

## **HR-357 An Expert System for Forecasting Fog on US Highway 30 in Cedar Rapids**

Key Words: frost, fog, expert system, roadway weather, decision making

### **ABSTRACT**

We have developed and deployed in operation automated systems for forecasting frost and fog on roadways and bridges at specific locations in Iowa. These systems ingest current observations and forecasted values of specific weather variables and produce forecasts of the indicated roadway condition. Forecasts made on the basis of uncertain (weather) input information will invariably lead to less-than-maximum hit rates and greater-than-zero false alarm rates. A procedure, based on signal detection theory, has been developed to separately analyze the accuracy and bias of the systems. By use of this procedure, the roadway maintenance manager can tune the system to achieve the optimum balance of hit rate vs false alarm rate for a given application. Comparison of the estimated levels of accuracy of these forecast systems with other reports in the meteorological literature reveals that our systems have skill levels sufficient to have practical value.