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Upgrades to the Slow Control of the IDMAR Junction Box

IDMAR is a multidisciplinary underwater research infrastructure currently under construction in the abyssal depths of the Mediterranean Sea, off the southeastern coast of Sicily. It integrates innovative sensors for real-time studies in the underwater environment. One of IDMAR's primary use cases is ARCA, the Cherenkov detector being developed by the KM3NeT Collaboration as part of the KM3 Neutrino Telescope, designed to study cosmic neutrinos at TeV-PeV energies.

A critical component of IDMAR is the Junction Box (JB), which receives electro-optical signals from onshore via the Main Electro-Optical Cable and distributes them to underwater experiments, such as the KM3NeT Detection Units (DUs). The original JB design has been upgraded to support a greater number of DUs, optimizing costs in the process. Version 2 of the JB design integrates two independent sub-units within the same mechanical enclosure, each with its own electro-optical connection. Despite their independence, a unified management approach ensures operational consistency.

A major advancement in the slow control system is the enhancement of authentication and authorization mechanisms. In addition to local authentication via usernames and passwords, the system now supports external authentication providers. Fine-grained user and group permission management has also been implemented, improving access control.

This paper presents the key architectural decisions behind these upgrades and their implementation.

Collaboration(s)

KM3NeT

Author: GIORGIO, Emidio Maria (INFN LNS)

Co-authors: Dr NICOLAU, Carlo Alessandro; Dr AMELI, Fabrizio; SCHMELLING, Jan Willem; Mr COPPOLINO, Lucio Mirko; RANDAZZO, Nunzio; COCIMANO, Rosanna; PULVIRENTI, Sara Rita (INFN - National Institute for Nuclear Physics)

Presenter: GIORGIO, Emidio Maria (INFN LNS)

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