

# Update on recent Virgo ENV investigations (West End latest news, Hrec $1/f^4$ noise)

F. Paoletti for the ENV team

21 Feb. 2020

# Where we were

17 Jan 2020 ([elog 48180](#))

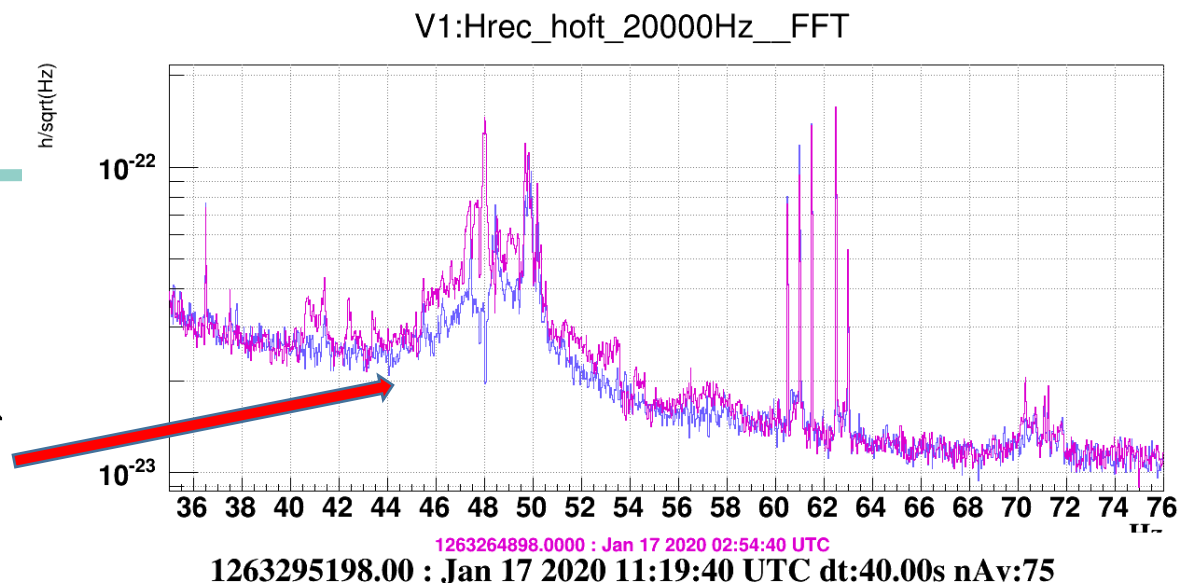
unplugging some West End Tower motors cables (MH.MA.TX and MH.MA.TZ Marionetta “balancing masses” motors cables - [elog 48226](#)) **we had a big effect on Hrec!**

Note:

- the crate power supply is **always OFF**
- these cables runs for some meters inside the tower together with MIRROR COILS CABLES

The clean-up effect is obtained by unplugging the motors cables  
**but also**

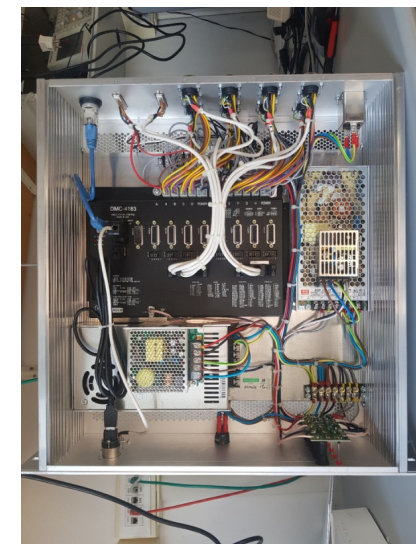
unplugging the power cord (mains) of the motors crate



