

The MoEDAL-MAPP/MALL Experiment Status

A 3D computer-generated rendering of the MoEDAL-MAPP/MALL experiment setup. The scene is set in a long, narrow tunnel. On the left side, a large, dark grey cylindrical structure is visible, with a purple and blue detector component attached to its side. A long, yellow and black striped detector assembly extends from the foreground into the distance. The floor of the tunnel is marked with green lines. The background shows the tunnel's exit and some structural elements.

TREX

March 4th, 2021

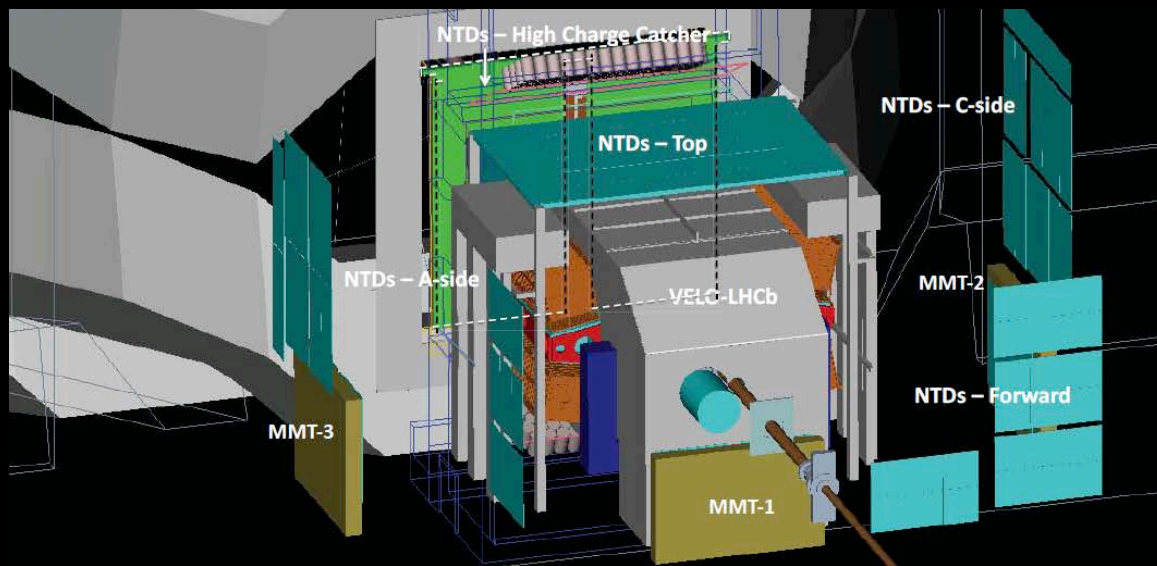
James Pinfold

for

The MoEDAL-MAPP Collaboration

The Ph. 1 MoEDAL Det. For Run-3

- *Very similar to the Run-2 detector deployed from 2015-2018*
- *There continue to be 4 independent subdetectors:*
 - *Nuclear Track Detectors (NTDs) consisting of stacks of plastic*
 - *Magnetic Monopole Trappers (MMTs) composed of aluminum bars*
 - *TimePix3 devices which are active silicon particle detectors*
 - *High Charge Catcher (HCC) a thin low mass NTD (if agreed by LHCb)*



MoEDAL-MAPP Splits



MoEDAL Run-3 Technical Design Report

Version 1.1

March 2021

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MAPP Phase-1 Technical Design Report

