Wire scanner calibration application

By Marta Vicente Romero

BI-SW

Wire scanner calibration application

- Introduction
- Calibration Bench
- Analysis
- Overview ExpertGUI
- Architecture
- Demo
- Future and conclusions
- Questions

1 Introduction

- Application used to perform the position calibration of currently operational wire scanners in PS and PSB
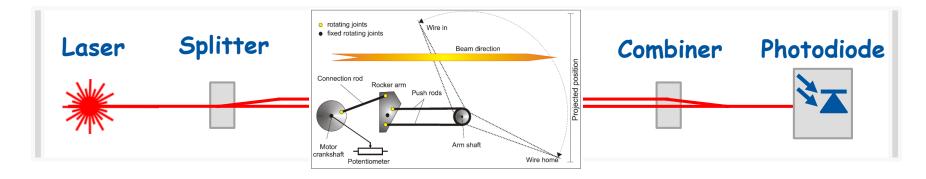
- Aim is to automatize the construction of calibration tables of scanners before their installation in the corresponding machine
  - For different speeds
  - For both movements, in/home

2 Calibration Bench

- Based on the acquisition of laser beam for a set of known positions

- Result: A table of projected position versus the observable : potentiometer value

Laser   **Splitter**   **Combiner**   **Photodiode**

- rotating joints
- fixed rotating joints

Wire in

Beam direction

Projected position

Connection rod

Rocker arm

Push rods

Motor crankshaft

Arm shaft

Potentiometer

Wire home

- Two different calibration benches -> different calibration configuration

3 Analysis

- Needs
  - Problems detected by the use of the application
  - New requirements (by the "calibration team")

- Obsolete architecture

3 Analysis

- Needs
  - Problems detected by the use of the application.
    - Difficulties to follow the workflow
    - Tedious handmade tasks
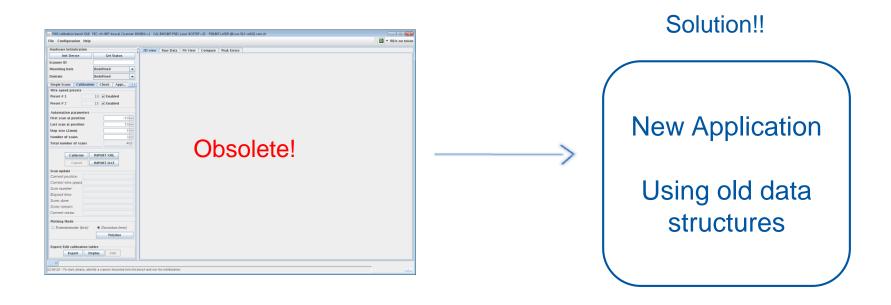   - Deploy calibration files
      - Edition of the result

3 Analysis

- ## Needs
  - New requirements:
    - Automation of handmade task

    - New features:
      - Edition: calibration tables edition, peak tables edition, application settings edition.

      - Deploy calibration tables and save to a repository

      - Task simplification

    - Addition of data visualization:
      - Charts: calibration tables visualization, position check errors.

    - Improve the workflow
      - Less steps for the user

      - Usability

3 Analysis

- Obsolete architecture
  - Difficult to maintain and add new requirements.
  - Serious improvements were needed.

Obsolete!

Solution!!

New Application

Using old data structures

4 Overview ExpertGUI
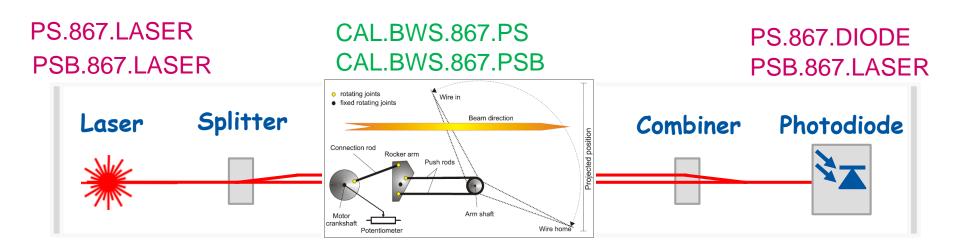
Device Control

FESA CLASSES

Wire scanner
(BWSINJ)

