

# GIF++ User DCS Update

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INFN Bologna 

GIF++ Annual User Meeting

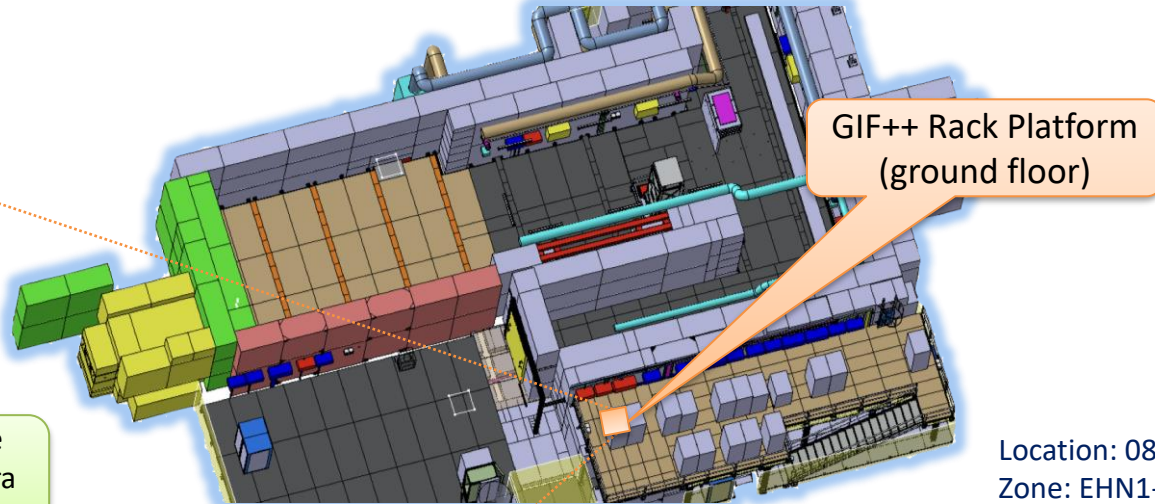
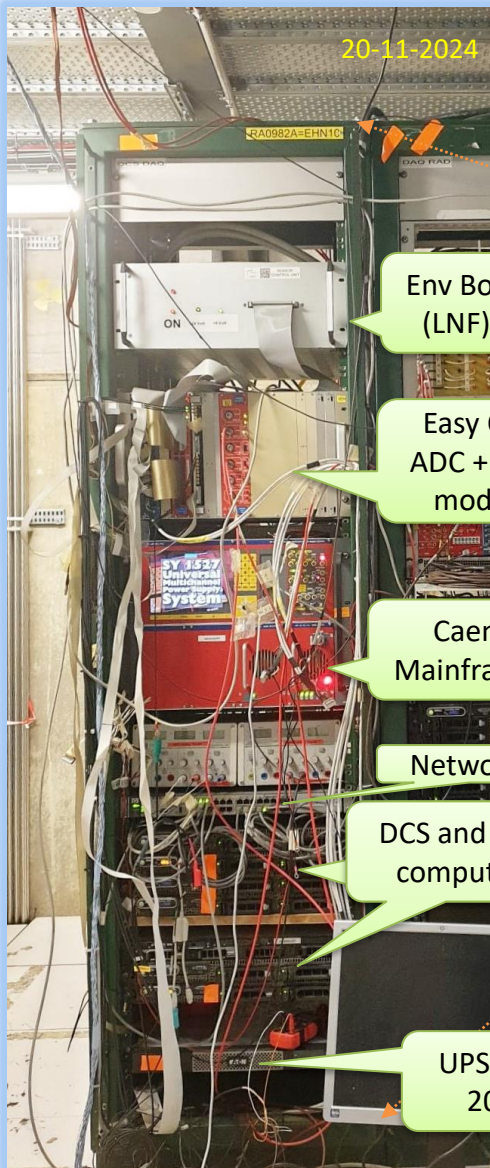
December 3<sup>rd</sup> 2024

