

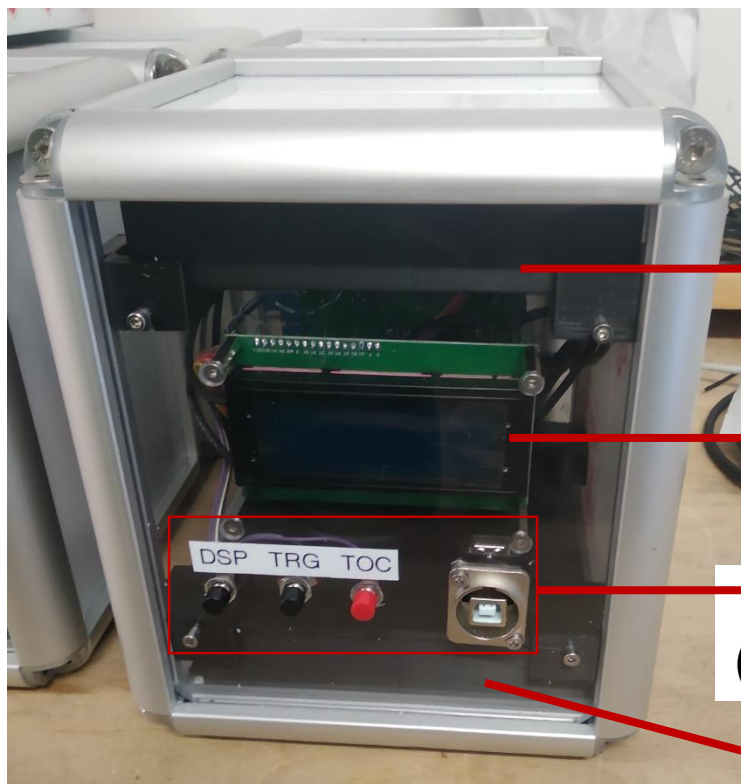
OCRA: updates from PISA

E.Bossini for the Pisa OCRA group

8 July 2022



CosmoCube



Tile 0

Display

Student interaction
(trg and display info selection)

Tile 1

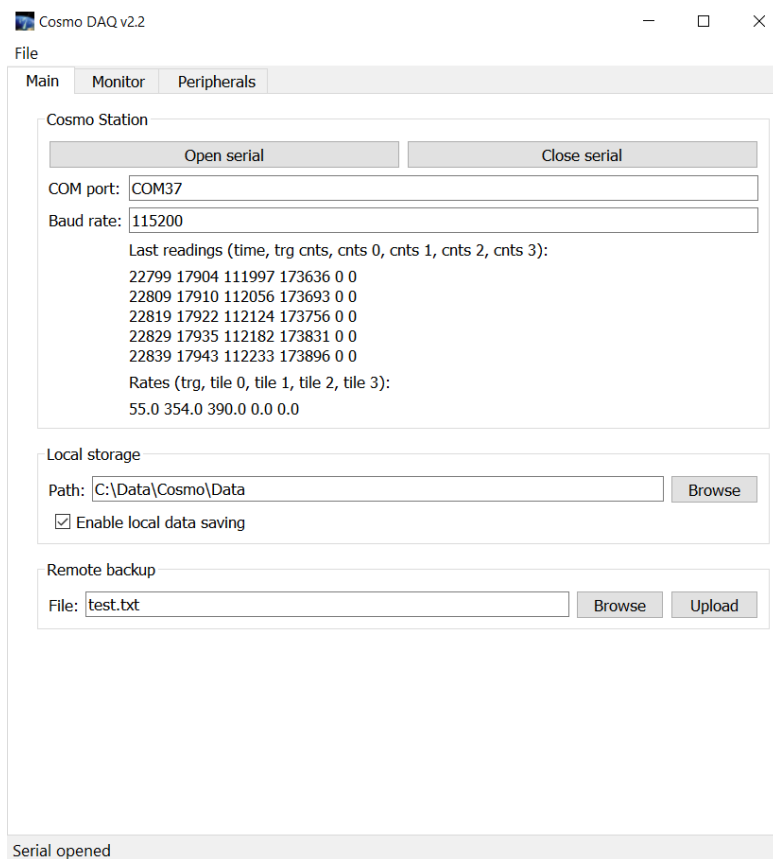
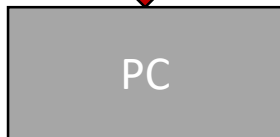
Main features:

- 2 integrated scintillator tiles, readout by SiPM
- Support for 2 additional tiles
- Trigger algorithm can be selected through a dedicated push button
- Adjustable SiPM bias and signal discrimination threshold
- Tiles/trigger counts & rates shown on screen
- Multiple power options (USB, external PS, power bank)
- TOC signal: acoustic signal for every trigger or tile signal
- Trigger and tiles counts can be read out through USB (UART protocol) every 10s.

