COMPASS Detector Control System

Jornadas do LIP

February 2016, Braga



FCT Fundação para a Ciência e a Tecnologia

MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Ref.: CERN/FIS-NUC/0017/2015



- The COMPASS Detector Control System (DCS) at CERN is an exclusive responsability of the LIP Lisbon group since 2003.
 - Including DCS on-call support during data taking.
- The DCS monitors and controls equipment from all detectors of the COMPASS experiment and also related external systems.
- Development and update of the DCS performed in accordance to the experiment needs.



Longitudinal Transverse Hadron

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COMPASS II

Polarized Drell-Yan Deep Virtual Compton Scattering (DVCS)

DVCS Run



DCS scheme

- WinCC OA (PVSS) distributed system
 - ~ 23k datapoints
 - ~ 24k parameters with alert handling
- CERN JCOP Framework on top of WinCC OA
 - Integrated set of software tools
- Custom development for COMPASS specificities
 - ECals, HCals, Triggers, DAQ readout engines control, etc



Drell-Yan Run

DCS Archiving



DCS archived values

- ~ 39k parameters archived
- ~ 4.7 x 10^9 values stored

- Archiving cycles as fast as 1 s (on change)
- Data streamed to a replica database

Drell-Yan Run

DVCS Run

DCS User Interface

- From a single UI, the user can access all the monitored and controlled parameters
 - Alert table
 - Detectors subsystems
 - Summary status
 - Custom Plot

- Visual and audible alerts
 - Grouped by detectors
 - Acknowledgement and automated actions for dedicated alerts



Drell-Yan Run

DVCS Run

Custom trending plots

- Easy way to plot several parameters at once
 - Right-click to select and add a parameter
- Possibility to:
 - Define starting time and time range
 - Save custom plot to import it on another session







DVCS Run

2015: Polarized Drell-Yan Run

First world DY with a polarized target

DCS monitoring included:

- Dilution refrigerator
- Magnet
- Microwaves and NMR coils







Performed via

- DIM
- DIP
- ELMB
- Siemens S7 driver

Introduction

Overview

Drell-Yan Run

DVCS Run

New detectors integrations

Drift Chamber 5

- HV
- LV

Replaced Straw 2 to stand higher intensity (~4x10⁸ pi/spill)

IFI	HV SYSTEM	Station 15 Station 3 Station	1 35 Statio	n 4				
	SCIFIJ Station 35	channels: Booster					4	3
	Group operation:	Channel Name	v0 (V)	vMon (V)	iMon (µA)	isOn	HwAlarms	
	01 0#1	Scifj_Hv_35_Booster_U_Ch000	0.00	0.00	0.00	FALSE	OK	
		Scifj_Hv_35_Booster_U_Ch001	0.00	0.00	0.00	FALSE	ОК	_
	Settings	Scifj_Hv_35_Booster_U_Ch002	0.00	0.00	0.00	FALSE	OK	
	Trends	Scifj_Hv_35_Booster_U_Ch003	0.00	0.00	0.00	FALSE	OK	
		Scifj_Hv_35_Booster_U_Ch004	0.00	0.00	0.00	FALSE	OK	
	Pop Window	Scifj_Hv_35_Booster_U_Ch005	0.00	0.00	0.00	FALSE	OK	
	Action	Scifj_Hv_35_Booster_U_Ch006	0.00	0.00	0.00	FALSE	OK	
		Scifj_Hv_35_Booster_U_Ch007	0.00	0.00	0.00	FALSE	OK	
		Scifj_Hv_35_Booster_U_Ch008	0.00	0.00	0.00	FALSE	OK	
		Scifj_Hv_35_Booster_U_Ch009	0.00	0.00	0.00	FALSE	OK	
		Scifj_Hv_35_Booster_U_Ch010	0.00	0.00	0.00	FALSE	OK	-
	SCIFIJ Station 35 Group operation:	channels: Hvchan	v0 (V)	vMon (V)	iMon (μA)	isOn	HwAlarms	
	On Off	Scifj_Hv_35_Hvchan_U_Ch000	0.00	0.00	0.00	FALSE	ОК	
	Continue	Scifj_Hv_35_Hvchan_U_Ch001	0.00	0.00	0.00	FALSE	ОК	
	oeungs	Scifj_Hv_35_Hvchan_U_Ch002	0.00	0.00	0.00	FALSE	ок	
	Trends	Scifj_Hv_35_Hvchan_U_Ch003	0.00	0.00	0.00	FALSE	ОК	
	Pop Window	Scifj_Hv_35_Hvchan_U_Ch004	0.00	0.00	0.00	FALSE	ОК	
	T OP WINDOW	Scifj_Hv_35_Hvchan_U_Ch005	0.00	0.00	0.00	FALSE	OK	
	Action	Scifi_Hv_35_Hvchan_U_Ch006	0.00	0.00	0.00	FALSE	OK	
		Scit_Hv_35_Hvchan_U_Ch007	0.00	0.00	0.00	FALSE	OK	
		Scifi_Hv_35_Hvchan_U_Choo8	0.00	0.00	0.00	FALSE	OK	
			0.00	0.00	0.00	EALSE	IC IK	
		Scit_Hv_35_Hvchan_U_Ch009	0.00	0.00			- City	

