Data Management and Tools for the Access to the Radiological Areas at CERN

E. Sanchez-Corral, P. Carbonez, A. Dorsival, G. Dumont, K. Foraz, T. Hakulinen, F. Havart, M.P. Kepinski, S. Mallon Amerigo, P. Martel, P. Ninin, R. Nunes, F. Valentini, J. Vollaire . CERN, Geneva, Switzerland

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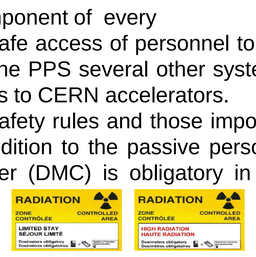
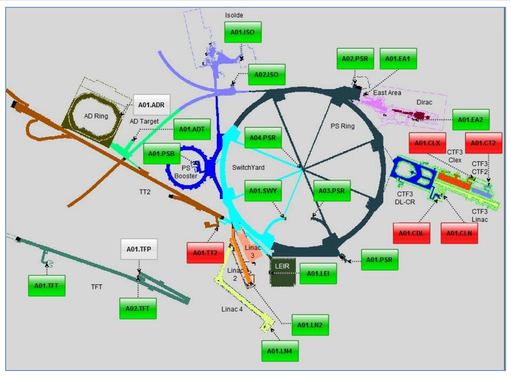
As part of the refurbishment of the PS accelerator complex Personnel Protection system, the Radiation Protection (RP) checkpoints and buffer zones for the radiological controls of equipment removed from the beam areas have been incorporated into the design of the new access points providing an integrated access concept to the primary beam areas. Integration of the RP and access control equipment has been very challenging due to lack of space in many of the zones. Although successfully carried out, our experience from the commissioning of the first installed access points shows that the integration should also include the software tools and procedures. This paper presents an inventory of all the tools and data bases currently used in order to ensure access to the CERN radiological areas according to CERN's safety and radioprotection procedures. We summarize the problems and limitations of each tool as well as the whole process and propose a number of improvements for the different kind of users including changes required in each of the tools. The aim is to optimize the access process and the operation & maintenance of the related tools by rationalizing and better integrating them.

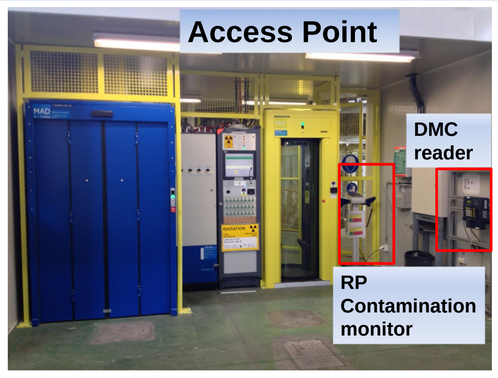
PS Accelerator Complex Personnel Protection System

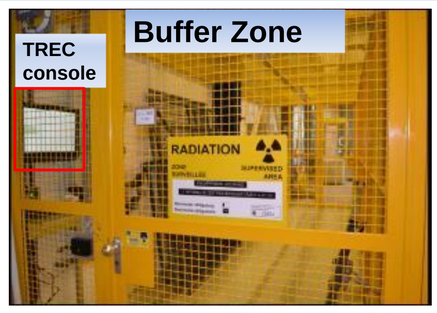
The Personnel Protection System (PPS) is a vital component of every accelerator facility. The role of the PPS is to ensure safe access of personnel to the accelerator and safe operation of beams. Further to the PPS several other systems are involved in the process of granting physical access to CERN accelerators.
CERN is under the obligation to follow both internal safety rules and those imposed by the Nuclear Authorities of the Hosts States. In addition to the passive personal dosimeter (DIS), the use of an operational dosimeter (DMC) is obligatory in the Controlled Radiation Areas.



The PS Accelerator Complex PPS is composed of:
- 2 subsystems, Access Safety and Access Control
- 17 Access Zones
- 19 access points and 123 controlled doors, 95 safety interlocks
- 13 buffer zones

