

# Detector Control System for 2006 run

DCS phones: 164872, 77076

## 1 PCs identification

The DCS uses one main Linux PC:

- **pcompass07**, located in the control room.

4 other Linux PCs are used for front-ends (CAEN control using SLiC/DIM):

- **pclip05** (BMS barrack),
- **pclip06** (DCS & Saclay barrack),
- **pclip07** (Trigger barrack),
- **pclip09** (RICH barrack).

3 other Windows PCs are used for front-ends (all controls from OPC servers):

- **pcompass03**,
- **pcompass06**,
- **pcompass08**,

all located in the DCS & Saclay barrack.

pcompass07 and the 3 Windows PCs are connected to **UPS units**. In case of **power cut**, these units start powering the PCs, while producing a “bip” sound. Automatic procedure of stopping PVSS and safe shutdown of the PCs occurs in the following minutes. DCS experts should be called when the power is back, to restart the PCs and the DCS project.

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## 2 PCs Accounts

All the DCS PCs are in the **COMPASS domain**. To access them from outside, one must login first in the gateway (**pccogw01** and **pccogw02**), using the personal lxplus usernames/passwords. Each computer is then accessible via ssh, using the accounts given below.

The main PC pccompass07 has 3 local accounts:

- **dc**s (for use of all COMPASS members – for DCS visualization, detector experts access, etc). Password is the old “onl” password.
- **compassdcs** (for exclusive use of the DCS group – for project development only).
- **root** (for exclusive use of the DCS group – for system maintenance only).

A session on the **dc**s account is to be opened at all times in **pccompass07** for use of the shift crew during the Run.

Front-ends Linux PCs for SLiC have only one local account **root**. These are for usage of the DCS group only.

Front-ends Windows PCs for OPC have 2 local accounts: **Administrator** and **compassdcs**. Both are for usage of the DCS group only.

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## 3 DCS project visualization

The DCS project is running in the main computer **pcompass07**. During Run, a **dcx login session** must be always opened, and the PVSS User Interface (UI) must be running.

If you don't see any UI window opened (and it is not minimized – check in the horizontal menu bar, on the bottom of the screen), start it from a terminal window, by typing in the prompt:

```
>dcxUI.
```

A PVSS login window should open. Choose

Username: **operator** Password: [EMPTY]

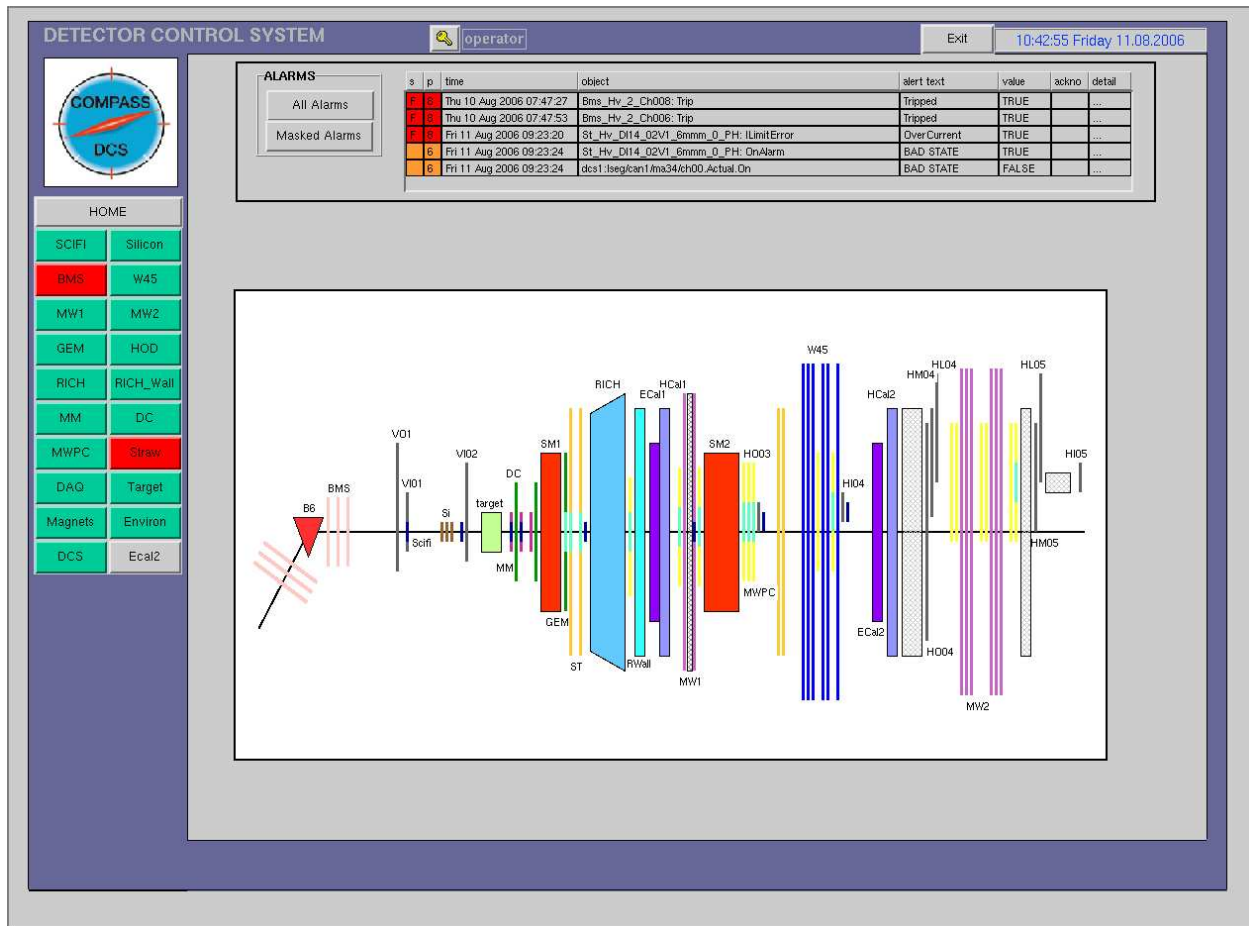
The entrance panel of the DCS project opens.

