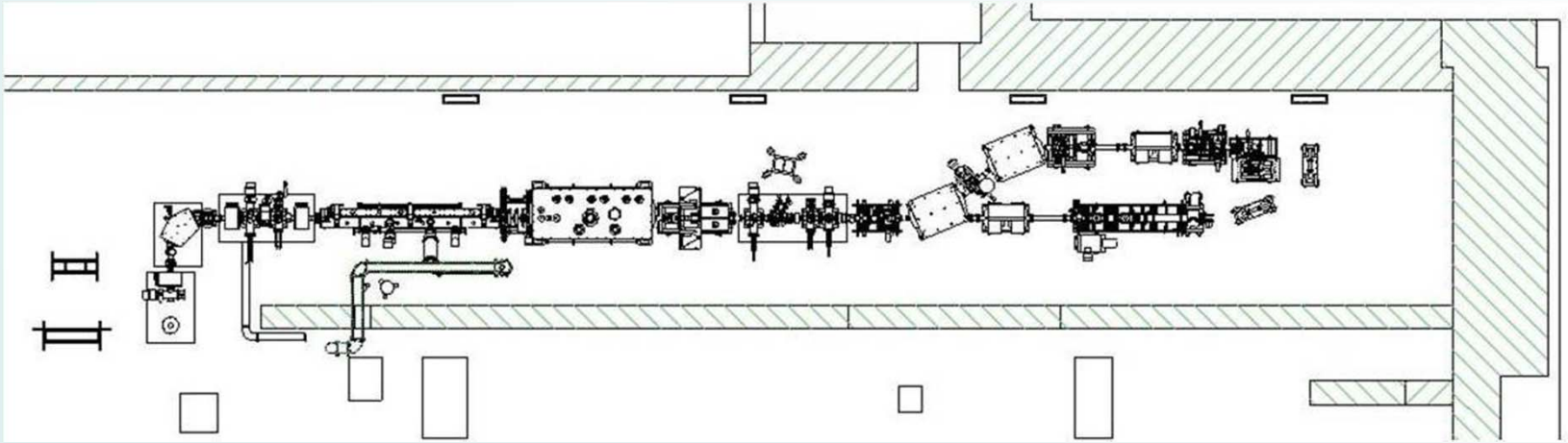
SARAF Phase-I Control System Rebuild

E. Reinfeld
I. Gertz, I. Eliyahu



Outline

- Overview of SARAF control system
- Problem definition
- Solution definition
- Implementation

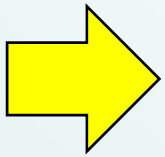
Introduction

- SARAF Phase-I consists of a 4MeV high current RF superconducting LINAC of protons and deuterons
- Commissioned to ACCEL the facility was planned to be delivered as a turnkey project
- The commissioning process and the control system were not completed
- Phase II (upgrade up to 40MeV) is planned to be completed untill 2017

