

# *AugerPrime SDEU ORR - SPMT*

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## *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

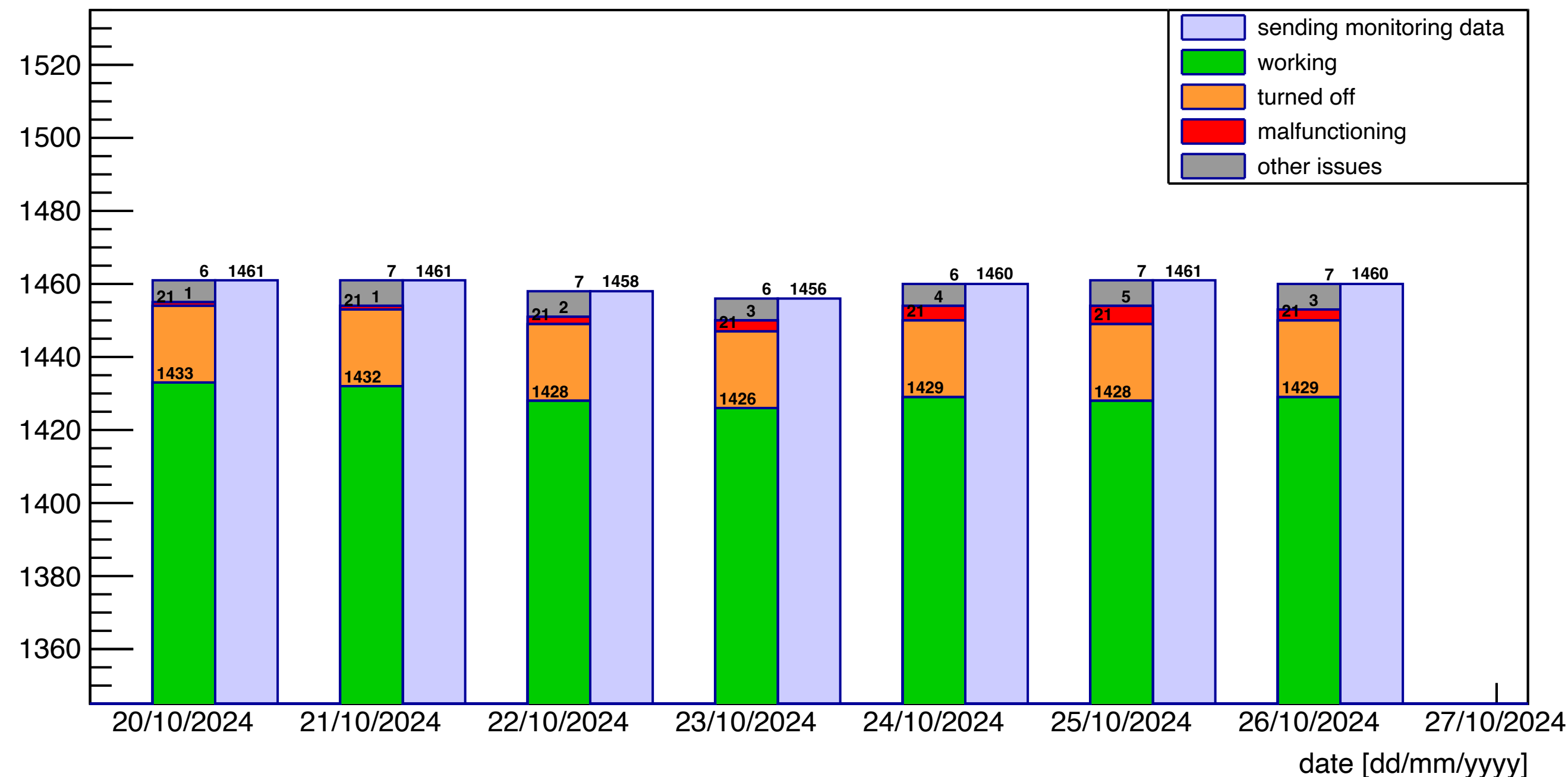
## 7.2 — Monitoring of SPMT-related slow-control quantities

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](#)

