

# GEM's Database + GUI Status & OMS Updates

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# Outline

- **Institutional Responsibility**
  - National Centre for Physics (NCP), Pakistan.
- **GEM Database Framework**
  - GUI Overview
  - Quality Control (QC)
  - Detector Construction
- **OMS for Data Visualization**
- **Completed Talks**
- **Tasks in Progress**
- **Future Tasks**

# Institutional Responsibility -- NCP

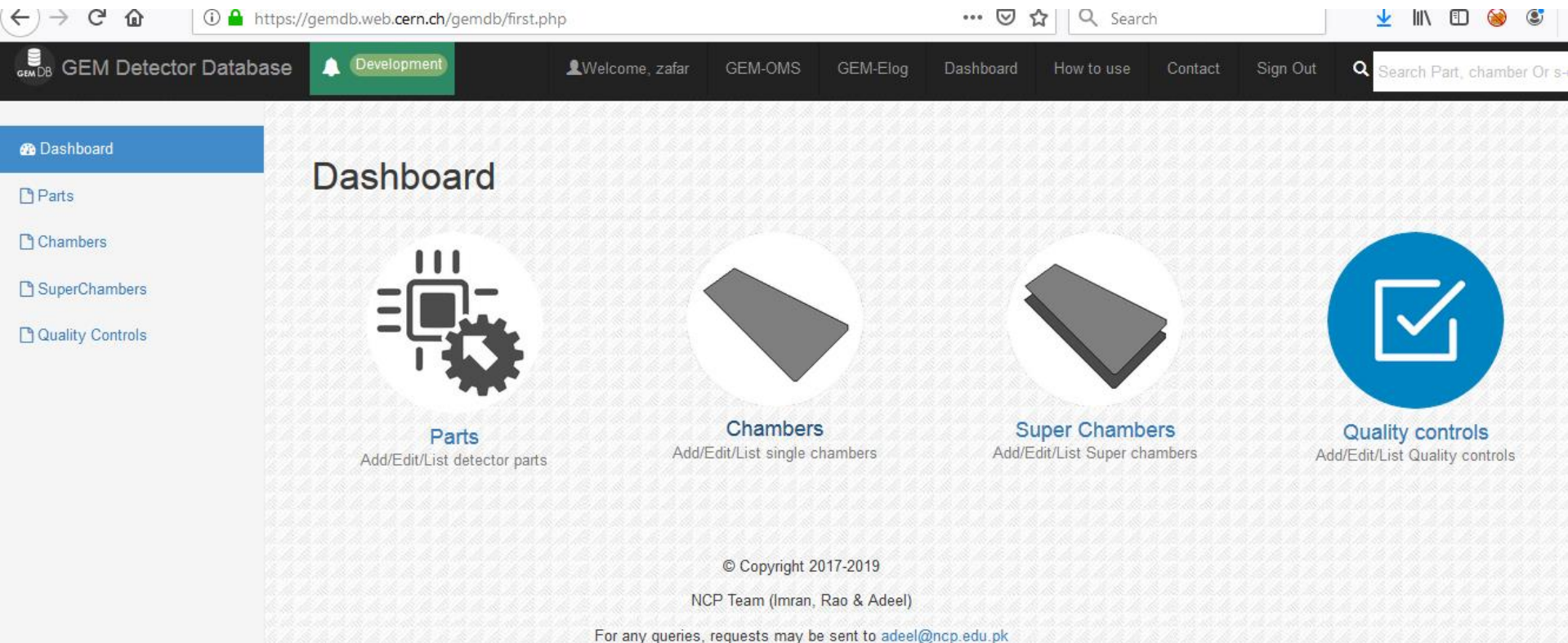
- Software Development group at NCP has been involved in this project for around last couple of years.
- Team members are:
  - Muhammad Imran (Ex/Prime Coordinator)
  - **Adeel-Ur-Rehman (Acting Coordinator)**
  - Rao Atif Shad (Prime & Acting OMS Coordinator)
- Imran and myself look after the database and GUI related stuffs.
- Rao works on OMS related tasks.
- We discuss progress regularly in the weekly database meeting.

# GEM Database Framework

- **Development and Production Databases**
  - Dev DB (CERN IT) and Prod DB (P5) have been setup
  - DB Loaders setup both in Dev and Prod environment
- **Separate Graphical User Interface for Dev and Prod DB**
  - Dev DB GUI
    - <https://gemdb.web.cern.ch/gemdb/>
  - Prod DB GUI
    - <https://gemdb-p5.web.cern.ch/gemdb-p5/>

# GUI Overview (Dashboard)

- GUI for entering detector construction data is fully functional.