Status:

- 1 CosmoCube ready
- 4 additional cubes under assembly (all components available)
- Will be distributed to schools to carry out measurements during the year

CosmoCube



Cross-platform software
(Python + Qt5.0) for GUI



- UART control
- Online rates & counts monitoring
- Local storage
- Central remote storage (under dev.)
- Data emulation & playback

CosmoCube

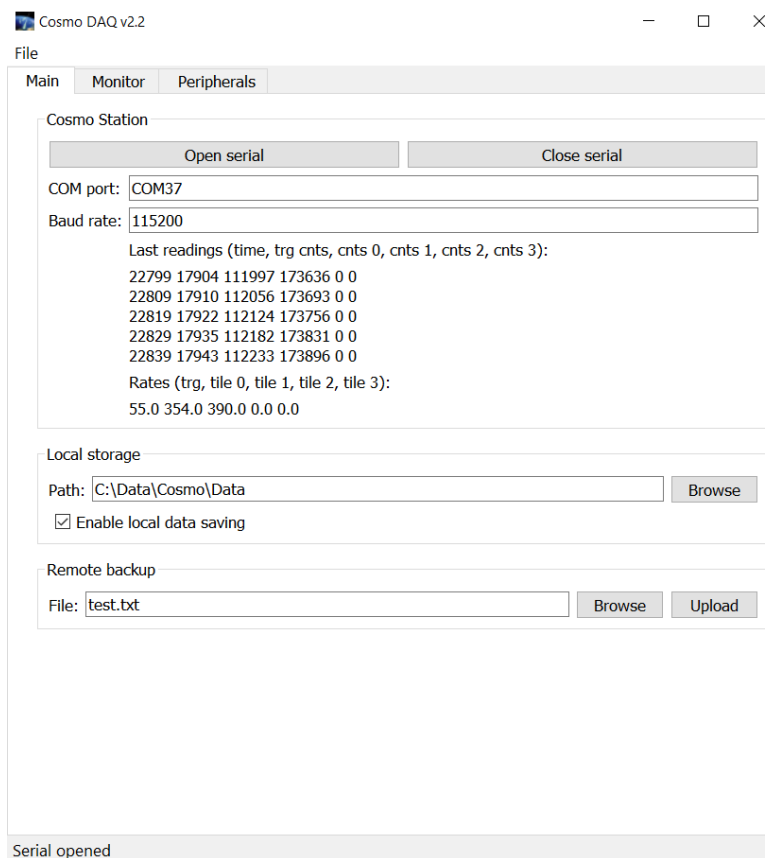


Power
bank

Raspberry

If connected to raspberry additional sensors can be read out and the information stored, creating a complete portable system:

