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icBLM quality assurance

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Outline

- Naming convention
- Data management system: Insight
- Acceptance tests workflow
- Ionization chamber: tests description
- After-installation tests

Naming convention

- Every Field Replaceable Unit (FRU) is named. A FRU can be a simple part or an assembly
  - Ex: FEB-050ROW:PBI-PPC-002 for a cabinet cable

- Naming convention:

Sec-Sub:**Dis-Dev-Idx**

Two major areas of FRU installation slots are identified:

- **tunnel**: including stub, tunnel wall and gallery wall,
- **support**: front end building (FEB), klystron gallery, gallery support area (GSA) in A2T

→ System name is not misused!

Data management system

- Data export / import with other software tools
- Systems and subsystems tests results coming from different locations (ESS, IK Partner, Industry partners…)
- We must be able to trace back acceptance tests results to laboratory measuring devices
- We need to be able to prepare an installation batch when an installation slot is ready: need for a dynamic tool

→ Having a reliable Data management system is critical!

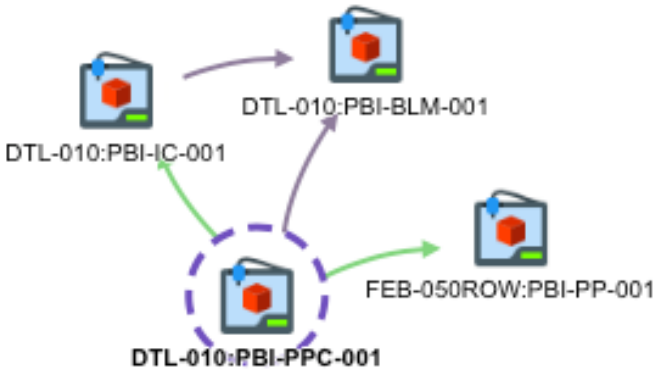
Data management system: Insight

- Ensures traceability between tests and production data, system components and laboratory devices.
- Objects' attributes store all FRU info: responsible, current status (procured, received, RFI…) etc.
- Added value, current installation or production progress… can be automatically extracted for each system or FRU
- Timeline is managed in Jira, tasks are linked to Insight.

We do not want to replace CHESS!

Data management system: Insight

- No lost effort, as everything can be scripted to populate external tools and extract any needed information!
- Installation batch: installation status easily verified and prepared
- Data is uploaded by BD team. Training IK and industrial partners on that is possible.



PBI Shopping List / System / PSL-826

DTL-010:PBI-BLM-001

Edit | Comment | More | Object Graph

Details

Name	DTL-010:PBI-BLM-001
Type	BLM
Model	IC
SubSection	DTL-010
Status	NOT STARTED

Inbound References

Object	Reference Type	Object Type
DTL-010:PBI-IC-001	Belongs	Beamline Slot
DTL-010:PBI-PPC-001	Belongs	Beamline Cable
FEB-050ROW:PBI-AMC-001	Belongs	Inter Chassis Slot
FEB-050ROW:PBI-AMC-002	Belongs	Inter Chassis Slot
FEB-050ROW:PBI-CPU-001	Belongs	Inter Chassis Slot
FEB-050ROW:PBI-EVR-001	Belongs	Inter Chassis Slot
FEB-050ROW:PBI-MCH-001	Belongs	Inter Chassis Slot
FEB-050ROW:PBI-MTCA-002	Belongs	Chassis Slot
FEB-050ROW:PBI-PPC-007	Belongs	Cabinet Cable
FEB-050ROW:PBI-PPC-008	Belongs	Cabinet Cable
FEB-050ROW:PBI-PS-001	Belongs	Inter Chassis Slot

Activity

Insight: Demo

- Ionization chamber reception

Measurements files format

- Large amount of measurements parameters: Data logged in HDF5 and uploaded to Insight.
- Data files produced at ESS follow a fixed format: Files, groups and datasets mandatory attributes are defined.
- Existing data received from IK and industry partners is stored as is for now, adding the needed metadata. Re-formatting to HDF5 is planned for each test results.

Acceptance tests workflow

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System tests requirements

- Tests requirements are defined for each subsystem

Test plan

- Describes subsystems' test setup and characterization procedures
- When not COTS: test plan is prepared/discussed and agreed with IK partner

