

# Tile Week: YETS Maintenance Update

February 8, 2023

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On behalf of TileCal maintenance team



# Introduction

## 1. Maintenance Overview

- a. Maintenance Status
- b. Electronics Progress
- c. Cooling Progress
- d. Useful Links

## 2. Recent Interventions

# 1. Maintenance Overview

# 1.a. Maintenance Status

Maintenance started in early December after LHC stopped running on November 28th

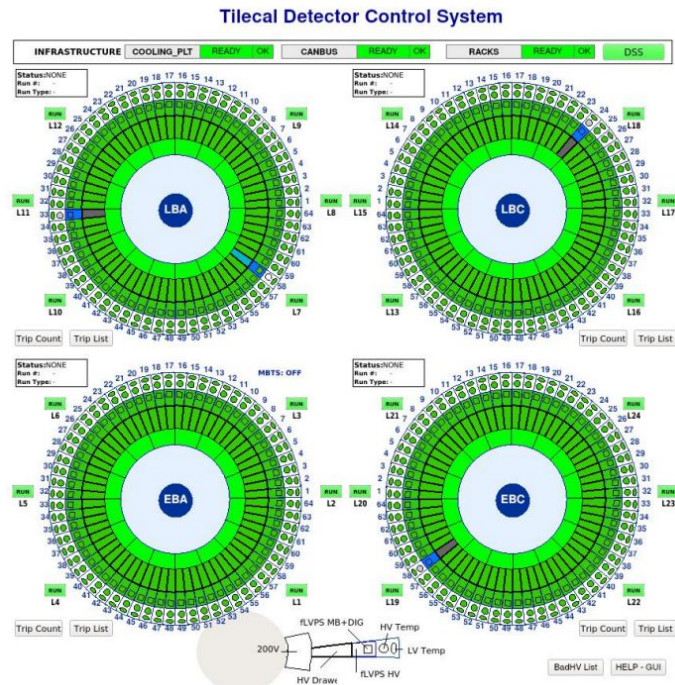
Four (4) Major Interventions:

LBA33: **Off** (trips on MB side) → Passed DVS tests after checks with Mobidick

EBC58: **Off** → Fixed digital sense line on Harting connector

LBC24: **Off** → New fLVPS installed, Harting connector replaced after burn

LBA58: **Emergency Mode** → Harting pins for HV checked and crimped; cooling on HV isolated



TileCal Status at the beginning of December 2022 before maintenance commenced

## 1.a. Maintenance Status

Partition	LBA	LBC	EBA	EBC
Module for Electronics Issue	<b>30,33,48,58,31,35,45,01</b>	<b>55,24,38,45,17*</b>	<b>25,40,46*,11,14,55</b>	<b>58,34,35,38</b>
Module for Cooling Issue	<b>30,31,45,58</b>	<b>33,49,64,24,38</b>	<b>07</b>	<b>48,49,30</b>
Total Number of Opened Modules	8	8	7	7

**Priority Maintenance:** Identified as having major problems based on [Irakli's presentation](#) (or modules OFF identified later)

*Other Interventions:* Identified in [this maintenance list](#), addressed as time and access allows; problems arising during YETS