## Outline:

- Reminder of the GIF++ User Detector Control System
- Status Update and Plans



# Setup Reminder



Location: 0887 R-8007  
Zone: EHN1-RA0982A

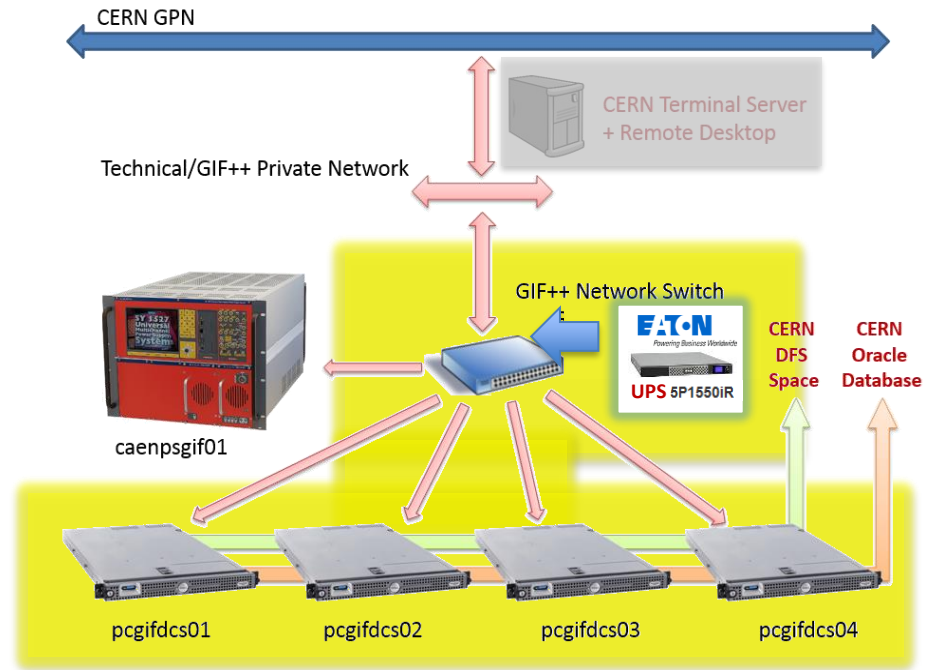
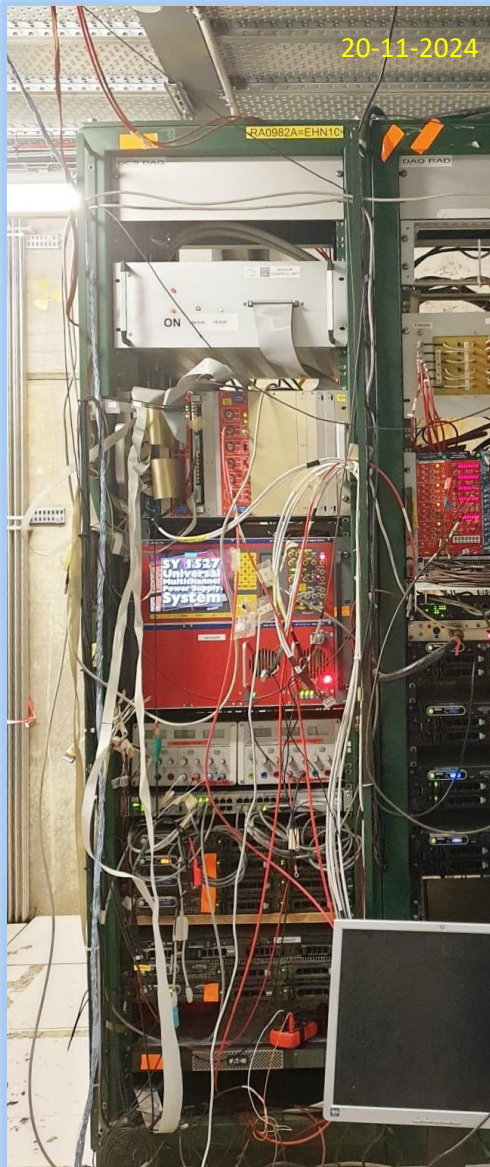
## Power System (present configuration):