Version 1.0

B. Acharya,^{1,2} J. Alexandre,¹ P. Benes,³ B. Bergmann,³ J. Bernabéu,⁴ A. Bevan,⁵ H. Branzas,⁶ P. Burian,³ M. Campbell,⁷ M. Campbell,⁷ S. Cecchini,⁸ Y. M. Cho,²⁸ M. de Montigny,⁹ A. de Roeck,⁷ J. P. Ellis,^{1,10} M. El Sawy,⁷ M. Fairbairn,¹ D. Felea,⁶ M. Frank,¹¹ J. Hays,⁵ A. M. Hirt,²⁹ P.Q. Hung,³⁰ J. Janecek,³ M. Kalliokoski,¹⁸ D-W Kim,¹³ A. Korzenev,¹⁵ D. Lacarère,⁷ S. C. Lee,¹³ C. Leroy,¹⁶ G. Levi,⁸ A. Lioni,¹⁵ A. S. Lobos,⁹ J. Mamuzik,⁴ A. Maulik,^{8,9} A. Margiotta,¹⁷ N. Mauri,⁸ N. E. Mavromatos,¹ P. Mermod,¹⁵ M. Mieskolainen,¹⁸ L. Millward,⁵ V. A. Mitsou,⁴ R. Oravo,¹⁸ I. Ostrovskiy,¹⁹ P.-P. Ouimet,⁹ J. Papavassilou,⁴ B. Parker,²⁰ L. Patrizii,⁸ G. E. Pávālaš,⁶ J. L. Pinfold,^{9,*} L. A. Popa,⁶ V. Popa,⁶ M. Pozzato,⁸ S. Pospisil,³ A. Rajantie,²¹ R. Ruiz de Austi,⁴ Z. Sahnoun,^{8,22} M. Sakellariadou,¹ A. Santra,⁴ S. Sarkar,¹ G. Semenoff,²³ A. Shaa,²⁴ G. Sirri,⁸ K. Sliwa,²⁵ R. Soluk,⁹ M. Spurio,⁸ M. Staelens,⁹ M. Suk,⁴ M. Tenti,²⁷ V. Togo,⁸ J. A. Tuszyński,⁹ A. Upreti,¹⁹ V. Vento,³ O. Vives,⁴ A. Wall,¹⁹



