



# INTEGRATION OF WIRELESS MOBILE EQUIPMENT IN SUPERVISORY APPLICATION

S. Blanchard\*, R. Ferreira, P. Gomes, G. Pigny, A. Rocha (CERN, Geneva)



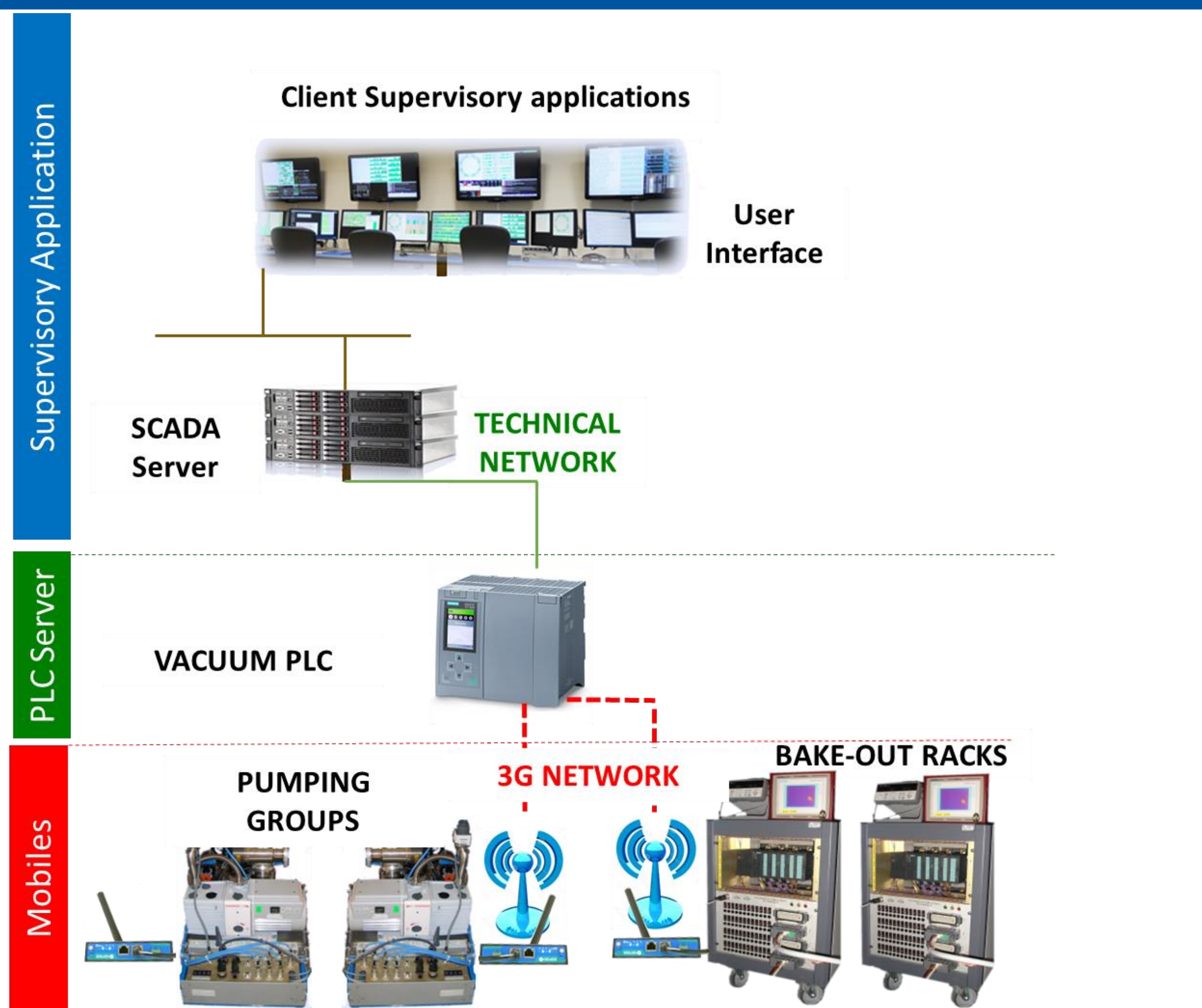
October 9, 2019  
Paper ID: WEPHA017

## Abstract

Pumping group stations and bake-out control cabinets are temporarily installed close to vacuum systems in CERN accelerator tunnels for their commissioning. The quality of the beam vacuum during operation depends greatly on the quality of the commissioning. Therefore, the integration of mobile equipment in the vacuum supervisory application is primordial. When connected to the control system, they appear automatically integrated in the synoptic. Mobile equipment are granted with the same level of remote control, diagnostics and data logging as fixed equipment.