- 1 SY-1527 CAEN Mainframe with several HV and LV boards
  - Slot 0: Mod. A1676 CAEN Branch Controller
  - Slot 1: Mod. A1526 6 Ch Pos. 15KV 1mA x
  - Slot 9: Mod. A1526 6 Ch Pos 15 KV 1mA
  - Slot 11: Mod A153GD 12Ch Neg 3.5 kV 3mA
  - Slot 13: Mod. A1526 6 Ch Neg. 15KV 1mA
- 1 Easy 3000 crate with
  - One 128-ch ADC (A-3801)
    - for readout of Environmental sensors and detector currents (requests can be accommodated)
  - One RPC ATLAS Phase 1 Test HV Board A3512HAP

## Computing Infrastructure:

- 1 Network switch dedicated network switch (GIF++ and managed CERN-IT)
  - Replaced in Jan 2022 after stopping working following some AUG tests
- Several DELL Rack mounted computers (mainly DELL 1950)
  - 1 production Windows Server main WinCC project
  - 1 spare shadow machine
  - 2 Windows additional machines for individual development or user interfaces
  - 2 DAQ machines (Linux) for R&D

# User DCS Network Reminder

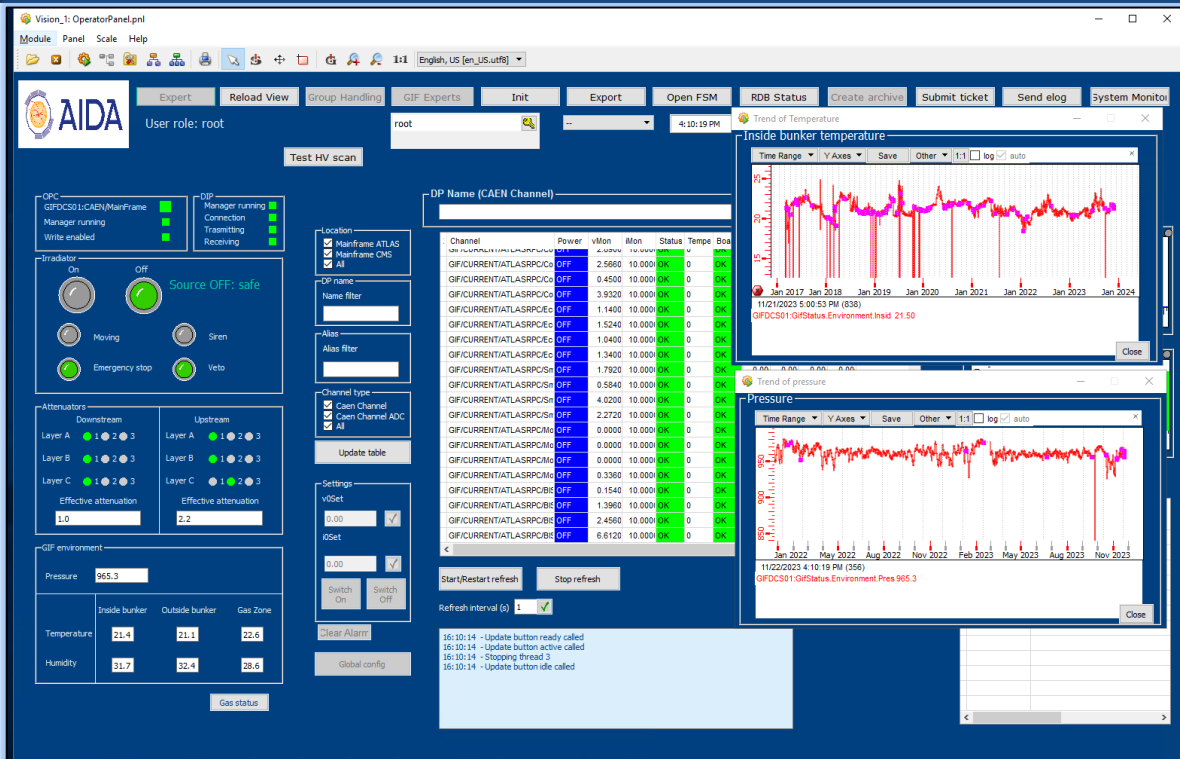
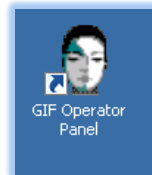


## Network:

- CERN Supported Network Switch with private subnet.
- All machines added to a CERN Network Set (GIF DCS CONTROL SET),
  - GIFPP BYPASS LIST, GIFPP DAQ AND DCS EXPOSED TO GPN created
- Gateway still kept open, Connect via remote desktop to any of the 4 computers, Shifters, Users, Experts defined by e-groups
- Software on DFS and data of Main USER-DCS WinCC project archived on Oracle (full history always accessible).
- **Uninterruptible Power Supply** for critical systems (Network switch, DCS PCs dcs01 + dcs02 + ...)