2006-2009: Commissioning of SARAF accelerator

2010: Delivery to SARAF team

2010: First two beam lines are completed

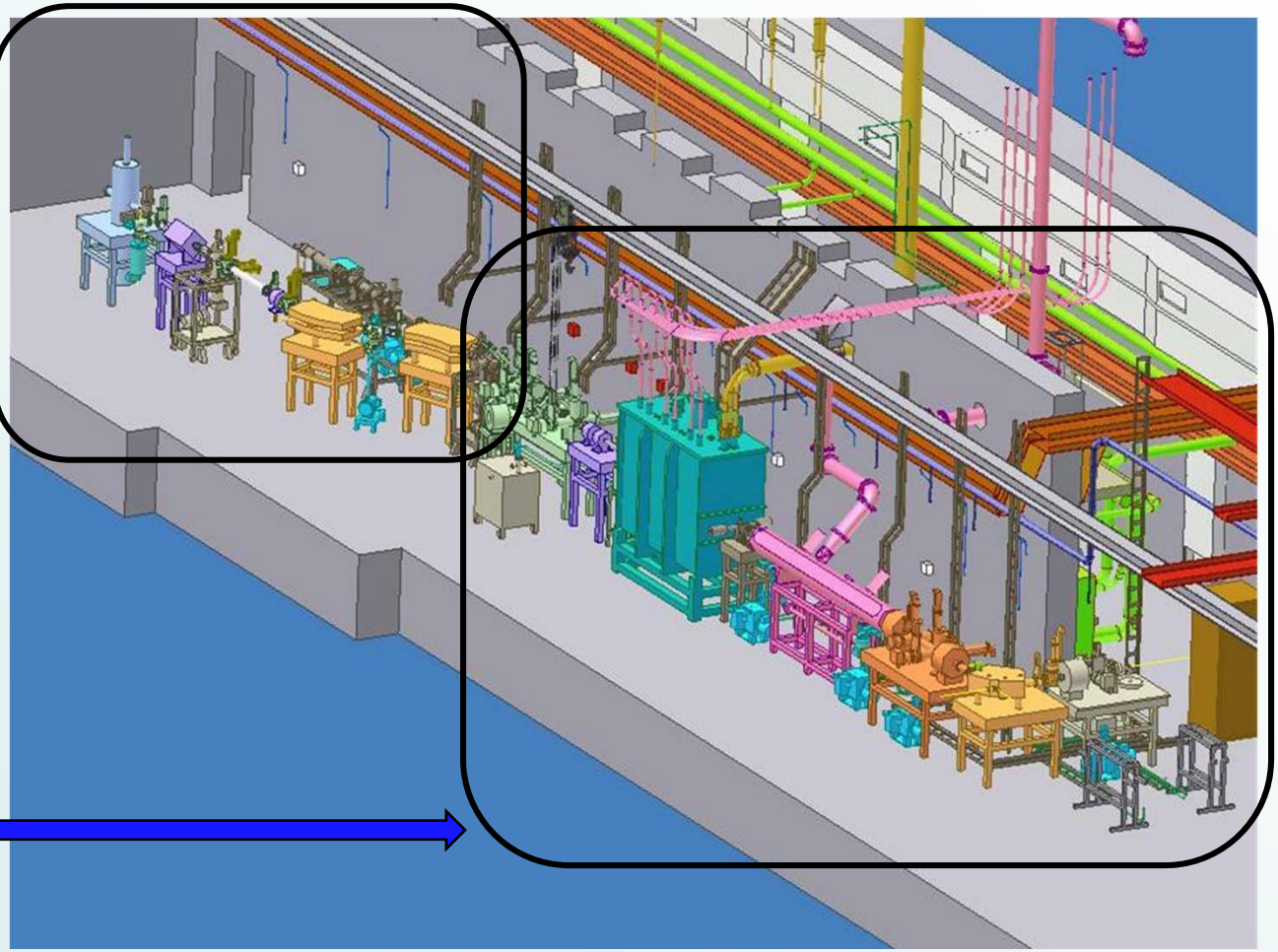


2018: Facility is working in full capacity. Phase 2 done

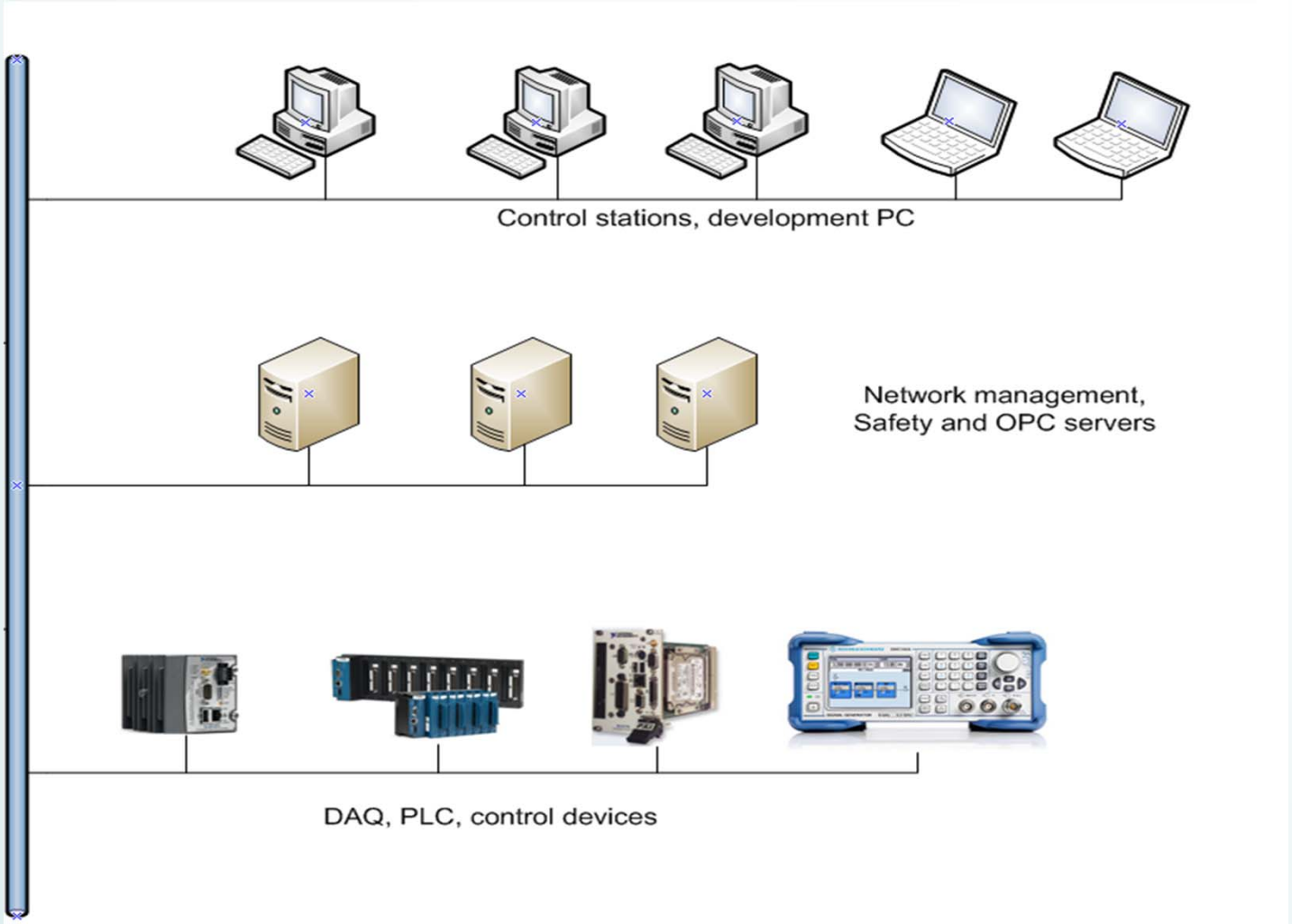
System overview

Beam lines
0 and 1, completed
By the SARAF Team
in 2010

Accelerator part
mounted by ACCEL
in 2006-2010



Control system overview



Problem definition

The control system was delivered while in development phase.

- Lack of knowledge transfer, limited documentation
- Fragile infrastructure
- Undocumented methodology and strategy
- Simple design – complex operation
- The rebuilding process needs to be done in parallel to accelerator operation
- The control system has to be streamlined and stable before SARAF phase II

Need to invest the effort now.

Solution definition

The control system needs to be moved to operational phase.

- Build knowledge base
- Revamp infrastructure
- Define a clear strategy
- Simplify operation
- Restructure the control system
- Define a methodology
- Deliver the rebuilt system before SARAF phase II

Systematic approach is planned.

