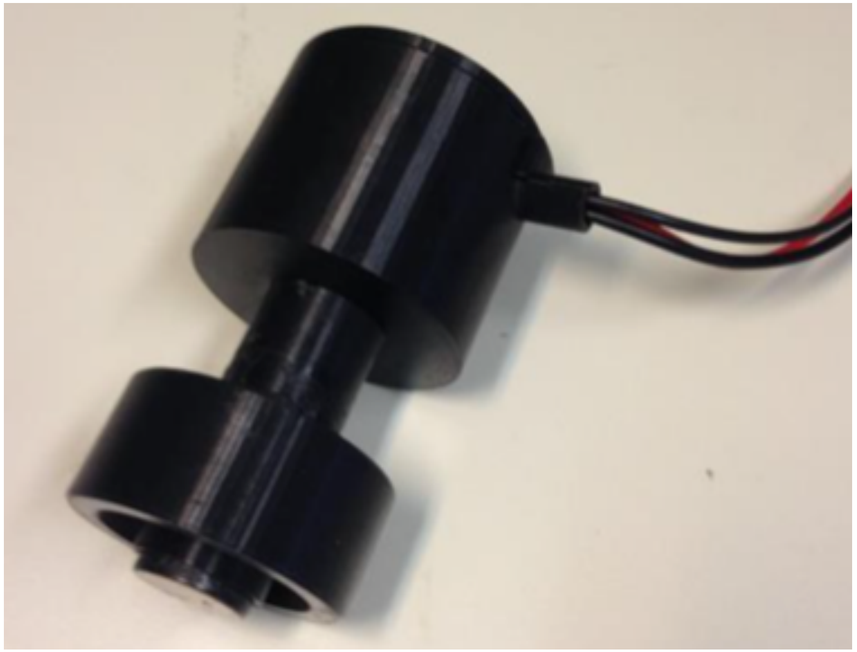
AugerPrime SDEU ORR - SPMT

Antonella Castellina
INFN and INAF - Torino



AugerPrime electronics Operation Readiness Review, November 10, 2024

Questions from the panel

7. Items considered not finished

— 2. Monitoring and Alarms

— 4. Transferring the databases for the SPMT and SPMT-HV tests to Malargue for secure storage and unified access by the collaboration.
The storage of the database-dumps at Lyon could serve as alternative.

8. Additional suggestions

— 2. Redundant oscilloscope for the SPMT setup

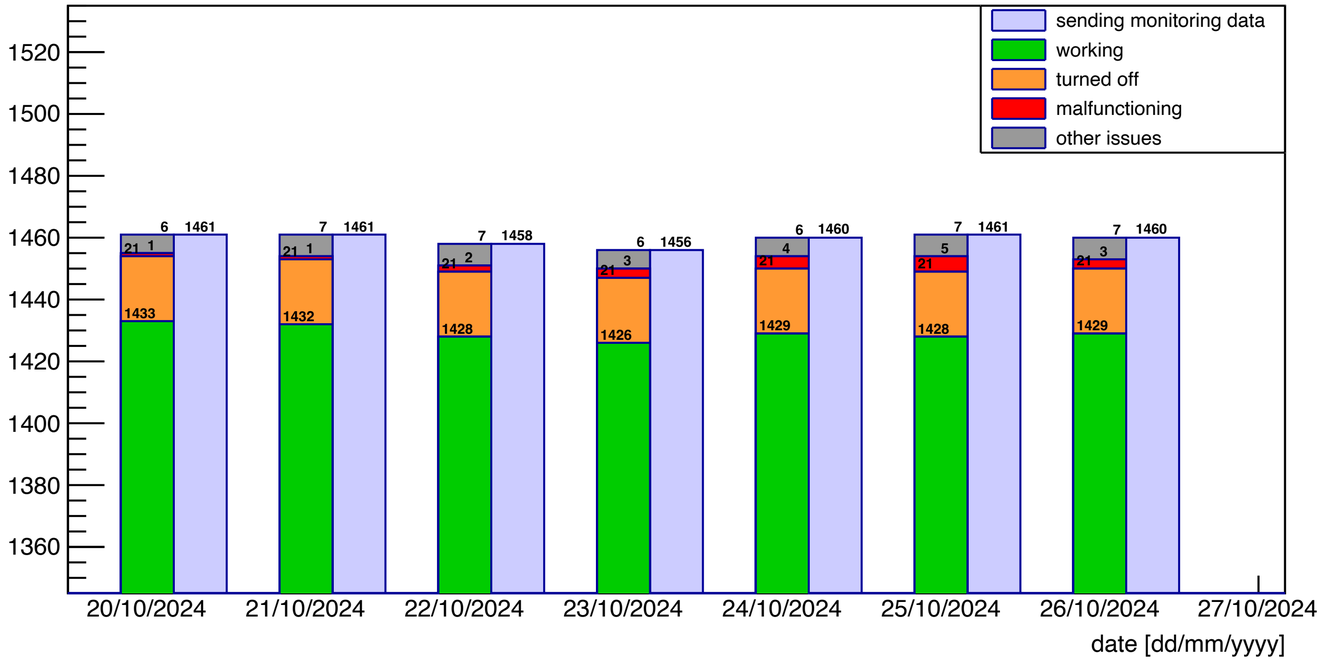
7.2 — Monitoring of SPMT-related slow-control quantities

