



**Project Number**

BDV30-977-03

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# Florida Department of Transportation Research Evaluation of Fog Predictions and Detections

March 2015

**Current Situation**

Fog can make driving conditions extremely hazardous. These hazards are further increased at night and/or when combined with smoke. Nationally, about 38,000 fog-related highway incidents occur each year, with over 600 fatalities. Florida ranks third in the number of these incidents. Detecting fog conditions and advising drivers appropriately presents a challenge to highway authorities, especially as these conditions can be very localized and develop quickly.

**Research Objectives**

In this project, Florida State University researchers sought to develop a method of detecting fog based on satellite data, and in doing so evaluate requirements and limits of such methods.

**Project Activities**

Using satellite data to detect fog is possible because certain satellites observe Florida several times a day and collect information at different wavelengths. Comparing different wavelengths can allow detection of various atmospheric phenomena, including fog.

The researchers selected two channels of satellite data as the basis for their methods. Using data from 2012 that allowed correlation of satellite data with ground-based weather observations, the researchers developed methods to distinguish between fog and other effects that could potentially give a false positive. Also, the data from the two channels were not precisely coordinated geographically, and methods were needed to make sure that the same location was being compared for each data channel. A fog climatology of Florida, or overview of the number of fog days for various locations in the state, was developed through this project, indicating where fog is more likely to have an impact on drivers. Researchers also found a high correlation between their fog climatology and fog-related incidents. However, researchers found that the ability to detect fog using satellite data was limited by the resolution of current satellite imaging – satellites scheduled for deployment in the near future promise an important increase in resolution. Also, additional information from these satellites, such as temperature, will support distinguishing between fog and clouds higher in the atmosphere, an effect that led to many of the false positives in the fog data.

**Project Benefits**

This project yielded additional information about fog in Florida. A foundation was laid for further studies of fog and fog detection, and methods were developed that can lead to more timely detection of fog conditions. Linking this type of data with Intelligent Transportation Systems may one day give drivers real-time advisories about hazardous fog conditions.



*Fog reduces visibility, creating hazardous driving conditions.*

*For more information, please see [dot.state.fl.us/research-center](http://dot.state.fl.us/research-center)*