# User DCS Software

- UserDCS project ([WinCC-OA](#) based) running on one of the Gif DCS servers (till a week ago [pcgifdcs02.cern.ch](#) )
- Interface accessible the other computers like [pcgifdcs03/04](#) via the “GIF Operator Panel” desktop icon
- Machine Allocation before November 2023:
  - **dcs01 backup**
  - **dcs02 main machine**
  - dcs03 other users
  - dcs04 CMS RPC
  - Now being updated re-organized



- Scripts and panel saved on a dedicated DFS space
- Any other machine with a working installation of WinCC-OA and read/write access to the DFS folder [\cern.ch\dfs\Projects\GIF\DCS\GIF++UserDCS](#) can setup a GUI connection Operator panel GUI allows access to most of the DCS features
- Communication with the Mainframe via the OPC protocol
- Information from GIF central DCS accessed via DIP
- All relevant information archived in a CERN Oracle DB
- CERN-based access control (e-groups) with different level of privileges

# The GUI: The Operator Panel

Reminder

The screenshot shows the Vision\_1 OperatorPanel.pnl interface. At the top, there's a menu bar with 'Module', 'Panel', 'Scale', and 'Help'. Below it is a toolbar with various icons. The main area is divided into several sections:

- Expert Panel:** Includes buttons for 'Expert', 'Reload View', 'Group Handling', 'GIF Experts', 'Init', 'Export', 'Open FSM', 'Build FSM', 'Create archive', 'Submit ticket', 'Send elog', and 'System Monitor'.
- Monitor Section:** Features a search bar for 'monitor', a dropdown for 'Cosmic Tracker', and a timestamp '3:56:53 PM 10/2/2018'.
- Source Control:** A section with 'On' and 'Off' buttons, and indicators for 'Moving', 'Emergency stop', 'Siren', and 'Veto'.
- Attenuators:** Controls for 'Downstream' and 'Upstream' layers (A, B, C) with radio buttons and 'Effective attenuation' input fields.
- GIF environment:** Displays 'Pressure' (968.5) and temperature/humidity for 'Inside bunker' (20.9, 36.3) and 'Outside bunker' (23.0, 29.4).
- Channel Monitoring Table:** A central table with columns: Channel, Power, vMon, iMon, Status, Temp, Board, vSet, v1, v2, v3, v4, v5, v6, v7, v8, v9, v10, v11, v12, v13, v14, v15, v16, v17, v18, v19, v20, v21, v22, v23, v24, v25, v26, v27, v28, v29, v30, v31, v32, v33, v34, v35, v36, v37, v38, v39, v40, v41, v42, v43, v44, v45, v46, v47, v48, v49, v50, v51, v52, v53, v54, v55, v56, v57, v58, v59, v60, v61, v62, v63, v64, v65, v66, v67, v68, v69, v70, v71, v72, v73, v74, v75, v76, v77, v78, v79, v80, v81, v82, v83, v84, v85, v86, v87, v88, v89, v90, v91, v92, v93, v94, v95, v96, v97, v98, v99, v100. The table lists various channels like TRACKER1-4, PROTA1-5, and COSMIC FLOOR1-4.
- DCS HV/LV and ADC channels:** A section with 'Settings' for 'v0Set' and 'i0Set', and 'Switch On/Off' buttons.
- Log/Status:** A bottom section with 'Start/Restart refresh', 'Stop refresh', 'Refresh interval (s)' set to 1, and a log of events.

Callouts highlight specific features:

- Dip Monitoring:** Points to the Source Control and Attenuators sections.
- User groups: different "groups" can monitor different channels:** Points to the Channel Monitoring Table.
- DCS HV/LV and ADC channels (for environmental monitoring, detector current monitoring and integrated charge for aging studies):** Points to the Settings and Switch sections.
- GIF++ Status:** Points to the Log/Status section.