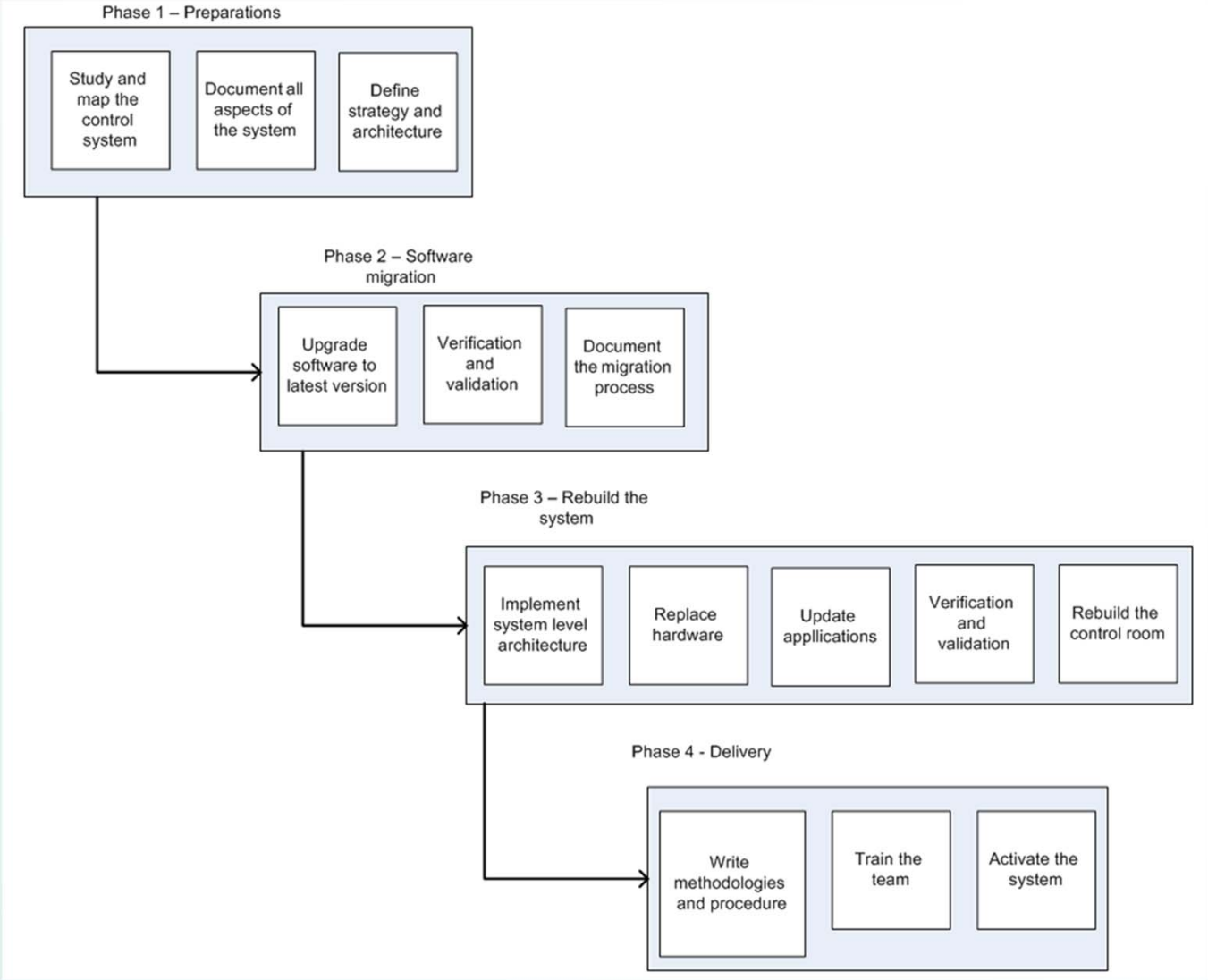
Implementation

Study the system

Migrate software

Rebuild the system

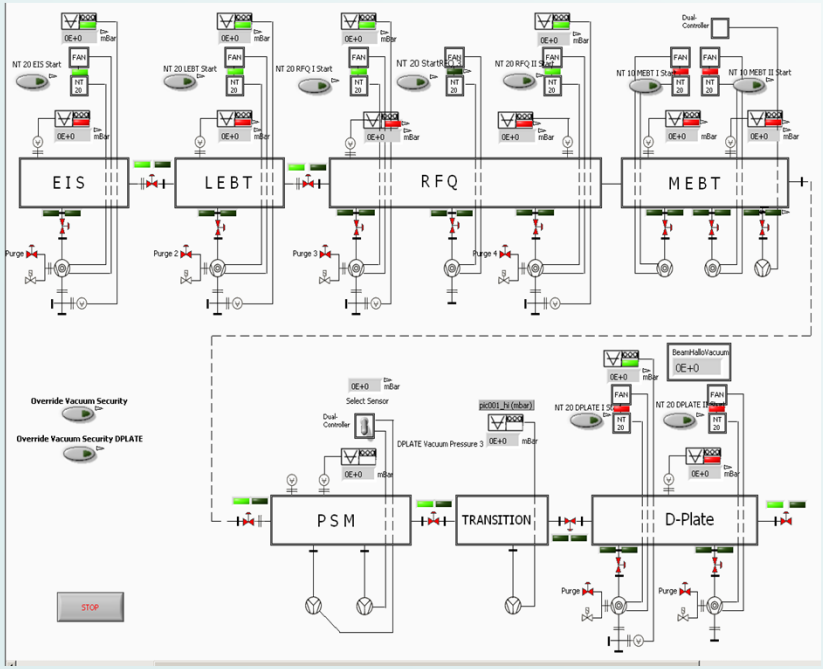
Deliver the system to the operation team



