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DEVELOPMENT OF A ROAD WEATHER INFORMATION SYSTEM FOR FLORIDA'S INTELLIGENT TRANSPORTATION SYSTEM

PROBLEM STATEMENT

Road Weather Information Systems (RWISs) can provide timely and useful early warning weather information to travelers, transportation managers, law enforcement, and emergency managers. This information can help to facilitate safe transportation under normal or evacuation conditions. Two FDOT Intelligent Transportation System (ITS) Strategic Plan goals may be addressed by RWIS: (1) reduce weather related traffic accidents by using road-weather information systems, and (2) improve emergency management communications while providing real-time traveler information systems for evacuation.

Previous work led by researchers from the University of North Florida (UNF) resulted in the development of design recommendations for a statewide RWIS. Further work is needed to evaluate and explore strategies for the implementation of an RWIS model that utilizes the existing Motorist Aid System (MAS) microwave tower infrastructure for communications and weather sensor site locations. Alternative designs, configurations, and installation methods for a statewide RWIS need to be evaluated.

OBJECTIVES

The objectives for this phase of study include the following:

1. Further develop and evaluate the proposition that the design of the FDOT RWIS should include the capability to use appropriately located between- and near-tower wireless weather sensors.
2. Develop and coordinate cooperative relationships with the National Weather Service (NWS) and other stakeholders.
3. Continue to investigate the relationships between atmospheric effects and signal fades experienced by the MAS tower system.

FINDINGS AND CONCLUSIONS

The most significant accomplishment of the research program was the development of the RWIS Research Facility, which has provided tremendous insights into the specific technical challenges associated with the design and installation of an RWIS. In particular, researchers learned that the MAS tower network provides reliable communications and power infrastructure, and, with adequate lightning protection, a suitable site for the installation of the weather sensors. The research shows that statewide implementation of a RWIS should include wireless weather sensors *between or near* the 20-mile spaced primary weather stations located on the MAS towers. This design feature anticipates (1) the need for specialized stations at fixed locations to address site specific potential hazards (e.g., high wind on high evacuation bridges) and at locations that are prone to fog, and (2) the deployment of portable units to support wildfire or hazardous material spill response operations.

This research has shown that a continued cooperative relationship between FDOT and NWS would be mutually beneficial. A fully implemented Florida RWIS, based on the concept of having a weather station at every MAS tower, would contribute significantly to the establishment of the Florida Weather Mesonet. By contributing much needed real-time, relatively high spatial resolution weather data to the NWS forecast models, the RWIS would, in turn, benefit by receiving more accurate, higher spatial resolution forecasts and advisories. This is especially important when forecasting the road segment locations of hazardous weather phenomena.

In support of this research project, UNF researchers have participated in the development of high-level design requirements for a national RWIS coordination effort, the Clarus Initiative, sponsored by the Federal Highway Administration (FHWA). FDOT's awareness of and involvement in this effort would help to ensure that a developed Florida RWIS could be a fully integrated component of the national system.

FDOT should also continue to work closely with the Florida Highway Patrol and the Florida Division of Emergency Management in the further development of a Florida RWIS. The RWIS will provide traffic and emergency managers with valuable information that will enable them to react to existing and predicted severe weather events more effectively. RWIS would provide an additional traffic management criterion to be considered, so there would be need for initial and ongoing requirements for training and policy development.

BENEFITS

This research provides additional information and guidance needed for the development of a statewide RWIS. The research has improved the understanding of the causes of microwave signal fades and could lead to improved microwave path design parameters. The implementation of an operational statewide RWIS could have a significant and measurable impact on traffic and emergency management operations in the State of Florida. The traveling public would also benefit by having additional information for trip planning and from in-transit warnings.

In January 2004, the UNF research team began designing the RWIS component of the FHWA sponsored project called "iFlorida" (see www.iflorida.net). The RWIS design, operational, and maintenance recommendations developed in the research project are being directly applied to the design of the iFlorida RWIS.

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