- GPS
- Accelerometer -> Inclination
- Pressure



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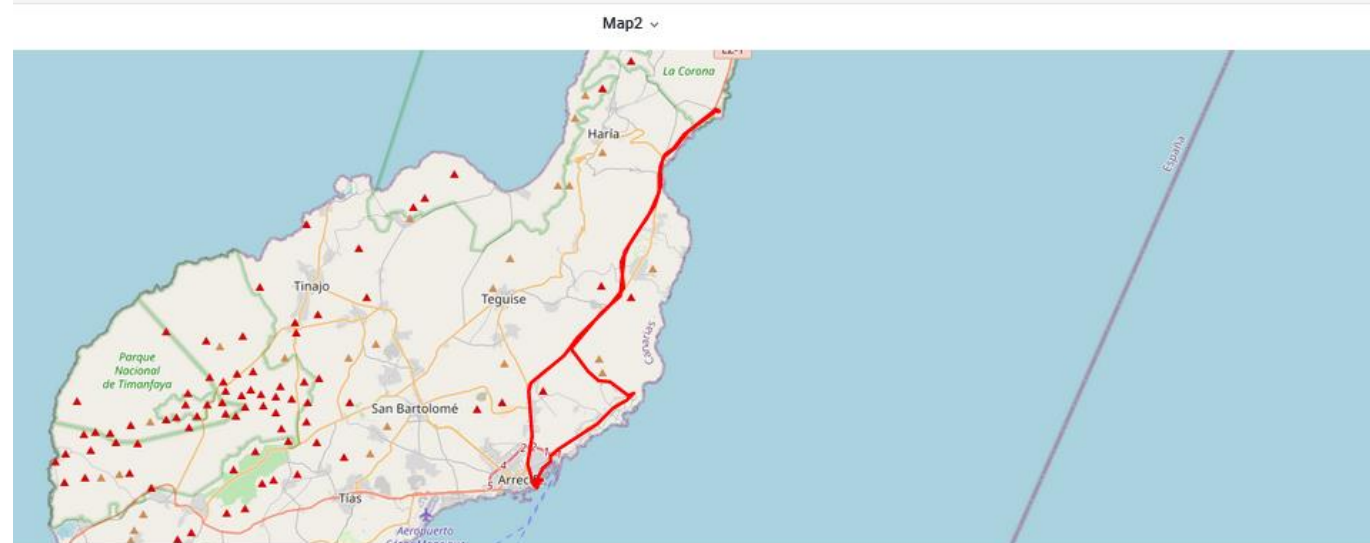
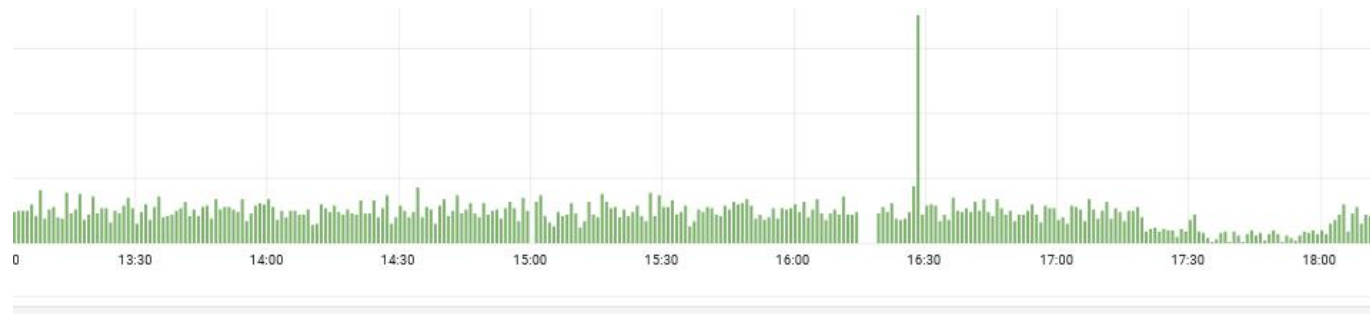
On board the Shibumi, Stefano Barberis & family's boat, with CosmoCube

CosmoCube already used for outreach, as it was part of the instrumentation of the Shibumi ship.

Brought with them during an excursion in the cave *Jameos del Agua* (Canarian islands):

<https://monitoring.shibumi.it/d/AsgobRS7k/cosmic-rays?orgId=1&from=1638178126086&to=1638213383904>

There you can find the data log. The lower rate @ 17:30-18:00 can be correlated with the period spent inside the cave.



«La Fisica tra le onde» with CosmoCube

<https://www.youtube.com/playlist?list=PLbsqUzxZlCp7AcfgnR06vnxtDVH9U58Qc>



Balloon launch: up to 32760 m altitude!

A system with 3 tiles launched with a balloon, first launch of the Unipi Miracle project.
Data analysis ongoing.



The students: Antoine, Domenico, Viola



Payload recovered, intact!

Richieste fondi 2023

Capitolo	Descrizione	Parziali (k€)	
		Richieste	SJ
Consumo	Materiale di stampaggio delle custodie per le mattonelle	1.00	0.00
	Sviluppo schede di amplificazione SiPM con controllo guadagno*	1.00	0.00
Missioni	Contatti con scuole (software/analisi dei cubi) e ingegneria (lancio su pallone)	1.00	0.00

*Progetto per lo sviluppo degli amplificatori per SiPM in grado di compensare automaticamente gli effetti di temperatura.

La variazione del punto di lavoro del SiPM è dell'ordine dei 50mv/C°, e con esso il guadagno interno. L'amplificatore può essere reazionato in temperatura per compensare. Aumenterebbe notevolmente la stabilità dei rate misurati durante le misure in itinere.