CIGRE Study Committee C2

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

WG* N° C2.17	**Name of Convenor : Walter Sattinger** (Switzerland) **E-mail address**: walter.sattinger@swissgrid.ch
Technical Issues # : 6	**Strategic Directions # : 2**
The WG applies to distribution networks: No	
Title of the Group: Wide Area Monitoring Systems – Support for Control Room Applications	

Scope, deliverables and proposed time schedule of the Group :

Background :

In line with recent worldwide technical recommendations and international standards there is an urgent need for real-time tools to support the control room operators in assessing power system stability. Wide Area Monitoring (WAM) systems have become one of the well-accepted tools for that purpose.

Due to the precise GPS-based time stamping of voltage and current phase measurements of far-located substations, a fast, efficient and comprehensive analysis of the dynamic system behaviour is possible, which has already been performed successfully in many cases. In addition, the voltage phase angle difference information can also be used for verifying the steady-state SCADA results based on model calculations.

Currently the availability of powerful IT platforms facilitates the development of highly-efficient Human Machine Interfaces (HMI) and a variety of comprehensive power system analysis tools.

In order to ensure a secure power system operation, a better link between the current mostly stand-alone WAM systems (PMUs & PDCs) and the standard control room SCADA/EMS (and their Human Machine Interfaces (HMIs)) is required, for improving power system observability and power system control.

Today, worldwide power systems are undergoing dramatic changes due to a shift from synchronous connected fossil-based electric power generation to power electronic connected renewable energy sources generation. Changes of responsibilities of the different power system operation and market participants also result in challenges for power system stability monitoring and control.

Scope:

The main scope of this WG will be assessing the existing WAM tools for control room application and describing the required interfacing to standard SCADA systems.

The main activities will focus on:

1. Reviewing previous CIGRE (SC C4, SC D2 and SC B5) work in this domain.

2. Giving an overview on current PMU-based systems installed in TSO and DSO systems and applications and corresponding successful implementations.

3. Identifying integration issues and possible further steps, in order to set up a feasible, robust and practicable bridge between the timely high-resolution dynamic measurements and comprehensive mostly steady-state slow changing SCADA

information.

4. Identifying possibilities to verify the steady-state grid model based on phase angle difference measurements.

5. Identifying possibilities for detection of generation or demand outages as well as grid disturbances, e.g. islanding; type and location (region)

6. Describing a minimum standard required for the implementation of the solutions identified with respect to related system functionality needs and communication infrastructure rules and constraints.

7. Identifying, from the control centre operator viewpoint, the most suitable approaches for supporting real-time power system dynamic behaviour assessment.

8. Identifying automatic actions to be made in real time operation with support of WAM systems.

9. Recommending areas for further research and development, in order to gain new insights.

Deliverables: Technical brochure with a summary to be published in Electra

Time Schedule: start: Oct 2016 **Final report** : end of 2018

Comments from Chairmen of SCs concerned:

Approval by Technical Committee Chairman:

Date: 09/10/2016

Table 1: Technical Issues of the TC project "Network of the Future" (cf. Electra 256 June 2011)

1	Active Distribution Networks resulting in bidirectional flows within distribution level and to the upstream network.
2	The application of advanced metering and resulting massive need for exchange of information.
3	The growth in the application of HVDC and power electronics at all voltage levels and its impact on power quality, system control, and system security, and standardisation.
4	The need for the development and massive installation of energy storage systems, and the impact this can have on the power system development and operation.
5	New concepts for system operation and control to take account of active customer interactions and different generation types.
6	New concepts for protection to respond to the developing grid and different characteristics of generation.
7	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
8	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
9	Increase of right of way capacity and use of overhead, underground and subsea infrastructure, and its consequence on the technical performance and reliability of the network.
10	An increasing need for keeping Stakeholders aware of the technical and commercial consequences and keeping them engaged during the development of the network of the future.

Table 2: Strategic directions of the TC (cf. Electra 249 April 2010)

1	The electrical power system of the future
2	Making the best use of the existing system
3	Focus on the environment and sustainability
4	Preparation of material readable for non-technical audience