User request for osci-signals in FCC

1. Introduction

To operate UNILAC ion sources, as well as to control the operation state, stability and performance, it is necessary to observe a temporal structure (pulse time shape) of pulses from certain ion source devices and beam diagnostics. At present time all necessary signals are transferred to the main control room (HKR) as analog signals and acquired with oscilloscopes. In the new FCC it is not foreseen to transfer any analog signal to the new main control room, therefore a solution for ion source signals is required.

2. Possible solution

As a possible solution it could be the use of digitized signals integrated in a new UNILAC control system as well as an integrated connection to existing oscilloscopes via web-interface.

3. Concept

Analog signals from all ion source devices (incl. power converters, control units, vacuum and beam diagnostics) are transferred to LSB1 area (for high current and PIG sources) and to LSB3 area (for ECR source). All necessary signals there are acquired with oscilloscopes, connected to the net. The most important for ion sources operation signals should be digitized using Pico-Scopes, archived and be available in the new control system for online monitoring. The other signals should be also available in the control system via web-interface with oscilloscopes.

4. Requirements

1) Digitizing analog signals in LSB1 from high current sources (Terminal North)

- number of channels: 14
- time resolution: 1 MHz (MIN: 500 kHz)
- acquisition: by a trigger
- MAX sample rate: 5 Hz
- MAX pulse length: 1.5 ms

2) Digitizing analog signals in LSB1 from PIG sources (Terminal South)

- number of channels: 14
- time resolution: 1 MHz (MIN: 500 kHz)
- acquisition: 50 Hz synchronized with UNILAC
- MAX sample rate: 50 Hz
- MAX pulse length: 7 ms

3) Digitizing analog signals in LSB3 from ECR source (HLI)

- number of channels: 14
- time resolution: 1 MHz
- acquisition: trigger / CW
- MAX sample rate: 50 Hz
- MAX pulse length: 7 ms

4) Archiving digitized signals (switchable option)

- there should be an option for Enable/Disable archiving for each channel
- archiving for Terminal North: every shot (MAX: 5 Hz)
- archiving for Terminal South: every shot (MAX: 10 Hz)
- archiving for HLI: every shot (MAX: 10 Hz)

5) Integration in the control system and user interface

- there should be a user interface for online monitoring of signals integrated in the App Launcher (at best in the Ion Source program)
- there should be a user interface to work with archived data integrated in the App Launcher
- connection to LSB-oscilloscopes via web-interface should be integrated in the App Launcher

5. Boundary conditions

The solution for ion source signals must be realized before moving the main control room to FCC.