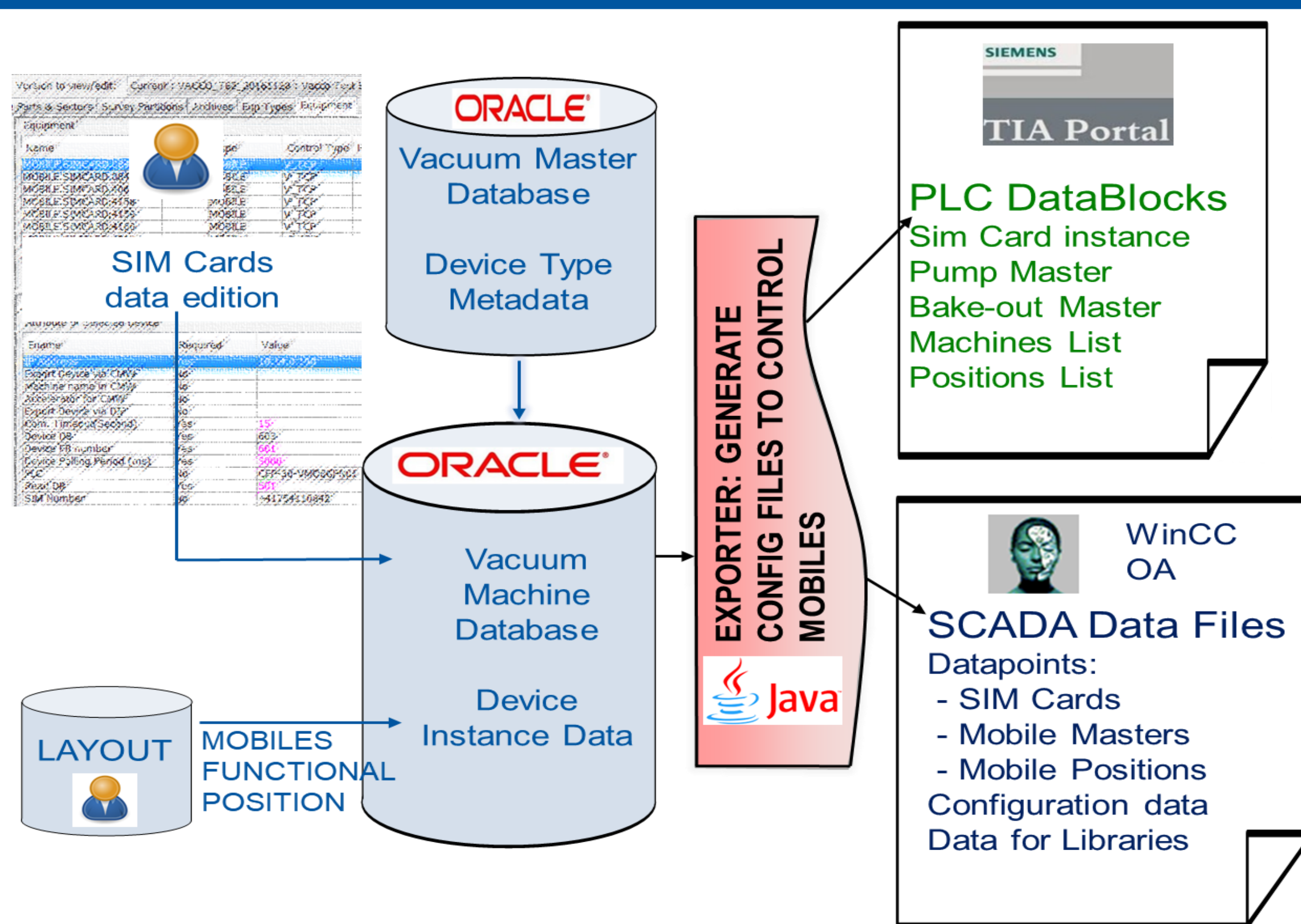
The wireless connection and the communication protocol with the supervisory application offer a flexible and reliable solution with high level of integrity.