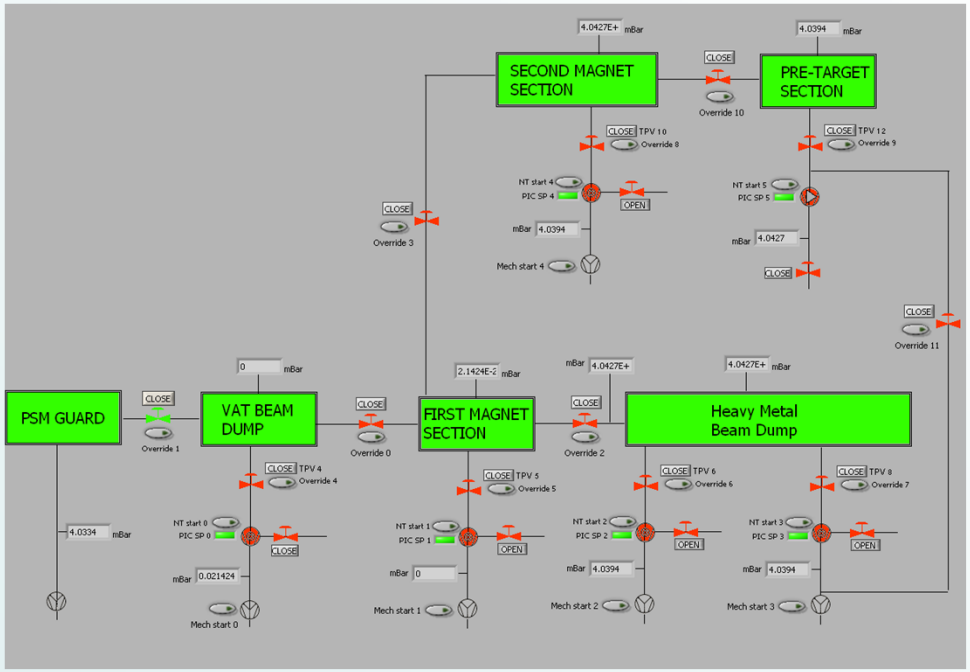
Vacuum control system

Initial state of vacuum control systems before redesign and rebuild.

Accelerator vacuum control system.