MoEDAL Installation & Operation at Run-3 and LHCb Resources

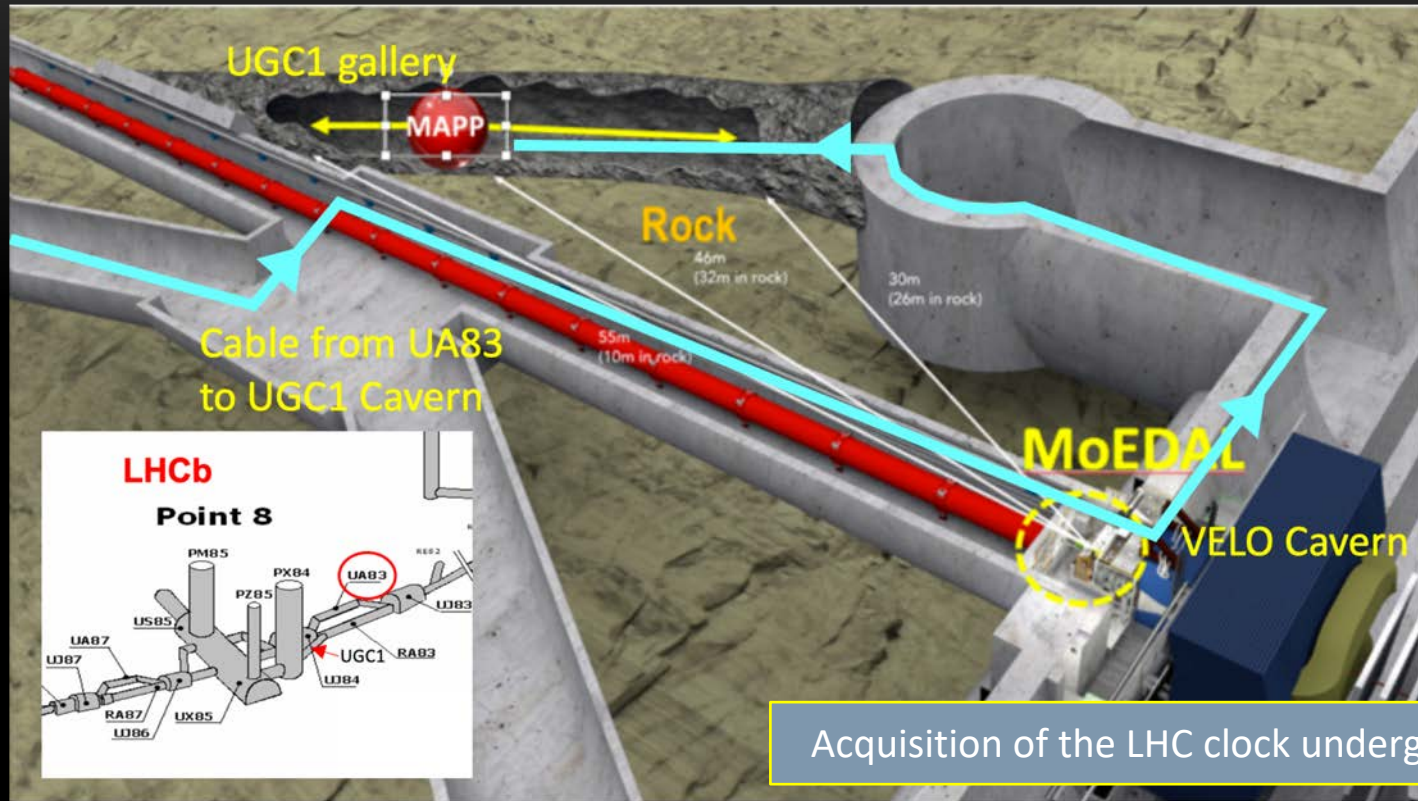
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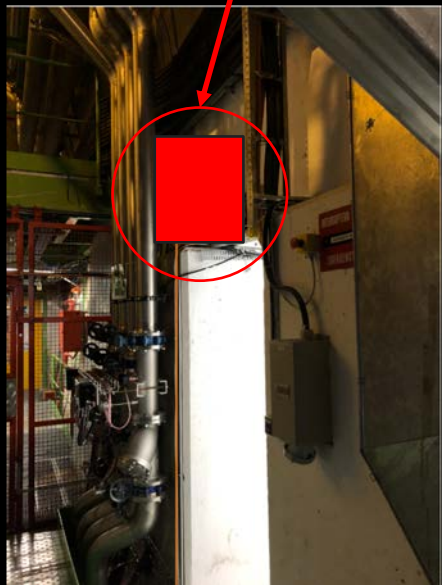
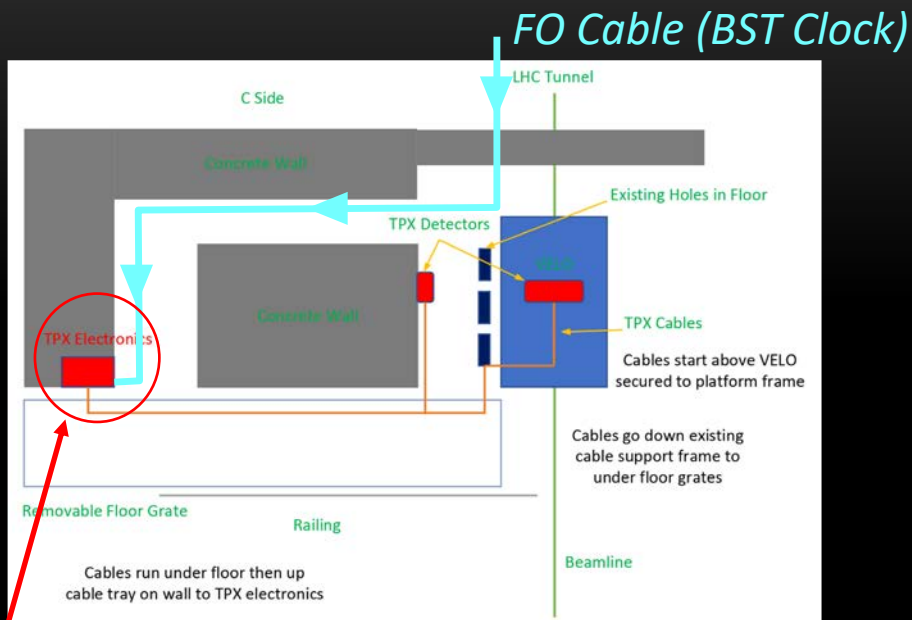
The required document has just been submitted to LHCb showing how we can reinstall and operate the MoEDAL detector with minimal/no interference with LHCb