The screenshot shows the web interface for the GEM Detector Database. The browser address bar displays <https://gemdb.web.cern.ch/gemdb/first.php>. The navigation bar includes the site name "GEM Detector Database", a "Development" status indicator, a user profile "Welcome, zafar", and menu items for "GEM-OMS", "GEM-Elog", "Dashboard", "How to use", "Contact", and "Sign Out". A search bar is located on the right side of the navigation bar.

The main content area is titled "Dashboard" and features four primary action buttons, each with an icon and a description:

- Parts**: Add/Edit/List detector parts (Icon: Microchip and gear)
- Chambers**: Add/Edit/List single chambers (Icon: Gray trapezoid)
- Super Chambers**: Add/Edit/List Super chambers (Icon: Gray trapezoid with shadow)
- Quality controls**: Add/Edit/List Quality controls (Icon: Blue circle with white checkmark)

At the bottom of the dashboard, the following text is displayed:

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NCP Team (Imran, Rao & Adeel)  
For any queries, requests may be sent to [adeel@ncp.edu.pk](mailto:adeel@ncp.edu.pk)

# GUI Overview (Parts)

- It is used to load various detector components to build chamber and super chambers.

The screenshot displays the 'Parts' section of the GEM Database GUI. A left sidebar contains navigation links: Dashboard, Parts (selected), Chambers, SuperChambers, and Quality Controls. The main area shows a grid of 14 component cards, each with an icon, a name, and 'Add new' and 'List' buttons.

Component Name	Icon Description
Readout board	Green circle with white circuit pattern
Drift board	Black circle with white circuit pattern
GEM Electronic Board	Blue circle with white circuit pattern
VFAT	Blue square with white circuit pattern
GEM Cooling Plate	Blue square with white circuit pattern
Radmon Sensor	Blue square with white circuit pattern
GBT	Blue square with white circuit pattern
GEM foil	Orange circle with white foil icon
GEM External Frame	Blue circle with white circuit pattern
OptoHybrid	Pink circle with white printer icon
GEM AMC Board	Blue circle with white circuit pattern
Temperature Sensor	Blue square with white circuit pattern
FPGA	Blue square with white circuit pattern

# GUI Overview (QC)

- Also deals with Quality Controls, Tracking and Channel Mapping.

Quality control list

QC ID	Test Name	Icon	Status
QC1	PCB Test	Gear	Not Checked
QC2	Foil Test	Gear	Not Checked
QC3	Leak Test	Trapezoid	Not Checked
QC4	HV Test	Trapezoid	Not Checked
QC5	Gain Test	Checkmark	Checked
QC6	HV Test	Checkmark	Checked
QC7	Strip Masking	Checkmark	Checked
QC8	QC8	Checkmark	Checked
QC Result	QC Result	Checkmark	Checked

# GUI Overview (Scope of Usage)

- All the production sites will use this interface to construct chambers/Super-chambers & upload QC data.

## + Geometry Stand Configuration Test

Column 1:			Column 2:			Column 3:		
<b>Super Chambers</b>	<b>Flip</b>	<b>Flow</b>	<b>Super Chambers</b>	<b>Flip</b>	<b>Flow</b>	<b>Super Chambers</b>	<b>Flip</b>	<b>Flow</b>
Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>	Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>	Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>
Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>	Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>	Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>
Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>	Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>	Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>
Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>	Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>	Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>
Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>	Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>	Select Super Chamber ▼	<input type="checkbox"/>	<input type="text"/>

Submit




# GUI Overview

- **Register parts**
  - Foils, Drifts, Readouts, VFATS, GEBs, External Frames, OptoHybrids, Cooling Plate Circuits, Temperature Sensors, Radmon Sensors, FPGA, GBT etc.
- **Attach parts**
  - 12 VFATs to GEB Narrow Long/Short
  - 12 VFATs to GEB Wide Long/Short
- **Construct Chambers and Attach Parts**
  - 3 Foils
  - 1 Drift PCB
  - 1 Readout PCB
  - GEB Wide and Narrow Long/Short
  - Optohybrid
  - Frames
  - Cooling Plates Circuits
  - Temperature Sensor
  - Radmon Sensor
  - FPGA
  - GBT
- **Attach/Detach child parts from parent parts**
- **Build Super Chambers**
  - Attach / Detach chambers to / from super chambers

# Add / View Components

- Readout boards
  - GEM electronic board
  - GEM Foil
  - OptoHybrid
  - Drift boards
  - VFAT
  - GEM external frame
  - GEM AMC board
  - GEM Cooling Plate Circuits
  - Temperature Sensors
  - Radmon Sensors
- 
- GUI generates relevant xml file and sends it to DBLoader after user submit form.
  - Dbloader loads this file into database.
  - Users can directly send xml/zip files directly to Dbloader if in case of bulk data upload.

