

# Status of the Migration of the S-DALINAC Accelerator Control System to EPICS\*

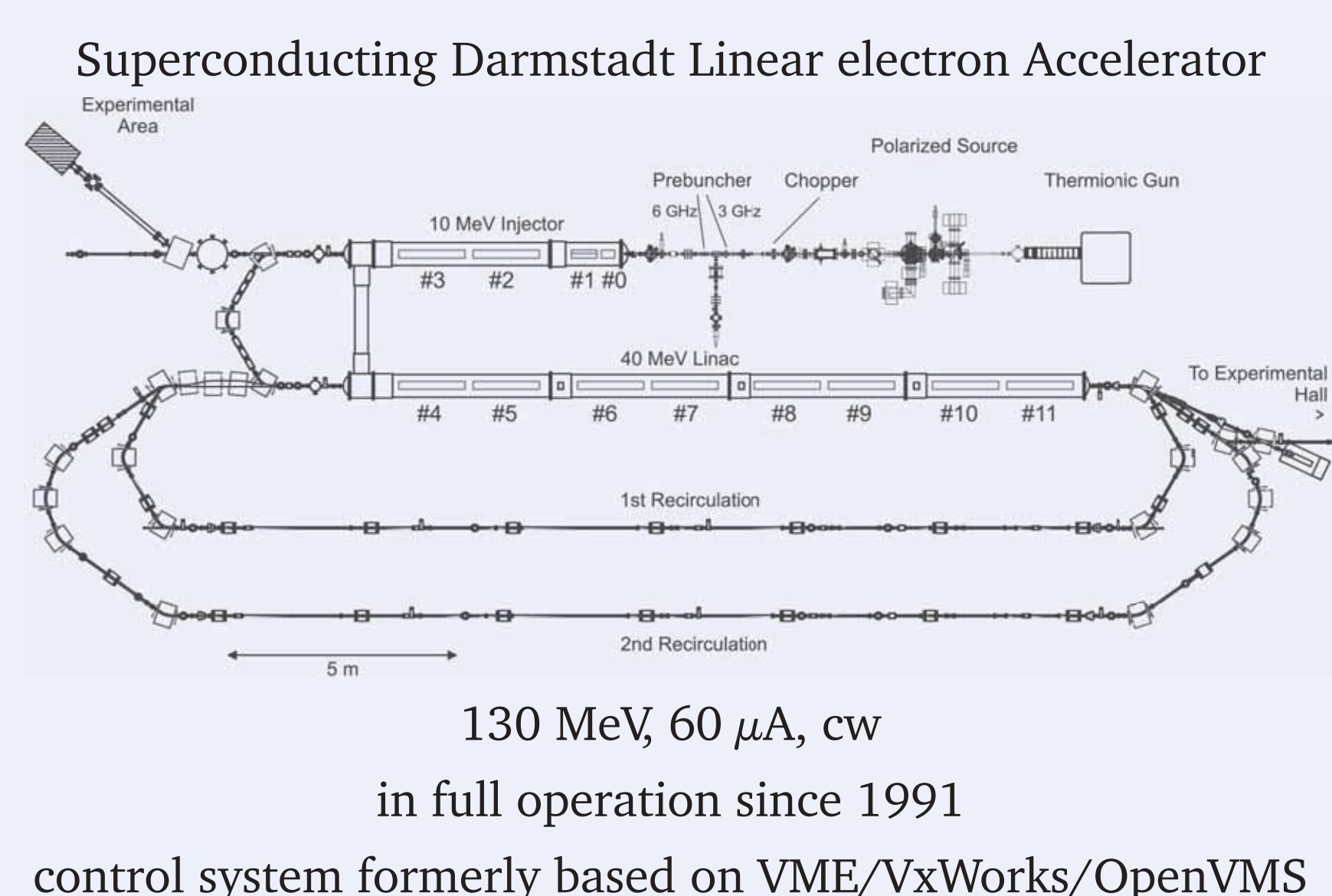


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## S-DALINAC



## EPICS at the S-DALINAC

### Why EPICS was chosen

- Linux compatibility
- highly configurable without programming
- no Licence issues

### Custom CAN device support

- based on socketCAN stack
- different application can access CAN interface at the same time
- independent of CAN interface device manufacturer
- see dedicated contribution **THPD13**