Target: daily detection of SPMTs turned off or malfunctioning

Strategy: study Vmon (VoltagePM4), Imon (CurrentPM4) and their ratio R from the MonitUUB table

✓ **Checks finalized and presented at the 15/10/2024 MOLTP meeting (download)**

✓ **Automatized job runs every Monday using the previous week of monitoring data**.



VERY limited man-power :

small % of Gialex time (not an Auger member anymore),

everything ready to be implemented

Some help from Isabelle and Julian needed for:

- ➡ transferring of plot with daily histograms to the SD-shift website
- ➡ notification to the SD-shifters of the SPMTs showing an issue
- ➡ Update of the monitoring website to visualize the ratio R in the MonitUUB table.

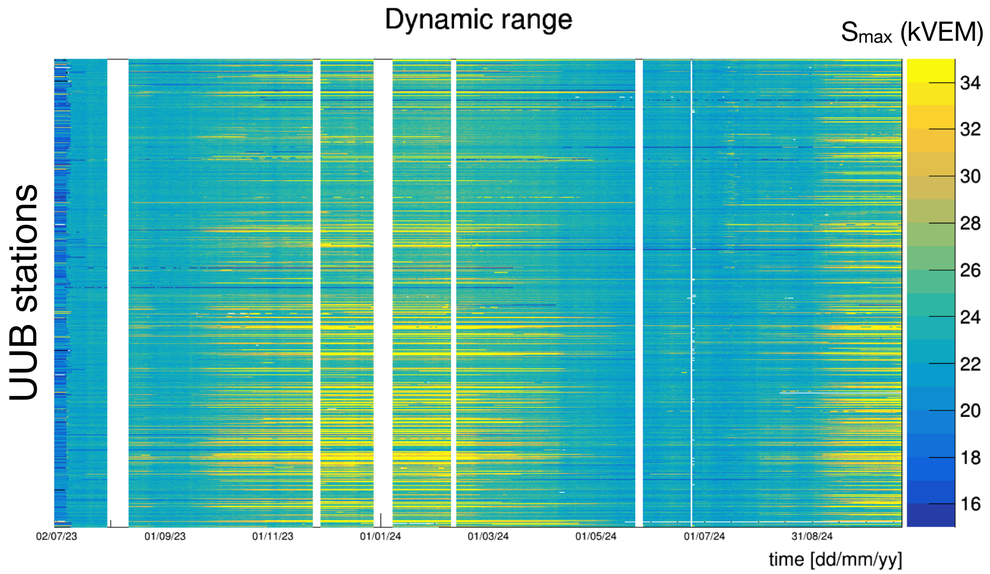
Link to “draft” website

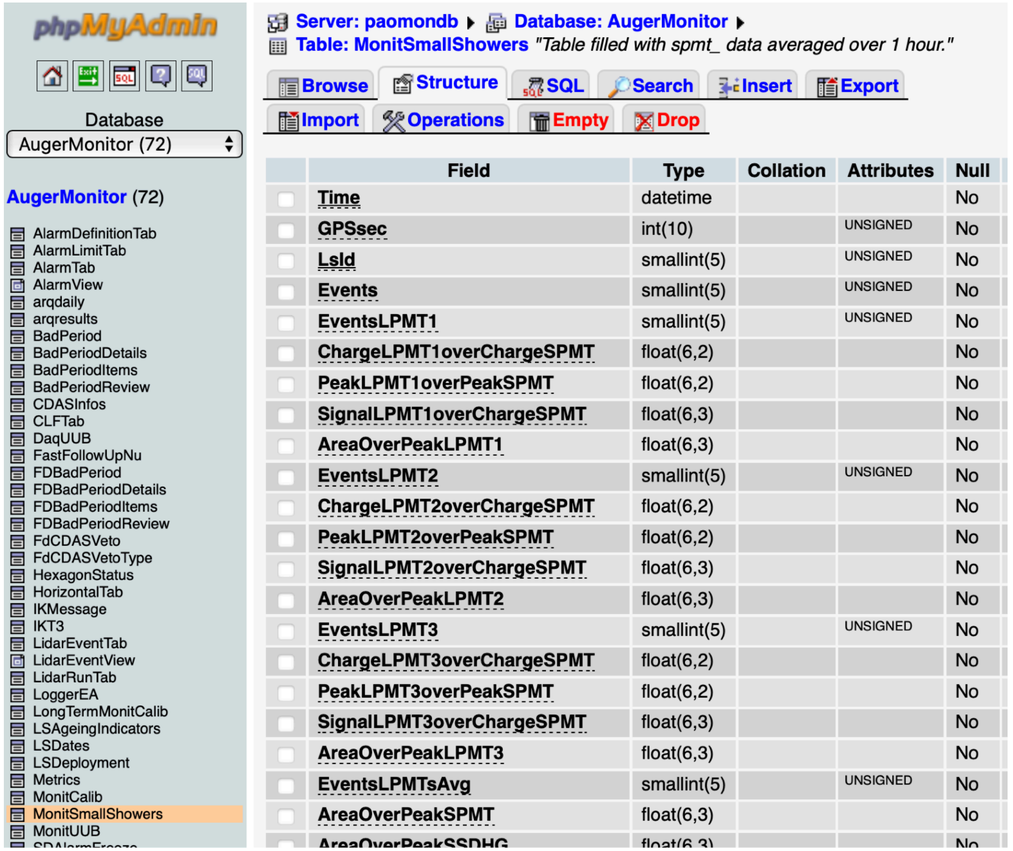
Merging request

7.2 — Monitoring of small showers and SPMT calibration

Monitoring of small showers acquisition

- Automatic job for the calculation of 1h averages of selected quantities run daily
- Results stored in the MonitSmallShowers
- tableVisualization in the monitoring website implemented, pending merge request





Monitoring of SPMT inter-calibration

- Calculation of dynamic range extension and SPMT signal dispersion (manually) performed

7.2 — Alarms

Daily and separately for each tank with a SPMT

For the small showers acquisition

(1)		entries < **24** in the *MonitSmallShowers* table	ALARM1	since the quantities are hourly averages, there should be 24 entries per day per tank
(2)	**Entries == 24**	if ***Events*<150 or *Events*>500** for ≥12 consecutive hour	ALARM2	~200 events per hour expected for a tank with 3 working LPMTs, ~400 with only 1 working LPMT)