	HV SYSTEM		THRESHOLDS	LV SYSTEM		PERATURE	S		GAS S	YSTE
ift Ibers	Image: Display line DC00 DC01 Image: Display line DC05 DC05	DC04	DC00-04	OCos		DC00	0C01	DC04	0	àas Sys
					·					
	Drift DC05 channe	els:						٩		
	Group operation:	Channel Name		v0 (V)	vMon (V)	iMon (μA)	isOn	HwAlarms	<u>^</u>	
	00 0# 1	Drift_Hv_5_DC	05U_BK	900.00	4.00	0.00	FALSE	ОК		
		Drift_Hv_5_DC	05U_Plane	1675.00	6.00	0.00	FALSE	OK		
	Settings	Drift_Hv_5_DC	05U_Wire	1675.00	17.00	0.00	FALSE	OK		
	Trends	Drift_Hv_5_DC	05V_BK	900.00	3.00	0.00	FALSE	OK		
		Drift_Hv_5_DC	05V_Plane	1675.00	5.00	0.00	FALSE	OK		
	Pop Window	Drift_Hv_5_DC	05V_Wire	1675.00	6.00	0.00	FALSE	OK		
	Action	Drift_Hv_5_DC	05X_BK	0.00	7.00	0.00	FALSE	OK		
		Drift_Hv_5_DC	05X_Plane	0.00	2.00	0.00	FALSE	OK		
	BK	Drift_Hv_5_DC	05X_Wire	0.00	0.00	0.00	FALSE	OK		
	Bit	Drift_Hv_5_DC	05Y_BK	900.00	4.00	0.00	FALSE	OK		
		Drift_Hv_5_DC	05Y_Plane	1675.00	5.00	0.00	FALSE	OK		
		Drift_Hv_5_DC	05Y_Wire	1675.00	16.00	0.00	FALSE	OK		
	Plane									
	too									
	Wire									
									~	
	L									



Vertex detector • HV

In front of the hadron absorber

Introduction

Overview

Drell-Yan Run

DVCS Run

Other DCS features

		Beam	Beam rates	Beam Line	Radiation levels			
	Radiation Environment levels	Radiation levels						
		PAXN211	1 Mean Dose Rate μSv/h <mark>γγ Alarms</mark>	PAXN2113 Mean Dose Rate	PAXN2211 Mean Dose Rate Iarms 0.00 μSv/h ✓ Alarms			
	HV SYSTEM			EHN2				
croMegas	Station 1 Station 2 Station 3 LV System Gas System							
	Lv System		XN2212 Mean Dose Rate .26 μSv/h ✔ Alarr	15	PAXN2213 Mean Dose Rate 0.70 µSv/h V Alarms			
	Station 1, source id: 380	P/	XN2112 Mean Dose Rate .26 μSv/h <mark>∕∕ Alarr</mark>	18	PBXN2213 Mean Dose Rate 0.25 µSv/h V Alarms			
	Timestamp: 2015.11.17 10:46:57.984							
	Station 2, source id: 381 Status: Off On Off Timestamp: 2015.11.17 10:46:57.984		Mi	croMegas	control			
	Station 3, source id: 382 Status: Off Imestamp: 2015.11.17 10:46:57.984			 Ethernet Relay an 	to Digital IO d DIM			

Drell-Yan Run

Other DCS features

- DAQ
 - Control of readout engines
 - COMPASS online DB status
- Frontends monitoring

- Indirect beam quality monitoring
 - Drift Chamber 0 HV
 - Webpage for easy access



Deep Virtual Compton Scattering Run

- Start of the DVCS Run: April 18, 2016
- New detector
 - ECal0
 - Cooling and ventilation system
 - LED monitoring
- Updates
 - RPD/Camera
 - LH₂ Target
 - Silicons
 - Ecal1 and Ecal2
 - RICH
 - MWPC
 - Frontends monitoring
 - ...

Spares





Manual: SPS Page-1

2016: DVCS

























































COMPASS

COMPASS DCS

WinCC OA

JCOP Framework

<u>DIM</u>

DIP

<u>ELMB</u>

<u>OPC</u>

<u>SLiC</u>

<u>CAEN</u>

ISEG