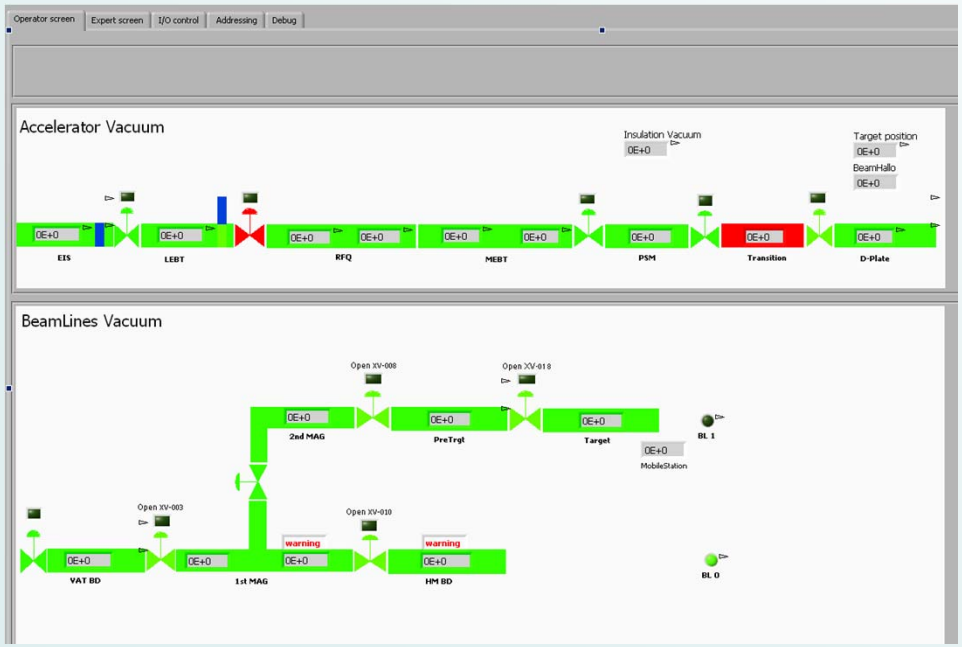
Beam lines vacuum control system.



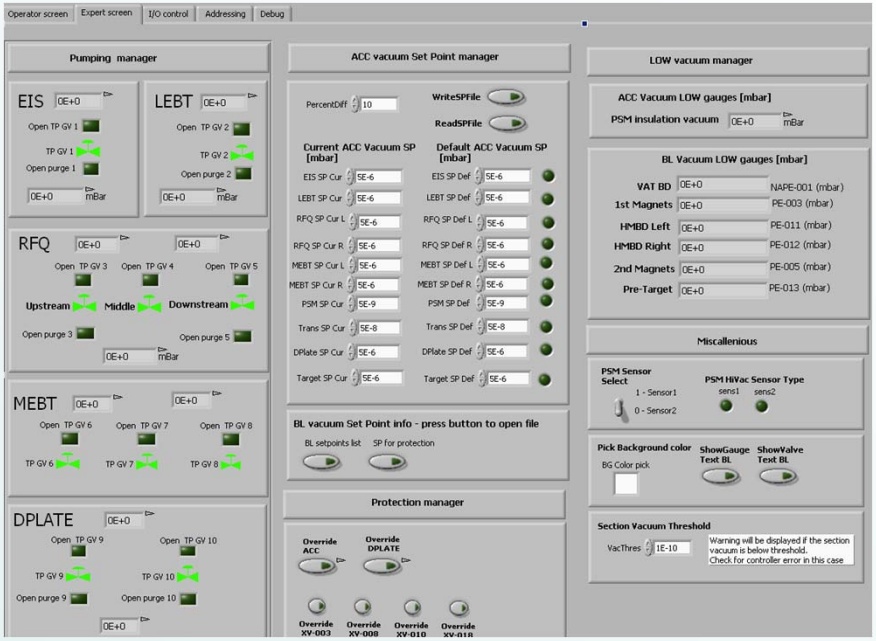
Vacuum control system

Accelerator full vacuum control system – new system.

