

# THP013 The On Line Read Out for the Radiation Monitoring System in the LHC Accelerator (RADMON)

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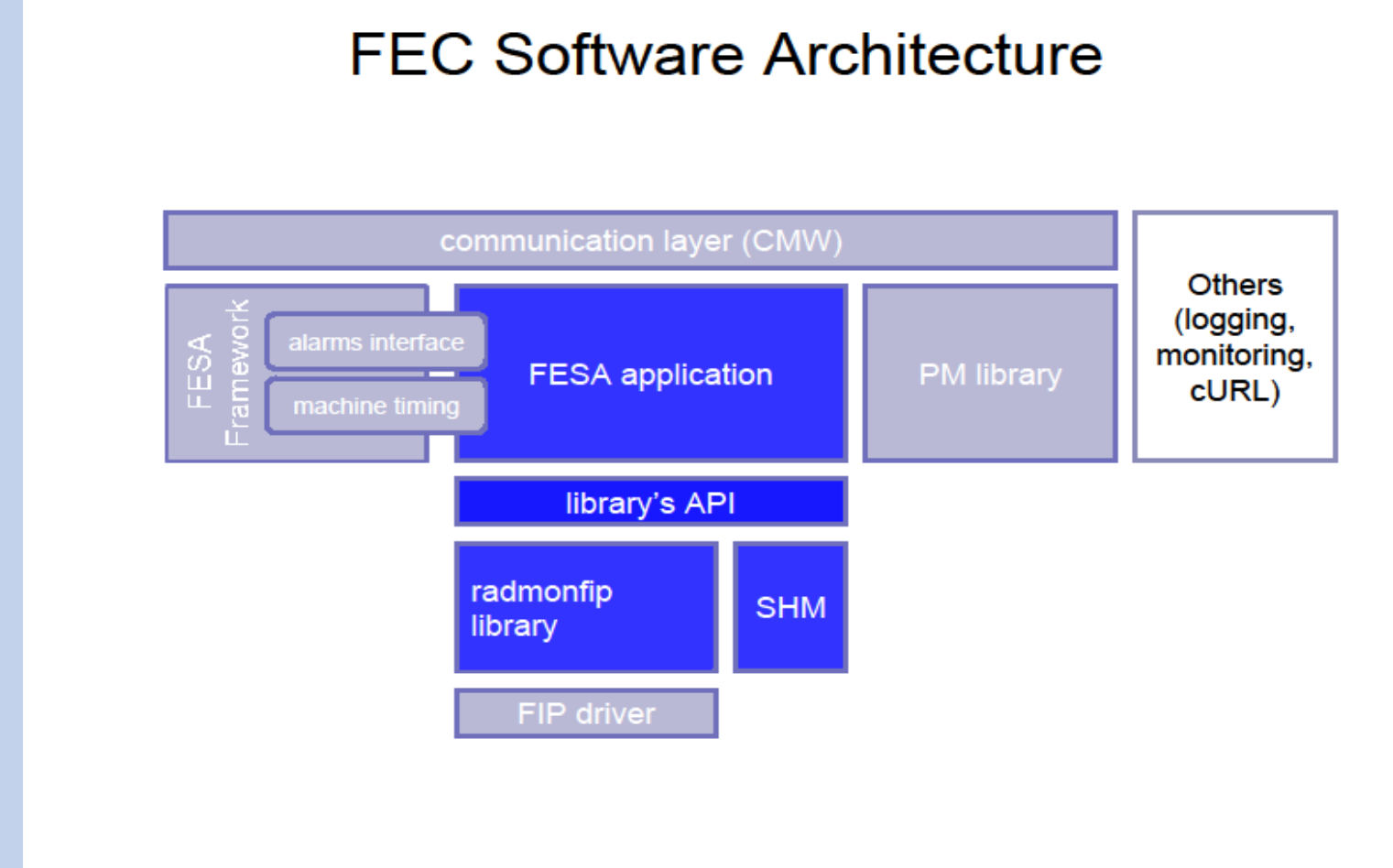
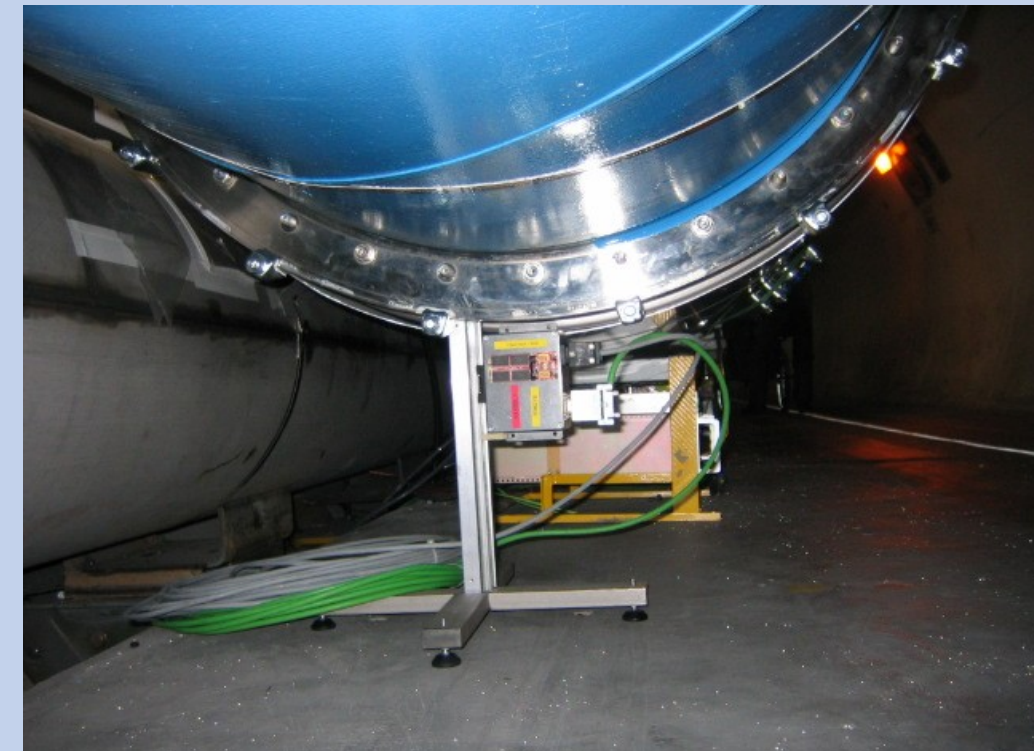
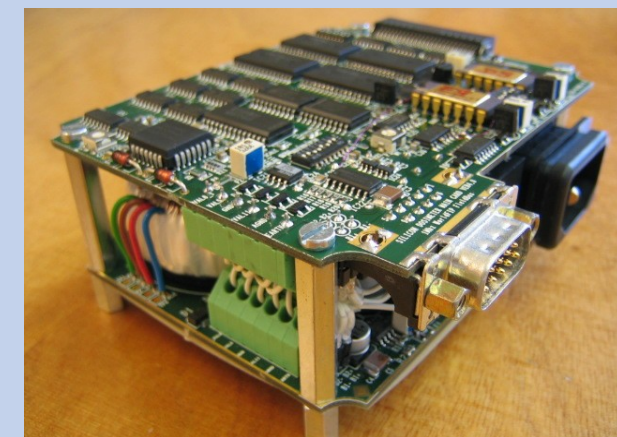
## Introduction