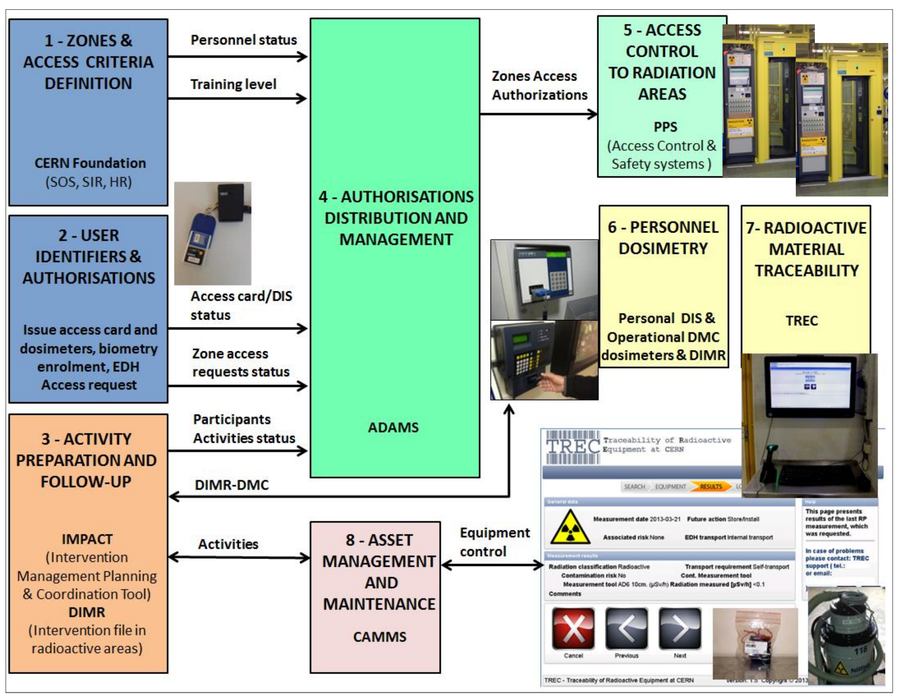


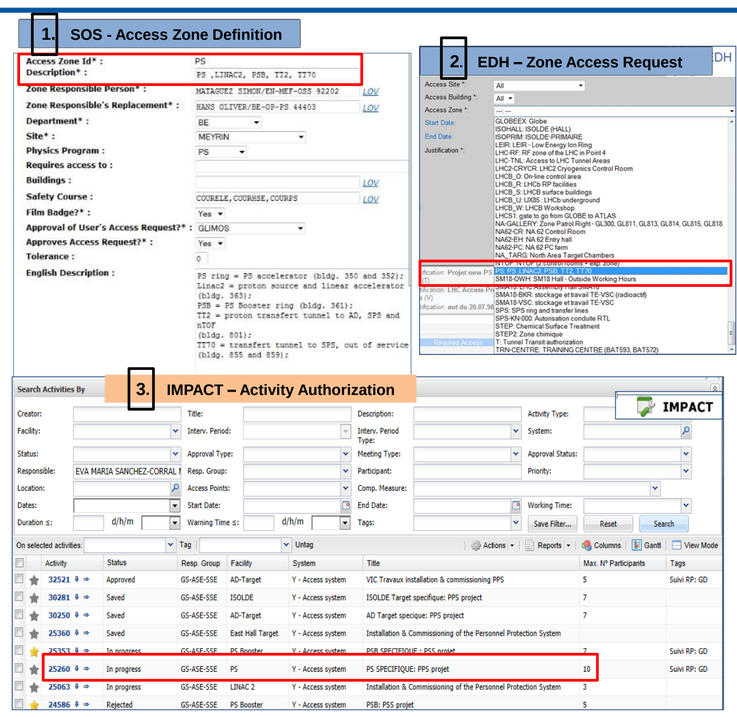




Access point layout integrates RP checkpoint (DMC reader and contamination monitors) + buffer zone equipped with a TREC console for radioactive material traceability.

Access Process Overview : Phases and Tools





Experience and Improvements

Integration of Access Point Processes

The DMC is integrated with IMPACT for setting-up the DIMR alarms threshold and follow-up of the radiation doses of the concerned activity.
In order to fulfill these functions, using the DMC reader installed in the RP checkpoint of the access point:
1. The DMC must be activated prior to entry to the zone using the concerned IMPACT activity number
2. The DMC must be read upon exit and deactivated

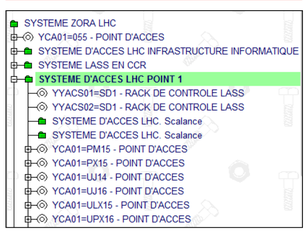
Different solutions are being studied to ensure and facilitate the proper use of the DMC linking the DMC activation to the entry access PAD cycle.

Access Zones and Authorisations Management Improvements

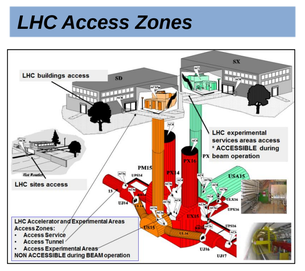
1. Use the Computerized Asset Maintenance Management (CAMMS) database as the access points' common data source for all the other systems;
2. Use the Geographic Information System (GIS) portal capabilities for making available useful information concerning the CERN locations (e.g. access control type, equipment installed);
3. Implement in the Safety Officer Support (SOS) database a global view of the CERN safety zones with their dependencies and hierarchy, and define access criteria accordingly;
4. Implement an N:M mapping between zones and access points, specifying in a clear and complete way all the access points required to pass through (complete path) in order to enter to each zone and the required access permissions;
5. Automatic generation of access permissions based on rules and roles, in addition to the EDH request existing procedure.

The final goal is to have a unique repository for the *"Zones & Access Control Points & Access Criteria"* in order to simplify the access requests procedure. Providing to the users real-time information about their permissions and requirements for access to each zone in a coherent and clear way will allow them to take any required action, and make the access process more efficient.

LHC PPS CAMMS data base



LHC Access Zones



Conclusions & Future Plans

Refurbishing of the Personnel Protection System in the PS Accelerator Complex at CERN has been an opportunity to facilitate and enforce procedures for personnel access and material controls. Radioactive material controls are successfully performed and traced with TREC in the buffer zones. Our first goal now is to define and implement the best solutions which fulfills CERN's legal obligation of daily monitoring of the radiation doses and the protection of personnel by the proper use of the operational dosimeter, in every different scenario and in the simplest way.
IMPACT has proven to be a very useful and powerful tool for the management and coordination of interventions in the accelerators and in particular those requiring a DIMR. Moreover, the integration of IMPACT with the access control system, by automatically limiting access to planned approved interventions, has reduced considerably the time required to enter to the zones. Future plans of IMPACT include the integration of all CERN safety procedures.

During the deployment of the new PS PPS system the new access points are progressively declared in the CERN CAMMS and in the Geographical Information system (GIS) providing a data repository which could then be used to implement the improvements presented related to management of access zones and authorizations.
The first long shutdown of CERN accelerators in 2013-2014, LS1, has been both an opportunity and a challenge to carefully prepare and plan in IMPACT the interventions required to execute safely and efficiently the deployment of new systems and to perform the maintenance works. Within this context, the personal protection system and all the tools required for a safe and efficient access to the CERN accelerators are of vital importance.

References

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