 Load data using XML / Zip Files

Select File to be uploaded  No file chosen

## Register

parts

 Readout board <input type="button" value="+ Add new"/> <input type="button" value="List"/>	 GEM foil <input type="button" value="+ Add new"/> <input type="button" value="List"/>
 Drift board <input type="button" value="+ Add new"/> <input type="button" value="List"/>	 GEM External Frame <input type="button" value="+ Add new"/> <input type="button" value="List"/>
 GEM Electronic Board <input type="button" value="+ Add new"/> <input type="button" value="List"/>	 OptoHybrid <input type="button" value="+ Add new"/> <input type="button" value="List"/>
 VFAT <input type="button" value="+ Add new"/> <input type="button" value="List"/>	 GEM AMC Board <input type="button" value="+ Add new"/> <input type="button" value="List"/>
 GEM Cooling Plate <input type="button" value="+ Add new"/> <input type="button" value="List"/>	 Temperature Sensor <input type="button" value="+ Add new"/> <input type="button" value="List"/>

# Attach/Detach VFATs to GEB

- Edit Page of GEB
- 12 VFATs to GEB Wide
- 12 VFATs to GEB Narrow

GEB [GEB-RO-L-5557]	
ID	31424
Serial Number:	GEB-RO-L-5557
Name:	GEB-RO-L-5557
Inserted at:	04-SEP-18 07:22:28.000000 AM EUROPE/ZURICH
Inserted by:	mimran
GEB TYPE:	GEM Electronics Board Wide
Manufacturer name:	Micro Pack
Location:	CERN
Comment or description:	test

Child parts:	
VFAT2 at Position: 7. 0xf9d3	 Detach 
VFAT2 at Position: 4. 0xf780	 Detach 
VFAT2 at Position: 6. 0xf94c	 Detach 
VFAT2 at Position: 5. 0xf99b	 Detach 
VFAT2 at Position: 23. 0xf9b3	 Detach 
VFAT2 at Position: 22. 0xf9b0	 Detach 
VFAT2 at Position: 21. 0xf9a4	 Detach 
VFAT2 at Position: 20. 0xf994	 Detach 

Attach New Child parts:

# Chamber Construction

- Once we add all the components, we can start building a chamber.







The screenshot displays the 'GEM Detector Database' web application interface. The top navigation bar includes a user profile 'Welcome, Hasib Md', a 'Dashboard' link, and a search bar containing 'Search Part, chamber Or s-'. A left sidebar lists navigation options: Dashboard, Parts, Chambers, SuperChambers, Quality Controls, Tracking Parts, and Channel mapping. The main content area is titled '+ New Chamber' and is divided into two columns. The left column, 'Chamber Information', contains a 'Serial Number' field with the value 'GE1/1-X-VERSION-INSTITUTE-XXXX', a 'Version' dropdown menu, an 'Institute' dropdown menu, a '4 digits Serial' text input field with 'XXXX', a 'Barcode' field with a barcode icon, and a 'Location' dropdown menu. The right column, 'Comments', features a text area with the prompt 'Leave your comment:' and a small icon in the bottom right corner.

# List/Edit Chambers

- **View list of chambers**
  - Show option displays a chamber's detail.
  - Edit option for attachment/detachment of components to / from chambers.

[+ Add new chamber](#)

### List





















#	Serial	User responsible	Show	Edit
1460	GE1/1-VII-L-CERN-Test-0001	 Umesh	<a href="#">Show</a>	<a href="#">Edit</a>
23000	GE1/1-X-S-BARI-0001	 piet	<a href="#">Show</a>	<a href="#">Edit</a>
12600	GE1/1-X-S-CERN-0003	 Hasib	<a href="#">Show</a>	<a href="#">Edit</a>
21040	GE1/1-X-L-CERN-0003	 hamd	<a href="#">Show</a>	<a href="#">Edit</a>
4980	GE1/1-VII-L-CERN-0002	 Umesh	<a href="#">Show</a>	<a href="#">Edit</a>
4981	GE1/1-VII-L-CERN-0004	 Umesh	<a href="#">Show</a>	<a href="#">Edit</a>