# The GUI: The Operator Panel

Vision\_1: OperatorPanel  
 Module Panel Scale Help  
 English, US [en\_US.utf8]

**AIDA** Expert Reload View Group Handling GIF Experts Init Export Open FSM RDB Status Create archive

User role: GIF\_Developers apolini ATLAS RPC 1:46:27 PM 12/2/2024

Test HV scan

New 2024 Features

Development by G. Falsetti

**OPC**  
 GIFDCS01:CAEN/MainFrame  Manager running   
 Manager running  Connection   
 Write enabled  Transmitting   
 Receiving

**DIP**  
 Manager running   
 Connection   
 Transmitting   
 Receiving

**Irradiator**  
 On Off Source OFF: safe  
 Moving Siren  
 Emergency stop Veto

**Attenuators**  
 Downstream Upstream  
 Layer A 1 2 3 Layer A 1 2 3  
 Layer B 1 2 3 Layer B 1 2 3  
 Layer C 1 2 3 Layer C 1 2 3  
 Effective attenuation 1.0 Effective attenuation 2.2

**GIF environment**  
 Pressure 961.9  
 Inside bunker Outside bunker Gas Zone  
 Temperature Humidity

**DP Name (CAEN Channel)**

Channel	Power	vMon	iMon	Statu	Temp	Boarc	v0 rbl	v1 se	v1 rbl	i0 set	Qint	Log/Info
channel000	OFF	4.0000	0.0000	OK	28	OK	7000.0	0.00	0.00	100.0	1251.8	
channel001	OFF	0.0000	0.0000	OK	28	OK	2000.0	0.00	0.00	100.0	2031.9	
channel002	OFF	4.0000	0.0000	OK	28	OK	0.00	0.00	0.00	6.00	0.00	
channel003	OFF	0.0000	0.0000	OK	28	OK	2000.0	0.00	0.00	500.0	136126	
channel004	OFF	3.0000	0.0000	OK	28	OK	22.00	0.00	0.00	100.0	0.00	
channel005	OFF	4.0000	0.0000	OK	28	OK	0.00	0.00	0.00	100.0	0.00	
GIF/HV/BIGAP/Conditioning/1	ON	4798.00	0.0000	OK	22	OK	4800.0	0.00	0.00	250.0	690325	
GIF/HV/BIGAP/Conditioning/2	DN	4801.00	0.3000	OK	22	OK	4800.0	0.00	0.00	250.0	110313	
GIF/HV/BIGAP/Conditioning/3	ON	4802.00	0.4000	OK	22	OK	4800.0	0.00	0.00	250.0	784916	
GIF/HV/BIGAP/Conditioning/4	ON	4802.00	0.2000	OK	22	OK	4800.0	0.00	0.00	250.0	134592	
GIF/HV/BIGAP/Conditioning/5	ON	4803.00	0.1000	OK	22	OK	4800.0	0.00	0.00	250.0	129606	
GIF/HV/BIGAP/Conditioning/6	ON	4803.00	0.4000	OK	22	OK	4800.0	0.00	0.00	250.0	155394	
channel028	OFF	0.1341	10.0000	OK	0	OK	0.00	0.00	0.00	5812.6	[7/1/2015	
channel029	OFF	20.7381	10.0000	OK	0	OK	0.00	0.00	0.00	0.00	141061	
channel030	OFF	41.6421	10.0000	OK	0	OK	0.00	0.00	0.00	0.00	284031	[6/25/201
channel024	OFF	0.0000	10.0000	OK	0	OK	0.00	0.00	0.00	0.00	302081	

Location  
 Mainframe ATLAS  
 Mainframe CMS  
 All

DP name  
 Name filter

Alias  
 Alias filter

Channel type  
 Caen Channel  
 Caen Channel ADC  
 All

Update table

Settings  
 v0Set 0.00   
 i0Set 0.00   
 Switch On Switch Off

Clear Alarm

Global config  
 HV Scan Panel  
 Reset Integrated Q

Start/Restart refresh Stop refresh Print on Log

Refresh interval (s) 1

13:42:57 - Update button ready called  
 13:42:57 - Update button active called  
 13:42:57 - Stopping thread 3  
 13:42:57 - Update button idle called  
 13:43:23 - 4  
 13:43:23 - 4  
 13:43:23 - 4  
 13:43:23 - 4