The LHC Clock for MoEDAL TPX (1)



- *The TMPX detector has been updated to consist of 8 Timpix3 chips*
 - *Six TimePix3 chips will be deployed under the NTD platform over the VELO vacuum vessel and two on the C-side wall. These devices can be operated in a data driven mode and with the LHC clock*
 - *The use of the LHC clock allows a better measurement of backgrounds in the VELO region and allows an accurate bunch-by-bunch luminosity determination.*

Bringing the LHC Clock into the VELO region



MAPP Detector Preliminary Safety Analysis

Received 23rd February 2022

CERN

CH-1211 Geneva 23
Switzerland



EDMS NO.

2487833

REV.

1.0

VALIDITY

Released

Date: 2021-02-23

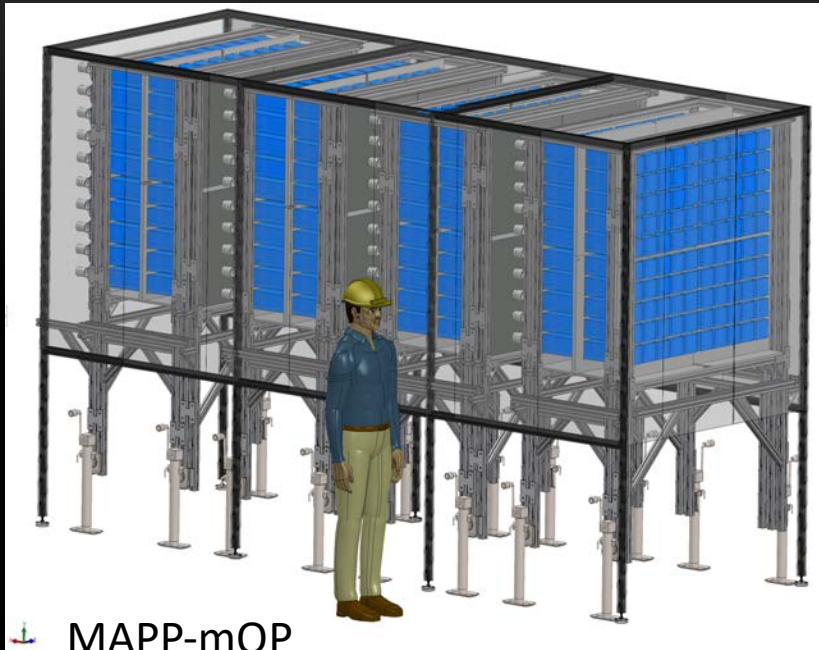
Preliminary Safety Analysis

Safety Study for the Installation of MoEDAL MAPP-mQP and MALL Detectors in UGC1 Gallery, Point 8 of the LHC

ABSTRACT:

This document is a preliminary safety study to install and operate the MoEDAL MAPP-mQP and MALL detectors in the UGC1 gallery, located at Point 8 of the LHC, within the LHCb experimental area.

