

EXECUTIVE SUMMARY

Session 3 – Operation, Control and Protection

SUMMARY

For the first Web-CIRED in history, nevertheless nearly 280 abstracts have been received in Session 3 showing the still enormous need of further development in the area of operation, control and protection of distribution grids even in times of Corona. Nearly 185 authors – about half of the proposals – were asked to submit a full paper. Finally, 147 full papers were delivered by the authors and have been accepted by National Committees and the Session 3 Team. While most of them were presented in at all nine Interactive Poster Sessions on Tuesday, nine papers more scientific papers were selected for the Research and Innovation Forum on Wednesday leaving 24 presentations for the closing Main Session on Thursday.



Session 3 Team:
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See you all **live again** in Rome 2023!

MAIN SESSION 3.1 & 3.2

Operation

Within the two blocks operation 12 of 46 papers were presented and discussed. A couple of papers addressed augmented and virtual reality applications ready for use in practice. These are applied for localisation of underground installation as well for training of maintenance work and incident cases. Further Interesting contributions reported about artificial intelligence supporting inspection from pictures taken with drones or street view, load forecasting and analysing transients even used for fault prediction.

In the field of TSO/DSO interaction, two contributions reported about continuous increase of reactive power at low active load due to decentralized generation and approaches to manage reactive power balancing. One paper addressed the upcoming utilization of flexibility requiring coordination between distribution and transmission. An interesting discussion followed the presentation about results from hardware in the loop tests on frequency control in respect to decreasing inertia.

A flexible use of the low voltage grids with soft open points (SOP) to increase hosting capacity was presented on level of a prototype to be further investigated especially regarding costs and benefits. An excellent example for issues in real operation gave the presentation about findings from testing the redundant supply of a railway tunnel.

MAIN SESSION 3.3

Control

Sixty-Nine papers had been accepted for the control block of session 3, which had been divided into 7 sub blocks. The main portion of papers still addresses MV automation, but the number of papers about LV automation is coming up. It should also be mentioned that more and more papers do not only describe pilot projects and several papers address the implementation and roll out of automation functions. Due to the increasing number of DER in the distribution networks and the new opportunities using smart meter data in combination with controllable consumers and infeeds lead to increasing needs for flexibility. The papers also show the challenges to communicate with IED of different vendors. In the main session six papers had been presented covering the sub block condition monitoring, LV and MV automation and SCADA/ distribution management.

MAIN SESSION 3.4

Protection

In the block “Protection” we received 35 papers, covering the topics “Fault Location and Earth Faults”, “Applications” and “Algorithms and Simulations”. New developments and improvements of protection functions as well as methods how to detect faults easier and more reliable are discussed in some papers of this block. The upcoming communication technology 5G could be a part of protection-functions in the future, but IT-security will be a big issue. Also, very interesting are the result of practical field-tests and investigations in the MV and LV network.

ROUND TABLE 7

Communication in Substation

Redundancy has always been a topic for the protection, automation, and control (PAC) of electrical power systems. Now, with the proliferation of IEC 61850 and the substation communication network taking on a crucial role, effectively implementing the wiring of the PAC devices, redundancy must be applied to this as well. Besides the technical aspects, there is the question how much efforts are dedicated to redundancy and to which degree redundancy is applied for the communication. Four panellists discussed this topic moderated by Fred Steinhauser.

ROUND TABLE 8

Monitoring and Control of LV Networks

Round Table 8 presented the results of the CIRED WG 2019-5. The report of the WG will be available soon and contains the results of a survey based on the state of the art and die future perspectives in monitoring and control of LV networks. In the field of LV networks utilities mainly focus on the use of data from smart meters and demonstrations projects also address the development and testing of new technologies. Five panellists presented projects in the field of monitoring and control in the round table moderated by Marie-Cécile Alvarez-Herault. The results of the survey are part of paper 0728.

ROUND TABLE 10

Microgrids: Towards a Symbiosis between DSO and Microgrids?

This Round Table combined the impressive results of two Cired Working Groups on Microgrids:

WG 2019-2 Microgrids Business Models and Regulatory Issues chaired by Jean Galand from France, WG-Report can be download (<http://www.cired.net/cired-working-groups/microgrids-business-models-and-regulatory-issues-wg2019-2>).

WG 2018-3 Microgrids in Interconnected and Islanded Modes chaired by Vincent Debusschere from France, WG-Report can be download (<http://www.cired.net/cired-working-groups/microgrids-in-interconnected-and-islanded-modes-wg-2018-3>).

RESEARCH & INNOVATION FORUM SESSION 3

Operation, Control and Protection

The RIF gave an overview about all more scientific paper of Session 3. Several European Universities presented their research in operating, controlling and protecting distribution grids (nine presentations at all).

INTERACTIVE POSTER TOURS

Nine interactive poster tours (Operation: 3; Control: 4; Protection: 2) had been guided by the rapporteurs of Session 3. Seventy-Nine authors took the opportunity to present their paper in detail. Due to less posters presented in the separate 90 minutes blocks the audience had more time for questions and discussions.

CONCLUSIONS

Highlights of Session 3 at Cired 2021 were especially the hot topics in the field of Ancillary Services and Flexibility Provisioning on distribution level, Islanding Operation and Cyber Security. Beside this a plenty of small or large improvements and new promising ideas in the field of Operation, Control and Protection have been presented.