**Voltage/Input (map/lin)**  
 5000  
 0 5 10 15

**Current/Output (map/lin)**  
 10  
 0 5 10 15

**Trend of Channel**  
 Time Range Y Axes Save Other 1:1 log auto  
 200 100 0 200 400 6000  
 11/26/2024 12:00:00 AM 12/1/2024 12:00:00 AM  
 12/2/2024 1:46:27 PM 292  
 GIF/HV/BIGAP/Conditioning/3 vMon 4802.00 GIF/HV/BIGAP/Conditioning/5 vMon 4803.00  
 GIF/HV/BIGAP/Conditioning/3 iMon 0.40 GIF/HV/BIGAP/Conditioning/5 iMon 0.10  
 GIF/HV/BIGAP/Conditioning/4 vMon 4802.00 GIF/HV/BIGAP/Conditioning/6 vMon 4803.00  
 GIF/HV/BIGAP/Conditioning/4 iMon 0.20 GIF/HV/BIGAP/Conditioning/6 iMon 0.40

# Information and Features

Reminder

## Available Information to and from DCS:

### • Info read from the Mainframe via OPC:

- All archived on Oracle DB
- 128-channels ADC board:
  - Currents from CMS RPC chambers (GIF/CURRENT/CMSRPC/XX)
  - P/T/RH from env sensors (GIF/SENSOR/ENV/XXX/ZONEY/P,T,RH)
  - P/T/RH from gas sensors (GIF/SENSOR/GAS/XXX/ZONEY/P,T,RH)
- 2 HV boards (ATLAS RPC and COSMIC tracker)
- Charge integration ( $\mu\text{C}$ ) for the currents read by 1) the HV CAEN channels 2) the ADC connected directly to the chambers:
  - Integration of the current read by the HV CAEN channels is not reliable due to the non-zero current produced during the ramp-up process

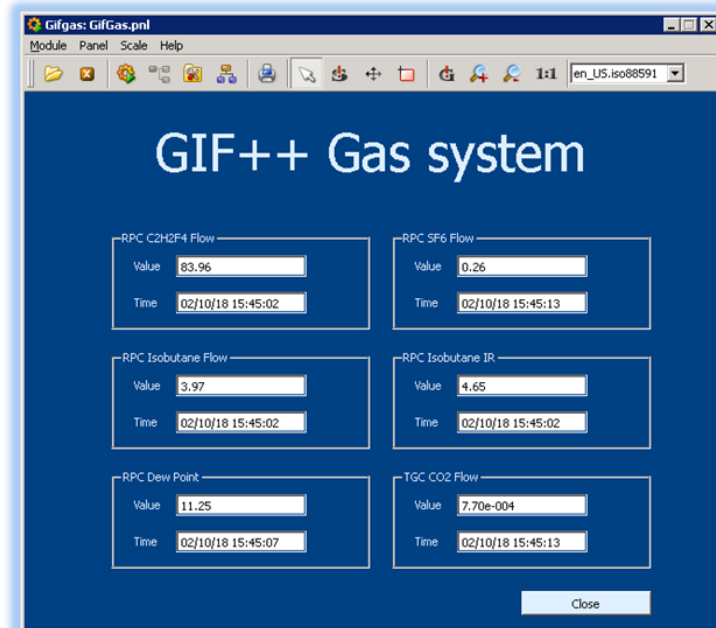
### • Info read from DIP:

- Source/Attenuators status
- Inside/outside bunker environment (P/T/RH)
- Gas mixer info

### • Info published on DIP:

- P/T/RH from env sensors (dip/GIFpp/EnvSensors/XXX/ZONEY)
- P/T/RH from gas sensors (dip/GIFpp/GasSensors/XXX/ZONEY)

- Values archived on CERN-Oracle and trends accessible by right clicking on the values