Test Design Document

- Design document is validated by system lead: we make sure test requirements are correctly translated
- Test coverage is reviewed. Possible risk assessment if we do not reach 100% coverage
- Tests IDs defined for each measurements

testbench implementation

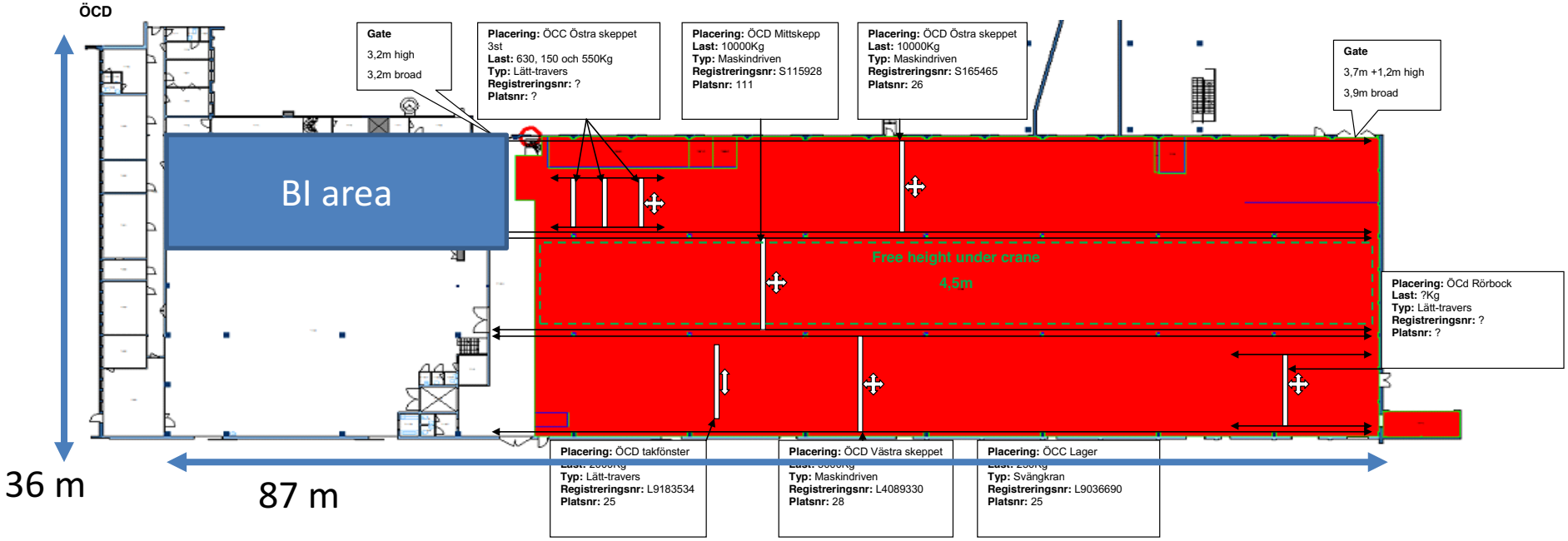
- Test system implemented in python.

Run tests

- Acceptance tests performed in RATS
- Data stored in Insight

Where do we store our systems?

- RATS preliminary layout



Where do we store our systems?

Acceptance tests workflow

- Component received.
- Component tested.
- RATS: Component stored.
- RATS: System assembly and test → RFI
- RATS: System stored
- Installation slot: System goes to ESS AT site.
  - **Guideline: Install and test as much as possible, as early as possible**
  - **Learning curve will help us moving faster with installation work after the first systems are processed**
- Last step: commissioning

icBLM: tests description

	Detector	Data acquisition units	HV unit	Complete acquisition chain
Functional test	x	x	x	x
Barcode check	x	x	x	
Source test	x			
Radiation source test (before startup)	x	x	x	
Signal offset		x	x	x
Beam Inhibit tests		x	x	x
Thresholds and channels assignment software checks		x	x	x
HV modulation tests		x	x	x

Uploaded to database:

- CERN production tests results
- ESS reception tests results: output of the tests described in the table above

icBLM: tests description

- Practical work started on the ionization chambers

After-installation tests sequence

- After-installation tests sequence:
  - **initial first-time commissioning: test_ID**
  - **cold check-out: test_ID**
  - **commissioning with beam: test_ID**
  - **quick self-check: test_ID**

- Sequential testing is important (tests timestamps are checked automatically). Otherwise the statement: "**the instrument is installed and working properly**" has less confidence.

- During debugging:
  - Relevant tests in each architectural layer are repeated until satisfactory results are obtained.
  - If the problem is identified and can be isolated within its layer, there is normally no need to repeat all of the tests which are sequentially following. Depending on the situation, some test might become mandatory nevertheless (for instance a software recompilation might entail a standard interface check, and a repaired connector might entail a signal transmission check).

After-installation tests sequence

- Cold check out: Testing of the whole instrument on all architectural layers:
  - monitor, front-end electronics, cables, mTCA-electronics, timing, data treatment, publishing, network transmission and machine protection interface.

- Commissioning with beam: Aims at verifying the correctness of the integration for machine operations.
  - Includes initial comparisons and cross-calibrations in order to gain confidence in the instrument. Performance limiting factors are identified.

- Quick self test: The self-test procedure includes testing of calibration, machine protection and data transmission.

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Thank you!

Questions ?