If the login panel does not open when typing “dcxUI”:

- Check first if PVSS is running, by typing in the prompt of a terminal window:  
>**ps -ef | grep PVSS**  
There should be as answer a long list of PVSS processes running, like: PVSS00data, PVSS00event, PVSS00ctrl, PVSS00valarch, etc.
- If at least the above mentioned processes are not shown, it means that the DCS project was stopped, and no equipments are being controlled anymore.
- Call a DCS expert: **#164872**. Project restart must be done by a DCS expert only.

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## 4 DCS Entrance Panel



The UI opens with the main COMPASS control panel.

On the top center, the UI ownership is shown – usually it is “**operator**”. Click the yellow key to change UI ownership (for example if you are a detector expert and want to change settings). If this area is showing “NO USER” in red, click the key to regain “operator” ownership.

On the top right there is a “**EXIT**” button. Use it to close the UI – then, restart the UI with the command “dcsUI” from the prompt of a terminal window. The DCS UI panel should be opened at all times in pccompass07.

On the left there are buttons to access the detectors information. The color of these buttons is inherited from the equipments belonging to these detectors

that are controlled/monitored by the DCS. The color code is as follows:

- GREEN: all OK
- ORANGE: some alert is present
- RED: Some fatal alert is present
- DARK GREY: an alert has come, but state went back to normal again. The Grey color is displayed until a user “**acknowledges**” the alert.
- LIGHT GREY: no alert is defined

On the center top there is the **alerts panel**. It shows the most recent 6 alerts in the system. If more than 6 alerts are active at the moment (which is probable), they can be viewed in detail from the “**All alarms**” button (choose “Time range: Current” and check that “filter” has “alert state: All” and “Dpe filter: \*” selected). The “**Masked Alarms**” button opens a list of all the alarms that are presently masked in the system (thus, if one of these will be in alert state, it will not show up as in the detector buttons color, or as a line in the alerts panel). The “**!!!**” in some lines of the alerts panel indicates that this alert is waiting for **acknowledgement**. The shift crew can do it by clicking on it.

The center area of the Entrance Panel shows the current detector selection. Use the “**home**” button on the left to go back to the spectrometer view in the central area of the panel.

## 5 Alert handling

**Alerts** are displayed as a **color**, and also as a “**cuckoo**” **sound** (sound only in the control room).

In general, fatal alerts are displayed in red color, and require human intervention. This is the case for HV channels trips, RICH vessel alerts, and DCS computers and/or managers stopped.

Gas system alerts and RICH vessel alerts also send **sms messages** to detector experts.

