CIDOS-97 ABSTRACT SUBMITTAL FORM

MOBILE AIRCRAFT ICING FORECAST SYSTEM

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ABSTRACT

An integrated mobile field system for forecasting in-flight and ground aviation icing hazards would be an asset for mid-latitude winter and year-round polar operations. Aviation icing presents a serious hazard for military aviation. Freezing precipitation and supercooled cloud liquid can compromise aircraft performance and safety. Aircraft icing endangers military aviators, restricts surveillance opportunities, and reduces combat effectiveness. Forecast resolution and accuracy are currently limited by weather observation systems that are insensitive to cloud phase (liquid or ice), have limited capability to measure cloud temperature, and are unable to provide information on cloud droplet or crystal size. I'ethnology exists that can provide these data including active systems such as short-wavelength radars and lidars and passive sensors such as microwave radiometers and in-situ meteorological probes. These measurement systems can be quite compact which reduces logistical requirements and enhances mobility. Advanced ground-based and airborne sensors with state-of-the-art retrieval algorithms will improve the capability of regional forecast models to provide accurate, timely forecasts of icing hazards. '['he packaging of these components with appropriate communication and information system interfaces into a mobile forecast system is feasible. A systems-level analysis extending from the meteorological sensor to the cockpit will identify effective strategies for increasing aircraft reliability and safety given improved forecasts. For example, tailoring hazard forecasts to specific aircraft can maximize the value of enhanced prediction capability. The dangers of in-flight icing can also be mitigated with the development of autonomous systems for detection icing hazards. Existing aircraft icing sensors detect the accumulation of ice. Advanced sensors that determine the ambient and approaching meteorological conditions could be used to predict the impending rate of ice deposition thereby increasing warning time. Deployment of autonomous detection systems would be an important component in developing an integrated field system for forecasting aviation icing hazards.

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