\* = in progress as of 8.2.2023

# 1.a. Maintenance Status

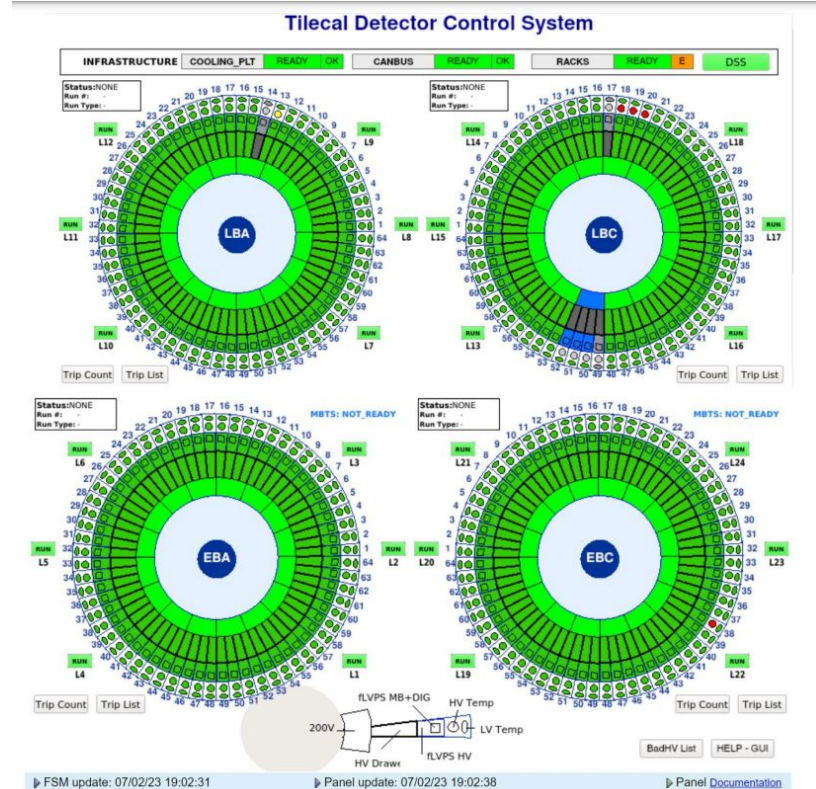
Tile status as of 7.2.2023:

All modules are ON except:

- LBA14: Demonstrator under improvement
- LBC17, LBC49: Under maintenance  
LBC50
- LBC51, LBC52: Powered by the same 200V\_DC unit as LBC49 (could not be started)

Not at working temperature (red dot)  
because HV side just started: EBC 38,  
LBC18-20

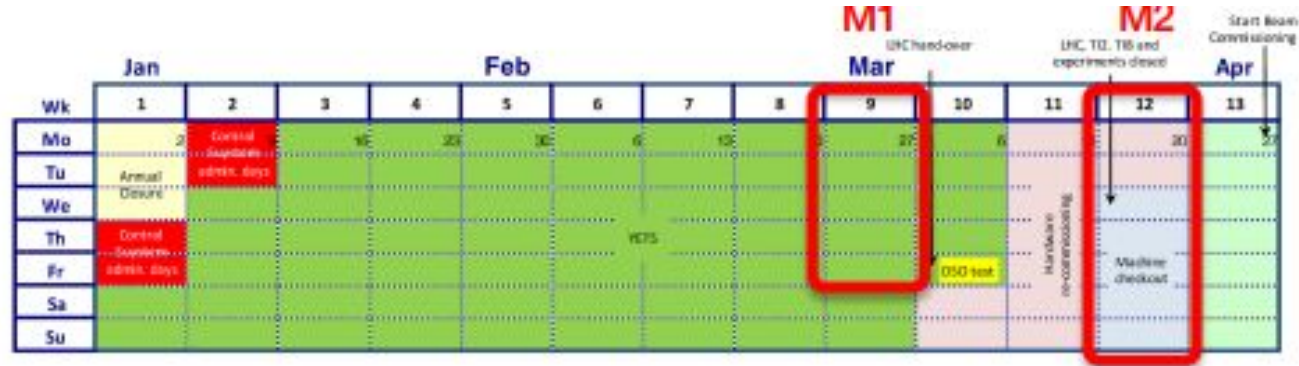
(Courtesy of [Stan's elog](#))