Operator screen

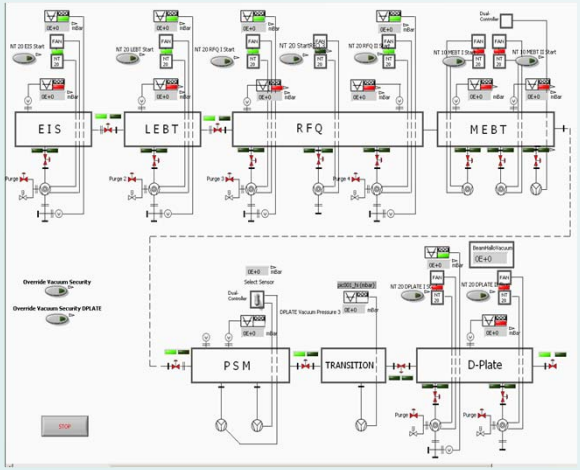


Expert screen

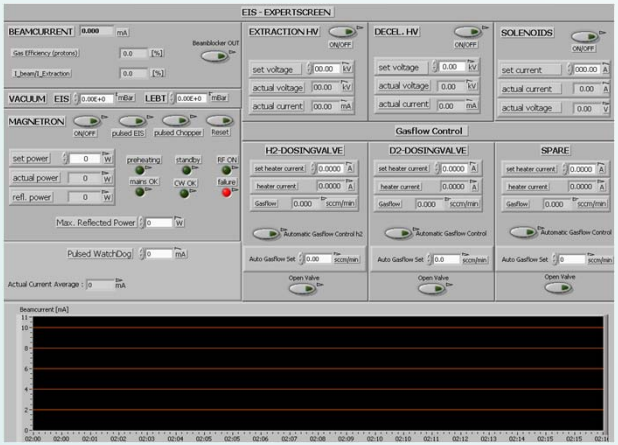


Phase A - Preparations

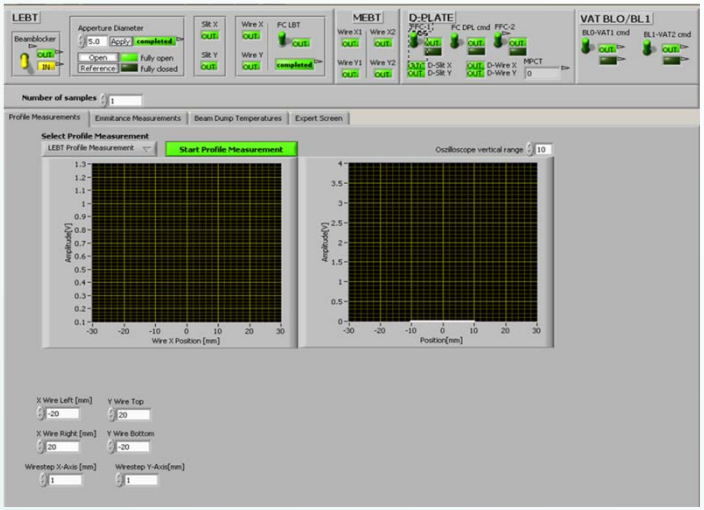
- Study, map and document the control system
- Clear and organize the system elements
- Fix major issues, and provide support to operators
- Design the control methodology in light of SARAF Phase-II



Vacuum CS



Ion source CS



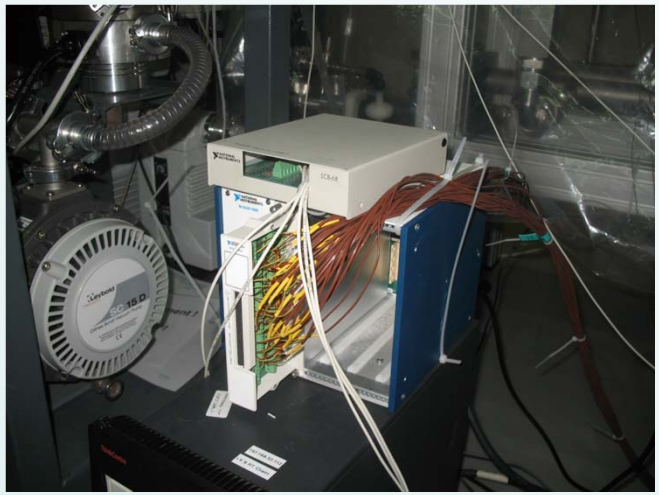
Diagnostics CS

Phase B – software migration

- The control system is based on Labview 8.2.1.
- Migrate the software to the latest stable version of Labview.
- Verify correct operation and document the process.

