

# Environmental Monitoring

(newcomers' guide)

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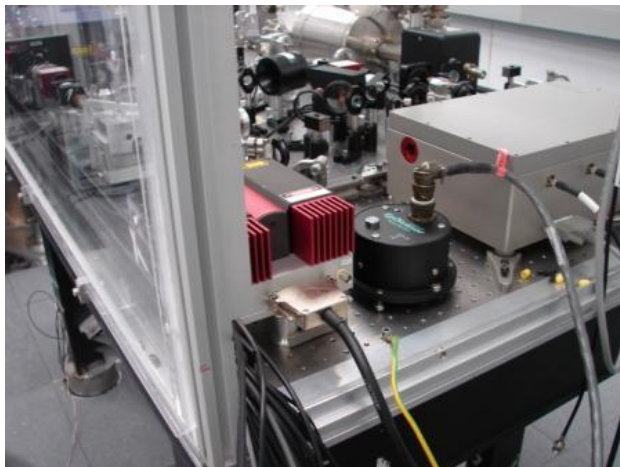
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# Environmental monitoring sensors

- Monitoring of environmental influences to the detector
- Network of probes in experimental halls: Central, NorthEnd, WestEnd, ModeCleaner
  - 130 fast sensors (sampling 1kHz to 20kHz)
  - 300 slow sensors (sampling 1Hz)
- Signals are acquired synchronously and stored together with all the rest of interferometer signals and used for noise investigations

- A Accelerometer
  - E Episor
  - V Velocimeter
  - T Thermometer
  - C Comb. (temp.+press.+hum.)
  - M Microphone
  - I Infrasound microphone
  - B Magnetometer
  - V Voltage probe
  - I Current probe
  - R Radio frequency antenna
- Weather station  
Lightning detector



# Documentation on sensors

In order to access these links you need an “Active directory” account. To request one please follow the path documented at <https://www.ego-gw.it/userProfile/index.aspx>  
If you need support: [service@ego-gw.it](mailto:service@ego-gw.it)

- EnvMon wiki: <https://wiki.virgo-gw.eu/Commissioning/EnvMon/WebHome>
  - Sensor maps:
    - [ENV\\_maps\\_24\\_07\\_2018.pdf](#) (with location of FAST and SLOW probes)
    - [Map\\_ENV\\_sensors\\_cirone.pdf](#) (with location of FAST probes, and associated NAMES)
  - Sensor list with description and channel names: [Fast\\_sensors.xlsx](#)
  - [Hardware inventory](#) (location of sensors, pictures, technical data)
  - [Channel database](#) (description of channel s name) (Search example: always put “V1” in front of the search string: i.e. “V1:ENV\*ACC\*” )
  - Sensors’ data sheets: <https://scientists.virgo-gw.eu/EnvMon/sensorDocs.htm>
  - ACRONYMS: to get a list use “Frag.s” option of Channel database.

# Documents

[more info about sensors, and examples of their use in noise hunting]