### Custom USB 2.0 device support

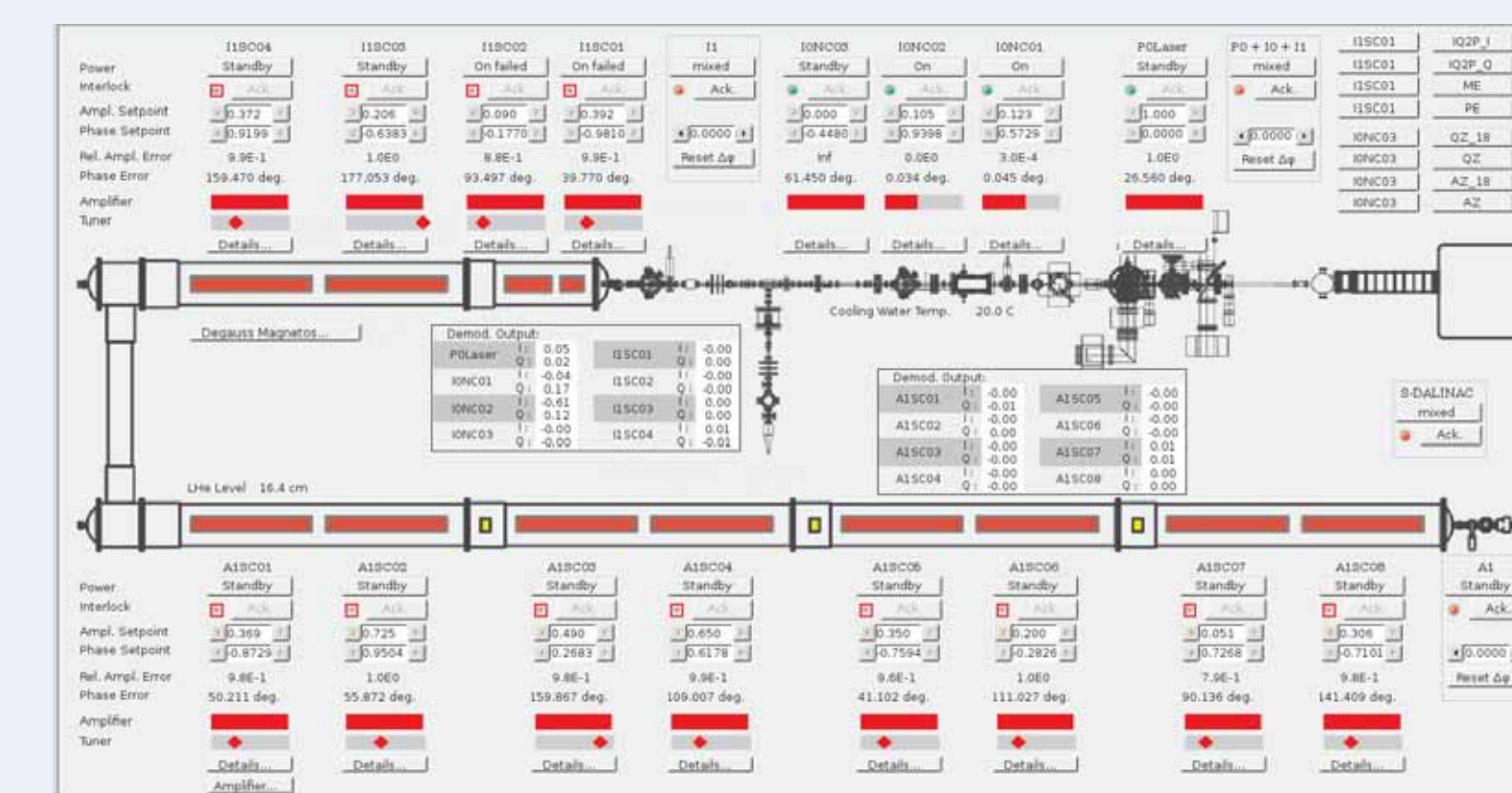
- allows diagnostics for digital low-level RF control system
- full resolution of 18 bit at 1 MS/s
- receives streaming data

### Input Output Controller

- configured from relational database
- utilize custom device support or Asyn/StreamDevice
- running on Debian Linux
- one physical or virtual machine per IOC

### Operator Interfaces

- Control System Studio
- BOY is used to create OPIs



### Custom Rotary Knobs + Touchscreens

- not EPICS compatible yet
- essential for efficient beam optimization



## Hardware

### In-house developed Hardware Family

#### CAN power supplies

- approx. 200 magnet power supplies with  $I_{Out} < 10$  A
- few power supplies (5 % of total number) with  $I_{Out} > 10$  A
- in-house developed preferred for cost reasons



### CAN Bus for Communication

- allows connection of multiple devices to one interface
- 1 Mbit/s for distances up to 40 m
- microcontrollers with integrated CAN controller available
- little configuration needed (in comparison to ethernet devices)
- transportable USB interfaces are available and make on-site diagnostics easy
- robust RJ-45 connectors



### The Whole Hardware Family

- magnet power supplies
- multi-purpose measurement system
- low-level RF control system
- controller for scintillating screens
- various electronics for experimental sites

### Firmware

All devices are equipped with a microcontroller. The firmware is the same for all devices. It determines the type of hardware it is running on and adapts its behaviour accordingly. That is, the commands being individual for each kind of hardware are provided.