motors crates

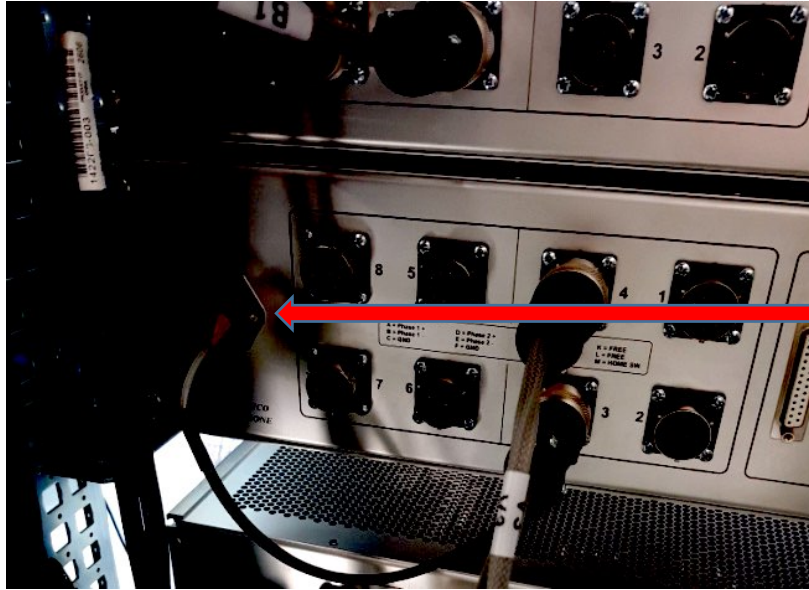


internal layout



# Latest test

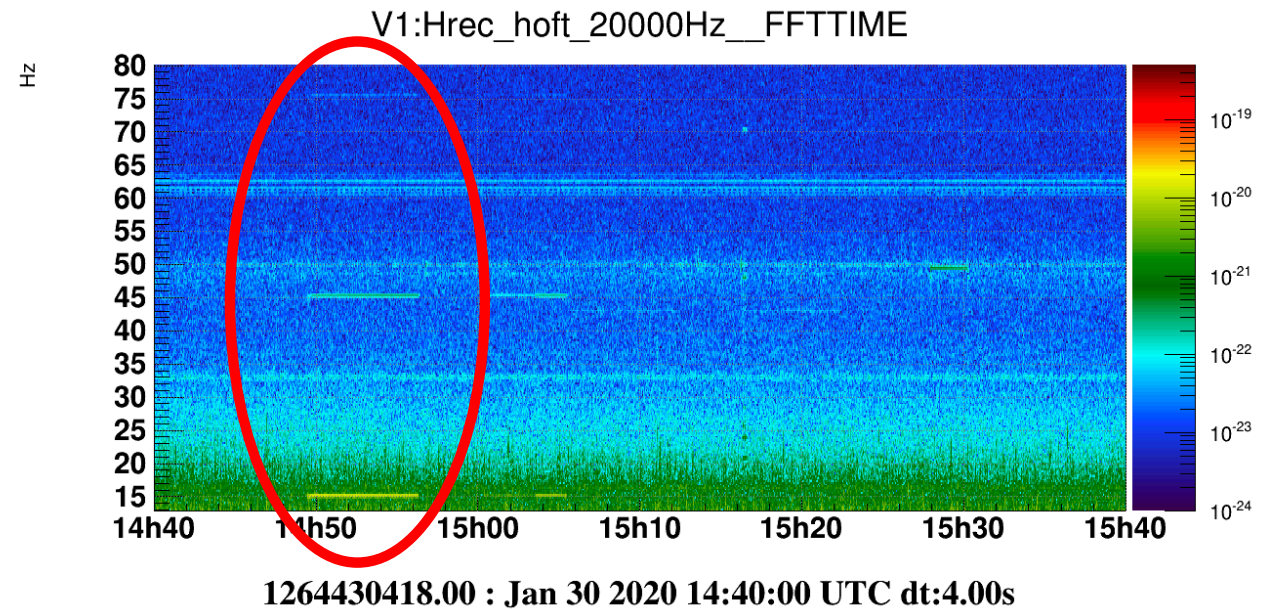
- <https://logbook.virgo-gw.eu/virgo/?r=48306>



back side of motors crates

next actions

- short term: leave (unused) cables/crates unplugged
- long term: discharge mirrors