## Hardware Architecture



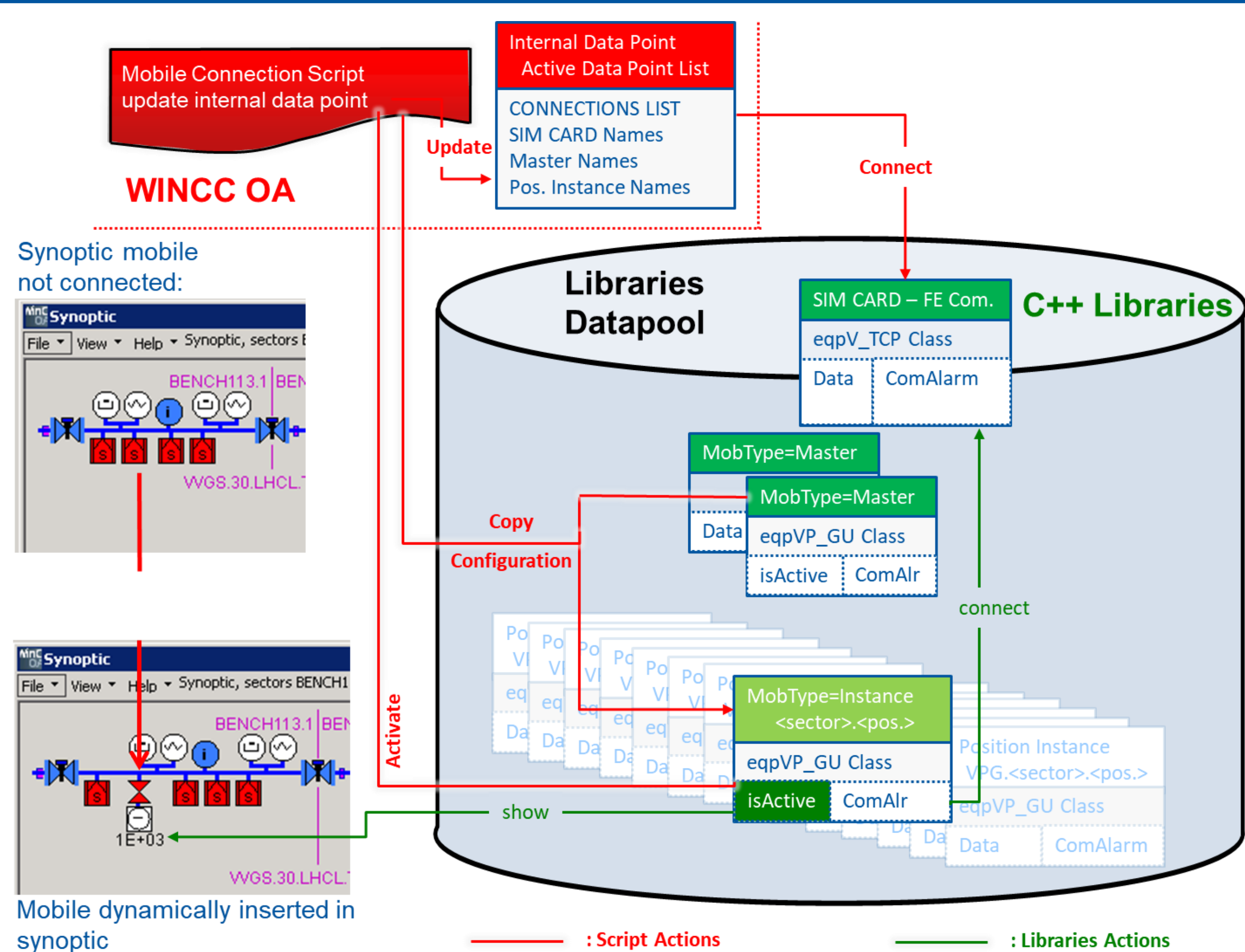
Mobile equipment concerned are pumping groups and bake-out cabinets. The vacuum systems of the CERN facilities require more than 250 mobile pumping groups and more than 120 bake-out cabinets. Around 80 mobile pumping groups and 70 bake-out cabinets are hardware compatible with the wireless communication system.