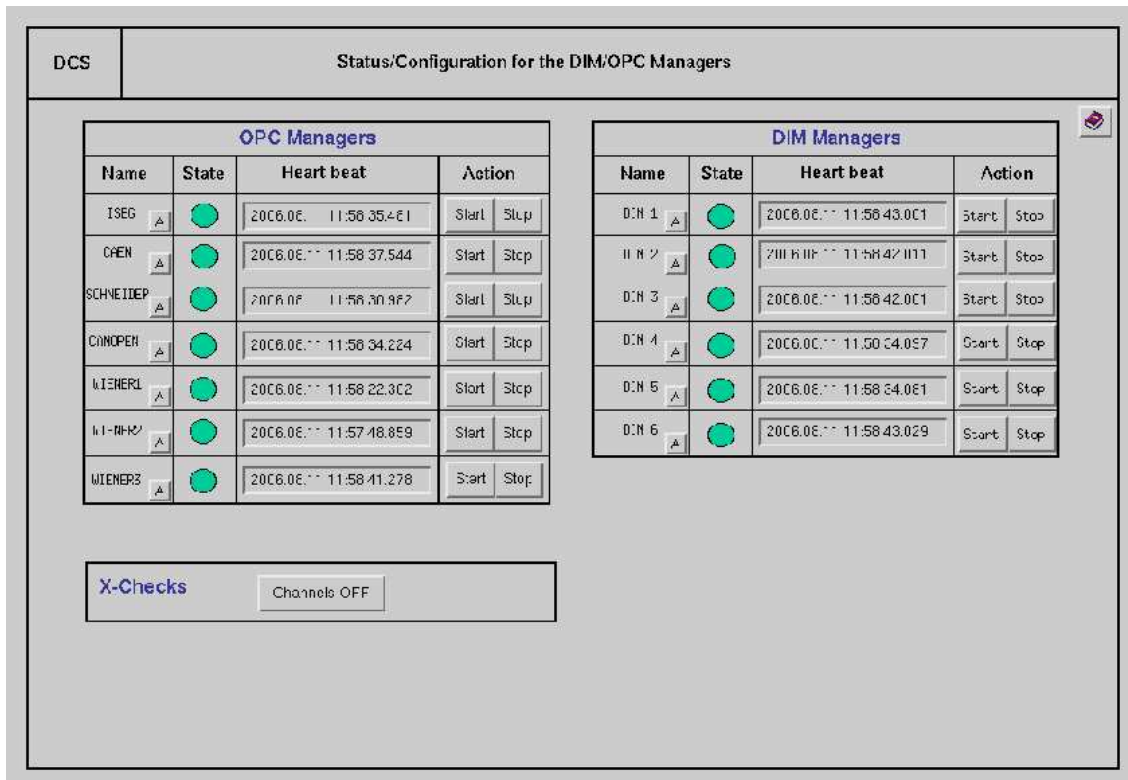
Some alerts require “**acknowledgement**”, meaning that even if the alert state condition is no longer present, the alert will remain as grey color, until acknowledged. This is the case for Gas system alerts. Acknowledgement can be done either from the alerts panel, by clicking in the “**!!!**” marks; or from the specific detector subsystem panel, by clicking the “**A**” button (sometimes also called “**Action**” button), and selecting “Acknowledge”.

Masking is used to avoid too many alerts being displayed at the same time, a situation that can distract the shift crew from new important alerts. Alerts can be masked, by clicking the “**A**” button (also called “**Action**” button), and selecting “**mask**”. Unmasking can be done with the same process. Only the shift crew should mask alerts, if the alert reason is already known and is being taken care. A button “Masked alarms” in the Entrance Panel can be used to view and print the list of currently masked items – this list should be printed once per shift.

In case a new alert has come but no “**cuckoo**” sound was produced, this can be due to another alert of the same type for the same detector subsystem being already present (this situation is then a normal behaviour). If this is not the case, check that the **loud speakers** are ON. If they are ON, go to the “main menu” (left bottom corner of the screen), select “Sound and Video”, then “Volume Control”, and check that “vol” and “speaker” are not at the minimum.

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## 6 DCS panel



The DCS panel, accessible by clicking the “DCS” button on the left, shows the state of the servers used for monitoring/control of equipments (GREEN: running; RED: stopped). “Start/Stop” buttons can be used by the shift crew to restart managers that stopped for some reason.

The correspondence between managers and equipments they control is:

- OPC Managers
  - ISEG: Straws HV and Silicons HV (@pcompass06)
  - CAEN: RICH PMTs HV and SciFi 55 (Warsaw) HV (@pcompass06)
  - SCHNEIDER: All detectors Gas Systems and RICH vessel pressure (@pcompass06, from PLCs)
  - CANOPEN: detectors and environment temperatures and humidities, magnetic fields of B6 and SM1, LV of MW1, MW2, W45 and MWPC (@pcompass08, from ELMbs)
  - WIENER1: DAQ VME Crates and fantrays (@pcompass08)