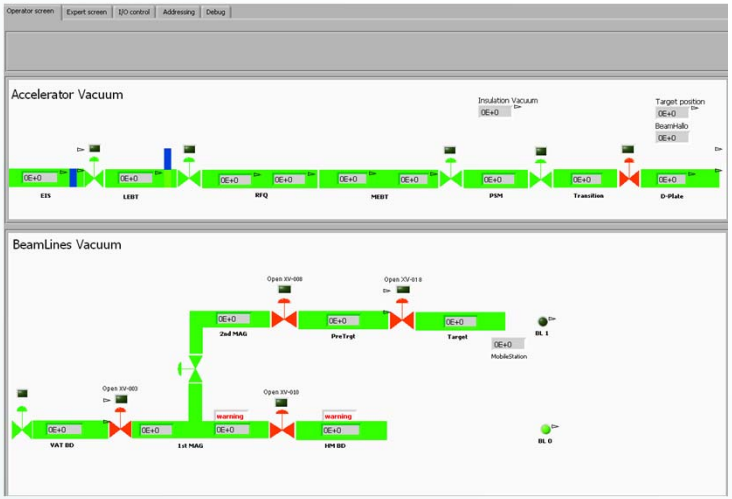
Phase C – rebuild the system

- Review each control system and application
- Add system level capabilities and design
- Streamline hardware and application
- Rebuild and modernize the control room
- Verify, validate, document

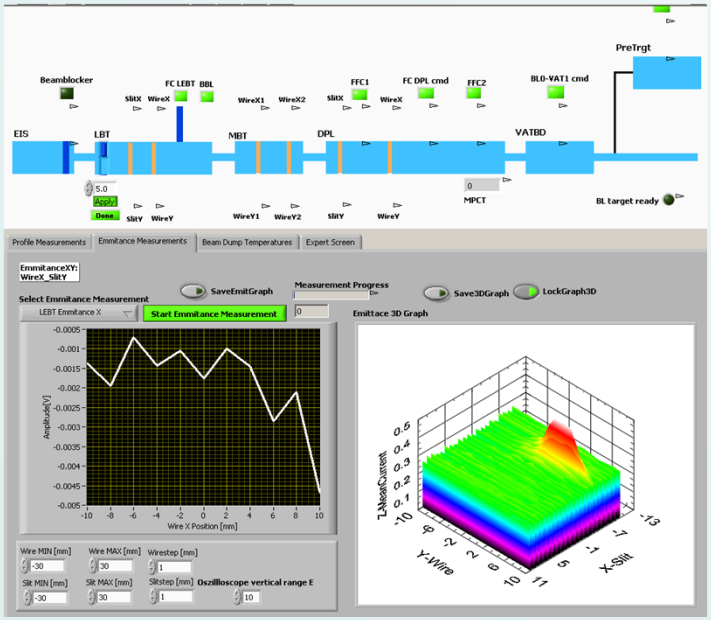


Phase D – delivery

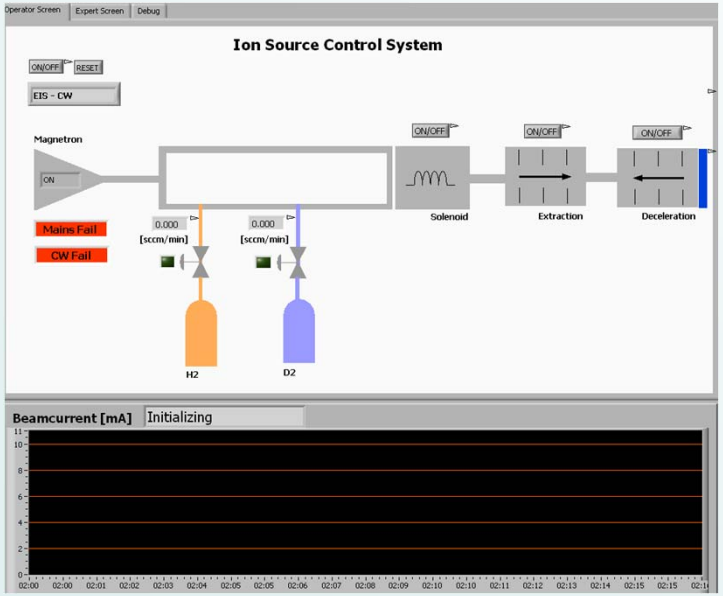
- Write procedures
- Train the team
- Activate the system



Vacuum CS



Diagnostics CS



Ion source CS

Summary

The SARAF Phase-I control system needs to be delivered from development to operational status.

Phase A of the project is currently ongoing

- Most of the control system is documented and mapped
- Methodology and strategy are being considered
- Working hard to restructure the system and start migrating the software soon