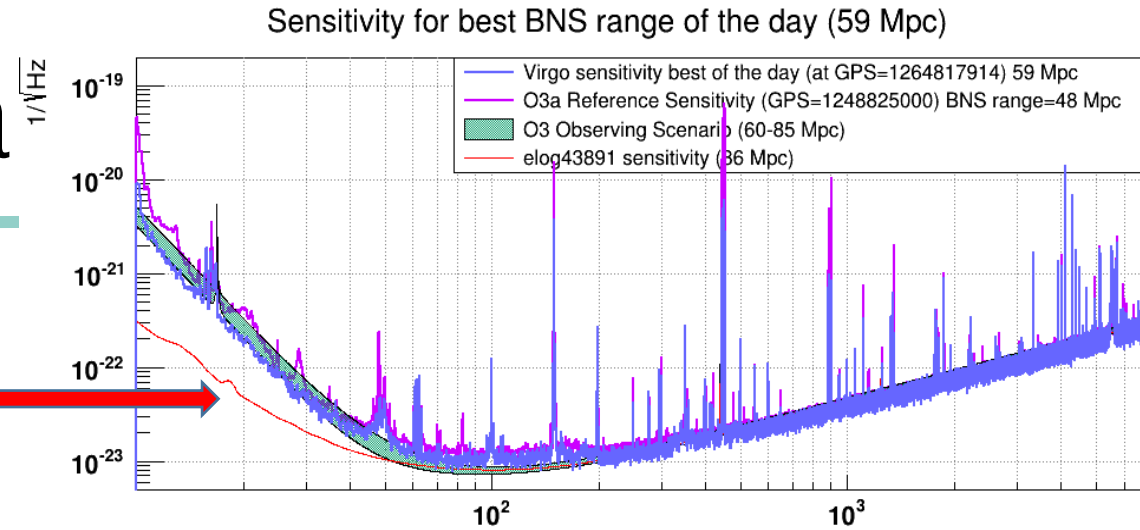
“common mode” signal (15Hz, 4Vrms) injected between Neutral and Earth mains supply of motors crate

- clear signal seen in Hrec at 15Hz and harmonics
- explained with an **electrostatic charge on the mirror** (see [November 2018 logbook entry](#)) and a capacitive coupling between the **motors cables** and the **mirror coils cables**