# Attach/Detach Components to/from Chambers

## Chamber [GE1/1-VII-L-CERN-0001]

ID	4982
Serial Number:	GE1/1-VII-L-CERN-0001
Inserted at:	24-FEB-17 09:54:58.000000 PM EUROPE/ZURICH
Inserted by:	Umesh
Location:	CERN
Comment or description:	GEM Chamber GE1/1-VII-L-CERN-0001

### Current Detector parts:

Drift: PCB-DR-VII-L-0001	 Detach 
Foil GEM3: FOIL-B1-L-0011	 Detach 
Foil GEM2: FOIL-B1-L-0006	 Detach 
Foil GEM1: FOIL-B1-L-0004	 Detach 
Readout: PCB-VIII-RO-B-L-0003	 Detach 
Frame: GE1/1-ExtFrame-B1-L-6464	 Detach 
Cooling Plate Circuit: CP-L-9999	 Detach 
GEB NARROW: GEB-RO-L-5555	 Detach 
VFAT2 at Position: 3. 0xf998	 Detach 
VFAT2 at Position: 19. 0xf778	 Detach 

### Attach New Detector parts:

Select Temp Sensor:

Select Redmon Sensor:

# Super Chamber Construction

- Need two chambers to build super chamber
- Attach two single chambers

**gmdB GEM Detector Database** Welcome, Hasib Md Dashboard How to use Contact Search Part, chamber Or s-cl

**+ New Super-Chamber**

**Super-Chamber Information**

- Serial Number  
GE1/1-SC-VERSION-XXXX  
Choose Version
- 4 digits Serial  
XXXX
- Barcode
- Manufacturer name  
Choose Manufacturer

**Attach single chambers**

Choose Chamber 1:  
Choose Long Ch...

Choose Chamber 2:  
Choose Long Ch...  
Long  
GE1/1-VI-L-CERN-0001  
GE1/1-VII-L-GHENT-0001  
GE1/1-VII-L-FIT-0003  
GE1/1-VII-L-MPT-0005  
GE1/1-VII-L-CERN-0007  
GE1/1-VIII-L-

UP  
DOWN

1st Chamber  
2nd Chamber

**Comments:**  
Leave your comment:





# Attach/Detach Chambers to/from Super Chambers

- Edit Super chamber page to attach / detach chamber to super chambers

## Super Chamber [GE1/1-SCL-001]

ID	5380
Serial Number:	GE1/1-SCL-001
Name:	GE1/1-SCL-001
Inserted at:	24-FEB-17 10.37.32.000000 PM EUROPE/ZURICH
Inserted by:	Umesh
Location:	CERN

### Detector parts:

- Chamber 1: GE1/1-X-L-CERN-0003  Detach 
- Chamber 2: GE1/1-VII-L-CERN-0002  Detach 

