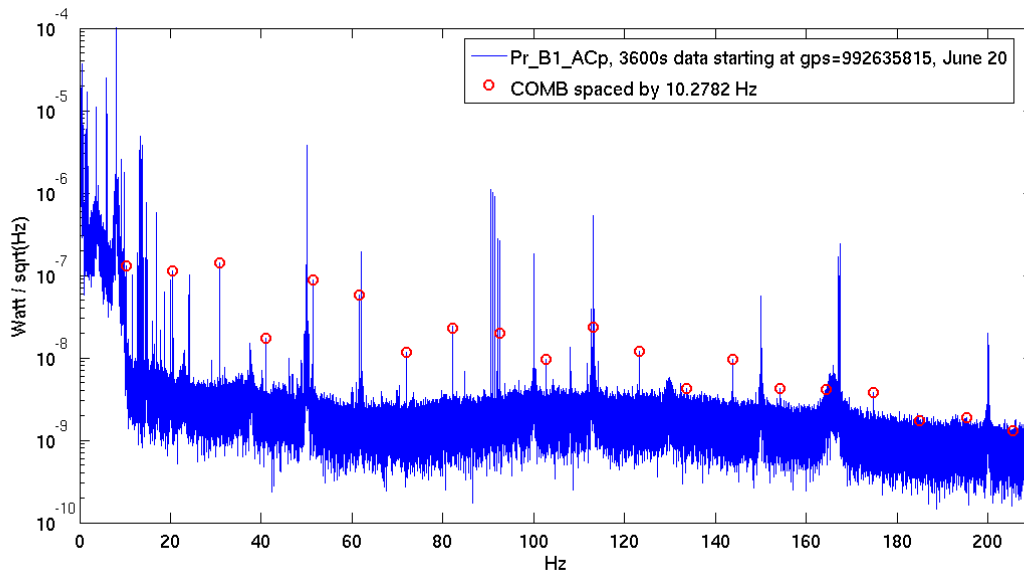
Alignment



- 8Hz tz-resonance always excited at beginning of lock: Switch-on of input-mirrors drift-control and lowering of lines delayed by a few hours
- B5 quadrants on suspended bench now read by shaped ADC, no clear improvement



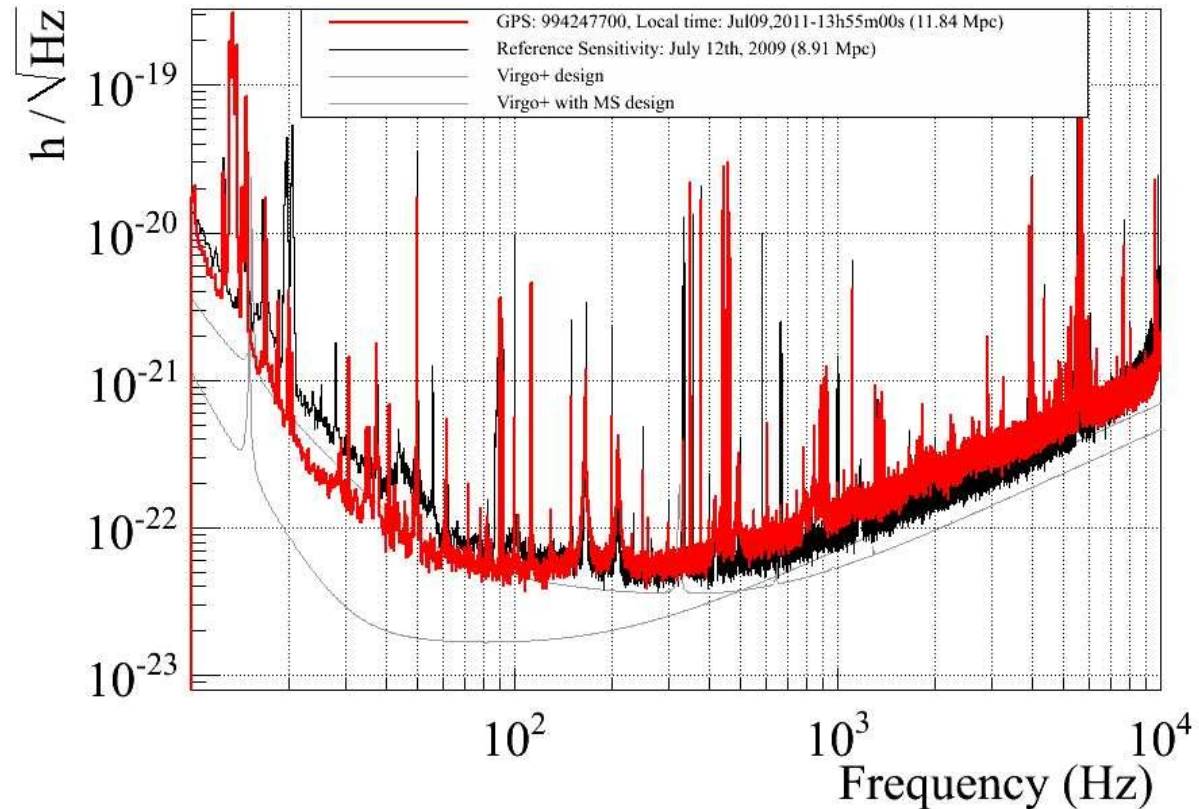
Environmental monitoring



- Comb in spectrum with spacing of exactly 0.05 Hz spacing, now gone
- Comb with spacing of 10.2782 Hz, seen also in VSR1, seen in input mirror current monitors
- Non-stationary bump at 29xx Hz, probably due to Gx_PR process very annoying for glitch-rate
- Some lines found around 17-19 Hz due to air-conditioning



Concluding



- Successfully started VSR4
- Good duty cycle, horizon stable around 10 Mpc
- Significant improvement in Vela region



To do

- Find the cause of the 'agricultural noise'
- Understand non-linear processes
- Finish measurements of Q
- Re-check the diffused light of benches
- Increase resistors on marionetta (calibrations, alpha/gamma)
- Work after the science run to be discussed now



End