- WIENER2: RICH LV (@pcompass03)
- WIENER3: Straws and SciFi 55 (Warsaw) LV (@pcompass06)
- DIM Servers
  - DIM1: BMS HV (@pclip05)
  - DIM2: Trigger (HOD) HV (@pclip07)
  - DIM3: SciFis 5, 6, 7 and 8 (Germany) HV; MW2 HV; MWPC 7 to 11 HV (@pclip07)
  - DIM4: GEMs 5 to 11 HV, LV and Centre voltages; W45 HV; MWPC 1 to 6 HV; MW1 HV (@pclip06)
  - DIM5: GEMS 1 to 4 HV, LV and Centre voltages; Silicon LV; SciFi 1 to 4 (Japan) HV; RICH Wall HV (@pclip09)
  - DIM6: RICH PDs HV (@pclip09)

At the bottom of the DCS Panel, there is an area for “**Cross-checks**”. A button “**OFF Channels**” is available, to provide the list of all the CAEN and ISEG HV and LV channels that are presently OFF, as well as the Wiener crates that are OFF.



## 7 HV Systems

The DCS for HV systems of each detector provides tables with the set voltage (**v0**), monitored voltage (**vMon**), monitored current (**iMon**), ON/OFF state (**isOn**) and hardware alarms (**HwAlarms**) for channels in the group. The 2 last columns have alerts defined. **isOn** displays GREEN color if the requested state equals the readback state from the channel; it displays ORANGE color otherwise. The **HwAlarms** is a summary of the possible hardware alarms for HV channels: OverVoltage, OverCurrent, UnderVoltage and Trip (all displayed in ORANGE, except for trip, displayed in RED).

**Note:** For Straws HV and Silicons HV (ISEG equipments), the “isOn” column shows always the ORANGE color when the channels are switched OFF. 2 additional columns are displayed in the table: the maximum allowed voltage of the channel (**vMax**) and the current trip limit (**i0**).

If a channel trips, one will see the alarm in the “isOn” column (requested state  $\neq$  readback state); and usually also the “Trip” information in the “HwAlarms” column. In this case, the channel must be ramped up by shift crew action.

The **PURPLE color** in the “v0”, “vMon” and “iMon” columns of the table means the reading of the item from the hardware was not succesfull (in this case, the value displayed is the last value the system could read). If all cells in these columns are PURPLE simultaneously for all channels, it means the SLiC server for this control stopped. If this happens, call a DCS expert (**#164872**).

More details on a channel can be obtained by double-clicking in the corresponding table line. A new panel opens, with more information on settings, etc for that channel. The channel can be put **ON/OFF** from the corresponding buttons in the panel. Channel settings can be changed (by detector experts only) by clicking the corresponding “**settings**” cell. Alarms can be masked/unmasked from the “**action**” button on top. A button to “**load settings from hardware**” (to import the readback setting values in the crate into the DCS system) is also available for detector experts use.

Together with the channels summary table in one HV group, there are some **Group operation** buttons: “ON/OFF”, “settings” (only for detector experts), “Trends” (not implemented yet) and “Pop window”. The Group operation will act in the selected channels of the table. To select channels, click in a line to mark it, then press “Ctrl” key and click with mouse in other lines to select them also. If no line selection was done in the table, the Group operation will act in ALL the channels of the table. The “Pop window” button is used to open the table in a separate window, from where printing is possible.

## 8 WIENER Control: DAQ VME crates and LV units

By clicking the **DAQ** button, a summary table with all the VME crates used for the data acquisition is shown. The columns show the current for each voltage channel. There is also a column “Power On”; and a column “Alarms”, grouping all the hardware alarms for the voltage channels. Only the “alarms” column has alert handling defined. It will show the **ORANGE** color in case of alarm from a channel, from the power supply or from the fantray. It will also show the **ORANGE** color in case the crate is switched OFF (and voltage settings  $\neq 0$  – in that case, the voltages monitored and set will differ, thus triggering alarm). The column will show **GREEN** color if no alarm is present. By double-clicking one line (i.e. one crate), a detailed panel for the specific crate will be displayed. For some crate types, the monitoring of fantray parameters is not possible, and in that case the fantrays fields will display the **PURPLE** color.

The **PURPLE** color indicates that either the reading of the parameters failed (loss of communication), or a bad quality flag was assigned to the item by the server, for some reason. Cells in the summary table that show occasionally the **PURPLE** color, alternating with white, is normal. If you observe persistent **PURPLE** color for an entire line (crate) in the summary table, inform a DCS expert.

The implementation of WIENER fantrays and LV units in the DCS does not allow to change settings, but only switch ON/OFF the crate, and monitor its parameters. The change of settings can be done by a DCS expert, on request, by using a different OPC client.

