

TRANSNATIONAL ACCESS USER PROJECT FACT SHEET

USER PROJECT	
Acronym	onPDnet
Title	Online Partial Discharge measurements in real distribution networks
ERIGrid Reference	04.005-2018
TA Call No.	4 th Call

HOST RESEARCH INFRASTRUCTURE			
Name	UDEX		
Country	Spain		
Start date	03/09/2018	Nº of Access days	15
End date	21/09/2018	Nº of Stay days	19

USER GROUP	
Name (Leader)	Santiago González
Organization (Leader)	Haefely
Country (Leader)	Switzerland
Name	Saliha Abdul Mahar
Organization	Haefely
Country	Switzerland
Name	
Organization	
Country	
Name	
Organization	
Country	

1. USER PROJECT SUMMARY (objectives, set-up, methodology, approach, motivation)

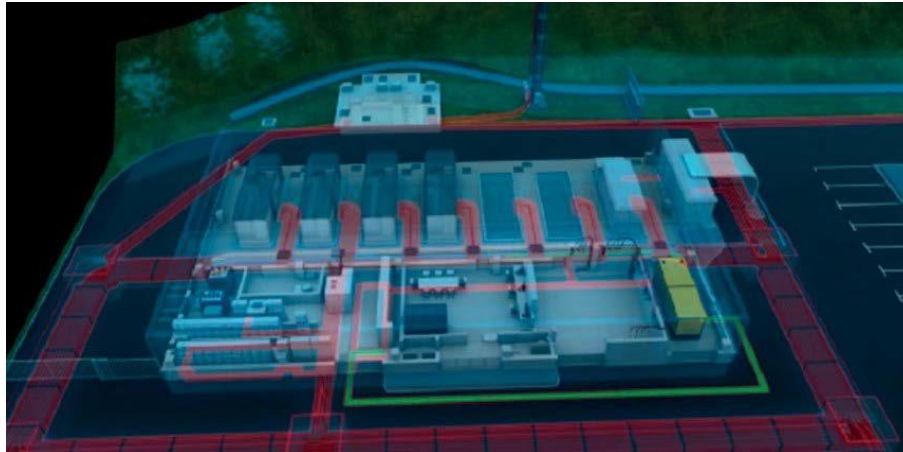
Asset management is one of the key strategies identified within Europe and globally for electricity networks particularly for the physical infrastructure of the assets, which are subject to regular maintenance programs. The advent of the smart grid has meant that these maintenance programs have developed from reactive to proactive and further to predictive although the latter is still in its embryonic stages.



Partial discharge (PD) measurements provide as a good indicator of early stage problems with electrical infrastructure assets. Measuring and on-line monitoring of PD are being accepted more and more and in some cases becoming a standard practice in the maintenance programs of network operators. The standards and characteristics of measuring equipment and procedures in laboratory environments is very well defined in their relevant standards, but in the field, the situation is extremely different and in-situ, in-service measurements have many other factors to consider.

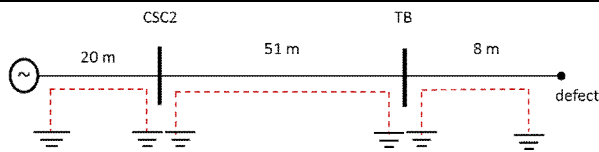
Key areas of proposed research are:

- Network interaction in 3-phase cable systems
- Frequency response of various network configurations
- Full Bandwidth measurements with High Frequency Current Transformers (HFCT).
- Effectiveness of defect location in real networks.



The flexibility of the UDEX laboratory allows for the configuration of a real distribution network fulfilling the requirements of the proposed research areas.

2. MAIN ACHIEVEMENTS (results, conclusions, lessons learned)



The TA action has provided Haefely with free access to a laboratory which may not otherwise have proceeded. The UDEX laboratory has a fully operational distribution network for the purposes of research and Haefely, being an instrument manufacturer, has benefited from learning crucial features for PD measurement such as network interactions in underground cables.

Principal conclusions from the work carried out are:

- The attenuation of the Higher frequency components of a PD pulse has been demonstrated through this research
- The utilization of the HF resonant components in the measured PD pulse allow a greater SNR but do not provide real value of charge.
- Applicability of the IEC 60270 measurement standards are relevant only while creating the test arrangement but bear no correlation while performing on-line measurements. Because calibration at frequencies lower than 100 kHz brings in very high levels of noise.

Lessons learned:

- The possibility of precise measurements with wideband sensors improves sensitivity at the cost of requiring more complex filtering and interpretation of acquired signals.
- Piecewise modelling of the complete network is vital for the development of calibration tools in order to predict the behavior of various network components for the purpose of online PD monitoring.

3. PLANNED DISSEMINATION OF RESULTS (journals, conferences, others)

As a result of this research, an abstract has already been submitted for the CIRED 2019 conference in Madrid, Spain.

A workshop for industrial organizations was held presenting research in progress during TA.

4. PLANNED DISSEMINATION OF RESULTS THROUGH ERIGRID CHANNELS

Contact erigrd-ta@list.ait.ac.at to organise promotion of your results

ERIGrid website