# Contacts, information and links:

- Info and queries on GIF++ user DCS:  
➔ [M. Romano, A. Polini](#)
- Some information on DCS architecture, machine names, projects, mapping of environmental information and services available on these twiki:
- <https://twiki.cern.ch/twiki/bin/view/Atlas/AtlasRpcGif>  
(currently available only for ATLAS users)
- <https://twiki.cern.ch/twiki/pub/CMSPublic/GifSensors/AccessstoGIFuserDCSMarino-2.pptx> additional instructions
- Issues and updates on dedicated **JIRA** project (preferential way to submit requests): <https://its.cern.ch/jira/projects/GIFPPUDCS>
- SVN repository:  
<svn+ssh://svn.cern.ch/repos/atlasusr/mromano/GIF++UserDCS/trunk>
- Mapping of the 6 Gas sensors and 4 Env sensors:  
<https://twiki.cern.ch/twiki/bin/view/CMSPublic/GifSensors>



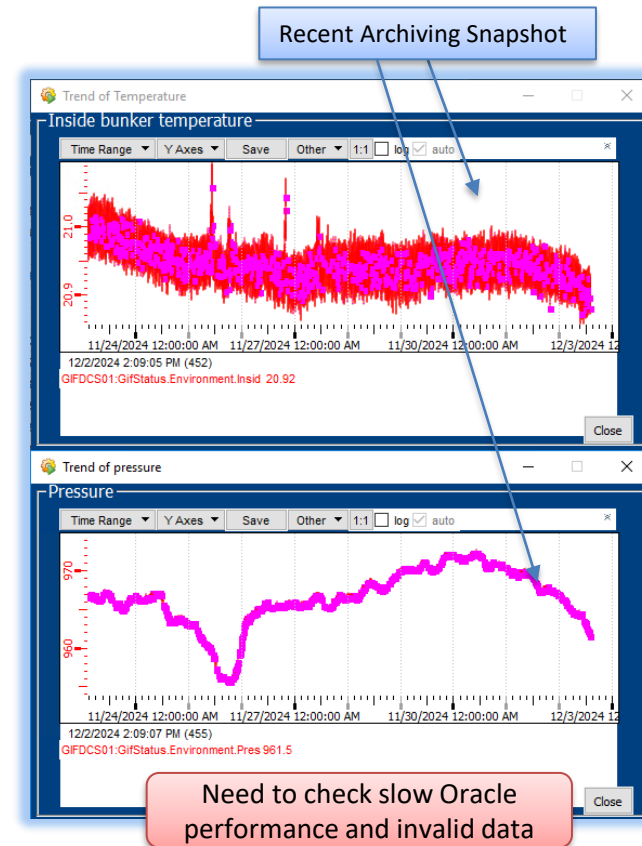
# Status

- GIF++ User-DCS running stably despite low resources and low manpower
- Key aspect for improvements are feedback and requests from user group
- System is remotely monitored and can be remotely shutdown/restarted
- UPS installed in 2019 added further stability and avoided disruptions
- Hardware so far stable but mostly obsolete and from CERN–recuperation.
  - A recent issue (2024) with the CAEN A-1676 BranchController loosing the internal crate map (which is saved in the mainframe).
  - Can be quickly recovered and happened during RPC HV scans
  - Board re-allocated. Might try and replace if failing again.
- Software:
  - Some updates appearing in particular following requests and developments from ATLAS RPC
- Documentation, user e-groups updated when needed.
- System running with high availability and mostly unattended although on best effort intervention in case of issues.



