



TIP 23h: Evaluation of Stand-alone or Hand-held Thunderstorm/ Lightning Detectors

Context

Lightning is dangerous to the public and more specifically to transmission utility personnel when working on transmission lines or equipment in substations. Use of stand-alone thunderstorm detectors are claimed to provide advanced warning of thunderstorm activity that can cause hazardous conditions for the public at-large, outdoor maintenance crews, personnel handling explosives, etc.

BPA is considering use of these types of devices to provide independent warning to maintenance and construction crews of approaching lightning storms.

Description

This project evaluates the performance of four stand-alone lightning detectors by comparing them to data from a National Lightning Detection Network (NLDN) system which will serve as a ground truth reference. The performance of the NLDN is well documented in literature.

The project will progress through a series of tasks.

- 1) **Identify products:** There are a number of detector products on the market. This task will identify products to be evaluated. A maximum of 4 detectors will be evaluated.
- 2) **Sensor set-up and data collection:** The sensors will be set-up to allow continuous monitoring of the information of the device(s) provided to the user.
- 3) **Sensor deployment and data capture:** Deploy sensors at different locations depending on thunderstorm activity forecasts in order to get as many lightning strikes as possible within the operational range of the sensors, which can be up to 75 miles.
- 4) **Data Analysis:** Analysis of the sensors output is based on data from the NLDN system database. It includes reference to the actual lightning activity; both cloud-to-ground and cloud-to-cloud activity along with its temporal and spatial development,

Specific analysis criteria include:

- Distance from the detector to the closest detected lightning, when device issues a warning or an alarm at different distances.
 - Storm approach lead time estimates from the detectors regarding:
 - First Warning to Stop Work radial zone.
 - Stop Work duration until lightning threat passes the stop work radial zone.
 - Compare lightning lead time estimates with storm movement using wind data direction and speed at various elevations
 - False alarm rate (FAR) and Failure to warn rate (FTW).
- 5) **Compile Report:** The report will compare stand-alone/handheld detectors with NLDN location system and include a summarization of test results.

Why It Matters

Currently, there is little knowledge of how well lightning detectors work. This technology is being used for safety programs, but its accuracy and efficiency is untested.

Understanding the accuracy and correct application of the thunderstorm detectors will increase the safety of field personnel and the public.

Goals and Objectives

The results of this evaluation will be incorporated into the Lightning and Grounding project (EPRI -P35.006) in the Overhead Transmission Program (EPRI-P35).

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Project Start Date: August 1, 2014

Project End Date: December 31, 2015

Funding

BPA FY2016 Membership: \$0

Reports & References

Links

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Participating Organizations

EPRI

