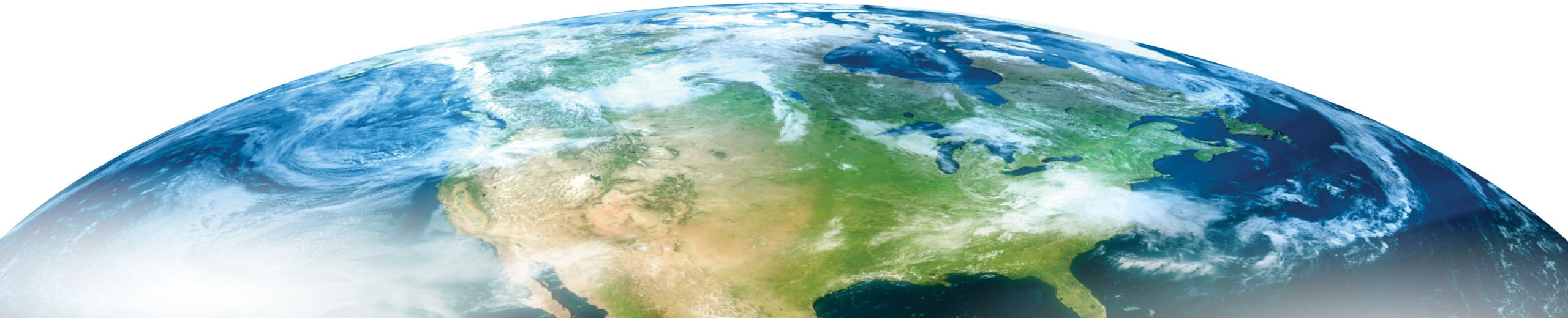
Icing Product Alaska-Diagnosis Operational Assessment Results

Presented to: Danny Sims
By: FAA AWDE Services, ANG-C63
Date: December 2020



Topics

- Introduction
- Background and Objectives
- Approach
- Results
- Conclusions
- Next steps

Introduction

Introduction

- The FAA Aviation Weather Research Program (AWRP) funded the National Center for Atmospheric Research (NCAR) In-Flight Icing Product Development Team (IFIPDT) to develop an icing diagnosing and forecasting product.
- The National Oceanic and Atmospheric Administration (NOAA) Aviation Weather Testbed (AWT) was tasked to integrate Icing Product Alaska (IPA) into a Graphical Forecasts for Aviation (GFA) infrastructure.
- The Aviation Weather Demonstration & Evaluation (AWDE) Services team (ANG-C63) was tasked to gather user input regarding the suitability and usability of the IPA Diagnosing (IPA-D) and Forecasting (IPA-F) product in 2017.
- In 2019, AWDE conducted a second assessment to determine the suitability of IPA-D.
- AWDE collaborated with the Aviation Weather Center (AWC) Testbed to integrate IPA onto the Graphical Forecasts for Aviation (GFA) platform to provide additional capabilities and features based on the 2017 and 2019 participant feedback.
- AWDE conducted an in-depth 8 week long assessment (October 5th-November 25th) to determine IPA-D usability and how IPA-D would be used in an operational environment.

Background and Objectives

Background

- IPA is capable of diagnosing, forecasting and displaying icing probability, severity, and super-cooled large drop potential.
- The forecast grids were fielded as experimental and to date has received positive feedback for the product's operational usefulness and suitability by several user groups, including the Alaskan Aviation Weather Unit (AAWU).
- Based on user feedback the GFA platform used by IPA provides more capabilities and features which need to be assessed by potential users to determine the usefulness and suitability.
- The current assessment focused on determining the operational environment and potential use of IPA-D, previous evaluations did not focus solely on IPA-D, therefore a need to focus on IPA-D is necessary to determine the usefulness of the information provided.

Objectives

Current Assessment Objectives:

- Determine if IPA-D provides operational decision-making support for the AAWU Meteorologists, Part 135/121 Pilots and Dispatchers, and GA Pilots located in the Alaska region.
- Determine the usability of IPA-D incorporated into the GFA product.

Future Assessment Objectives (based on current results)*:

- Develop use cases based on participant feedback regarding the product's support for operational decision-making.
- Provide on-going support for the CONOPS development.

**The last two objectives are follow-on activities that will take place after completion of this assessment. The need to develop Use Cases and the CONOPs will be determined based on the need and use of the IPA-D product.*

Approach

Participant Summary

Total	# Completed Questionnaire	User Group	Primary Geographic Flying Region	Aircraft Certified for Icing		Average Flight Hours	Formal Training for Icing Products		How Often Icing is used for Decision-Making (# of responses in parenthesis)
				Yes	No		Yes	No	
4	1	Part 135 Pilot	Northern and Central Southeast Panhandle, Southeast Alaska	3		8000 2500 2500	3	1	Sometimes (3)
2	2	GA Pilot	South Central		2	3000		2	Rarely
2		Part 135 Dispatcher (Helicopter dispatcher, DO operations)	South Central, Western, and North Slope	1		N/A	1		Always
1		Part 121 Dispatcher	--						
3	1	*AAWU	--						
1		*CWSU	--						
13	4	Total							

**Note: Demographic questionnaires and product questionnaires were not given to AAWU and CWSU Meteorologists because the questionnaires focused on pilot flight planning.*

Approach

- All participants were provided a training briefing detailing assessment objectives, participant expectations, IPA-D background information, IPA-D capabilities and contact information for AWDE personnel.
- All participants were asked to use IPA-D as supplemental information for flight planning.
- All participants were asked to participate in at least two virtual teleconferences to provide feedback on the operational use of IPA-D.
- Structured interviews were conducted virtually primarily one-on-one with the exception of the AAWU interviews which had multiple participants in attendance.
- The AWC Testbed participated in interviews to provide additional product information, as necessary.
- During the interviews, participants were asked to describe how IPA-D was used in the operational environment while planning flights during the assessment period.
- Participants were invited to share screen shots and supplemental information during and after interviews.

