

RESEARCH NEWS

RESEARCH NEWS

March 3, 2025 || Page 1 | 3

Improving system stability in hybrid AC/DC networks

Modular SCADA Platform Aims to Ensure Stability in Power Grids

The European electricity supply system is currently in flux as a result of the energy transition. An increasing number of plants and systems are feeding into the decentralized power grid through power electronics. In the future, hybrid power grids will incorporate sections with alternating and direct current lines. The partners in the InterSCADA EU project are developing a modular SCADA platform intended to help grid operators throughout Europe to maintain system stability in increasingly hybrid AC/DC power grids. In this interview, Robin Patrick Williams, a research scientist at the Fraunhofer Institute for Applied Information Technology FIT, explains why a SCADA platform is necessary in order to automate future transmission and distribution grids. Williams and Prof. Antonello Monti, a group manager at Fraunhofer FIT, are jointly responsible for coordinating the project.

What goals are you pursuing in the InterSCADA project?

In the EU-funded InterSCADA project, we are developing and testing a vendor-independent open-source control system platform in collaboration with 17 partners. Newly implemented monitoring and control functions along with automation mechanisms allow distribution and transmission grid operators to respond quickly to sudden system disruptions.

What is a SCADA platform?

SCADA software has existed for decades. The acronym stands for “supervisory control and data acquisition,” encompassing control systems used to monitor and control plants, systems and infrastructure. A few years back, we saw the emergence of projects that take modular open-source approaches. In InterSCADA, specific modules or “services” are being developed and tested for a platform like this.

What role does InterSCADA play in this?

The specific role of InterSCADA lies in developing algorithms and software modules for grid operation in increasingly interlinked hybrid AC/DC networks. At the same time, the demonstrators serve as proof of concept for the new modular approach.

Contact

Monika Landgraf | Fraunhofer-Gesellschaft, Munich, Germany | Communications | Phone +49 89 1205-1333 | presse@zv.fraunhofer.de

Alexander Deeg | Fraunhofer Institute for Applied Information Technology FIT | Phone +49 2241 14-3808 | Schloss Birlinghoven | 53757 Sankt Augustin, Germany | www.fit.fraunhofer.de | alexander.deeg@fit.fraunhofer.de

Which features set InterSCADA apart?

InterSCADA covers a wide range of tasks. For example, the platform collects information on grid status and determines line capacity utilization. We develop suitable algorithms for this at Fraunhofer FIT. The platform also handles active fault localization and troubleshooting at various voltage levels. This is becoming increasingly necessary in the low voltage segment. It also provides the translation tool for the communication protocols and machine languages of the various devices involved (switches, PMUs, protection devices).

Why is it important to be able to respond flexibly to dynamic grid situations?

The European energy sector aims to reduce CO₂ emissions and dependency on energy imports by generating increasing amounts of power from renewable energy sources such as wind and solar, which are often connected to the grid via power electronics. In addition to connection to power grids via electronic inverters, DC lines and grids are expanded in some cases (such as with offshore wind farms) and linked to the AC grid. Beyond that, more and more companies are shifting the supply of power to their factories and industrial production plants from AC to DC. All this is resulting in hybrid networks, and maintaining their stability underscores the need for advanced grid control concepts.

Can the platform be used Europe-wide?

Yes. There's already a lively discussion across the whole of Europe between the different grid areas. The grid operators have to abide by the regulations and standards that apply across the entire EU. These standards will be expanded to include new generators, and the control systems for hybrid grids are expected to be in demand across Europe.

What tests are planned?

The InterSCADA platform will be used and tested in demonstrators in four European countries: France, Greece, Italy and Spain. The goal is to ensure that the desired solutions can be replicated in diverse geographic settings and under different regulatory and technical conditions.



Fig. 1 The InterSCADA open-source control system platform will allow distribution and transmission grid operators to respond quickly to sudden system disruptions.

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RESEARCH NEWS

March 3, 2025 || Page 3 | 3