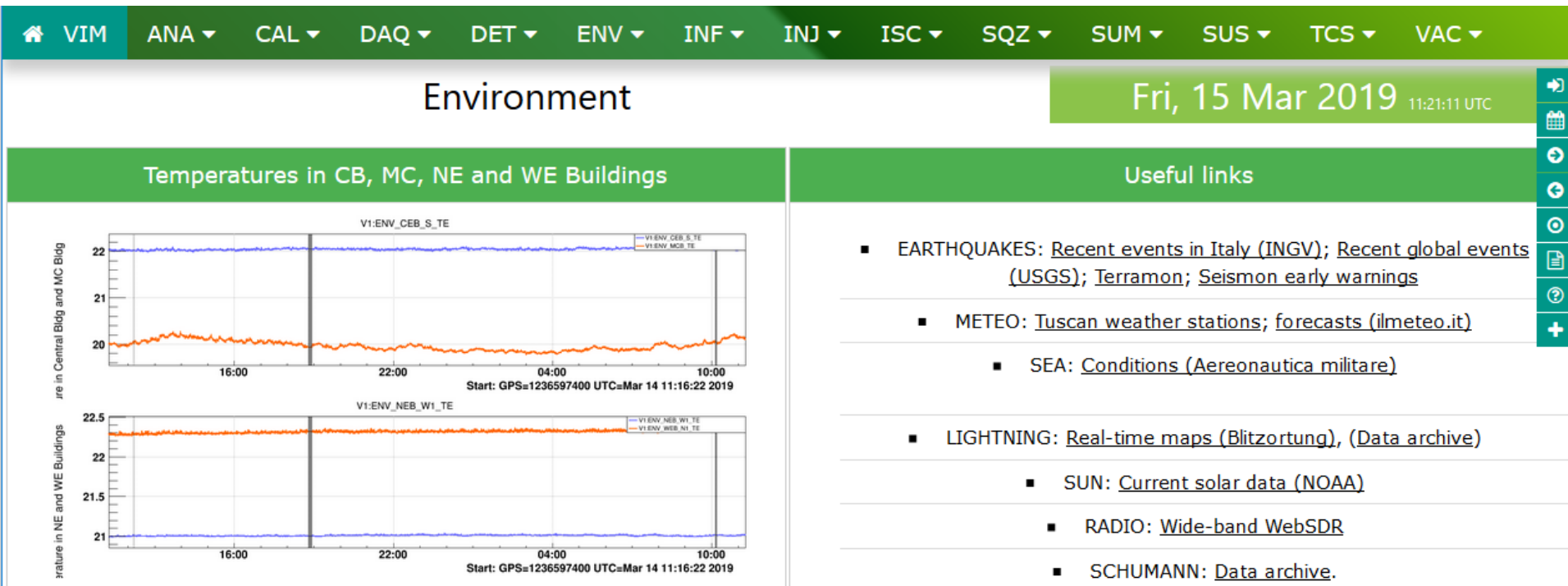
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- Rosario’s - env sensors
  - EnvMon electronics [VIR-0534A-14](#)
  - Environmental sensors census [VIR-0427A-12](#)
  - Virgo acoustic environmental sensors [VIR-0542A-18](#)
- Irene’s – noise hunting
  - Hunting environmental noise in Virgo [VIR-0078A-19](#)
  - Geophysical noise in the Virgo GW antenna [VIR-0145A-19](#)
- Federico’s – ... more noise hunting
  - Report on O3 preparation activities: [VIR-0046A-19](#)
  - Noise from HVAC: [VIR-0674A-18](#)

# VIM “Environment”

<https://vim-online.virgo-gw.eu/?config=7>

- Info on current status of EGO- Virgo site environmental noise conditions (browse daily archives)



# DMS “Environment”

<https://dms.virgo-gw.eu/>

Environment	CB Hall	MC Hall	TCS zones	NE Hall	WE Hall	WindActivity	Seismon	BRMSMon
	INJ Area	DET Area	EE Room	DAQ Room	External	DeadChannel	Lights	SeaActivity

- **Monitor sensors working status** (box “DeadChannel”) → RED if sensor signal RMS goes **below** set threshold
- **Detect Environmental Noisy conditions**, different zones (boxes “CEB Hall” “MC Hall” ...) → RED if RMS goes **above** a set threshold
- Monitors of external noisy conditions: SeaActivity, Wind, Seismon (distant Earthquake alert from USGS)
- None of these REDs is Critical for the Interferometer Operation (indeed none is alarmed, but simply notified us by the Operators through logbook reporting, or by email)
- Critical conditions (HVAC failure, Laser Failure) are detected elsewhere in DMS and alarmed,

Possibly they might, with long latency, cause some AMBIENT TEMPERATURE monitors (included in “CEB hall”, “MC hall”, ....) to turn RED

