Description of the DEMO for the PDC-WAMS RFP

To be included in the RfP

PSOS

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Author	F. Villella
Function	Senior Power System Expert
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Related documents

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1. Introduction and scope of the document

This document introduces the demonstration sessions that are foreseen for the technical evaluation of the selected vendors regarding the RfP on PDC-WAMS.
It contains a list of demos that will have to be performed interactively by the selected vendor with the detail on the aim, the scope, the expected results and relative evaluation approach.
The demos will be performed interactively by the vendor during the evaluation process and
can be performed either on ELIA premises or remotely via TEAMS meeting (screen sharing).

2. DEMO 1 – connection of ELIA PMU to vendor PDC/WAMS system via IEEE C37.118

2.1 Aim

Considering that the PMU has to continually communicate with the PDC/WAMS systems, it is of outmost importance to confirm the compatibility of the two. The aim of this DEMO is to confirm the possibility to communicate, connect, pull and visualize data coming from the PMU on the vendor PDC/WAMS system.

2.2 Scope

The vendor will receive a PMU from ELIA that he will be able to configure to connect to the vendor PDC.
The vendor will configure its PDC/WAMS system to communicate to the PMU using its standard configuration approach/software and C37.118 protocol.
The vendor shall prove that the connection is performed.
The vendor shall show that the information on quality flag / time synchronization of C37.118 is correctly transferred to the PDC/WAMS system.
The vendor shall visualize a chosen measurement (that can be zero) of the ELIA PMU on the vendor WAMS system.

2.3 Expected result

During the DEMO, it is expected that the vendor will demonstrate that the PDC/WAMS system is able to correctly communicate and connect to the vendor PDC.

2.4 Evaluation approach

The evaluation is a pass/fail criteria. If the vendor has been able to connect the PMU to the PDC it will be a pass, in case contrary, it will be a fail.

3. DEMO 2 – Visualization of data – I - historical

3.1 Aim

Confirm the user-friendliness of the PDC-WAMS systems for data visualization purposes of historical data.

3.2 Scope

The vendor shall demonstrate, via sharing of the PDC-WAMS user interface the following:

1. Visualization of PMU diagnostic data interface
2. Visualization of synchrophasor data and post-processing output for a predefined range (e.g. 1 hour/1 day /1 week/…)
3. Visualization of synchrophasor data and post-processing output for a zoomed range (i.e. selected interactively during the demo)
4. Visualization of synchrophasor data from different PMUs on the same plot (e.g. voltage magnitude from PMU1 and voltage angle from PMU 2)

5. Visualization of result of WAMS analysis algorithm (e.g. power oscillation detection)
6. Configuration of the user-interface (trends, plots, alarm list), demonstration of the sign on mechanism, and simultaneous multi-user usage of the solution

The data to be visualized and the time range will be selected by ELIA during the demonstration based on the information available by the vendor during demonstration.

3.3 Expected result

During the demo it is expected that the vendor to be able to easily accomplish the scope defined above with a limited amount of actions to demonstrate the user-friendliness of the solution.

3.4 Evaluation approach

The evaluation will be performed based on the capability of the PDC/WAMS to comply with the scope and based on the complexity of the operations performed by the vendor to cover the requests from ELIA. The PDC/WAMS system shall be able to visualize at least one day (24hours) of historical data at least 50 frames per second of at least two synchrophasor streams. This demonstration will be scored with a pass-fail criterion and scoring principles considering the capabilities that have to be demonstrated in accordance with the technical score defined in the document “PDC_WAMS_Tender_Evaluation.docx”.

4. DEMO 3 – Visualization of data – II - realtime

4.1 Aim

Confirm the user-friendliness of the PDC-WAMS systems for data visualization purposes of realtime data.

4.2 Scope

The vendor shall demonstrate, via sharing of the PDC-WAMS user interface the following for a PMU realtime synchrophasor stream:

1. Visualize electrical synchrophasor data (e.g. frequency, voltage, current…)
2. Visualize result of WAMS analysis (e.g. power oscillation monitoring)
3. Demonstrate the alarm/threshold functionality
4. Show the functionalities related to the curve visualization (e.g. zoom/tooltip, cursor/hoover functionality)
5. Show the topological view
6. Show the geographical view (if any)
7. Define alarms on the output of the functionality and show how to forward it to an external entity.
8. Show the configuration of the basic user-interface
9. Show the configuration and storage of configuration (based on user profile) of the use-defined user-interface configuration (if present in the solution)

The data to be visualized can be selected by the vendor during the demonstration.

4.3 Expected result

During the demo it is expected that the vendor to be able to easily accomplish the scope defined above with a limited amount of actions to demonstrate the user-friendliness of the solution.

4.4 Evaluation approach

The evaluation will be performed based on the capability of the PDC/WAMS to comply with the scope and based on the complexity of the operations performed by the vendor to cover the requests from ELIA. This demonstration will be scored with a pass-fail criterion and scoring principles considering the capabilities that must be demonstrated in accordance with the technical score defined in the document “PDC_WAMS_Tender_Evaluation.docx”.

5. DEMO 4 – Export of PMU data

5.1 Aim

Confirm the capability and performances of the PDC-WAMS systems for PMU data extraction

5.2 Scope

The vendor shall demonstrate:

1. The data extraction functionalities of the PMU-WAMS system on a PMU data stream
2. The extraction of 1 hour of 2 historical synchrophasor stream (e.g. a voltage from PMU1 and current from PMU2) to a third party software format (e.g. flat csv, comtrade file)

The data to be extracted can be selected by the vendor during the demonstration but shall include at least one hour of data at 50 samples per second.