### Attach New Chambers:



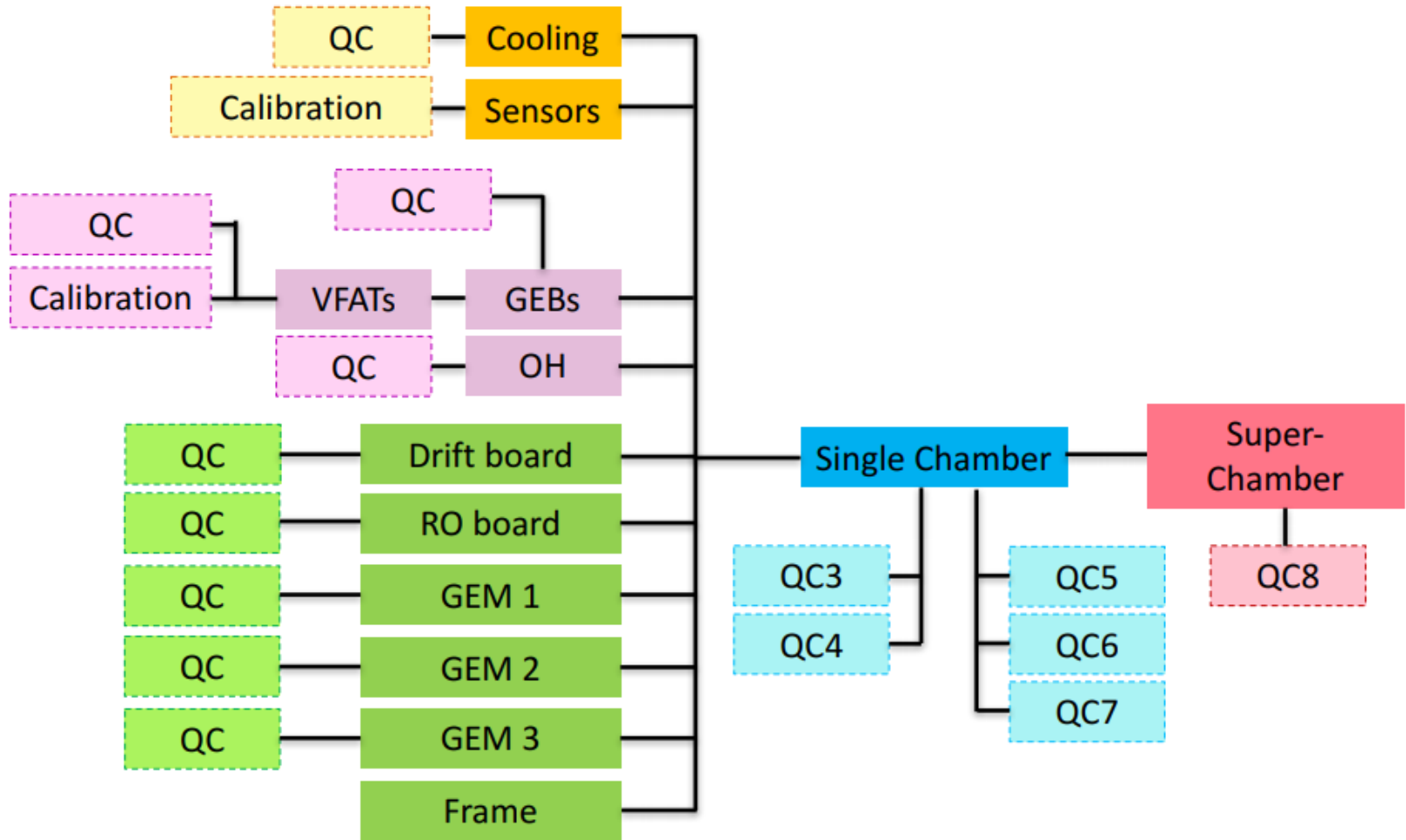
# Quality Controls

- Interface for uploading various QCs data.
- Users provide relevant excel file for different QC.
- GUI converts excel file into relevant xml files and sends them to dbloader for uploading into database.

Quality control list

- QC1 PCB Test
- QC2 Foil Test
- QC3 Leak Test
- QC4 HV Test
- QC5 Gain Test
- QC6 HV Test
- Strip Masking Strip Masking
- QC8 QC8
- QC Result QC Result

# Detector Construction



# Online Monitoring System (OMS)

# OMS Overview

- OMS is used for data visualization of GEMDB instances (both Development and Production).
- It displays data about the results of QCs and other stuff.
- Rao is primarily involved in GEM OMS development (along with useful assistance of Aivaras Silale in the past).
- Data and plots from QC2 to QC8 are displayed in OMS.
- URL to access old OMS version for GEM is:
  - <https://cmsomsdet.cern.ch/gem/>
- URL to access the updated core version of OMS is:
  - <https://cmsoms.cern.ch/gem/>

# What is OMS?

- It is a data visualization framework tool
- Display database data in tables and plots
- The OMS for subdetectors is the successor of WBM
- <https://cmsomsdet.cern.ch/>



## CMS Web Based Monitoring online



### Subdetectors WBM

[ECALSummary](#)  
[DTSsummary](#)  
[RPCSummary](#)  
[HGCALEHome](#)  
[HGCALEHome](#)  
[CSCSummary](#)  
[TrackerTools](#)  
[PixelHome](#)

[BCM1F Bunch Info](#)  
[TriggerModes](#)  
[ScreenSnapShots](#)

### Core Services

WBM: [RunSummary](#) [24h] [24h&1+trig]  
 OMS: [Run Report](#) [Run Summary](#)

WBM: [RunTimeSummary](#) [LHC Fills] [Deadtime](#)  
 OMS: [Runtime Analysis](#) [Deadtime Analysis](#) [Downtime Analysis](#)

WBM: [FillReport](#) [Latest Stable Fill] [DataSummary](#)  
 OMS: [Fill Summary](#) [Fill Report](#) [Yearly Summary](#)

