



**Federal Aviation
Administration**

AFS-400 Operational Approval of Graphical Weather Products

Presented to: SAE Aircraft & Engine Icing Conference

By: Mark Fox, AFS-410

Date: September 26, 2007



Introduction

- Weather Product Classification
- Product Implementation Concepts
 - Configuration Management
 - Technical Validation
 - FAA Safety Management System (SMS) and Preliminary Hazard Assessment (PHA)
 - Operational Suitability Evaluation (OSE) of weather products
- Current Icing Product (CIP)
- AFS-400 ISO-9000 Weather Product Approval Process
- Future Plans – Industry Weather Products
- AFS-400 Research Efforts and Priorities



Weather Product Classification

- FAA POLICY (HBAT 05-01 & AIM)
 - Primary Weather Products
 - Supplementary Weather Products

- Primary Weather Product
 - Meets all regulatory requirements and safety needs for flight-related aviation weather decisions

- Supplementary Weather Product
 - Used for situational awareness
 - Must be used in conjunction with one or more primary weather products
 - May be restricted

- Restriction Mitigation
 - Goal is not to create a product with a restriction
 - Restriction is a mitigation to overcome product hazards
 - Restriction allows use while hazards are being mitigated or eliminated
 - When hazards are eliminated or mitigated then restriction is removed

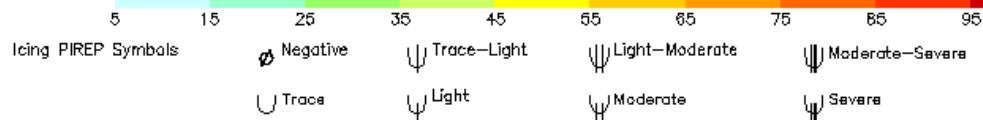
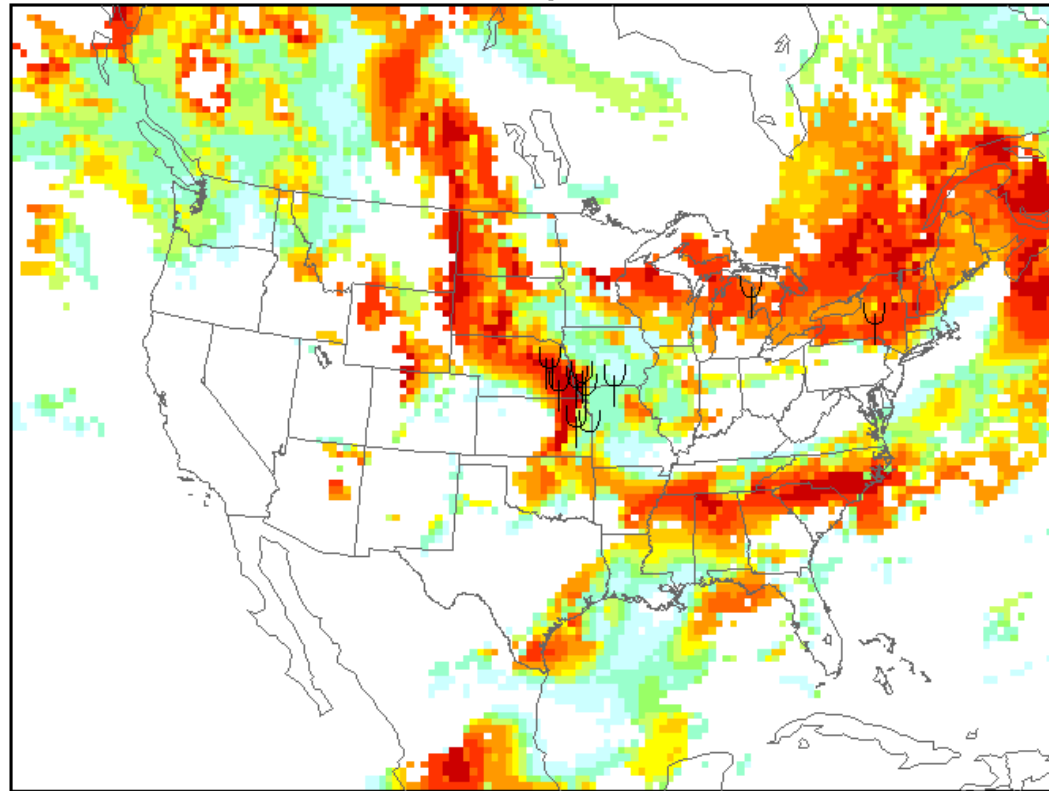


CIP – Current Icing Potential

The CIP is an automatically-generated product that supplements AIRMETs and SIGMETs by identifying areas of current icing potential, but it does NOT substitute for the intensity and forecast information contained in AIRMETs and SIGMETs. It is authorized for operational use by meteorologists and dispatchers.