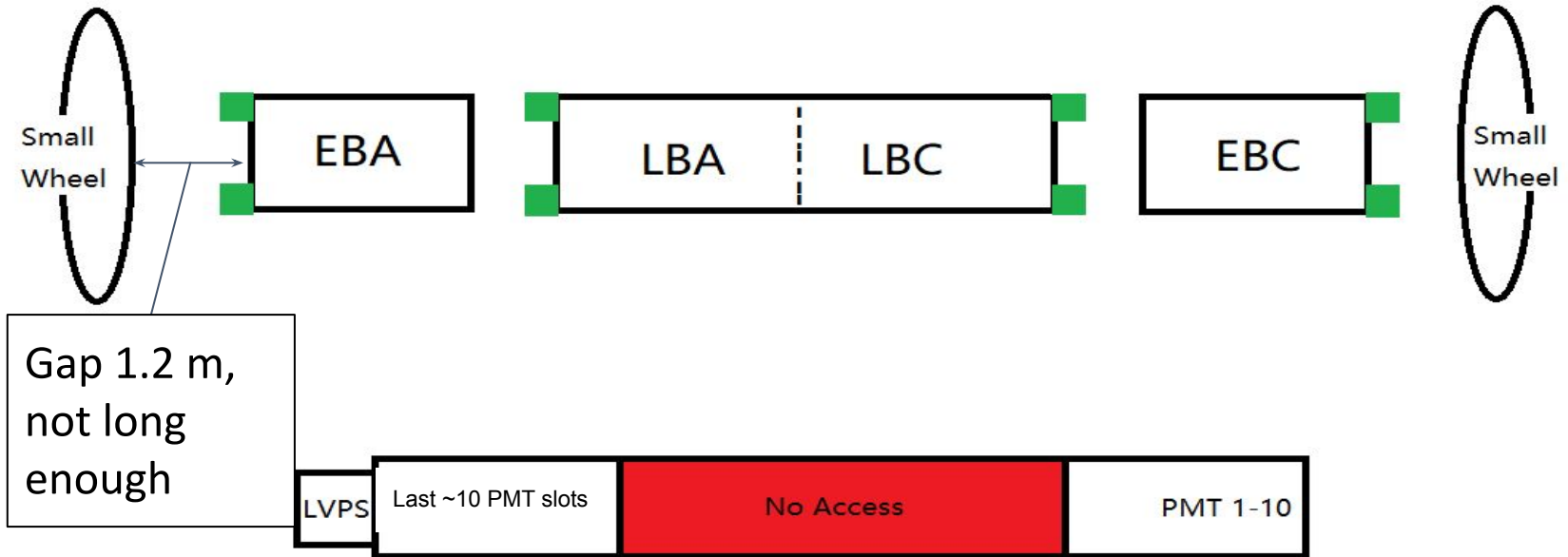
# 1.a. Maintenance Status: Remaining Time

Important dates:

- EBC will close to run position on Feb. 15, 2023.
- EBA will close to run position on Feb. 17, 2023.



# 1.a. Maintenance Status: Access Constraints





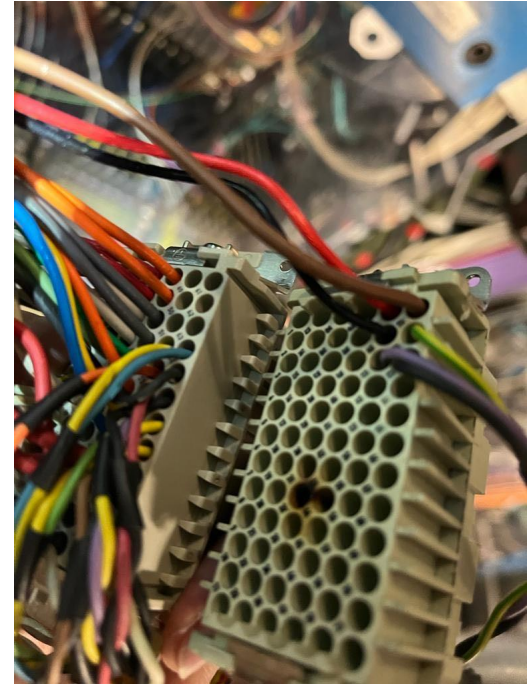
## 1.b. Electronics Progress

### Common problems discovered:

- Damaged Harting connectors to LVPS (example LBC24)
- Cut wires (example LBC55 trigger cables)
- Bad 3-in-1 cards in single channels (PMTs)

### Solutions employed:

- Crimping and replacing Harting connector and LVPS
- Rewiring and dry soldering
- Replacing 3-in-1 cards
- Diagnosing and testing problems with MobiDick



# 1.c. Cooling Progress

PPV cycle **479 mins** as of Jan. 31, 2023,  
improved from approx. 200 mins.

