# Detector Control System for PANDA

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PANDA Collaboration Meeting
GSI Darmstadt, September 2007

# Outline

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# Introduction

# Introduction to Controls in PANDA

## Current Status

- No requirements document
- No device list
- No list of variables

## What we want:

- Experiment Control System
    - Detector Control
    - Run Control
    - Monitoring
- Detector testing & development

## The Technical Coordinator's Views

- Overview of PANDA detector system
- Experiences from former experiments
- DAQ point of view
- *But: many details may be missed here*

# Detector Control

## Devices

- Detectors
- Magnets
- Target

## Classes of data

- Fixed values
- Parameters
- Firmware

## Controled values

- HV and LV supplies
    - Currents, voltages, trips
    - Ramps and other switching procedures
- Gas system
    - Gas mixture
    - Flow
- Cooling
    - Coolant flow
    - Temperature regulation
    - Dew point monitoring

# Run Control and Monitoring

## Process control

- **State machine**
- Run start/stop
- Data flow
- Critical conditions

## Trigger control

- Settings & firmware
- Algorithms & parameters
- Priority hierarchy

## Calibration

- Calibration modes:
  - Calibration runs
  - Online calibration

## Detector Monitoring

- Currents & voltages
- Profiles, noise, rates

## Data Monitoring

- Data quality
- Online selection

## Circumstances

- Environment:
  Temperature, air pressure, humidity
- Accelerator:
  Cycle, beam current, beam energy

# User Interface and Database

## Graphical UI

- Control the whole experiment
- Easy operation
- Trends and history
- Access control (authorisation)

## Alarms

- Attend critical conditions
- Display and quick access

## Logging

- Circumstantial information
- Run based information
- Shift crew handling

## Database requirements

- Run conditions
- Versioning and history
- Circumstantial information

## Detector database

- Firmware
- Readout settings (thresholds etc.)
- Hardware settings (HV, LV etc.)
- Alignment values
- Calibration constants (RT, E)

# DCS Work Packages

# General Remarks

## Requirements

- Portability
- Scalability

## Architectures

- Networked access
- Linux must be implemented
- Wide distribution

## Deliverables

- User requirements document
- Device list
- List of variables

# Description of Work Packages

## Design phase

- Framework design
- User requirements
- Device and value lists
- Prototyping

## Implementation phase

- Framework adaptation
- Device implementation
- User interface
- Documentation

# Distribution of DCS Work

## Tasks of member institutes

*All tasks dividable in subsystems*

- User requirements etc.
- Prototyping
- General framework implementation
    - Device drivers
    - User interface
    - Communication interfaces
    - Database
- Link between detector groups and FAIR/GSI Controls

## Tasks of FAIR/GSI Controls

- Framework design
- Templates and libraries
- Database design and service
- Consulting

## Tasks of detector groups

- Detector requirements
- Layout of user interface
- Connection implementation

# DCS Organisation

# Expressions of Interest

## Interested Institutes

- GSI, Controls Group
- Jülich, ZEL
- Warsaw
- Bucharest
- Frascati
- *Other insitutes*

## Committments

- Designated manpower
- Responsibility for work packages
- Cooperation within the group

# Formation of the Group

## Tasks for today:

- Expressions of membership
- Selection of a Subgroup Chair
- Communication:
    - Wiki
    - Forum
    - Mailing list (?)
- Link person GSI Controls

## Detector representatives

- One DCS contact per detector
- Come to DCS meetings
- Answer questions on requirments
- *In future:* work out detector implementation