Maximum Icing potential (FL010-FL300)

Analysis valid 1600 UTC Mon 15 Mar 2004



Product Implementation Concepts

→ Configuration Management

- Ensures distributed product is identical to approved product
- Significant product changes may result in new requirements prior to approval of new product configuration

→ Technical Acceptance

- NCAR, AWC – science (algorithms) and verification
- NWS/AWC Operational product – RE&D phase completed and incorporated into product infrastructure
- Primary Weather Product = “Equivalent Level of Safety”



Product Implementation Concepts

- FAA SMS and Preliminary Hazard Assessment (PHA)
 - Subject Matter Experts (SME) identify potential hazards
 - **Severity** and **Likelihood** of each hazard are ranked
 - High risk hazards must be mitigated prior to operational approval
 - Hazards and proposed mitigations are factors in Operational Suitability Evaluation planning



Product Implementation Concepts

- Operational Suitability Evaluation (OSE)
 - Hazard mitigation, technical acceptance prior to OSE
 - OSE vs. Subject Matter Expertise (SME)
 - SME = individual opinion, not formal
 - OSE = formal, structured, many individuals
 - Flight Standards assesses the need for an OSE prior to the approval of new weather products

- OSE Objective: Evaluate pilot use of weather products in flight planning scenarios to determine operational suitability
 - Verify issues identified in the Preliminary Hazard Assessment
 - Identify any new hazards
 - Provide focus areas for necessary guidance
 - Roadmap for supplementary use by pilots
 - Roadmap for primary use by pilots



Product Implementation Concepts

- ➔ OSE General Approach
 - Diverse group of active pilots (users)
 - Focus on preflight and in-flight planning
 - Determine the weather product's effect on:
 - Situational Awareness
 - Decision Making
 - Risk Avoidance
 - Solicit comments on:
 - Usability and relevance
 - Complaints, compliments, and recommendations

- ➔ National Ceiling and Visibility Analysis (NCV) and Graphical Turbulence Guidance, version 2 (GTG-2) are ongoing

- ➔ OSE completed for the Current Icing Product (CIP) in Fall 2006



CIP – Current Icing Product

By FAA policy CIP is a Supplementary Weather Product for enhanced situational awareness only and must be used with one or more primary products (safety decision) such as an AIRMET or SIGMET (see AIM 7-1-3).