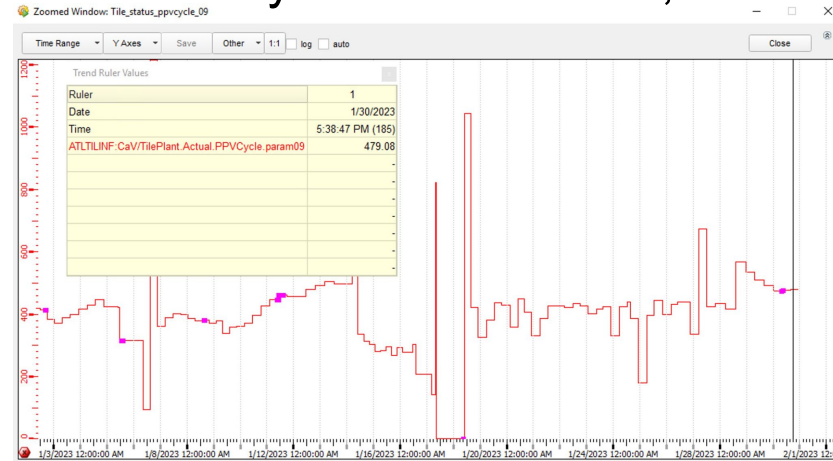
## Common problems discovered:

- Bent hoses on patch panel.
- Leaking connectors.

## Solutions employed:

- Unbend hoses.
- Replace connectors (when accessible).
- If leak cannot be identified further than the internal drawer level the offending module loop (4 within each module) is closed.

PPV cycle as of Jan. 30, 2023

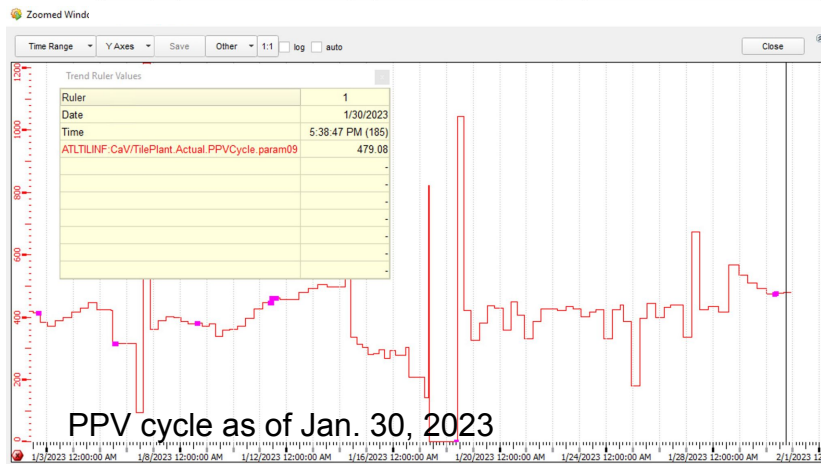
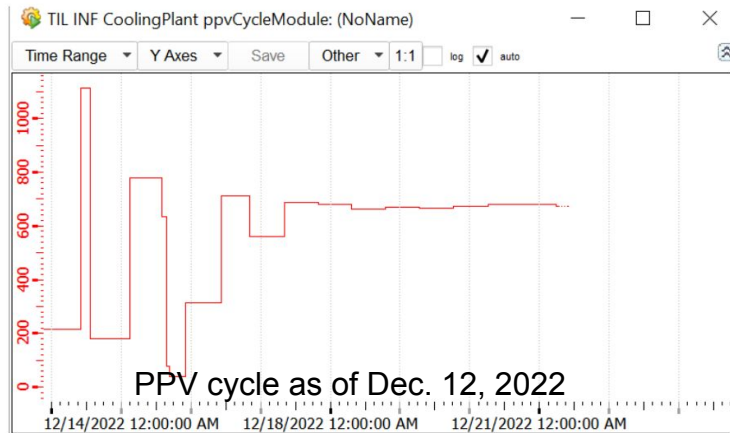