## Database and Exporter script



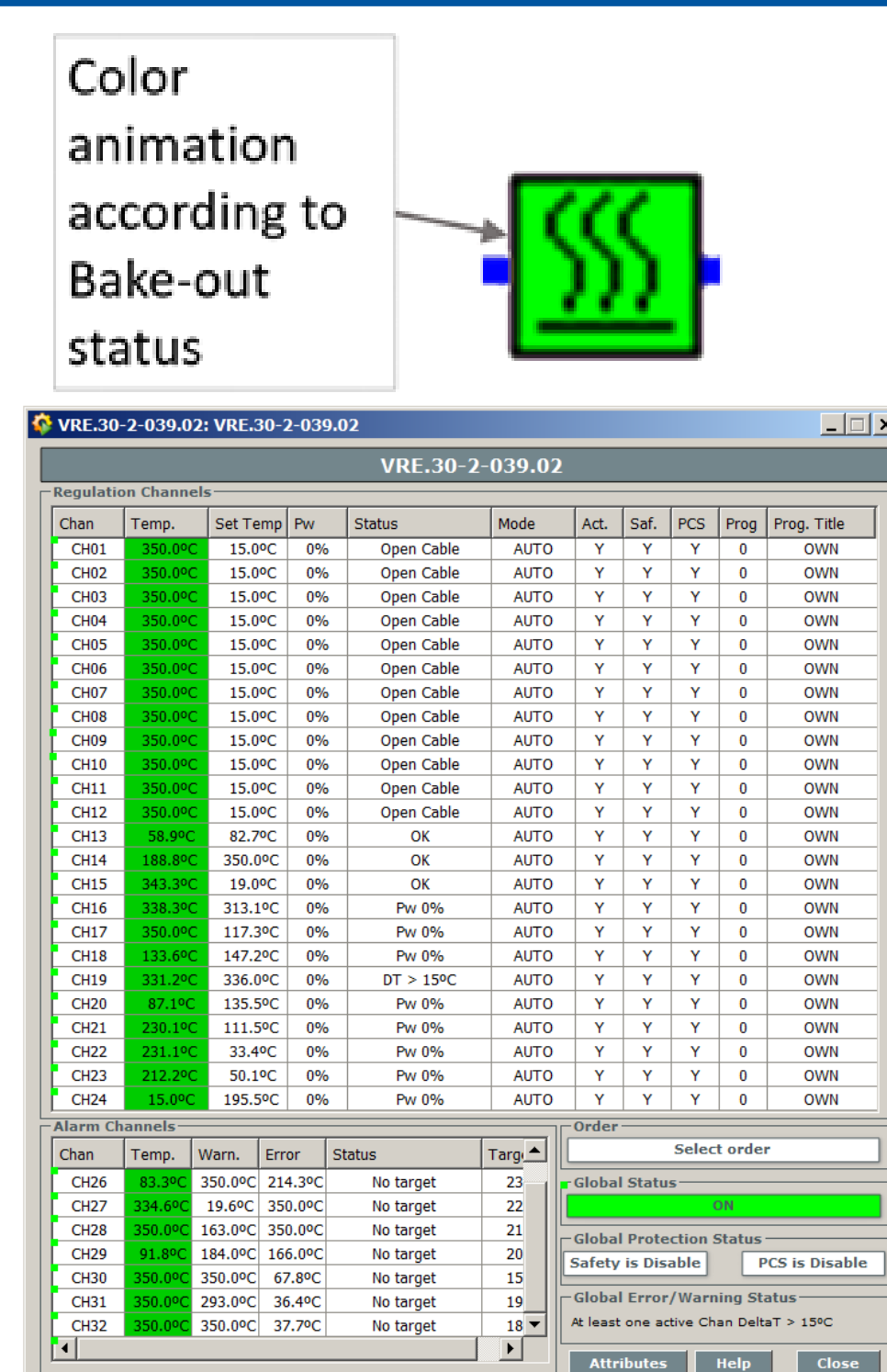
Definitions of new equipment control types in the master database; update of the Files Generation Script (Exporter) to include the pumping group and bake-out control types. Insertion of the wireless mobile connection concept in the Exporter.