The RadMon has been designed to measure the radiation levels

- Dose [Gy]
- Neutrons [n/cm2 expressed in 1 MeV eq/cm2]
- Hadrons [h/cm2]

in real-time and during the beam circulation at the location of equipment to

- provide an early warning if levels are too high for a dedicated equipment,
- identify radiation induced failures,
- study variation of radiation levels,
- improve shielding.



## Radmonfip library

- is responsible for the communication with RadMon devices via WFIP fieldbus such as initialize devices, read and write commands, get status information.
- provides API functionalities for the higher levels.
- provides direct access to device via toolset from the gateways.

The RadMon Device and Tap Calibration System facilitates the generation of the configuration files used in the RadMon data acquisition software.

## RadMon – The FESA application

The Radiation Monitoring C/C++ application (RadMon) were developed in the Fesa framework.

Two Fesa classes.

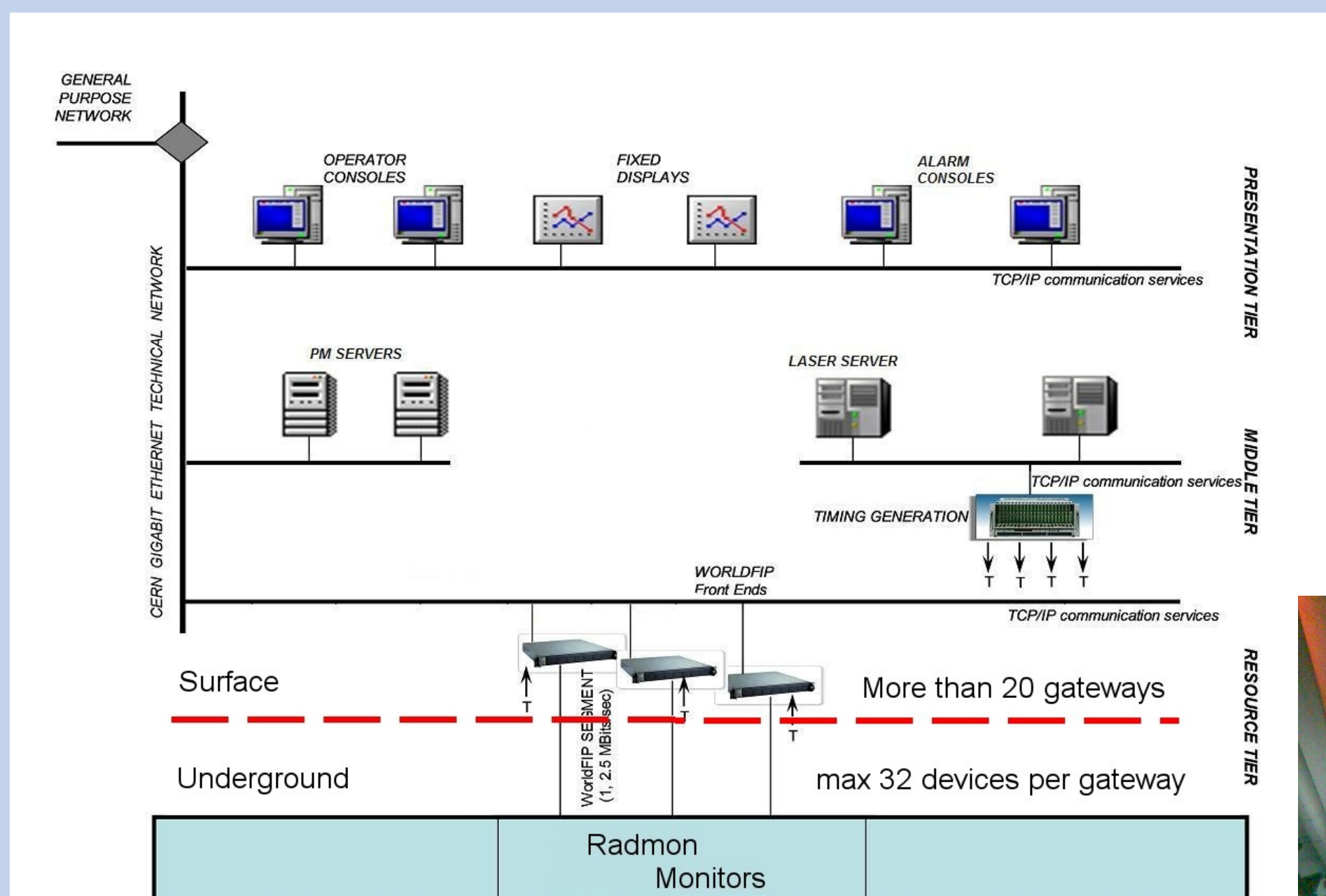
- RadMonDev: described the details of the devices data, this class is to present the data.
- RadMon: executing all the functionality of Software Requirements.
  - Communicate with and retrieve data from RadMon devices located throughout the LHC and experimental areas
  - Represent the data in human-readable form in the Control Room and for the physicists later analysis
  - Store data in databases
  - Generate Post Mortem reports