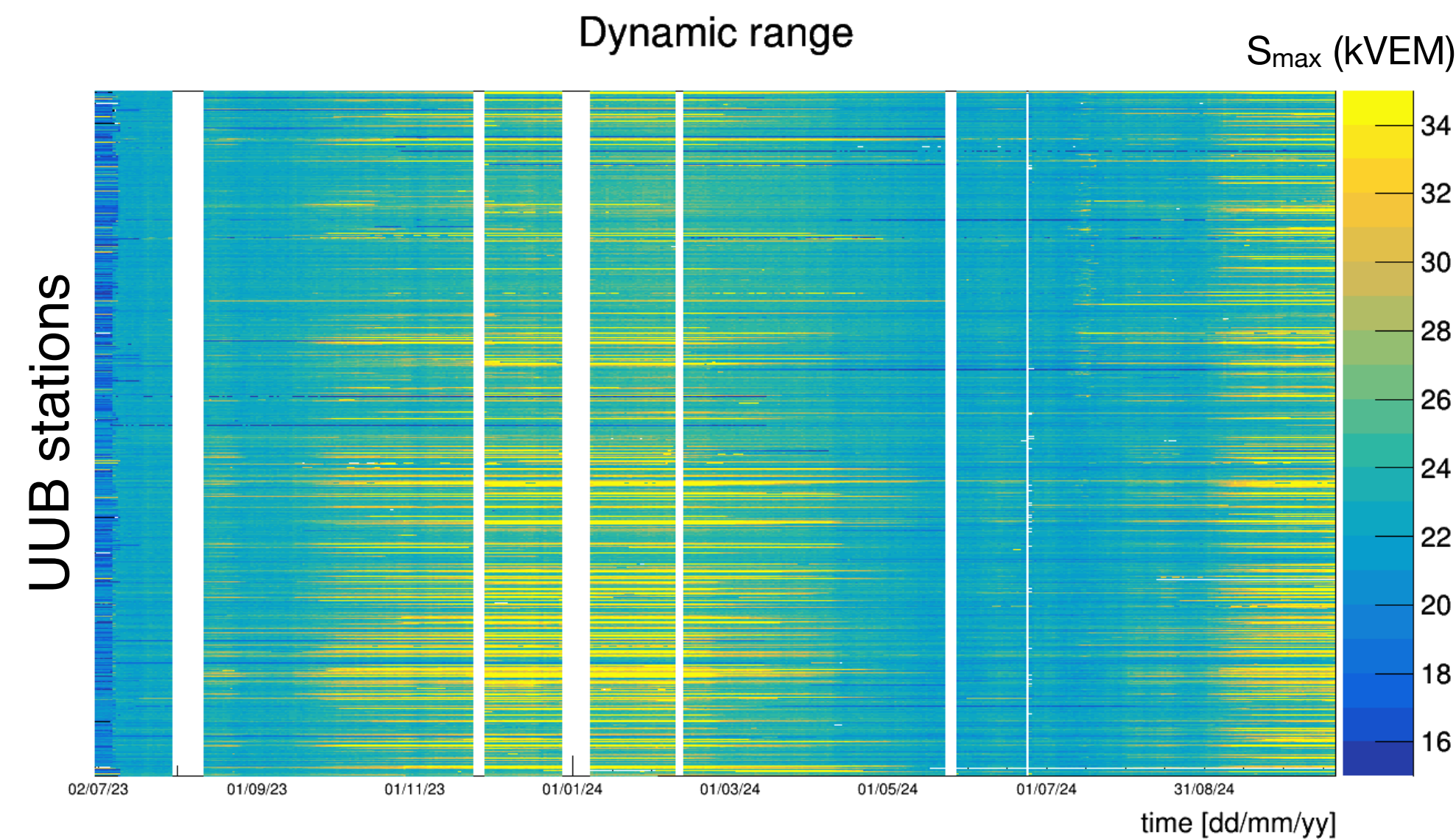
[Merging request](#)



# 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](#)



phpMyAdmin

Database: AugerMonitor (72)

AugerMonitor (72)

