Senior Project - NIRSS

NASA Icing Remote Sensing System
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Icing hazards are of significant concern to the aviation industry. Better information on icing hazards aloft will increase aircraft safety and improve aviation efficiency in dealing with hazardous areas. Currently, icing hazards and their severity are identified only after an aircraft has encountered them and reported them to traffic control. This method is undesirable. It does not provide a detailed analysis of the full spacial location of the hazard, it is based on pilot opinion of severity which is very inexact, and it requires an aircraft to come into contact with the hazard.
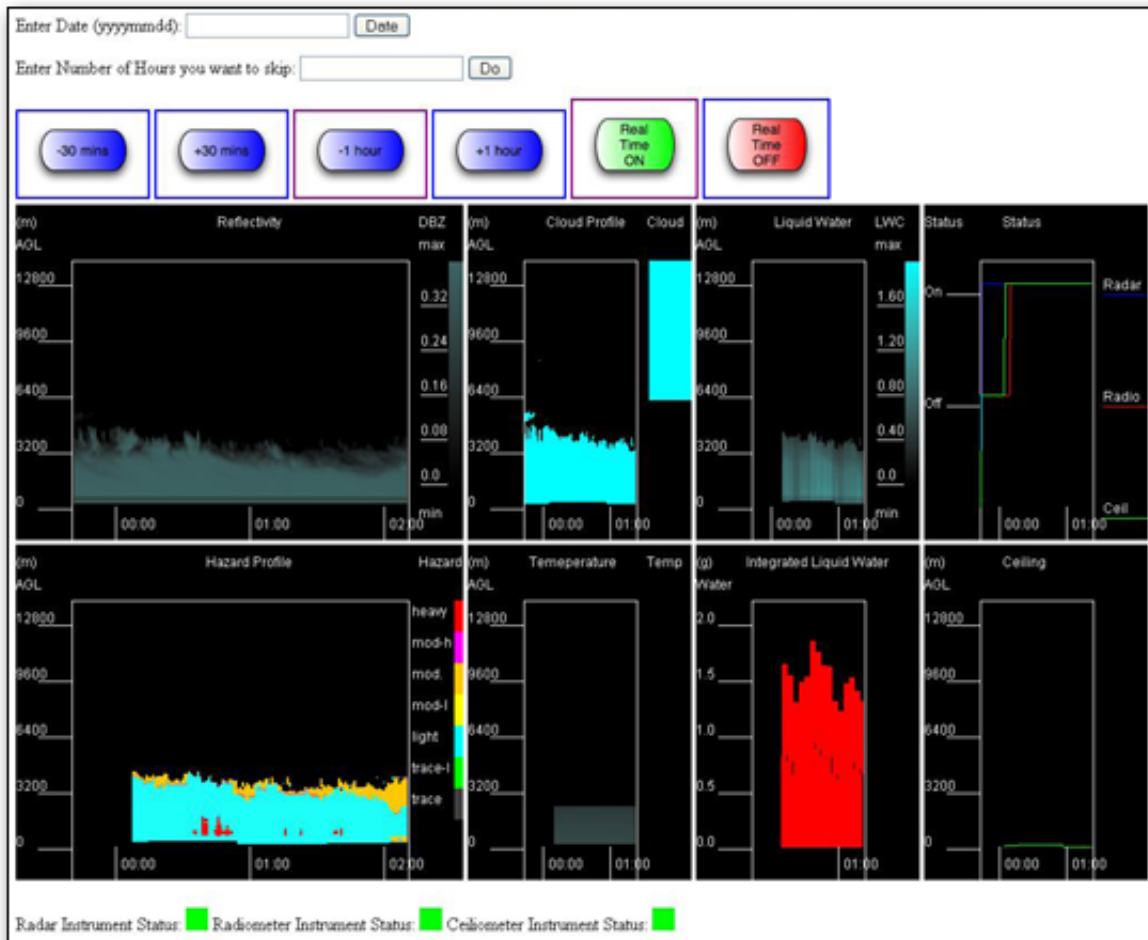
The NASA Icing Remote Sensing activity started with the findings of the 1997 White House Commission on Aviation Safety and Security, which directed the FAA and NASA to significantly increase the level of safety for aircraft, including all-weather operations. NASA then initiated the Aviation Safety Investment Strategy Team (ASIST), which prioritized aviation safety activities required to meet the White House goals. The ASIST Weather team identified inflight icing as one of its top three priorities to improve flight safety.

The primary thrust of the NASA Icing Remote Sensing activity is to develop the required sensing technologies and test them in the real-world aviation environment. The system is a re-implementation of the second version of NIRSS, with a focus on re-writing the code base to a standardized programming language, improving memory and computational efficiency of the system, improving quality checks of data, improving quality checks of instrumentation status, and providing a network accessible visual display.

NIRSS version three was designed as two separate applications: a data analysis application and a display application. The data analysis application was written in C and builds the icing hazard profile from sensor instrumentation inputs. The display application was written as a Java AWT (Abstract Window Toolkit) applet. Users can view the display across a network by addressing a URI from a JavaScript-enabled browser. The software is deployed on a standard workstation running SuSE 10.0. Apache Tomcat is used to serve the display Java applet to the network.

Instrumentation

NIRSS Display