# DMS “Environment”

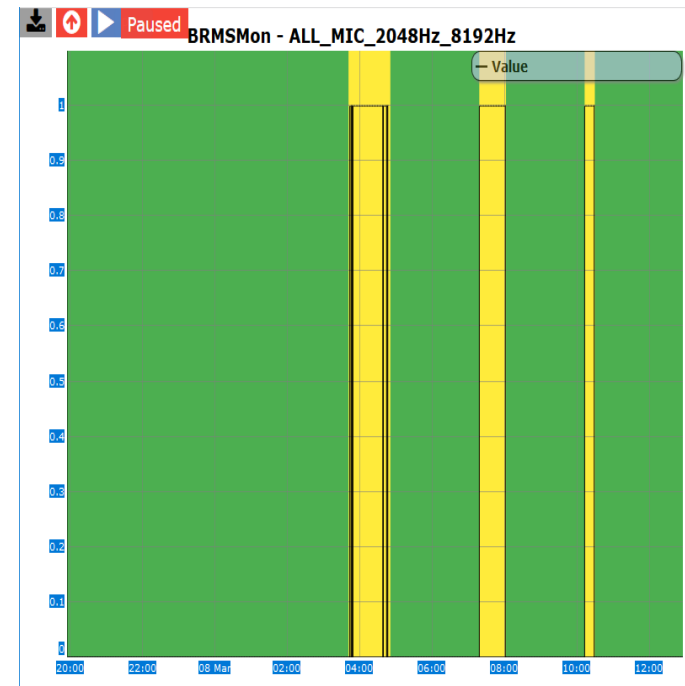
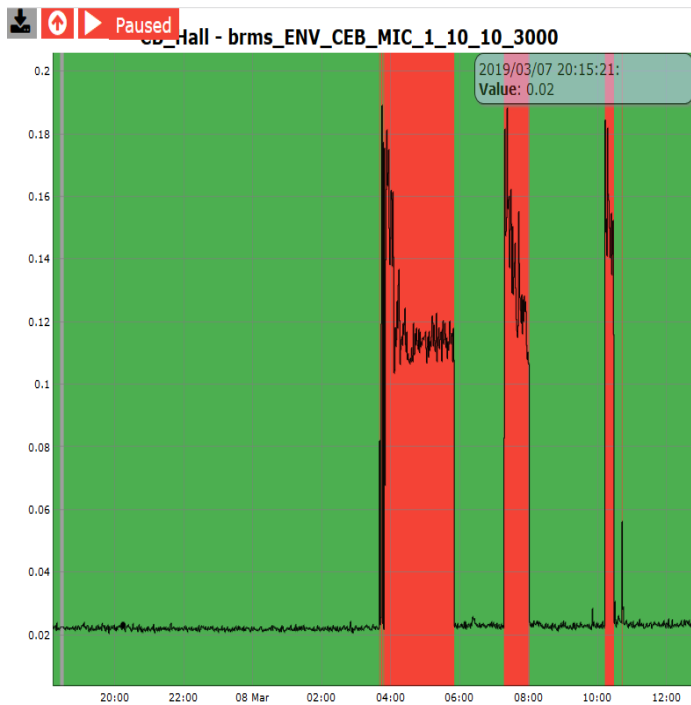
<https://dms.virgo-gw.eu/>

Environment	CB Hall	MC Hall	TCS zones	NE Hall	WE Hall	WindActivity	Seismon	BRMSMon
	INJ Area	DET Area	EE Room	DAQ Room	External	DeadChannel	Lights	SeaActivity

- Box “Seismon”: Earthquake alerts from [USGS](#)
- Box “BRMSMon”: FLAG environmental events (used for DataQuality, and eventually decide on veto events)

