

**Document Title:** EA001 - Using Synchrophasor Data to Analyze Fault Event Causes

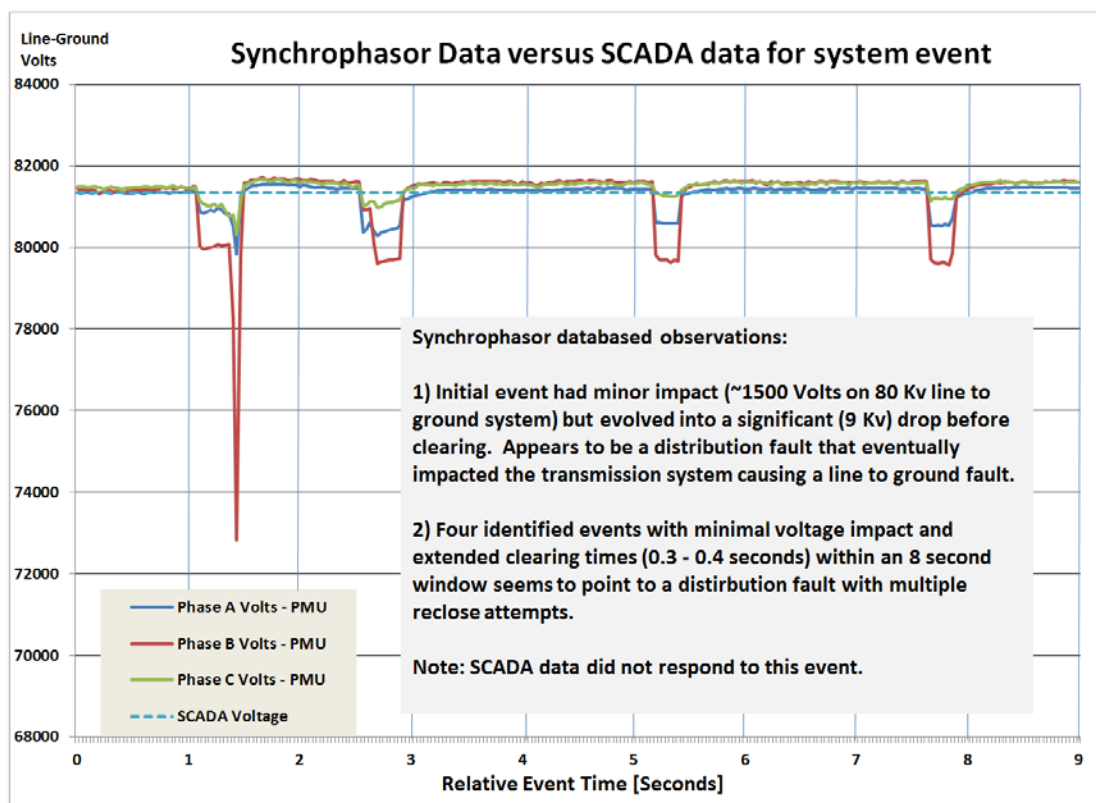
**Category:** Event Analysis

**Time Horizon:** Operations Assessment

**Party Involved:** American Transmission Company

**Event Date:** unknown

**Event Description:** A transmission fault was cleared properly by the appropriate line protection equipment. When reviewing the synchrophasor voltage data for the fault from a nearby station (see Figure 1 below) it became obvious that the initiating event for the transmission system fault was most likely on the distribution system. Several multi-phase events were observed where the first of these eventually migrated to a phase to ground transmission fault.



*Figure 1 – ATC Fault Analysis Using Synchrophasor Voltage Data*

## Operational Value

Periodically customers experience problems on their facilities and look to their source utility to determine the source of those problems. In the past these inquiries could be vague regarding time of event and scope of any issues. As customer equipment has become more advanced customers can now provide synchronized times and power system data for the events that impact them.

Traditionally SCADA data has been used when asked to determine if any events occurred on the transmission and distribution systems serving the customer. SCADA data can sometimes provide insights into the cause of events but the relatively slow scan rate of 2-4 seconds is not adequate to analyze events that can involve breaker tripping times that occur within cycles.

Most Phasor Measurement Units [PMUs] installed at the transmission system level record data at a rate of 30 samples/second or faster which equates to a sample being taken at least once every two cycles on a 60 Hz system. This higher speed scan rate allows the PMU to provide at least 1 or 2 scans during an event. With this data rate an accurate determination can be made as to whether anything was happening on the system at the time of the customer event.

## **Background**

The mission of the North American Synchrophasor Initiative (NASPI) Control Room Solutions Task Team (CRSTT) is to work collectively with other NASPI task teams to advance the use of real-time synchrophasor applications for improving control room operations and grid reliability. This team utilizes its experience and regional diversity to provide advice, direction, support and guidance to NASPI stakeholders and other organizations involved in the development and implementation of real-time synchrophasor applications.

This is one of a series of operational use case documents being developed by CRSTT members to describe the various manners in which grid operators and electric utilities are using synchrophasor data to provide value in the Operations Horizon. Existing versions of these papers, along with other CRSTT work products can be found on the CRSTT page of the NASPI website (<https://www.naspi.org/crstt>).

## **References**