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### 9 ELMBs

The **ELMBs** monitor temperatures, humidities, pressures, magnetic fields, gas flows (if not connected to PLCs), some LVs, etc. Access these measurements from the detector buttons in the Entrance Panel.

Value fields with **WHITE** background color indicate that no alert limits were defined for this measurement. **GREEN** color indicates the value is within the defined alert limits. **ORANGE** and **RED** indicate it exceeded the limits and is in alert state. **LIGHT GREY** indicates an alarm is defined but was masked – it can be unmasked from the “A” button next to the value field. The **PURPLE** color indicates the last reading was not successful (loss of communication), or that a bad quality was assigned to this item by the server.

If all the value fields show the **PURPLE** color, check in the DCS Panel if the OPC manager “CANOPEN” is running. If it is not running, restart it from the “Start” button. In case this doesn’t work, call a DCS expert (**#164872**).

## 10 Trends

Trends (graph of values as a function of time) can be accessed from the buttons displaying a graph. On the top of the trend panel there is a line with tabs for commands. Under this line, the legend of the displayed trend appears, with the name of the channel, the present value, and the timestamp of the reading. In the big central area, the graph is displayed. And in the bottom, a second area for legend is shown.

The tab for commands on top starts with a button “**Run**” or “**Freeze**”. When saying “Freeze”, it means that the graph is presently in **online mode** – all new values are displayed as they arrive, as long as the trend panel is opened. When saying “Run”, it means the graph is presently in **offline mode**, i.e. accessing the archives. In this mode, the horizontal scroll bar is active in the graph. Move it to go to a specific date in the archive history. A vertical black bar acts as pointer, and the corresponding date appears in the legend.

The tab “**Time Range**” allows to modify the timescale. By default this is set to 8 hours. An option for “user specified” timescale is also available.

The tab “**Y Axis**” offers the possibility to display or not the y scale in the graph. By default, only the scale for the first curve is displayed. If there is more than one curve superimposed in the graph, the following ones will be normalized with respect to the first. Use the tab to display also other curves scales.

The tab “**Other**” allows to select the “**Plot configuration**” option, from where an absolute scale for the graph can be set (by inserting values in the **Y axis: Min** and **Y axis: Max** fields). This tab offers also a “**Print plot**” option.

All the modifications done to the display of a trend will be lost when the trend panel is closed. Some permanent modifications can be done by DCS experts, on request.

## 11 For detector experts

Some actions, like changing parameter settings, importing and exporting settings from file, or loading settings from the hardware, can only be done from a detector expert login. Use the yellow key in the top of the Entrance Panel to login as expert.

If you are a detector expert, but were not given a password yet, contact a DCS expert to obtain one, or check with your colleagues if this password was given to one of them. It is recommended that the detector expert password remains secret, and it is the responsibility of the expert to decide to whom he gives it. In case you forget your password, the DCS experts can reset it for you.

After you finished expert actions in the DCS system, do not forget to **logout**, by clicking the yellow key, and giving ownership of the UI back to “operator”.

COMPASS members can open remote sessions of the DCS project, both for viewing the status of the DCS (login with username: “Guest” and password: [EMPTY]) or for changing settings (login as detector expert, with detector password). Opening remote sessions with login “operator” outside the control room is also possible, but not recommended. To open a remote session, login first in the COMPASS gateway, with your lxplus username. Afterwards, do:

```
>ssh -l dcs pccompass07  
>dcsUI
```

and login to the DCS with detector expert username and password (or guest, without password). Remote sessions expire after 2 hours, after which the DCS UI asks you to insert again your password, for security reasons. If no password is inserted, the UI remains opened, but without any privileges (“NO USER”).

Detector experts can change settings for their detector only, from the “**settings**” button in the Group operation, or by clicking in the specific setting cell of a table when viewing a single channel. When using Group operation always check that only the channels you want to modify are included in the ta-

ble for changes. Insert the new set value and press the “set” button. Check in the table that all the values you wanted are readback – if they are not, wait until you see them in the tabl, or press the “set” button again.

After you change settings, save the new values into file, for security. To save settings, click the “tools” button for **export/import of settings**, located in the detector buttons bar on top. To export, click the folder button to attribute a name to the new file. Usually, the name should contain the date of saving. The extension of the file must always be the name of the detector, in capital letters (i.e. RICH, SCIFI, MWPC, etc). Click the “Start” button to export. You can use the “Edit” button to view the content of the file selected, in an editor window.

If the equipment (for example, a crate) lost its settings, these can be imported from file, and sent as commands to the devices using the “**import settings**” functionality.