## Fesa Design

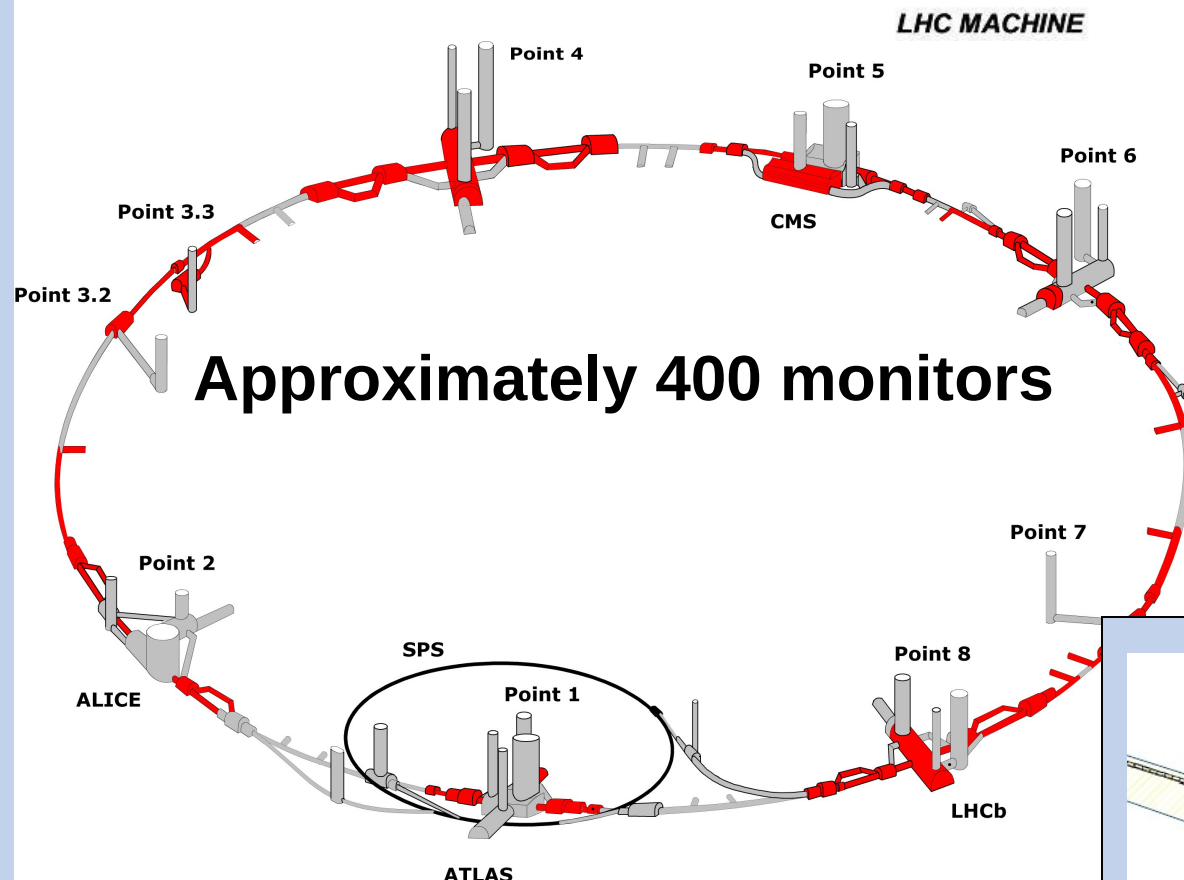
The different sections contain properties to define the different aspects of the system. This is the use of the generated code made by Fesa. For example: „Device-data” shows the name of variables that contain the status of the hardware device.