# Examples DMS “Environment”

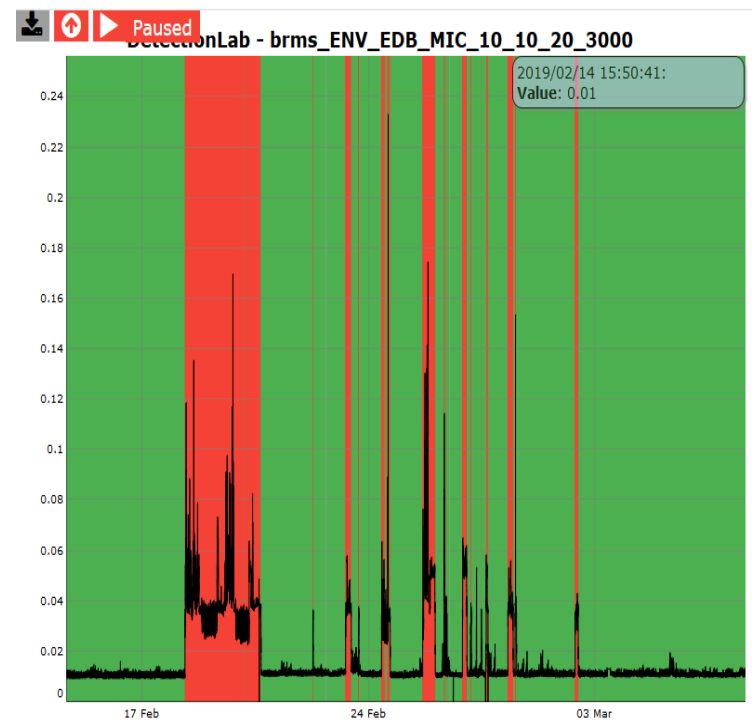
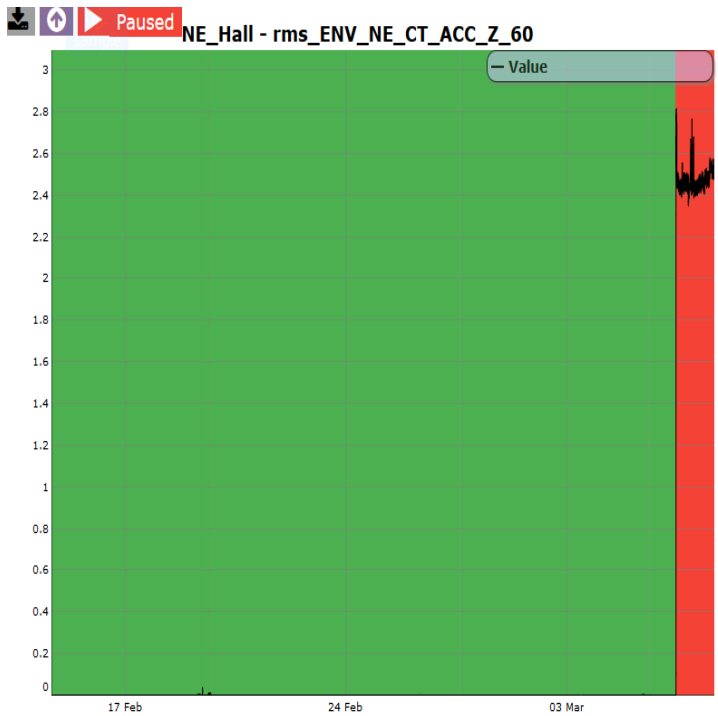
- LEFT: microphone in the Central Hall measure sudden increase of noise because sound alarm switched on in the hall.
- RIGHT: the associated FLAG switches to 1.





# Examples DMS “Environment”

- LEFT: noise level of accelerometer ENV\_NE\_CT\_ACC\_Z increased a lot → conditioning electronics was misbehaving
- RIGHT: noise level of microphone on External Detection Bench increases when DetLab air conditioner is switched to full power during access into the Lab.



# Examples DMS “Environment”

- LEFT: lights in the West tunnel are ON (time periods in yellow)
- RIGHT: Sea activity is above 75 percentile (Yellow) or above the 90 percentile (Red)