- AlarmDefinitionTab
- AlarmLimitTab
- AlarmTab
- AlarmView
- arqdaily
- arqresults
- BadPeriod
- BadPeriodDetails
- BadPeriodItems
- BadPeriodReview
- CDASInfos
- CLFTab
- DaqUUB
- FastFollowUpNu
- FDBadPeriod
- FDBadPeriodDetails
- FDBadPeriodItems
- FDBadPeriodReview
- FdCDASVeto
- FdCDASVetoType
- HexagonStatus
- HorizontalTab
- IKMessage
- IKT3
- LidarEventTab
- LidarEventView
- LidarRunTab
- LoggerEA
- LongTermMonitCalib
- LSAgeingIndicators
- LSDates
- LSDeployment
- Metrics
- MonitCalib
- MonitSmallShowers**
- MonitUUB
- SPAlarmEvents

Server: paomondb Database: AugerMonitor

Table: MonitSmallShowers "Table filled with spmt\_ data averaged over 1 hour."

Browse Structure SQL Search Insert Export

Import Operations Empty Drop

	Field	Type	Collation	Attributes	Null
<input type="checkbox"/>	Time	datetime			No
<input type="checkbox"/>	GPSsec	int(10)		UNSIGNED	No
<input type="checkbox"/>	LsId	smallint(5)		UNSIGNED	No
<input type="checkbox"/>	Events	smallint(5)		UNSIGNED	No
<input type="checkbox"/>	EventsLPMT1	smallint(5)		UNSIGNED	No
<input type="checkbox"/>	ChargeLPMT1overChargeSPMT	float(6,2)			No
<input type="checkbox"/>	PeakLPMT1overPeakSPMT	float(6,2)			No
<input type="checkbox"/>	SignalLPMT1overChargeSPMT	float(6,3)			No
<input type="checkbox"/>	AreaOverPeakLPMT1	float(6,3)			No
<input type="checkbox"/>	EventsLPMT2	smallint(5)		UNSIGNED	No
<input type="checkbox"/>	ChargeLPMT2overChargeSPMT	float(6,2)			No
<input type="checkbox"/>	PeakLPMT2overPeakSPMT	float(6,2)			No
<input type="checkbox"/>	SignalLPMT2overChargeSPMT	float(6,3)			No
<input type="checkbox"/>	AreaOverPeakLPMT2	float(6,3)			No
<input type="checkbox"/>	EventsLPMT3	smallint(5)		UNSIGNED	No
<input type="checkbox"/>	ChargeLPMT3overChargeSPMT	float(6,2)			No
<input type="checkbox"/>	PeakLPMT3overPeakSPMT	float(6,2)			No
<input type="checkbox"/>	SignalLPMT3overChargeSPMT	float(6,3)			No
<input type="checkbox"/>	AreaOverPeakLPMT3	float(6,3)			No
<input type="checkbox"/>	EventsLPMTsAvg	smallint(5)		UNSIGNED	No
<input type="checkbox"/>	AreaOverPeakSPMT	float(6,3)			No
<input type="checkbox"/>	AreaOverPeakSSDHG	float(6,3)			No

## 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 < <b>24</b> in the <i>MonitSmallShowers</i> table	ALARM1	since the quantities are hourly averages, there should be 24 entries per day per tank
(2)	Entries == 24	if <b>Events</b> <150 or <b>Events</b> >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 <b>MaskedStatusLPMTx</b> != 1 during the 24 hours period	ALARM3	LPMTx is “unstable”
(4)	MaskedStatusLPMT=1	if <b>CustomVEMChargeLPMTxFailures</b> > 0.8 for ≥12 consecutive hours	ALARM4	> 80% of failed calibrations using the custom algorithm
(5)		if <b>EventsLPMTx</b> <30 or <b>EventsLPMTx</b> >50 for ≥12 consecutive hours	ALARM5	too many/too few events in the inter-calibration region
(6)		if <b>SignalLPMTxOverChargeSPMT</b> <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 $S_{max} < 15 \text{ kVEM}$ or $S_{max} > 35 \text{ kVEM}$	ALARM2	too low/high values of the daily <b>dynamic range extension</b>
(3)	if $\sigma[(S_{SPMT}-S_{LPMTs})/S_{LPMTs}]>0.2$	ALARM3	excessive values of the daily <b>SPMT signal dispersion w.r.t. the LPMT signals</b> 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