5.3 Expected result

During the demo it is expected that the vendor to be able to easily accomplish the scope defined above with a limited amount of actions and in a fast way to demonstrate the user-friendliness and the performances of the solution.

5.4 Evaluation approach

The evaluation will be performed based on the capability of the PDC/WAMS to comply with the scope and based on the complexity of the operations performed by the vendor to cover the requests (during the demo) from ELIA.
An additional evaluation criteria is the time taken to perform the data extraction that is expected to be as fast as possible. This demonstration will be scored with a pass-fail criterion and scoring principles considering the capabilities that have to be demonstrated in accordance with the technical score defined in the document "PDC_WAMS_Tender_Evaluation.docx".

6. DEMO 5 – WAMS I – Power Oscillation Detection Functionality

6.1 Aim

Confirm the capability and performances of the PDC-WAMS systems for WAMS analysis functionality for power oscillation detection.

6.2 Scope

The vendor shall demonstrate:

1. How the functionality is working by demonstrating its usage to ELIA
2. How to adapt inputs and parameters of the power oscillation detection, including:
    a. Selection of a subset of PMU for the calculation
    b. Selection of several arbitrary inputs for the functionality - (e.g. voltage magnitudes and angles, current magnitudes and angles, active and reactive power, frequency and ROCoF…)
    c. Selection/creation of a mathematical combination of synchrophasor data as input
    d. Demonstration of bandwidth of observability of the functionality
3. How to visualize the functionality outputs, more specifically
    a. Amplitudes of the detected oscillations
    b. Frequencies of the detected oscillations
    c. Damping coefficients of the detected oscillations
    d. Energies of the detected oscillations (if available)
    e. Participation factors of the detected oscillations

   f. Range of frequency
4. Automatic definition of the number of modes visualized, without the interaction of the user
5. How to define alarms on the output of the functionality and how to forward it to an external entity (e.g. SCADA/EMS).

The functionality can be demonstrated on real-time (data flow from a running PMU) or on historical ones (data flow from a PMU simulator).

6.3 Expected result

During the demo it is expected the vendor to be able to demonstrate the functionalities specified in the scope defined above and to demonstrate the user-friendliness and the performances of the solution.

6.4 Evaluation approach

The evaluation will be performed based on the capability of the PDC/WAMS to comply with the scope.
This demonstration will be scored with a pass-fail criterion and scoring principles considering the capabilities that have to be demonstrated in accordance with the technical score defined in the document "PDC_WAMS_Tender_Evaluation.docx".

7. DEMO 6 – WAMS II – Power Oscillation Locator Functionality

7.1 Aim

Confirm the capability and performances of the PDC-WAMS systems for WAMS analysis functionality for power oscillation locator.

7.2 Scope

The vendor shall demonstrate:

1. How the functionality is working by demonstrating its usage to ELIA
2. How to adapt inputs and parameters of the power oscillation detection, including:
   a. Selection of arbitrary inputs for the functionality (e.g. voltage magnitudes and angles, current magnitudes and angles, active and reactive power, frequency and ROCoF…)
   b. Selection/creation of a mathematical combination of synchrophasor data as input
3. How to visualize the functionality outputs, more specifically
   a. Ranking of the synchrophasor or composed input that impacts the most the different oscillation modes.
   b. Location of source-sink of oscillation
4. How to define alarms on the output of the functionality and how to forward it to an external entity.

The functionality shall be demonstrated on real-time (data flow from a running PMU) and on historical ones (data flow from a PMU simulator).

7.3 Expected result

During the demo it is expected the vendor to be able to demonstrate all the functionalities specified in the scope defined above and to demonstrate the user-friendliness and the performances of the solution.

7.4 Evaluation approach

The evaluation will be performed based on the capability of the PDC/WAMS to comply with the scope.

This demonstration will be scored with a pass-fail criterion and scoring principles considering the capabilities that have to be demonstrated in accordance with the technical score defined in the document "PDC_WAMS_Tender_Evaluation.docx".

8. DEMO 7 – WAMS III – Power Oscillation Detection Functionality – Benchmark measurement

8.1 Aim

Confirm the capability and performances of the PDC-WAMS systems for WAMS analysis functionality for power oscillation detection based on a set of real benchmark measurement.

8.2 Scope

The employee (ELIA) will share two sets of real measurement of active power of four PMUs that will have to be used for demonstrating this functionality. The measurements will be shared in human-readable format (e.g. csv file) and will have to be used by the vendor during the demonstration on the algorithm results.

The vendor shall demonstrate:

1. How the functionality is working on the real measurements.
2. The results of the analysis regarding estimated:
    a. Amplitudes of the detected oscillations
    b. Frequencies of the detected oscillations
    c. Damping coefficients of the detected oscillations
    d. Energies of the detected oscillations (if available)
    e. Participation factors of the detected oscillations
    f. Range of frequencies
3. The algorithm defined by the vendor shall be able to recognize possible patterns in the data in terms of ambient and forced oscillations.

The results of the automatic analysis will be compared with the values calculated by visual inspection of the real measurements.

8.3 Expected result

During the demo it is expected the vendor to be able to demonstrate the ability of the power oscillation detection algorithm of the vendor to be able to recognize ambient/natural oscillations.

8.4 Evaluation approach

The evaluation will be performed based on the capability of the PDC/WAMS to comply with the scope.

This demonstration will be scored with a pass-fail criterion and scoring principles considering the capabilities that have to be demonstrated in accordance with the technical score defined in the document "PDC_WAMS_Tender_Evaluation.docx".