# 1.c. Cooling Progress: PPV Cycle

Before January 1st, PPV Cycle was approximately 700 minutes with 6 modules locked, having been identified in December as having possible major leaks (EBA07, EBA30, LBA30, LBA45, LBA58, LBC38)

Suddenly, on January 1st we lost ~200 minutes in the cooling cycle due to a major leak (middle connectors in LBC33 mostly)

After subsequent cooling interventions, the PPV cycle was recovered to ~500 minutes. The difference is due to small leaks in many modules (we simply cannot target every one)



## 1.d. Useful Links

1. Maintenance and Operations Meetings 2023: Previous maintenance reports detailing interventions on each module for cooling and electronics issues for the past week
  - a. [January 19th](#)
  - b. [January 26th](#)
  - c. [February 2nd](#)
2. [List of Problematic Modules](#): Up-to-date list of problematic modules and channels identified before YETS with current outcomes after maintenance interventions
3. [Maintenance Elog](#): Logbook of interventions by maintenance team with discussion of issues
4. [Problematic Drawers](#): Irakli's slides identifying drawers with major electronics and cooling issues

## 2. Recent Interventions

# Interventions

## 1. Cooling Loop #7

Problem: Problem with the valve (pressure is not stable if loop is remotely isolated and the cooling valve is opened/closed)

Intervention: Cooling experts (Damien) need to investigate. Modules in this cooling loop (LBA49-60) were turned off during investigation

Status: Successful completion by ATLAS cooling experts

## 2. LBA+LBC 45

Problem: The laser signals are not correct i.e. wrong gain in almost every channel. The drawers were misaligned due to lack of a copper stopper in LBA45. Upon insertion, it moved LBC45, too.

Intervention: Copper stopper was attached and both modules were reopened and pushed in properly

Status: Correct position confirmed by calibration runs

# Interventions

## 3. EBC 34

Problem: Digital errors in Digitizer #3

Intervention: Digitizer was replaced (New address:4872 [decimal] or 1308[hexadecimal])

Status: Digitizer #2 failed DVS test with bad CIS pedestal in LG→ Maintenance list error

## 4. EBC 38

Problem: PMT08 had a bad integrator

Intervention: Drawer was opened and extracted from the back side. 3-in-1 card for PMT08 was replaced

Status: Module closed. Failed DVS test 3 times (pedestal runs)

# Interventions

## 5. LBC 17

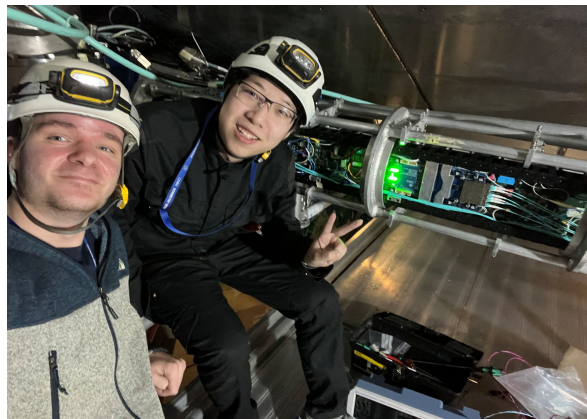
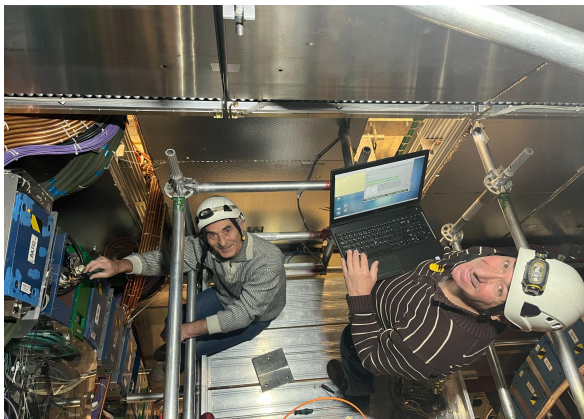
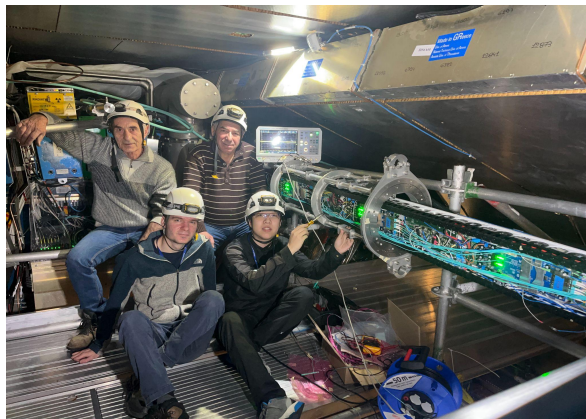
Problem: Many digital errors with Digitizer #7