## Connection Management



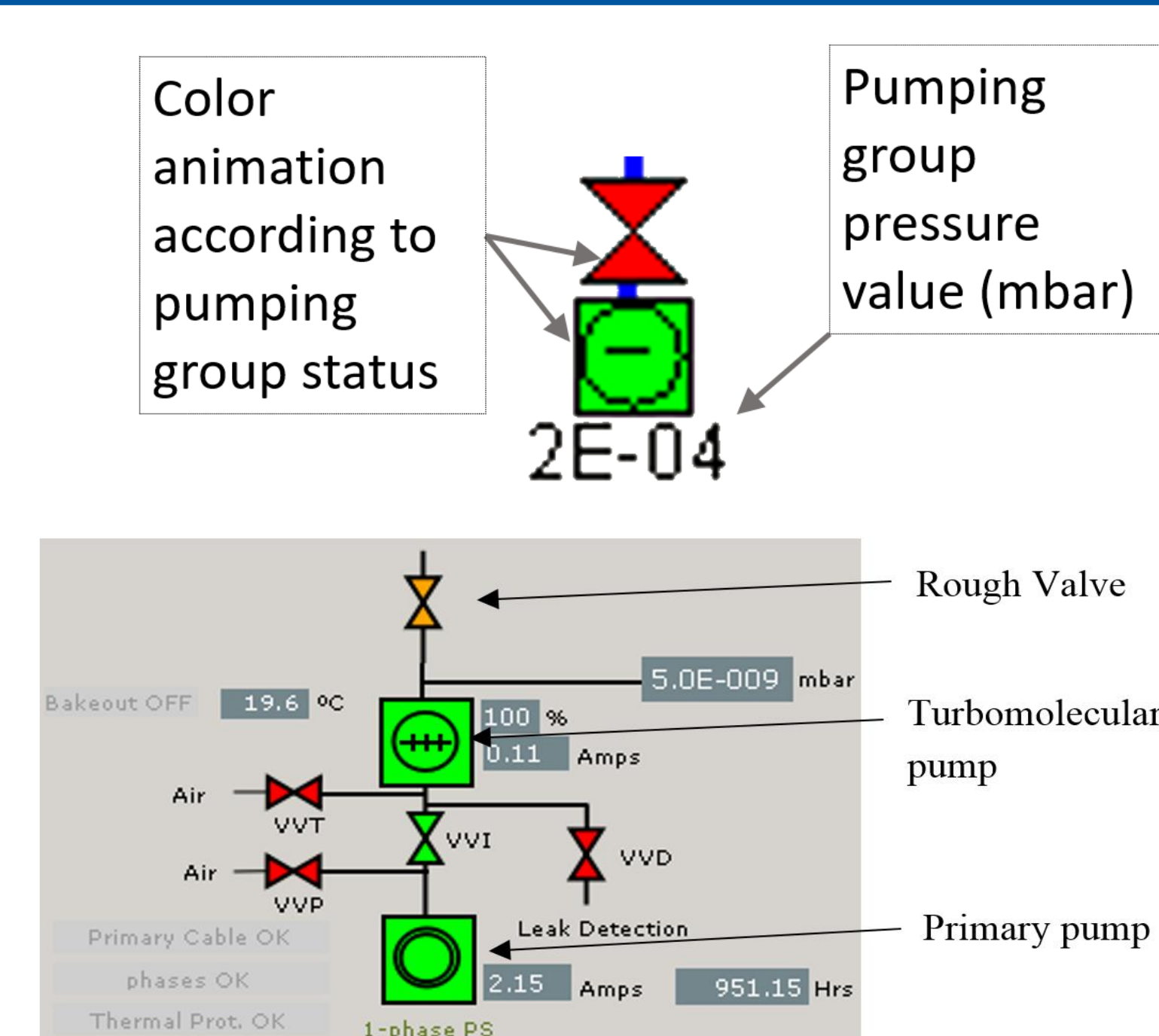
Script gets the type of the mobile equipment and the position from the SIM card data point. Then, it copies the configuration of the master data point to the functional position data point. Finally, the functional position is activated in the shared libraries data pool.