### TriggerRates

WBM: [\[Pre-DT L1\]](#) [\[Post-DT L1\]](#) [\[HLT\]](#)  
 OMS: [L1 Current Rates](#)  
[L1 Trigger Rates](#)

[\[LumiScalers\]](#) | [Automatic Fill eMails](#)  
[LastValue](#) | [ConditionBrowser](#) | [iPlot](#)  
[\[MagnetHistory\]](#) | [\[CurrentBunches\]](#) | [BunchFill](#)

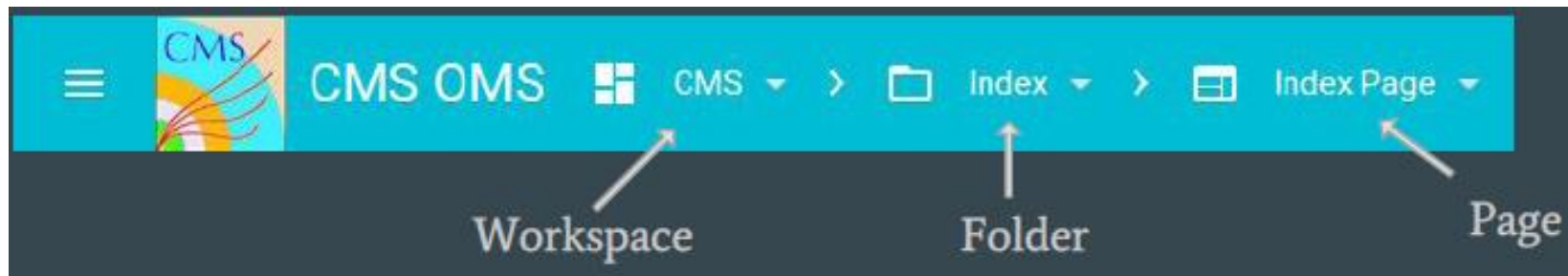
### Links

[DQM Run Registry](#) [Online] [Offline] [User]  
[Online DQM GUI](#)  
[Run Coordination](#)  
 Twiki: [OnlineWB TrIDAS](#)  
[CMS Online](#)  
[Shift eLog](#)  
[LHC Page 1](#)

[Snappy eLogViewer](#)