Stepping Motors
(BOSTEP)
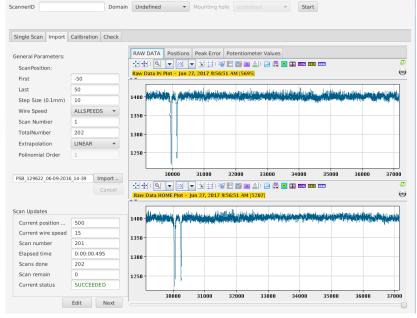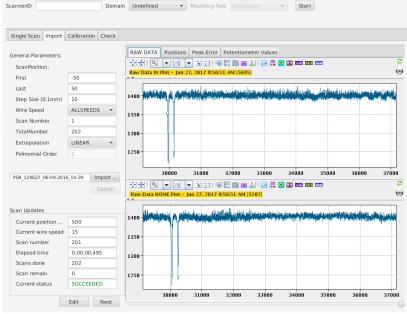
PS.867.LASER
PSB.867.LASER

CAL.BWS.867.PS
CAL.BWS.867.PSB

PS.867.DIODE
PSB.867.LASER

Device Control

FESA
Wire Scanners &
Stepping Motors

Acquisition

Settings

Device Control

FESA
Wire Scanners &
Stepping Motors

Acquisition

Settings
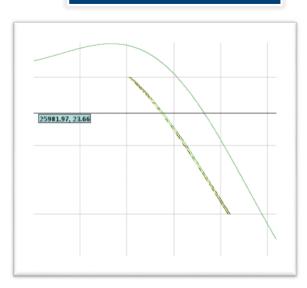
Analysis and Tables

Application Settings

Scans Logging

Device Control

FESA
Wire Scanners &
Stepping Motors

Acquisition

Settings
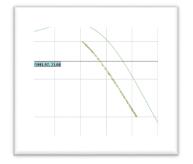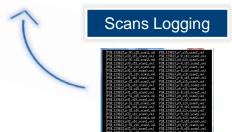
Edition

speed_15_direction_in.dat

Position	Peak 1 Pot	Peak 2 Pot
-50.0	34240.0	34348.0
-49.0	34201.0	34310.0
-48.0	34162.0	34264.0
-47.0	34132.0	34239.0
-46.0	34090.0	34197.0
-45.0	34055.0	34161.0
-44.0	34022.0	34127.0
-43.0	33985.0	34087.0
-42.0	33952.0	34050.0
-41.0	33918.0	34012.0

Application Settings
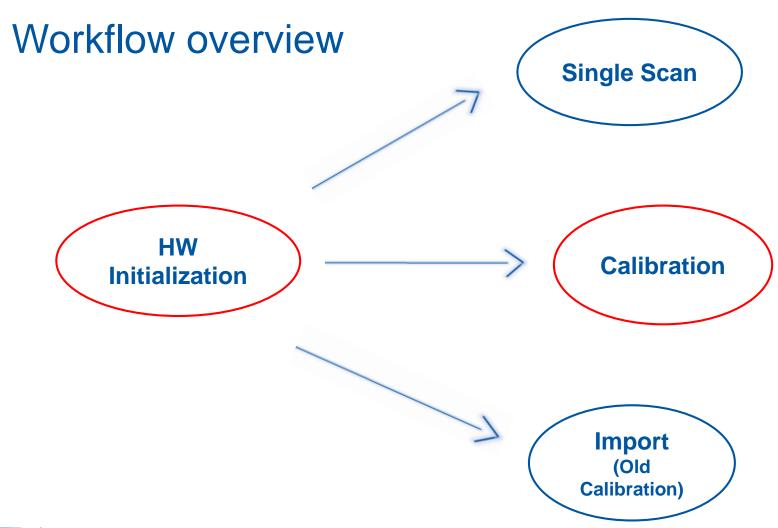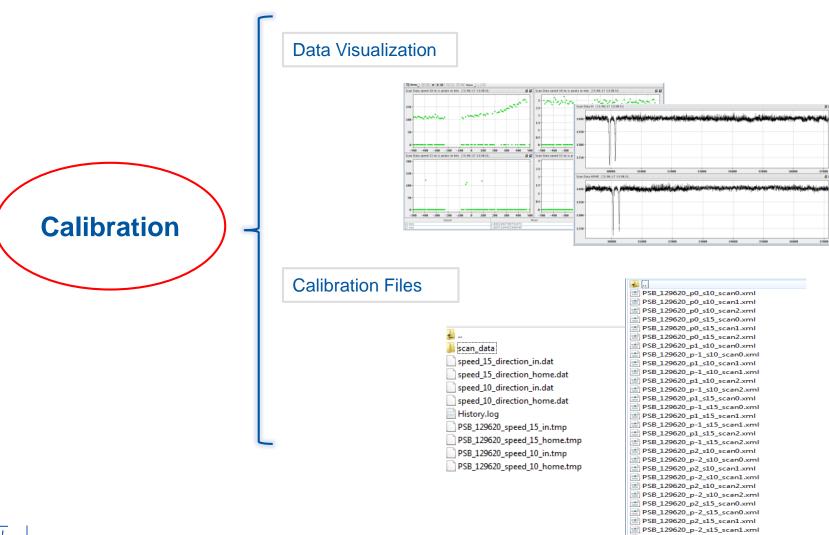
Analysis and Tables