## Infrastructure

### General

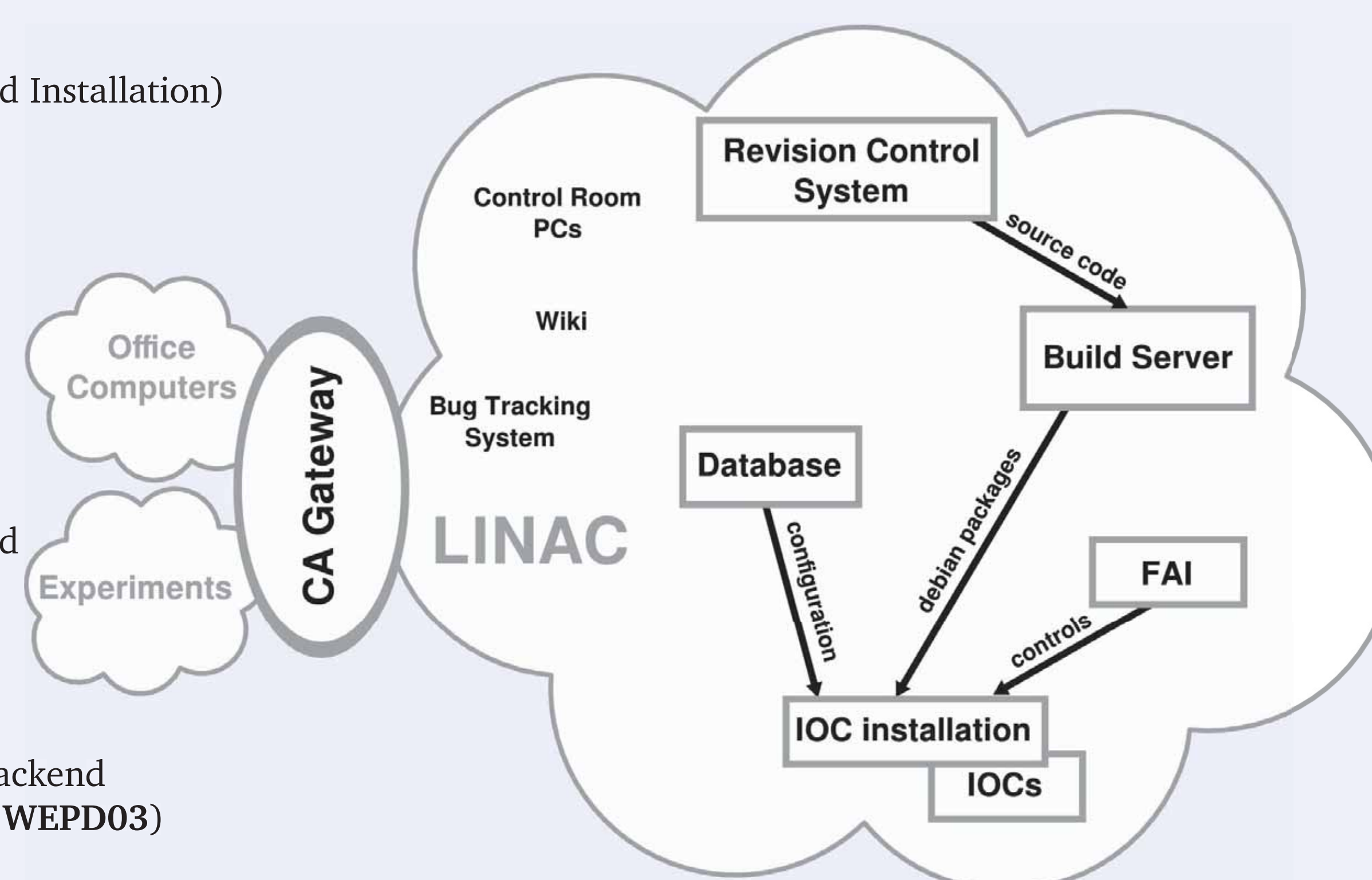
- Debian FAI (Fully Automated Installation)
- Build Server
- Bugtracker
- Wiki

### Automatic Installation

- install production machines within minutes
- install procedure is completely documented and stored in a central place

### EPICS specific

- CA Gateway
- Archiver with PostgreSQL backend (see dedicated contribution **WEPD03**)
- State Machines (Sequencer)



## Summary

### Done

- 2 years of successful operation
- several essential subsystems migrated (low-level RF!)
- migration is approximately 50 % finished

### To be done

- magnet power supplies are to be migrated
- operator interfaces: physical rotary knobs
- alarm system toolkit like BEAST

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