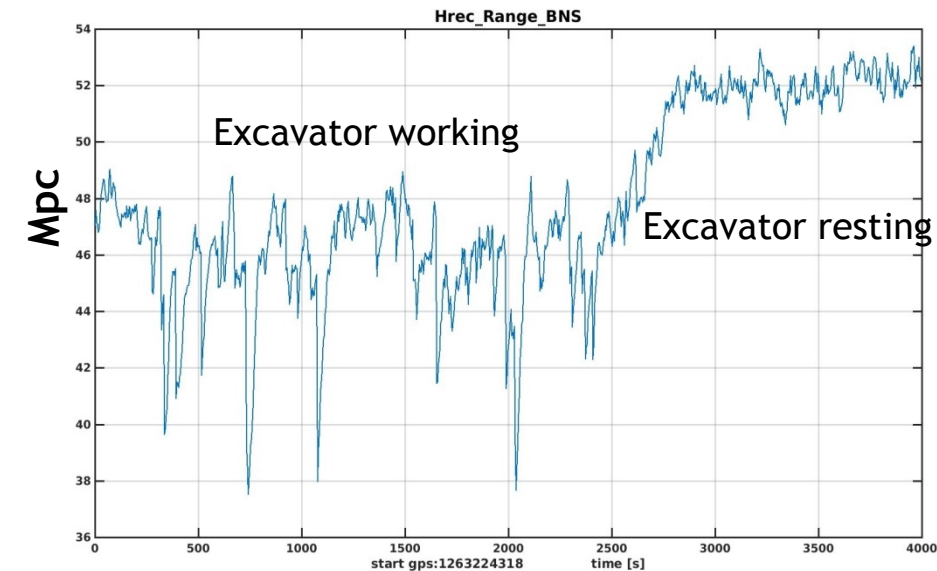


# Hrec $1/f^4$ noise (the wa

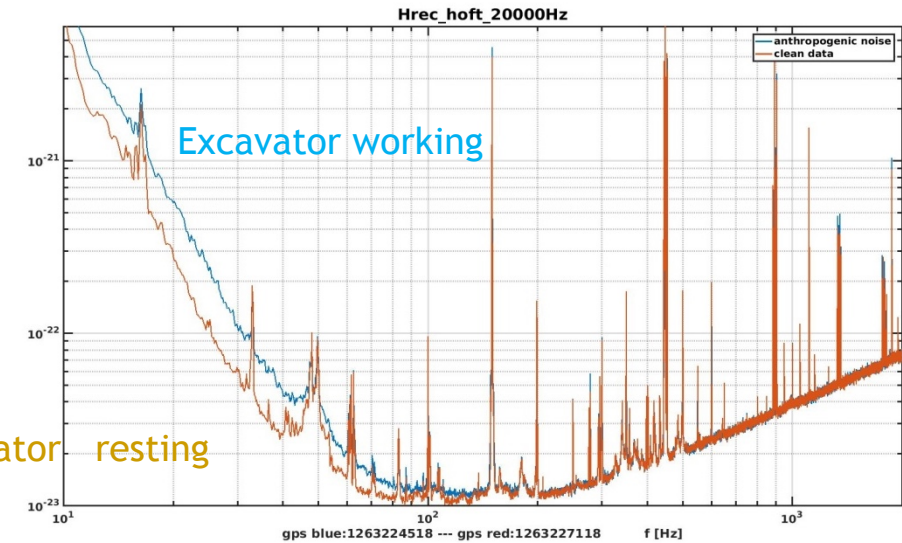
We should reach the **RED curve**, but we instead have a noise that NEVER went below the **green zone**



Suspect of scattered light (the wall increase when there is high anthropic seismic noise): checked with the “courtesy” of a big excavator working near the Central Building ([elog 48311](#))