Scans Logging

4 Overview ExpertGui
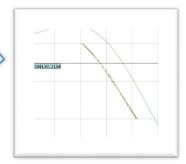
Main functionality:

- Hardware initialization
- Single Scans
- Calibration
- Import Scans
- Check
- Analysis (calculations and visualization)

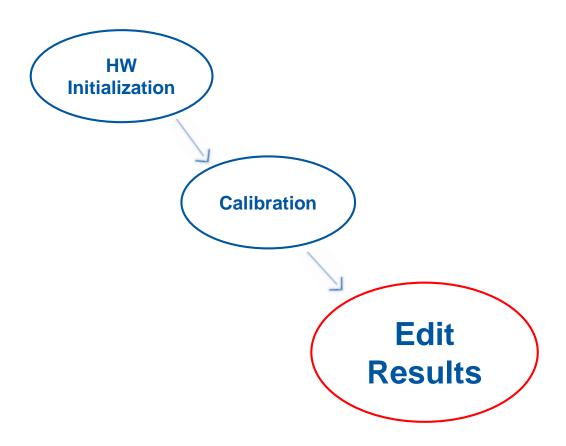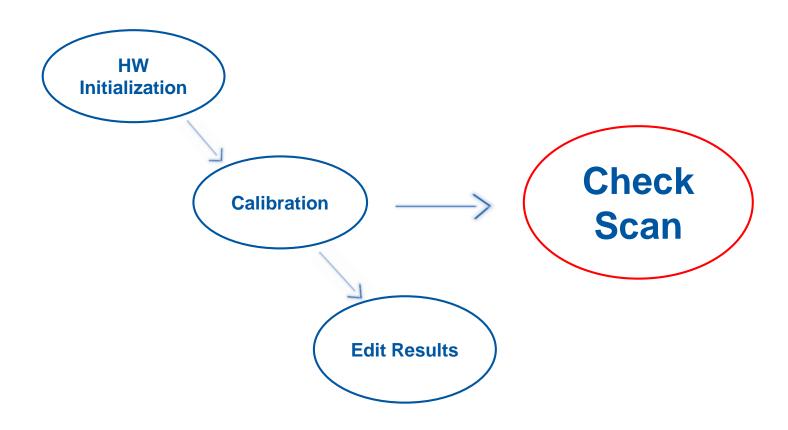# 4 Overview ExpertGui

Workflow overview

Single Scan

HW Initialization

Calibration

Import (Old Calibration)

4 Overview ExpertGui

Data Visualization

Calibration

Calibration Files

4 Overview ExpertGui

4 Overview ExpertGui

4 Overview ExpertGui

HW Initialization

Calibration

Check Scans

Edit Results

Deploy

Wire scanners

5 Architecture
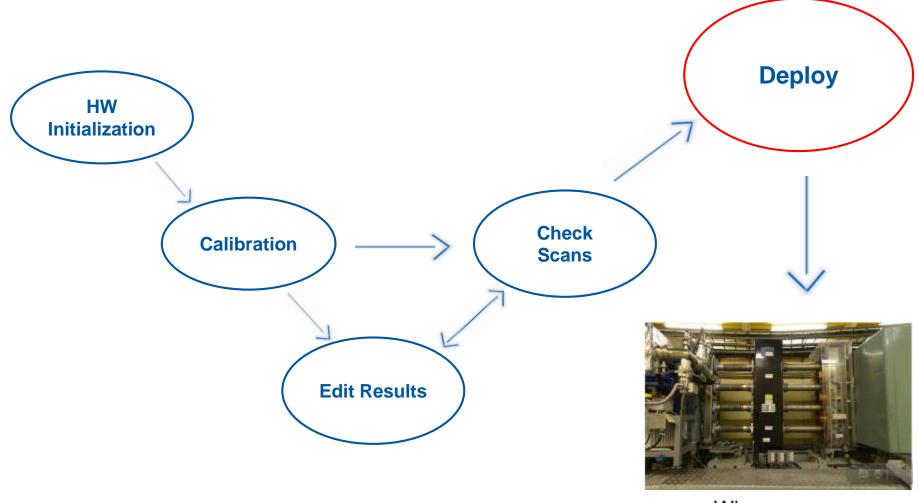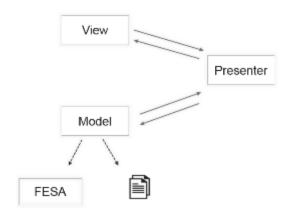
New BI Software guidelines:

- ExpertGUIs moving to JavaFX

- Unification under common architecture base on Model – View – Controller (MVC)
  - modularity, reusability, maintenance, extensibility.