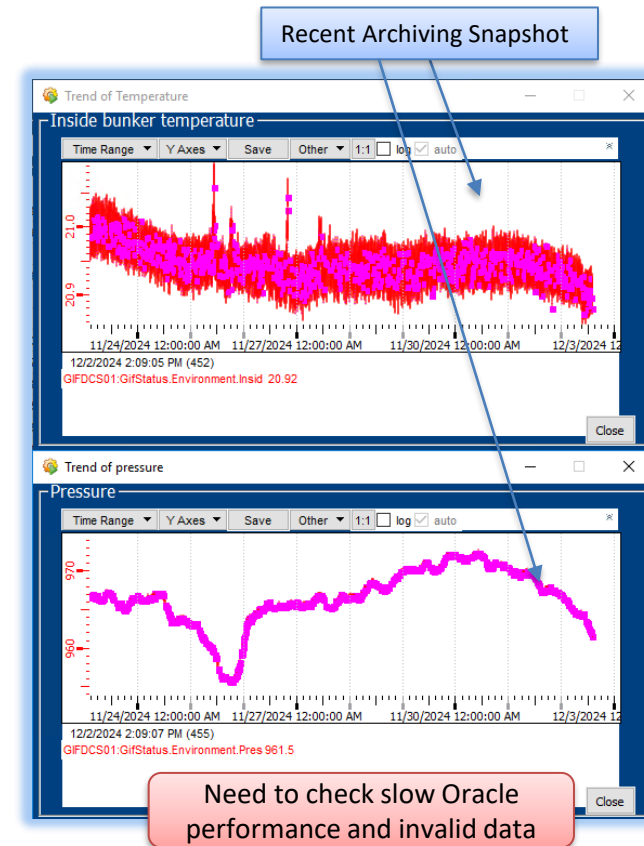
# Plans and Outlook

- Continue maintaining the system with at least one main project, one backup, and machines as additional user interfaces
- **Present Setup (OS and DCS project):**
  - Main Machine is now pcgifdcs03 (Windows Server 2016)
  - WinccOA 3.16 Framework: 8.3.4 Oracle Client v.12
- **Ongoing preparation new System:**
  - Tested Windows Server 2022 + WinCC 3.19 (done last week)
  - Oracle NGA migration being prepared
  - Aiming at completion before GIF restart in 2025.
- **Continue with service with best effort support**
- Users: please refer to Marino and myself and the links in previous slide for info/queries



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Thanks

**backup**

# Information and Features (ii)

Reminder

## Some Additional Features:

- Mail and SMS alerts: users can subscribe to alerts regarding the source, gas and general DCS status
- “Submit ticket” button to open a ticket on the dedicated JIRA project
- Possibility to dump, on-demand, the values of the archived values at any date
- Channel list of individual experimental setups can be modified on the fly via a dedicated GUI
- “Send elog” button allows to directly post an entry to the GIFelog
- Possibility of scheduling and performing DCS automated tests if conditions are fulfilled
  - Example from the past (ATLAS RPC):
    - Every morning (with source ON): bring the channels at half nominal voltage, wait 30min and ramp them up
    - Every Wednesday evening (with source OFF): switch off the channels, ramp them back up in 25 steps, waiting 5mins between steps. Save voltages and current on file

ExpertName	ExpertPhone	ExpertMail	SMS	DCS	GAS	ATLAS	RPC	CMS	RPC	SOURCE	Email	Gas	ATLAS	RPC	CMS	RPC	SOURCE	ExpertInfo
Alessandro Polini		apolini@cern.ch																
CMS RPC shifter	168054	cmsrpc.gif@cern.ch	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Gianluigi Alberghi		g.alberghi@cern.ch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Giulio Aielli		aielli@cern.ch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ian Crotty	164414	ian.crotty@cern.ch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Marino Romano		mromano@cern.ch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Muhammad Gul		mgul@cern.ch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Nicolas Zaganidis	162556	Nicolas.Zaganidis@cern.ch	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Cern Authentication | GIF Plus Plus User DCS - CER... | +

https://its.cern.ch/jira/projects/GIFPPUDCS/summary

JIRA Dashboards Projects Issues Boards Create

**GIF** GIF Plus Plus User DCS  
Create board

Issues Reports

Activity Switch view

June 23

# Maintenance and Interventions

Reminder

- System running 24/7 and allowing for:
  - Control and monitor of HV and LV channels for detectors
  - ADC channel for monitoring of Gas and environmental quantities, detector currents, and on user request
  - Monitor and publish Pass GIF++ information through DIP etc.
  - Graphic User Interface for control and monitor
  - Possibility of automatic messages (for alarms/errors) and of automatic procedures/scanning sequences.
- System kept alive with minimal person-power:
  - (A. Polini, M. Romano, INFN Bologna) acting mostly on request.
  - Improvement in stability after inclusion of UPS (in 2019). We had no WinCC database corruptions in the last 24+ months.
  - Few manual RESETs to CAEN HW needed after power cut
    - CAEN Mainframe is not connected to the UPS