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Integration of Heterogeneous Access Control Functionalities Using the New Generation of NI cRIO 903x Controllers

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F. Valentini, P. Ninin, T. Hakulinen, L. Hammouti –
CERN, Geneva, Switzerland

Engineering of Personnel Protection Systems (PPS) in large research facilities, such as CERN, represents nowadays a major challenge in terms of requirements for safety and access control functionalities. PPS are usually conceived as two separate independent entities: a Safety System dealing with machine interlocks and subject to rigid safety standards (e.g. IEC-61508); and a conventional Access Control System made by integration of different COTS technologies. The latter provides a large palette of functionalities and tools intended either to assist users accessing the controlled areas, or to automate a certain number of control room operator's tasks. In this paper we analyse the benefits in terms of performance, cost and system maintainability of adopting the new generation of NI multipurpose cRIO 903x controllers. These new devices allow an optimal integration of a large set of access control functionalities, namely: automatic control of mo-torized devices, identification/count of users in zone, implementation of dedicated anti-intrusion algorithms, graphical display of relevant information for local users, and remote control/monitoring for control room operators.

Fun-01 • **PAD - Access Cycle Management**. Implementation of all rules regulating the access cycles, control of the two doors motors and detection of *passage unicity*.

Fun-02 • **MAD - Access Cycle Management**. Implementation of all rules regulating the access cycles and control of the two doors motors.

Fun-03 • **MAD - Anti Intrusion Detection**. The internal volume is surveilled by two human detection systems based on motion detection and video image analysis algorithms.

Fun-04 • **Dynamic Information Dispatch**. Visualization of the state of the zone behind the access point. A graphical application drives the users during the access procedure.

Fun-05 • **Remote Supervision**. Publishing of diagnostic data related to the different subsystems to SCADA systems of Control Room Operators (e.g. Technical Infrastructure Monitoring - TIM).

Fun-06 • **Remote Maintenance**. The maintenance team needs to perform remote commands on different subsystem components (e.g. cut the power of certain devices).

Fun-07 • **Personnel Safety Tokens Distribution**. Delivery of safety tokens to every user accessing the zone. The tokens are stored inside an electronically controlled distributor.

Fun-08 • **RFid User Identification**. An RFid reader is used to perform a first identification of the user and verify that he is in possession of a CERN radiation dosimeter.

Fun-09 • **Biometric User Identification**. A biometric identification is performed via an iris scanner to verify that the identity of person inside the PAD corresponds with the dosimeter id.

Fun-10 • **Access Privileges Verification**. The identity of the identified user is checked againt a central access database to verify that the user is holding all required credentials to access the zone.

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