5 Architecture

ExpertGUIs moving to JavaFX

- BI – SW section utilities.

    - Tools develop by the section
    - Common development guidelines

- CO standard components have been included.
  (https://wikis.cern.ch/display/GUI/Reference+Guide)

    - General frame.
    - RBAC Authentication.
    - Logger utilities.

- Current state: Combination of JavaFX with Swing components.
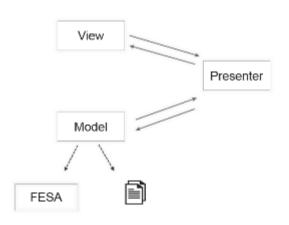   - ☺ Property system and bindings, fxml, css.
    - ☹ Missing features from swing

5 Architecture

Using a variation of the MVC
Model - View - **Presenter**

- **Model**: Business logic: Scans data, analysis data, lookup tables calculation, errors, scan parameters, application settings.

- **View:** fxml files with view controls

- **Presenter:**
  - Receives the user inputs from the view. It asks to the model to operate accordingly.
  - Presentation of the data in the view.

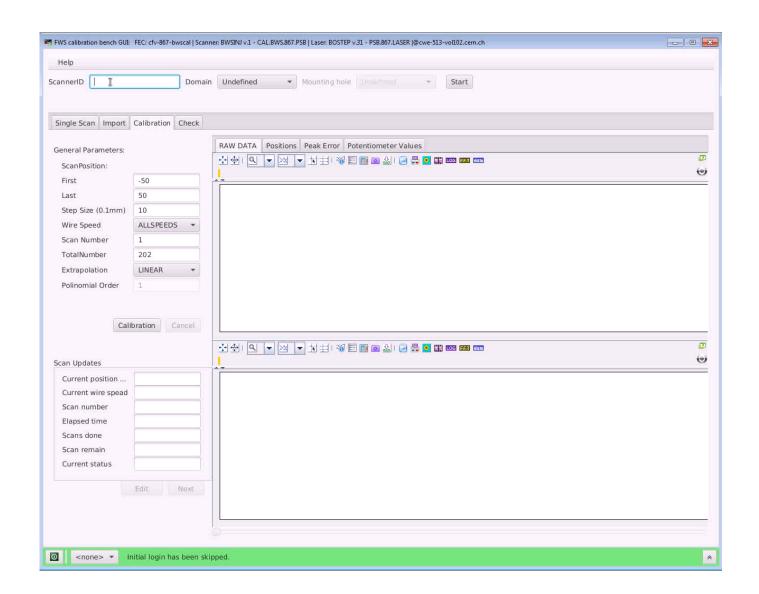# 5 Architecture

Using a variation of the MVC

- **Model - View - Presenter**

This project:

- Decoupling existing content
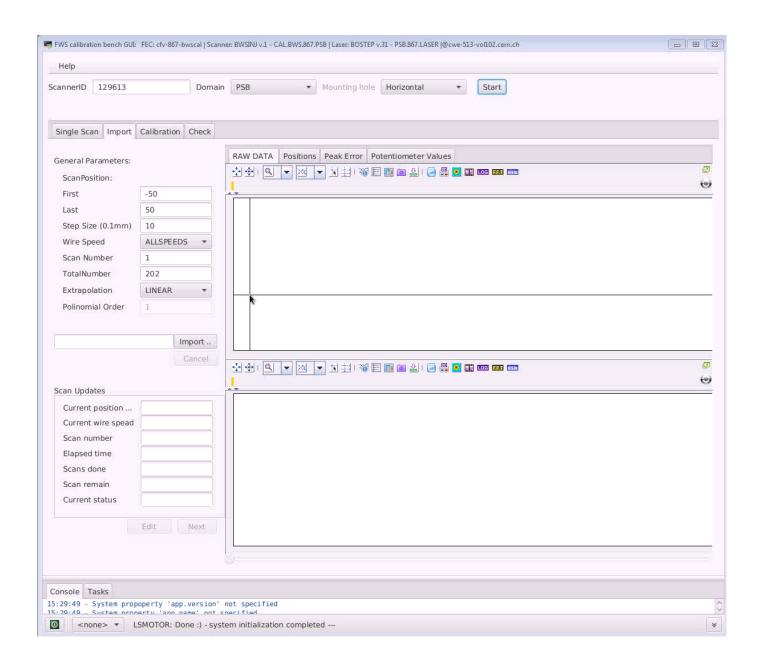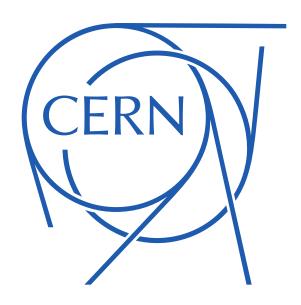- Focus in modularity in the business logic
- Group views and components