Intervention: Drawer was opened and extracted in the short basket. External drawer was disconnected from internal drawer

Status: TBA



# Maintenance Team Photos!



Team: Irakli, Nugzar, Stan, Peter, Jacky, Luca, and Filippo

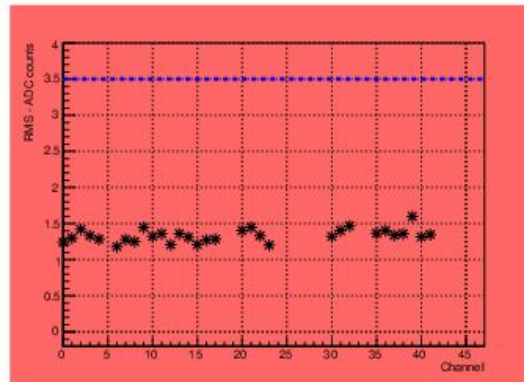
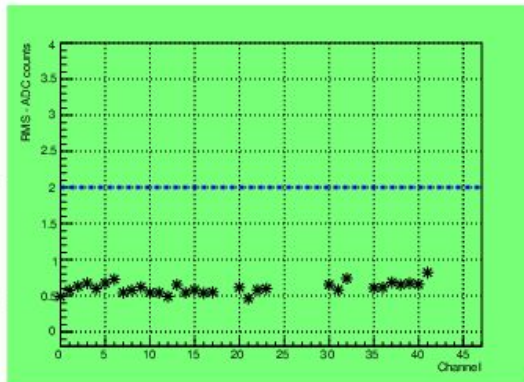
Photos: Irakli, Nugzar, Peter, and Jacky in the PIT ...

# Appendix

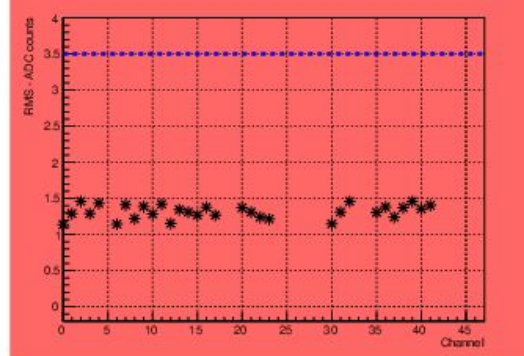
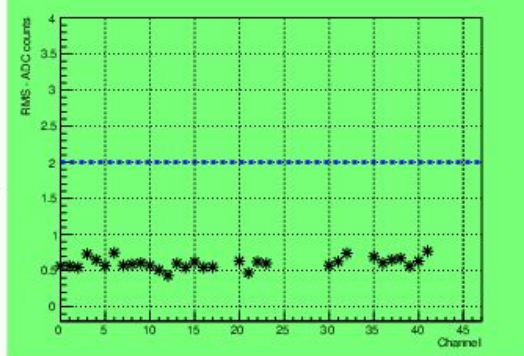
EBC 38: CIS  
pedestal bad in  
DVS test

## EBC38 Pedestal

High freq LG & HG



Low freq LG & HG



EBC 34:  
Digitizer #2 bad  
(affecting  
channels  
39-41)