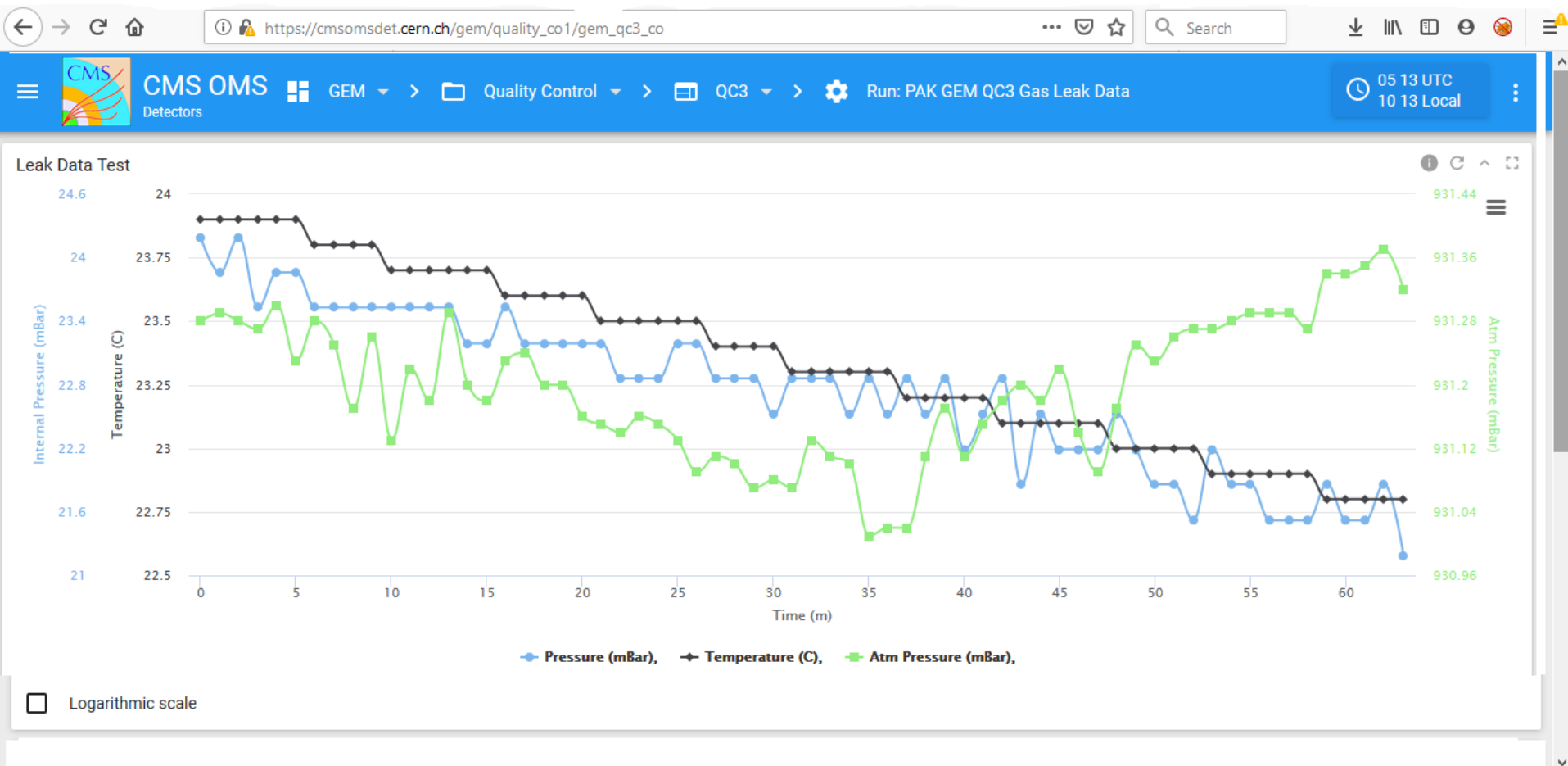
# OMS Content Structure

- **Workspace** – top-level object in the hierarchy of content organization.
  - Can represent a CMS detector logical or organizational units, sub-detectors, etc. For example, CMS, GEM, Pixel, Tracker, HCAL, CSC.
- **Folder** – hierarchical container (lower-level) for Pages. For example,
  - Quality Control, DAQ, ConfigurationDB etc, etc.
- **Page** – actual content container that is composed of a single Controller (optional) and one or more Portlets. For example, Run Summary, Report, etc.



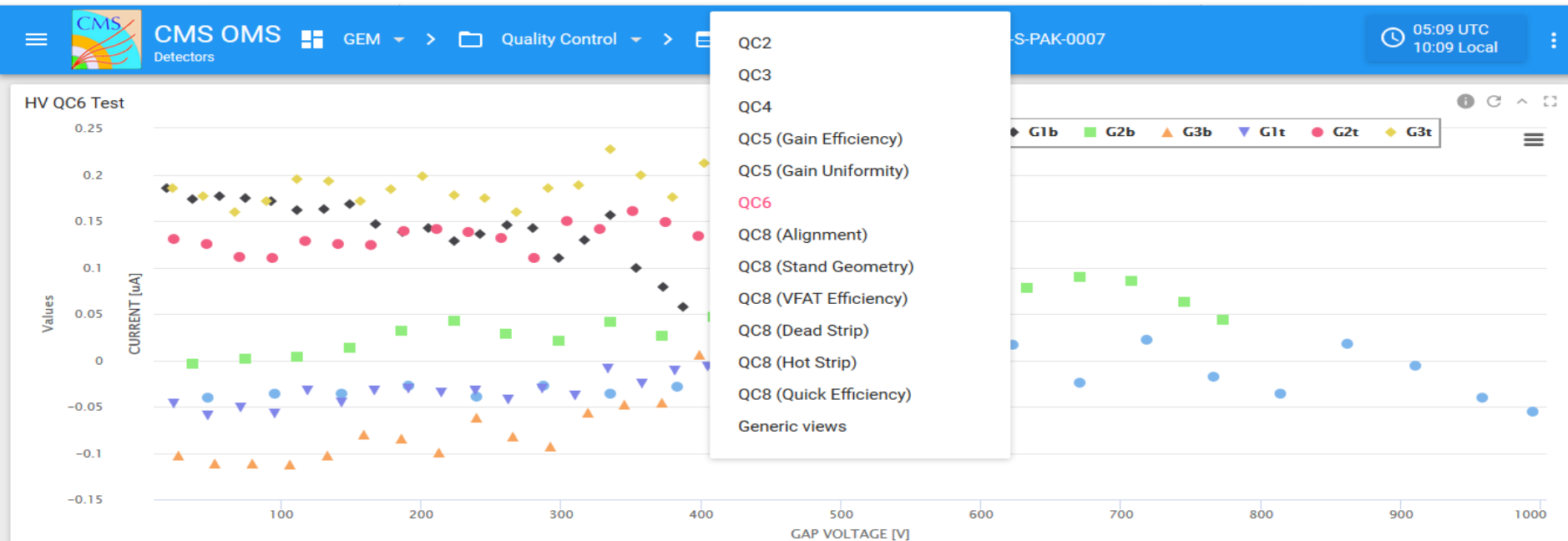
# OMS (Test plots)