Vital Statistics of MoEDAL-mQP



- *Weight 4-5 tonnes, dividable into pieces that weigh less than 20kg.*
- *Size about 1.5m X 2.5m x 4.0m*
- *Scintillator based doesn't require gas or HV (CW bases)*
- *Uses SW trigger and is readout over the internet*
- *Operates in a standalone mode in the UGC1 cavern*
- *Personnel in the UGC1 cavern at any one time ≤ 5 people*
- *Occupancy of the cavern < 10 days over the year - a few % of a year*

First Estimate of Costs

3. Cost estimation

Safety Requirement	Cost	Cost + Contingency
Fire Detection	21,000 CHF	23,100 CHF (10 %)
Emergency Red phone	11,200 CHF	11,760 CHF (5 %)
Electrical Safety	48,200 CHF	53,000 (10 %)
Civil Engineering	151,000 CHF	166,100 CHF (10 %)
HVAC	45,000 CHF	54,000 CHF (20%)
Access and work at height at UGC1	10,000 CHF	11,000 CHF (10 %)
Radiation Protection Patrol & Access System Requirement	45,000 CHF 4,500 CHF	49,500 CHF (10 %) Patrol System 4,725 CHF (5 %) Sector door
TOTAL	335,900 CHF	373,185 CHF

The costs of the safety measures is roughly the cost of the Phase-1 MAPP (MAPP-mQP) detector

The Sub-Reports

6. **References**

- [Ref.1] Project Safety Requirement (PSR) MoEDAL - MAPP and MALL detector - [EDMS 2472788](#)
- [Ref.2] Technical Design Report – [EDMS 2441095](#)
- [Ref.3] Preliminary Safety Assessment for the Installation of MoEDAL MAPP-mQP Detector – [EDMS 2428296](#)
- [Ref.4] Launch Safety Discussion document - [EDMS 2467861](#)
- [Ref.5] Civil Engineering quotation – [EDMS 2487834](#)
- [Ref.6] HVAC quotation – [EDMS 2487835](#)
- [Ref.7] Electrical quotation – [EDMS 2487840](#)
- [Ref.8] Red phone quotation – [EDMS 2487847](#)
- [Ref.9] Fire detection quotation – [EDMS 2487864](#)
- [Ref.10] Access quotation – [EDMS 2487878](#)
- [Ref.11] Fluka Studies for MoEDAL MAPP-mQP installation – [EDMS 2438507](#)
- [Ref.12] RP Patrol & Access system quotation – [EDMS 2487907](#)
- [Ref.13] Sector door quotation – [EDMS 2488102](#)

As we have just received this document we need some time to go through these references in detail

We would then like to meet with the Safety Group for a discussion

Work at Heights + a Small Lift (~200kg)

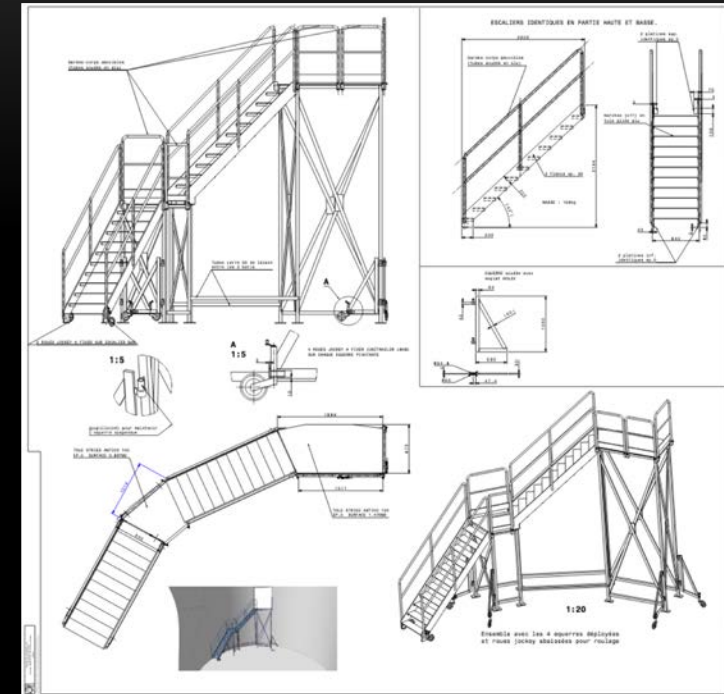
2.6 Access and work at height in UGC1

Due to the geographical location of UGC1, (4 metres above the floor of PX84) and the characteristics of the area, (curved shaft wall of PX84), it will be necessary to build a customized access staircase for the installation and operation period which will allow to people to have safe access to UGC1. The staircase shall have the following characteristics:

- This access staircase will be mobile, to allow removal during LHCb handling operations.
- The reception of material or equipment in UGC1 will be possible via a platform at the top of the staircase equipped with a retractable guardrail.
- It is noted that during equipment and material delivery operations, in the absence of a guardrail, the personnel will have to use a harness attached to the anchor point installed by SCE, until the guardrail is replaced.

Detailed design and cost in [Ref.10].

This is in the EHS safety plan



Not in the safety plan a lift in the mouth of tunnel to raise small loads (max ~250kg) from the cavern floor.

Our First Thoughts

- *We would like to thank Olga Beltramello, James Devine and Evelyne Dho for this thorough document and also LHCb's Eric Thomas and Gloria Corti for checking it.*
- *Although we have only had a superficial look at the document we have a number of questions and possible areas where we may potentially save money*
- *We plan to have a meeting with the safety group to discuss issues arising. The immediate questions are:*
 - *What are the areas where money can be saved, if any?*
 - *How to schedule the required work in a manner compatible with LHCb installation*
 - *How does this work affect the Phase-1 MoEDAL-MAPP schedule*
 - *Delays incurred in seeking funds to pay for this work (we had budgeted 70K CHF)*

The LHC Clock for MAPP

The potential routing of the fo-cable carrying the LHC clock signal to MAPP was shown a few slides back

Re: MoEDAL-MAPP fibre-optic cable Inbox x



James Pinfeld <pinfoldster@gmail.com>
to Jean-Pierre, Yvon, Tom, Johannes ▾

Dear **Jean-Pierre**,

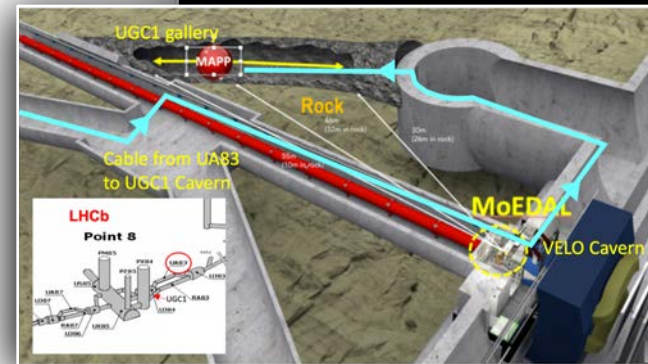
Many thanks for the invite to the Reunion ICL Machine LHC & SPS.

Johannes Troller and Tom Levens have been helping us with the issue of acquiring the machine LHC BST signal.

Through correspondence with them by email we have come up with the following plan which is, if I understand correctly, to take fibres from an LHC surface rack BY05=SR8 to US85 (-SR8 (CYFIB0x) to US85 (CYFIB01) --> 40+ available) and from there to US83 (US85 (CYFIB01) to UA83 (CYFIB01) --> 24 available).

We would need two fibres (maybe 4 fibres to allow a spare in each case?) would then go from UA83 to our locations adjacent to the VELO cavern and the other in the UGC1 cavern.

We were told that we needed to have a PLAN Document detailing the request. With some difficulty we found out who to contact, Marzia Bernadini. She proposed that I contact Yvon Muttonis to proceed with integration studies and Anne Laure Perrot to write the engineering change request.



We are now working on the PLAN document

Thanking you in advance for any help

