

ICING PRODUCT ALASKA (IPA)

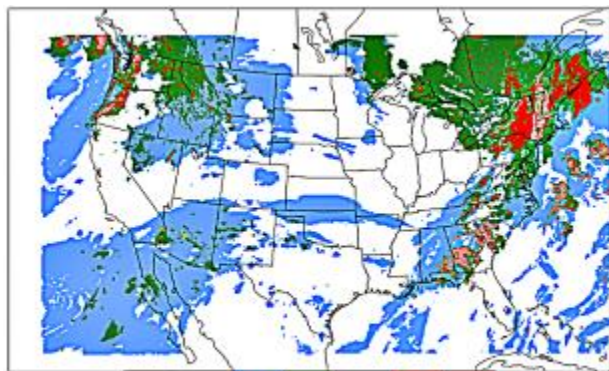
IPA produces experimental guidance for inflight icing conditions over Alaska and surrounding areas. It uses output from a numerical weather prediction model to create a gridded display of the probability of icing, the severity of that icing, and the potential for any SLD to exist. IPA enhancements will include additional observational sources unique to Alaska, and by using technologies developed for CIP and FIP.

IFI SHORT & LONG TERM PLANS

CIP and FIP enhancements (CIP and FIP Version 2.x) are targeted for initial NWS operational implementation in 2022. Future versions will add refinements for improved accuracy and applicability to new entrants in the NAS. As NWS increases the domain of the HRRR to include all of North America, CIP, FIP, and IPA will be merged into a single capability running over the entire domain.

POSSIBLE FUTURE OUTPUT

ICING CLASSIFICATION



APPENDIX
OC COMP

03 hour
forecast valid
at 12/1/2017
0400 UTC

IFI RESEARCH SUPPORT TEAM

National Center for Atmospheric Research (NCAR),
Boulder, CO

National Oceanic and Atmospheric Administration
(NOAA) Earth System Research Laboratory (ESRL)
Global Systems Division (GSD), Boulder, CO

NOAA NWS National Centers for Environmental
Prediction (NCEP) Aviation Weather Center (AWC),
Kansas City, MO

FAA William J. Hughes Technical Center Aviation
Weather Demonstration and Evaluation (AWDE)
Services, Atlantic City, NJ

REFERENCE DOCUMENTS

Aircraft Owners and Pilots Association (AOPA) Air
Safety Foundation, Safety Advisor (SA-11-04/08),
Aircraft Icing

AOPA Air Safety Institute 27th Joseph T. Nall
Report, General Aviation Accidents in 2015

Bernstein, B. C., F. McDonough, M. Politovich, B.
Brown, T. Ratvasky, D. Miller, C. Wolff, and G.
Cunning: Current Icing Potential: Algorithm
Description and Comparison with Aircraft
Observations, Journal of Applied Meteorology, July
2005

FAA AWRP Inflight Icing Project Plan, April 2019 –
March 2020, Version 1.0, January 2019

BROCHURE PROVIDED BY

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[https://www.faa.gov/nextgen/programs/weather/
awrp/](https://www.faa.gov/nextgen/programs/weather/awrp/)

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Federal Aviation
Administration

INFLIGHT ICING PROGRAM



Next GEN

AVIATION WEATHER RESEARCH PROGRAM

The Federal Aviation Administration (FAA) Aviation Weather Research Program (AWRP) conducts applied weather research to enhance the safety and efficiency of the National Airspace System (NAS). The goal of the research is to transition new or improved weather capabilities into evolving air traffic management decision support tools and/or incorporation by the National Weather Service (NWS) to improve delivery of FAA-required services and enhance aviation safety and efficiency.

AWRP RESEARCH AREAS

- ✈ Inflight Icing
- ✈ Turbulence
- ✈ Convective Weather
- ✈ Ceiling and Visibility
- ✈ Weather Radar Techniques
- ✈ Weather Prediction Model Development

INFLIGHT ICING

Inflight icing (IFI) is a safety issue for aviation as it can distort the flow of air over the wing, decreasing the ability of the wings to create lift, reducing the angle of attack for maximum lift, adversely affecting handling qualities, and significantly increasing drag. An airplane may stall at much higher speeds and lower angles of attack than normal. It can roll or pitch uncontrollably, and recovery may be impossible. Other surfaces and functions that can be hampered include antennas, flap hinges, control horns, windshields, pitot tubes, wing struts, and fixed landing gear. Per the latest Aircraft Owners and Pilot Association Nall Report, aircraft icing is one of the top five weather-related causes of general aviation accidents.

INFLIGHT ICING, A SAFETY HAZARD

The United States National Transportation Safety Board findings showed that during the period 2008 – 2016, there were 46 aircraft accidents and 52 fatalities that identified structural, inflight icing as a cause or factor.



*Aircraft after being unable to climb to 5,000 feet
"We were starting to pick up moderate rime icing but
the boots were still shedding the ice"*

REGULATION & POLICY CHANGES

Regulatory and policy changes have resulted in a shift in IFI research strategy. Traditional IFI forecasts focused on the potential and intensity of icing ranging from trace, light, moderate, to severe. Policy changes in Title 14, Code of Federal Regulations Part 25 [Airworthiness Standards: Transport Category Aircraft], Appendix C and Appendix O have been created to improve the safety in inflight icing and supercooled large drop (SLD) conditions. This has resulted in the following new icing categories for aircraft certification:

- ✈ No cloud
- ✈ Cloud but no icing
- ✈ Appendix C icing conditions with maximum drop diameters (D_{max}) < 100 microns
- ✈ Appendix O with D_{max} 100–500 microns
- ✈ Appendix O with D_{max} > 500 microns

CURRENT IFI OPERATIONAL CAPABILITIES

Current Icing Product (CIP) is an hourly diagnostics tool that makes use of satellite imagery, numerical weather prediction (NWP) model output, national radar and lightning data, surface weather observations, and pilot reports by combining individual data sources into an integrated algorithm that makes use of the strengths of each capability while simultaneously minimizing individual weaknesses. The output of CIP consists of a three-dimensional grid of icing potential, severity, and SLD potential.

Forecast Icing Product (FIP) is a forecast version of CIP designed to mimic the technique of combining information from various sources and forecasts out to 18 hours.

IFI PROGRAM ENHANCEMENTS

The IFI program is focused on improving CIP and FIP by incorporating enhancements in NWP, weather satellites, and weather radar, and developing enhancements for Appendices C and O guidance.

- ✈ The NWP model output will transition to the High Resolution Rapid Refresh (HRRR) model
- ✈ Newest generation of Geostationary Operational Environmental Satellites provides an opportunity to enhance real time detection of aircraft icing hazards
- ✈ Incorporate Next Generation Weather Radar dual-polarization data from the Multi-Radar Multi-Sensor national mosaic
- ✈ Provide drop size output consistent with Appendices C and O