## Radiation Monitoring System Architecture

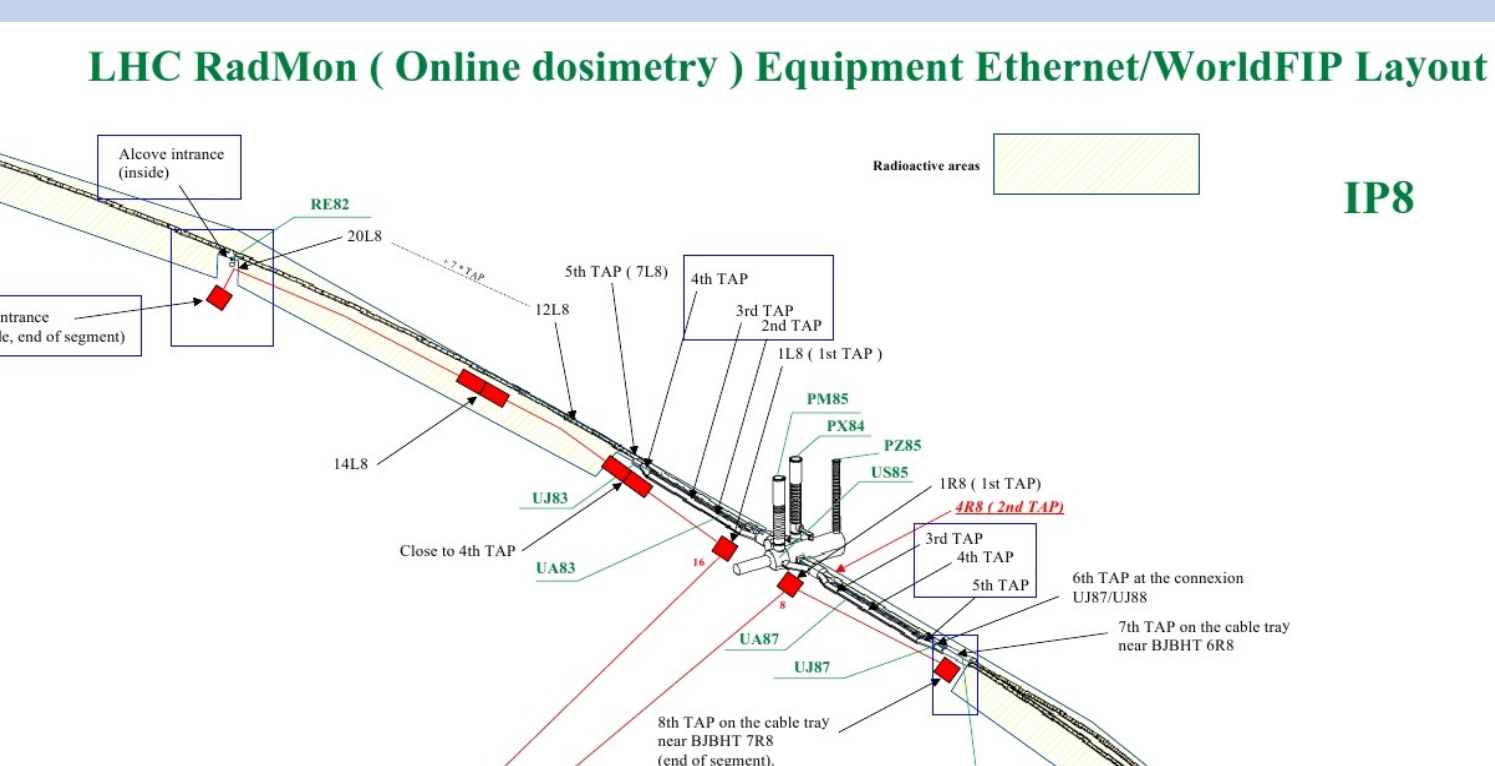


To cover the 27km long LHC tunnel and the Experiments expected hundreds of sensors are needed.