(3)	**Events∈(150-500)**	**if MaskedStatusLPMTx != 1** during the 24 hours period	ALARM3	LPMTx is "unstable"
(4)	**MaskedStatusLPMT=1**	if **CustomVEMChargeLPMTxFailures > 0.8** for ≥12 consecutive hours	ALARM4	> 80% of failed calibrations using the custom algorithm
(5)		if **EventsLPMTx<30 or EventsLPMTx>50** for ≥12 consecutive hours	ALARM5	too many/too few events in the inter-calibration region
(6)		if **SignalLPMTxOverChargeSPMT<0.5 or >2.5** for ≥12 consecutive hours	ALARM6	raw approximation for the inter-calibration factor, expected to be in the range (0.5, 2.5)

For the SPMT inter-calibration

(1)	if $\beta < 0.5$ or $\beta > 2.5$	ALARM1	failures in the procedure and too low/high values of the inter-calibration factor
(2)	if $S_{max} < 15$ kVEM or $S_{max} > 35$ kVEM	ALARM2	too low/high values of the daily **dynamic range extension**
(3)	if $\sigma[(S_{SPMT}-S_{LPMTs})/S_{LPMTs}]>0.2$	ALARM3	excessive values of the daily **SPMT signal dispersion w.r.t. the LPMT signals** calculated in the inter-calibration region, which is related to the SPMT signal accuracy

7.4 — Transferring the databases

- The database with the results of the calibration of the SPMT are taken care of by the Napoli group. Currently the data are stored in MySQL (database and ascii files)
- The database with the results of the tests of the HVPS for the SPMT are stored in Pandora (https://pandora.infn.it/public/b4022a).
- The transfer will be organized by Napoli (SPMT) and Torino (SPMT-HVPS) in agreement with the local staff
- Note that any storage in Lyon will have to be transferred to the new data center in Bologna (in 2025)

8.2 — Redundant oscilloscope

- We acknowledge the need for redundancy
- A new oscilloscope can be provided in 2025
- If needed, an old one can be sent from Torino