## Bake-out Widget



Icon shown in synoptic and faceplate panel of the Bake-out rack.

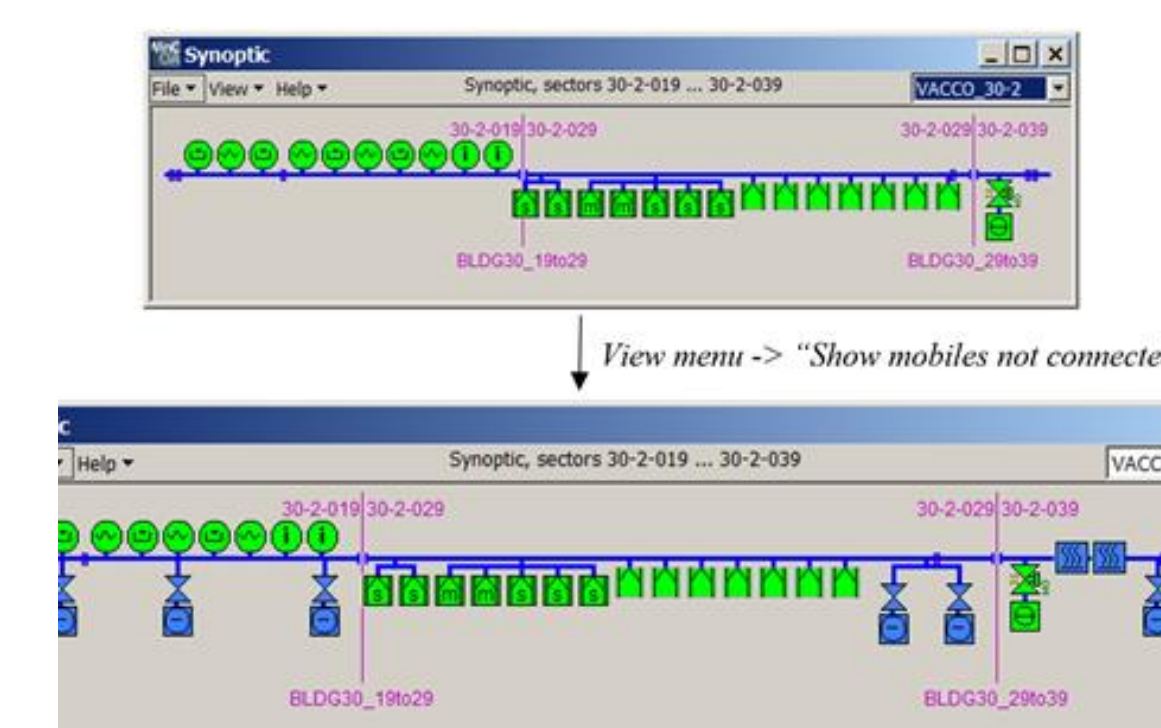
## Pumping Group Widget



Icon shown in synoptic and faceplate panel of the pumping group.

## Data access to mobiles not connected

The first access is on the synoptic panel. In the View menu of the synoptic panel, the operator may select "Show mobiles not connected". The second access is through the device list. Device list integrates a new selection criteria: "Not Active".



## Conclusion

The system has been successfully deployed in the LHC and SPS applications at the beginning of the second CERN accelerators Long Shutdown (LS2). It offers remote control of mobile equipment with a high level of integrity. The permanent monitoring and data logging of mobile equipment contributes to the quality of the commissioning, and so to the quality of vacuum for the next physics run. This scalable integration in the SCADA, of complex processes driven by PLC-based mobile stations, required the development of new concepts to manage the connection and integrate automatically mobile equipment in the supervisory application with full features.