- Each segment has got one controlling Front-end computer (FEC), acts as the bus arbitrator for the segment.

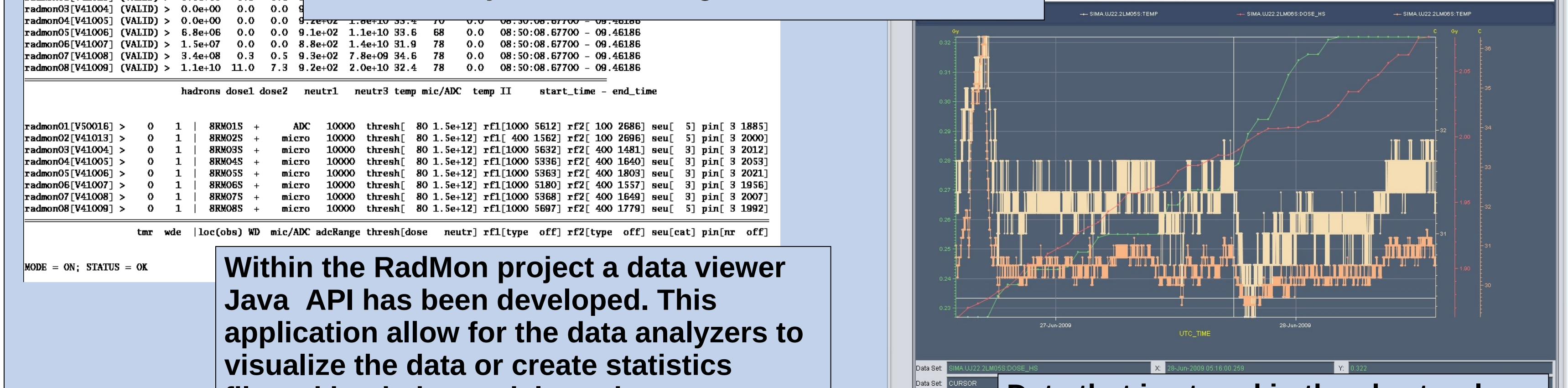


- Devices and FECs are connected via Real Time WorldFIP Fieldbus.
- Synchronized with machine/experiments timing/Post Mortem
- FECs are connected to the CERN gigabit Ethernet backbone



## Databases

There is the possibility to check the data on-line on the gateways provided by the radmonfip library. It is possible to extract the data in human-readable form and raw data form with the information of the calibration of the devices. This option is mainly used to verify the monitoring hardware.



Within the RadMon project a data viewer Java API has been developed. This application allow for the data analyzers to visualize the data or create statistics filtered by their special requirements.

Data that is stored in the short or long term logging databases can be accessed via a web-based interface named TIMBER.

Every line on the picture gives a triplet about the problem.

- The name of the device.
- Description of the problem.
- The name and telephone number of the responsible person

## Alarms

RadMon uses the integrated Laser Alarm interface in The FESA framework to collect, store and manage information regarding abnormal situations in the Laser Alarm System and presents the alarm to the operators that can take actions to fix the problem.

During operation, data from the monitors is stored on line in databases:

- Measurement DB:
  - short-term storage
  - overwrite data after 7 days
  - all device data store
  - high time resolution (1 Hz)

- Logging DB:
  - permanent storage
  - selected data only
  - low time resolution (0.1 Hz)