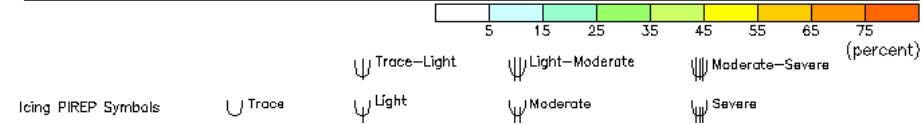
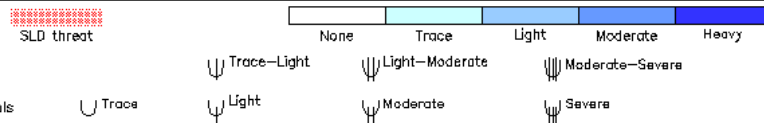
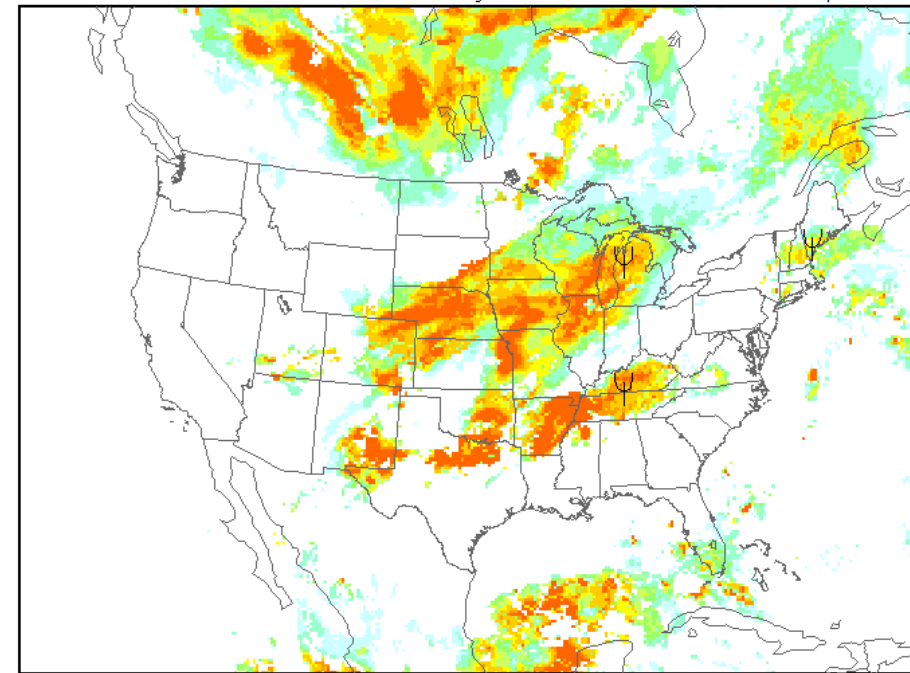
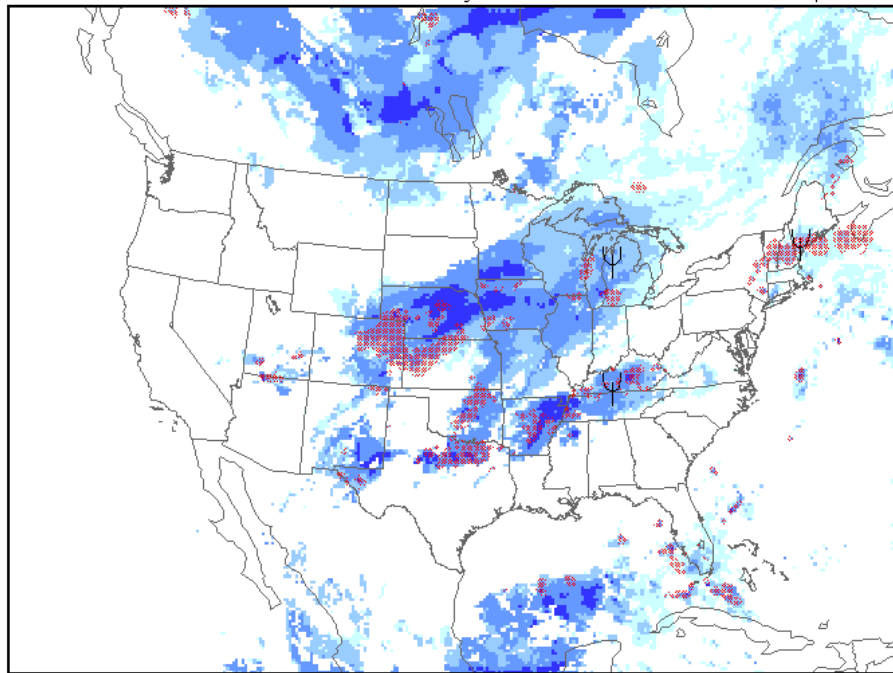
By FAA policy CIP is a Supplementary Weather Product for enhanced situational awareness only and must be used with one or more primary products (safety decision) such as an AIRMET or SIGMET (see AIM 7-1-3).

Maximum icing severity (1000 ft. MSL to FL300)

Analysis valid 1300 UTC Mon 10 Sep 2007

Maximum icing probability (1000 ft. MSL to FL300)

Analysis valid 1300 UTC Mon 10 Sep 2007



CIP OSE Results

- Pilots overwhelmingly agreed that CIP Severity and Probability.....
 - Were easy to interpret
 - Enhanced safety
 - Were optimal for pre-flight planning
 - Was useful to supplement strategic and tactical planning

- Issues identified by pilots:
 - In some instances, CIP information was used as forecast information, not solely nowcast
 - Integrated nowcast and forecast (FIP) information would be useful for flight planning
 - More frequent update rates would be beneficial (e.g., 15 minutes as opposed to hourly, vendor value added)
 - Probability masking on severity was more acceptable when used in conjunction with independent presentations of severity and probability information

ISO 9000 Weather Product Approval Process

- Formalizes Flight Standards requirements for weather product approval
 - Requires human factors input during product development
 - Supports FAA Safety Management System
 - Flight Standards assessment determines if additional technical verification and OSE are required on a case by case basis
 - Minor configuration changes in approved weather products can be quickly approved if the changes do not cause significant impact to the users



Industry Weather Products

- AFS Weather Product Approval Process may provide roadmap for FAA Approval of industry weather products
- Repeated industry requests
- Supports FAA NextGen concept of including both government and industry weather products to populate 4-D weather database
- Industry approval process may reflect requirements of EWINS programs to determine provider eligibility
- Research needed to determine requirements and potential industry concerns



AFS Research Efforts & Priorities

- OSE for additional products emerging from AWRP/AWC (i.e., GTG, NC&V, G-AIRMET, GFA)
- Assure technical validity of emerging weather products
- Industry Survey to establish baseline for needed weather products & user input
- Feasibility study of an application process for AFS operational approval of industry weather products



Thank you

Contact Information:

Mark Fox

AFS-410

202-385-4529

Mark.E.Fox@FAA.gov