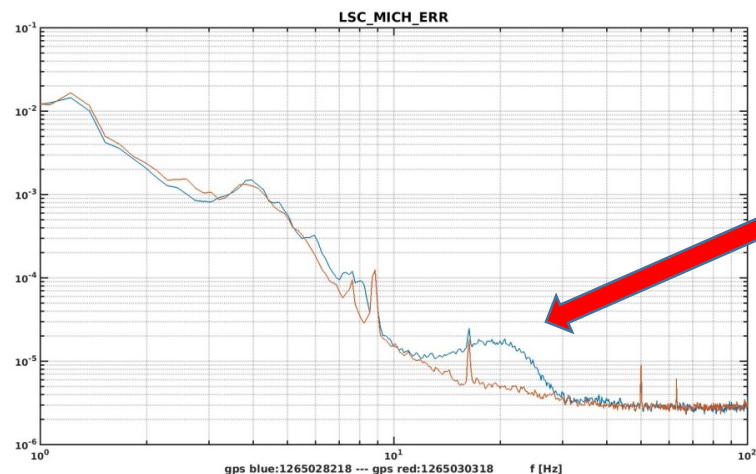
Excavator resting



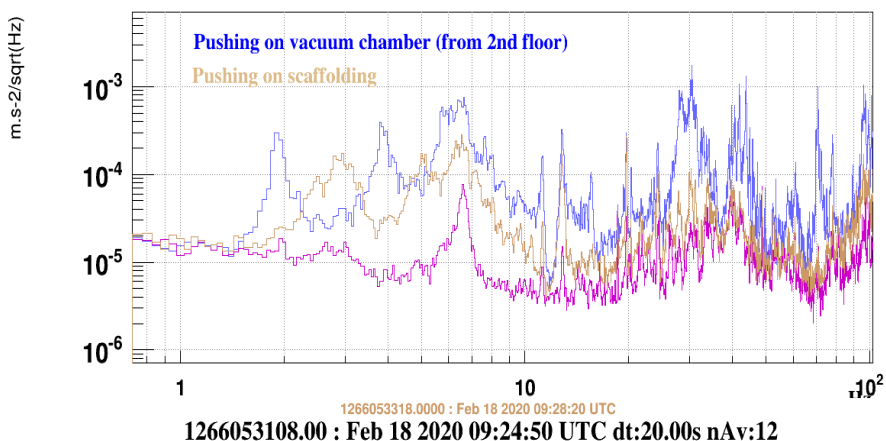
# Tests done up to now

HVAC Central Building **global** switch-off

Some improvement at 20Hz, but mostly due to **MICH reduction**

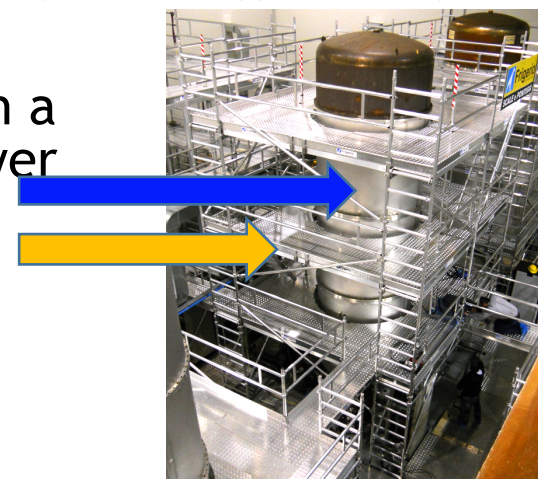
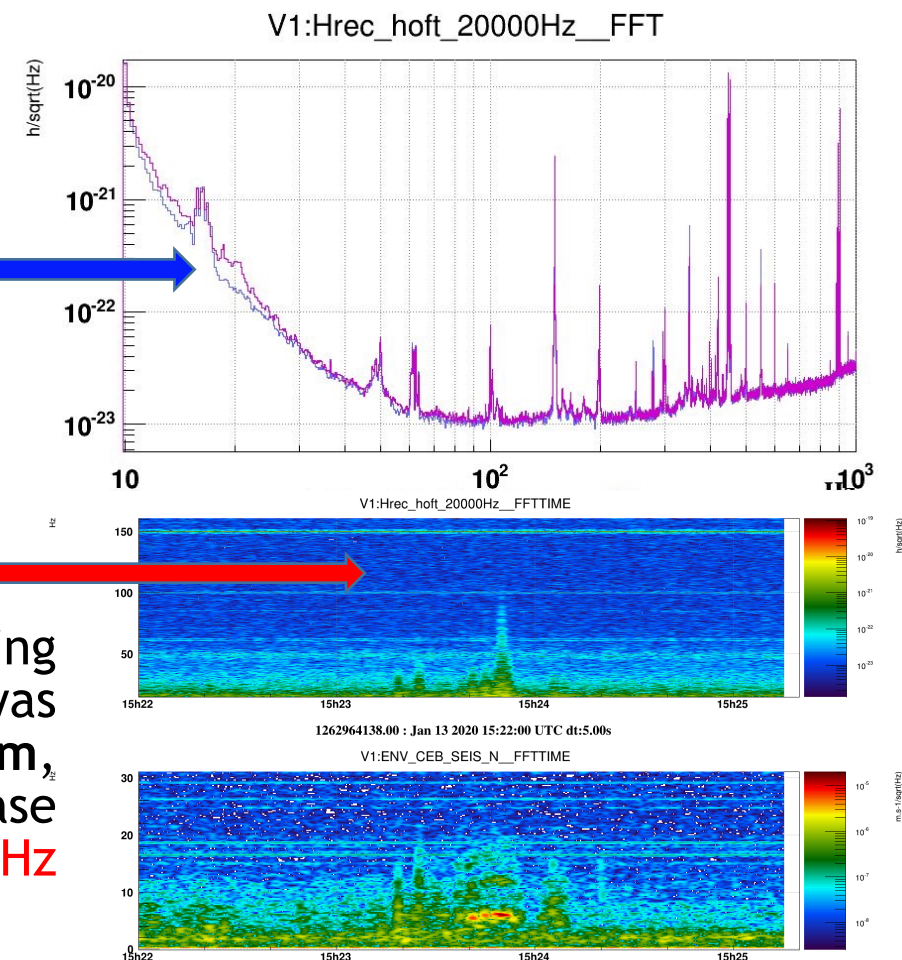


V1:ENV\_NI\_ACC\_X\_FFT



We also noticed that during the excavator work there was a ~7Hz peak increase in **seism**, and consequently an increase of **noise in Hrec up to 100Hz**

This seism peak generated by the excavator coincides by chance with a structure's resonance of the NI tower system (**vessel** or **scaffolding**, see elog [48479](#)); further tests planned with a shaker to better understand the possible coupling mechanisms



# The end

---

- ~ 70 days to the end of O3b run
- Still 10 “maintenance” Tuesday morning, and about the same days of commissioning time
- Of these, some have to be assigned to “non ENV” activities
- We hope to have enough shifts to conclude our most important works

Thanks for your attention

- The Virgo ENV team -