SPS BLM SYSTEM:
INTRODUCTION TO THE LS2 CHANGES

Machine Protection Panel 05/06/2020

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Overview

- A major upgrade of the legacy SPS BLM system is on-going to allow its operation in Run 3
- Follow up presentations will cover changes in:
  - Hardware (E. Effinger)
  - Software (S. Jensen)
  - Databases (E. Calvo)
- History & Motivation

History

- The SPS BLM system has already several decades of successful operation
- This was a direct result of simple and robust engineering solutions
- Though over time:
  - Several ad-hoc modifications to target needs of machine operation
  - Maintenance and upgrades of various parts have happened over the years only to keep it available
  - Tracking of assets never fully moved to newer CERN tools for its management.
- In the LIU project, it was decided to postpone the replacement of the system to LS3 and focus on the remaining injectors.

Motivation

- Large part of the system has to operate for four more years and more in some locations until resources become available.
  - Several variations of the electronic modules
  - Not enough spares and many obsolete parts

  - CONS has approved the SPS ring's installation and electronic costs.
  - Transfer lines and detector production are under negotiation.

- Machine damage potential is already high and will get even worse with LIU beams
  - Current system needs improvement in measurement accuracy and decision latency

  - See previous MPP meetings & discussions, especially from 2018

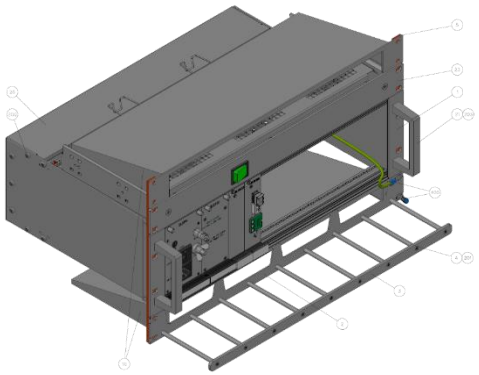
- We also need to prepare the future replacement of the system and for this we need
  - better knowledge of the assets, e.g. locations and quantities, and
  - in a format understandable with the various services

  - LAYOUT has only a fraction of the current installed locations
  - Logging & applications use different names
  - Many obsolete parts defined as operational

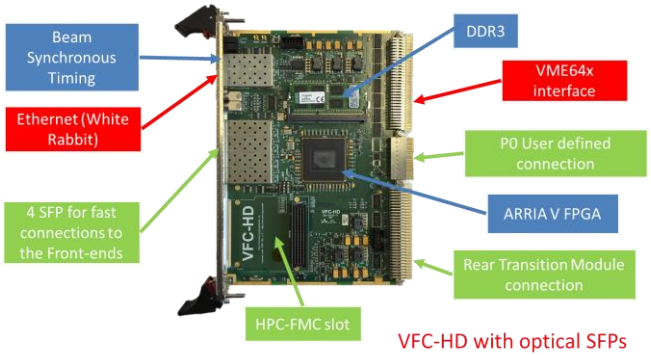
THANK YOU

Peak in the Future Developments

- A new system is under development aiming deployment at SPS during LS3
- Specifications to meet needs for both SPS and LHC
  - Deployment at LHC during LS4, i.e. after validation in SPS
  - Harmonisation across the Accelerator Complex with two systems to maintain (one at PS Complex and second at SPS & LHC)
- Main functionalities
  - Radiation tolerant electronics up to 1 kGy
  - 10 µs acquisition period & real-time processing
  - 8 orders of dynamic range



Acquisition crate



VFC-HD with optical SFPs

Processing module