**2021 IEEE-NASPI Oscillation Source Location Contest**

Solution Template

# **Team Information:**

|  |  |
| --- | --- |
| **Team Name** |  |
| **Primary Contact First Name** |  |
| **Primary Contact Last Name** |  |
| **Primary Contact Email** |  |
| **Primary Contact Affiliation** |  |
| **Optional: Team member name(s), organization(s), and email address(es)** |  |

# **Method Description**

**Overview:**

(~250 words, provide a general description of your method, including algorithms, software tools used and links to your publications if applicable)

**Required Data Sources:**

(List ALL data sources required for online implementation, such as PMU data, model parameters, real-time system topology, SCADA data, GPS coordinates, trained models, etc.):

# **Solution**

## **Solution Summary:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Oscillation Source(s) Information** | | | | |
|  | **Case**  **#** | **Frequency (Hz)** | **Area Name** | **Bus #** | **Asset Type**  **(choose)\*\*\*** | **Controller (choose)\*\*\*** | **Comments** |
| **Credit**  **Weight\*** | **N/A** | **N/A** | **3 pt.\*\*** | **+3 pt. – correct**  **+1 pt. – within 1 bus**  **+0 pt. – other** | **+1 pt. – correct**  **+0 pt. – N/A**  **-1 pt. – wrong** | **+1 pt. – correct**  **+0 pt. – N/A**  **-1 pt. – wrong** | **N/A** |
| **x** | 1 |  |  |  | N/A | N/A |  |
| **x** | 2 |  |  |  | N/A | N/A |  |
| **x** | … |  |  |  | N/A | N/A |  |
| **x** | 13 |  |  |  | N/A | N/A |  |
| **0** | A1 |  |  |  | N/A | N/A |  |
| **0** | A2 |  |  |  | N/A | N/A |  |
| **0** | A3 |  |  |  | N/A | N/A |  |

## **\* Each case is weighted differently; this info will be available at the end of the contest.**

## **\*\* Total case score = 0 if Area is wrong.**

**\*\*\* Choices are in the dropdown list in the table.**

## **Evidence, Explanation and Extra Info:**

|  |  |
| --- | --- |
| **Case #** | **Evidence, Explanation and Extra Information** |
| **1** |  |
| **2** |  |
| **…** |  |
| **13** |  |
| **A1** |  |
| **A2** |  |
| **A3** |  |

# **Rules**

The score for each field is listed on the solution template.

Your total score and evidence/explanation together will be used by the committee to select the winners.

The 3 additional cases, A1, A2, A3 are for evaluating PMU accuracy class interoperability only, please provide your honest response if you could. Your response for A1, A2, A3 **will NOT be used** in judging your scores. Thank you for your help!

# **Results Communication and Publicity**

* Your response and detailed performance will be kept confidential.
* All participants will get their detailed evaluation in private emails.
* Only the winners and their final scores will be announced in public.
* An overall & anonymous statistics will be shared with public.

# **Solution Template Instructions**

## **How to Fill in the Solution Summary Table?**

1. Fill in the table as much as you can, but do not feel compelled to fill in every single field.

You may need to justify your answers, and a wrong answer can have negative points.

1. Always start a new row if any of the columns have more than one item.

Exception: when a specific source(s) cannot be located, enter the suspect sources in the “Bus #” column, rank them from most likely to least likely, and explain in the “Comments” field.

1. Asset Type: choose from Generator, Load, HVDC or N/A if not sure or not specific.
2. Controller: choose from Exciter, Governor, Other or N/A if not sure or not specific.
3. Comments: only provide clarification here if the previous columns are not self-evident.

**Evidence, Explanation and Extra Information Table:**

All other information goes here and please **be concise**. You can choose to provide intermediate and/or final evidence from the algorithm and/or software to support your conclusions. You may also provide extra info about the oscillation or source if you could.

## **Examples:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **Oscillation Source(s) Information** | | | | |
| **Case #** | **Frequency (Hz)** | **Area Name** | **Bus #** | **Asset Type**  **(choose)** | **Controller (choose)** | **Comments** |
| **1** | 1.0 | South | 1032 | Generator | Exciter | This is a forced oscillation. |
| **1** | 1.0 | South | 1034 | Generator | Governor | This is a forced oscillation. |
| **2** | 0.8 | South | 1034 | Load | Other |  |
| **2** | 1.0 | South | 1000 | HVDC | Other |  |
| **3** | 0.5 | South | 1032 | Generator | N/A | This is a forced oscillation resonating with a natural mode. |
| **3** | 0.8 | South | 1032 | Generator | N/A |  |
| **4** | 0.5 | South | 1000  1001,1002 | N/A | N/A | 1000 is the most likely source,  1001 and 1002 are secondary suspects. |
| **5** | 0.5 | South | N/A | N/A | N/A |  |

|  |  |
| --- | --- |
| **Case #** | **Evidence, Explanation and Extra Information** |
| **1** | 1032 Gen-C was pinpointed as the source because xxx, here is the evidence.  1034 Gen-G was pinpointed as the other source because xxx, here is the plot. |

1. Case 1: two sources contribute to forced oscillations at one frequency.
2. Case 2: there are two forced oscillations; each has its own frequency and source.
3. Case 3: there are two forced oscillations at different frequencies; one frequency resonated with a natural mode; all from one source.
4. Case 4: the source can be narrowed down to a small pocket with a few buses.
5. Case 5: the source can only be traced inside area South.