- Various test plots could be viewed with the help of OMS.



# OMS (QC)

- A choice of Quality Control plots could also be obtained.





# OMS (Parts)

- Also offers to visualize the configuration of chamber parts

The screenshot shows the CMS OMS web interface. The browser address bar displays <https://cmsomsdet.cern.ch/gem/production/index>. The page header includes the CMS logo, 'CMS OMS Detectors', and navigation elements. A dropdown menu is open, listing options: Index, Quality Control, DAQ, VFAT 3, ConfigurationDB, Index (DEV DB), Quality Control (DEV DB), DAQ (DEV), VFAT3 (DEV), and ConfigurationDB (DEV). The main content area features a table with columns: TYPE, NAME, PARENTTYPE, and PARENTNAME. The table lists various GEM Foil and GEM Chamber parts, including their identifiers and parent relationships. At the bottom, there is a pagination control showing 'Rows per page: 10' and 'Page 1 of 369'.

TYPE	NAME	PARENTTYPE	PARENTNAME
GEM Detector ROOT	ROOT	GEM Detector ROOT	ROOT
GEM Foil	FOIL-B20-L-0260	GEM Chamber	GE1/1-X-L-CERN-0018
GEM Foil	FOIL-B1-L-Test-0004	GEM Chamber	GE1/1-VII-L-CERN-Test-0001
GEM Foil	FOIL-B1-L-Test-0006	GEM Chamber	GE1/1-VII-L-CERN-Test-0001
GEM Foil	FOIL-B1-L-Test-0011	GEM Chamber	GE1/1-VII-L-CERN-Test-0001
GEM Foil	FOIL-B20-L-0251	GEM Chamber	GE1/1-X-L-CERN-0019
GEM Foil	FOIL-B23-L-0301	GEM Chamber	GE1/1-X-L-CERN-0034
GEM Foil	FOIL-B12-L-0144	GEM Chamber	GE1/1-X-L-CERN-0002
GEM Foil	FOIL-B1-S-9002	GEM Chamber	GE1/1-X-S-BARI-9001
GEM Foil	FOIL-B16-L-0196	GEM Chamber	GE1/1-X-L-CERN-0005

# Tasks Completed

# Features/Tasks Accomplished

- Development of templates, webpages for data uploading in GUI , and data visualization in OMS for various tests of QC3, QC4, QC5, QC6 and QC8.
- Addition of Edit feature regarding Chamber and Super Chamber Module
- Addition of Registration feature of various new Components, GEB Narrow/Wide,OH, AMC, Cooling Plate, Temperature Sensor and Radmon Sensor.
- Development of web pages in GUI for parent/child attachment of various components.
- Creation of tables/views, templates and OMS pages for Configuration DB
- Creation of tables/views, templates and OMS pages for VFAT3 parts DB
- Development of web pages for QC Results in GUI and OMS.
- Development of tables/views, templates for QC Components and Electronics (for ULB Group).
- Uploading of Bulk Data to OMDS using GUI without having an account at CMSUSR.

# Tasks in Progress

# Work in Progress

- OMS migration from DET to CORE is in progress now.
- A dashboard of OMS to show the status of QC, installation and commissioning with the help of a corresponding DB table (as requested by Jared recently)
- ConfDB interactions for GEM DAQ (as requested by Louis)

# Future Tasks

# Tasks Foreseen Ahead

- Improvements in the construction DB, Adding new features (QC7, GE2/1, ME0)
- Design of the Configuration DB
- Dashboards for the QC8, Commissioning
- The Equipment DB
- Performances Dashboard
- Survey of the missing content (user not updating the DB)
- Performance DB (and new Run Registry service for Data certification)
- OMS including the views of the Condition DB

Q/A?

Thanks!