7 Future and Conclusions

- The new application is:
  - easier to maintain and take over by other persons.
  - ready to be extended.

- Improvement in the calibration process.
  - avoid handmade tasks
  - better visualization adapted to the user needs
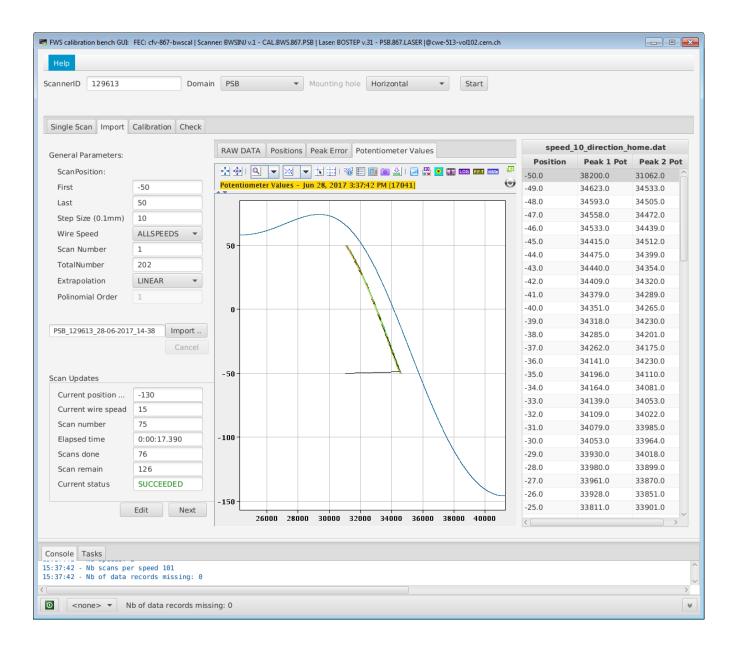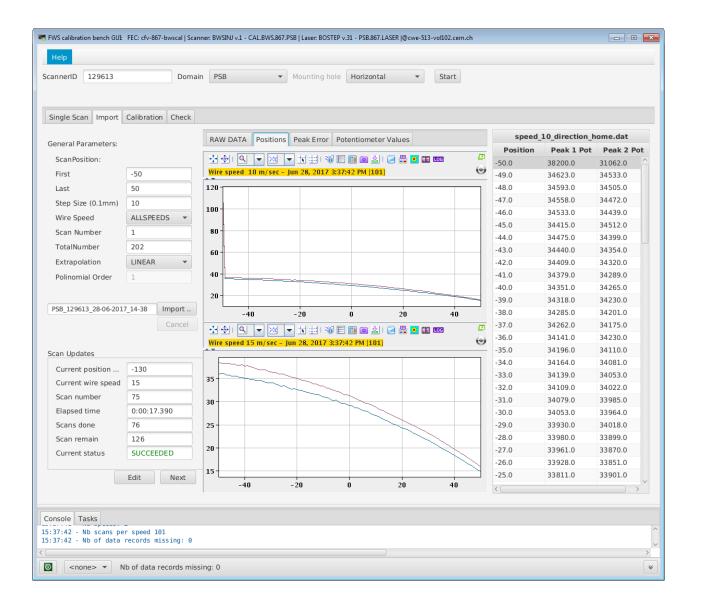
Questions

Thank you

3 Overview ExpertGui

Device Control

FESA CLASS	Devices	
	PSB	PS
BWSINJ (Wire scanner Injection)	CAL.BWS.867.PSB	CAL.BWS.867.PS
BOSTEP (Step In Motors)	PSB.867.LASER	PS.867.LASER PS.867.DIODE