Approach Continued

- During the interviews, the AWDE Team collected data using questions which:
  - Allowed participants to provide comments regarding the use of IPA-D for decision-making in the operational environment.
  - Focused on information used to support decisions, utility of icing information, and any additional information participants wanted to make available.
- After completion of the structured interview sessions, pilot participants were emailed a questionnaire to complete via Google forms.
  - 5-point Likert scale rating was used (5-Strongly Agree, 4-Agree, 3-Neither Agree/Disagree, 2-Disagree, and 1-Strongly Disagree).
  - Space for additional comments was provided.

Results

Questionnaire Results

IPA-D Questionnaire Results

Question (Strongly Agree=5, Agree=4, Neither Agree nor Disagree=3, Disagree=2, Strongly Disagree=1)	Median	GA Pilot (N=2) Median	Part 135 Pilot (N=1) Median	*AAWU Meteorologist (N=1) Median
1. IPA-D information would be suitable for use in my operational environment.	5	5	5	4
2. IPA-D information would provide a consistent view of icing conditions over the Alaskan Region.	4.5	5	4	4
3. IPA-D information would help reduce the risk of flying into icing conditions.	4.5	5	4	4
4. IPA-D would provide improved icing information in a timely manner to support safe and efficient routes in the Alaskan region.	5	4.5	5	5
5. IPA-D information would allow you to proactively plan and execute efficient icing-related route deviations and reroutes.	5	5	5	5
6. IPA-D information would improve situational awareness of icing coverage and severity.	5	5	5	5
7. IPA-D information would support the identification of areas with icing conditions.	4.5	7.5	4	4

**One AAWU Meteorologist filled out the questionnaire. Due to the fact the questionnaire focused on flight planning, some questions were not applicable to the AAWU Meteorologists.*

IPA-D Questionnaire Results

Question (Strongly Agree=5, Agree=4, Neither Agree nor Disagree=3, Disagree=2, Strongly Disagree=1)	Median	GA Pilot (N=2) Median	Part 135 Pilot (N=1) Median	*AAWU Meteorologist (N=1) Median
8. IPA-D information would support the identification of areas with icing conditions.	4.5	5	4	3
9. IPA-D would aid me in my flight planning decision-making.	4.5	5	4	3
10. I would use IPA-D on a daily basis for flight planning.	4.5	5	5	3
11. I would use IPA-D on a daily basis enroute.	3	3	3	3
12. I would use both IPA-D (0 hour) and IPA-F (2+ hour) together to help inform go-no-go decisions.	4.5	5	4	3

**One AAWU Meteorologist filled out the questionnaire. Due to the fact the questionnaire focused on flight planning, some questions were not applicable to the AAWU Meteorologists.*

Questionnaire Comments

- GA Pilots
  - As a GA pilot, mostly VFR, this tool is most important because the NWS and AAWU do not forecast trace or light icing, they only forecast moderate or greater icing. My aircraft does not have de-icing equipment and icing avoidance at any intensity is my main concern.
  - Better information is key to making better decisions. The IPA-D tool provided better information than I've had before.
- AAWU Meteorologist
  - Useful in the evaluation of current icing forecast, areas of icing not forecast can be diagnosed which may help in amending the forecast.
  - Having a diagnostic product to compare to forecast product can provide a comprehensive view of current state of the atmosphere with respect to icing conditions, which should reduce risk.
  - The overlay of SLD with Severity (index) is particularly good at this in a visual way; certainly red over progressively darker blues is a good way to look at the threat.
  - The current icing diagnostic has some uses; though we often have to reduce the coverage of IPA-F in using it in producing the icing forecast. IPA-D follows this process as well, there are additional areas to diagnose that were not apart of IPA-F and sometimes these are valid and sometimes they are model artifacts.

Structured Interview Question Results

Note: The Part 135 Pilots and Part 135 Dispatchers had other pilots, dispatchers, and team members using and viewing IPA-D. Feedback obtained through interview questions includes feedback from those team members also.

When is IPA-D Used?

When and how often are you using IPA-D? Prior to departure? If so how many hours prior? Have you used IPA-D enroute?

- All Pilots:
  - IPA-D was consistently used at least 0-3 hours prior to departure to assess the most current icing conditions.
  - As departure time approached, IPA-D was used multiple times to re-evaluate any changes in icing conditions enroute and at the arrival location.
  - If IPA-D was ***easily*** accessible, all pilots would use the product while enroute to determine the most current icing conditions.
- Part 121/135 Dispatchers:
  - Dispatchers stated the need to constantly reassess current icing conditions, therefore, IPA-D was consistently used.
  - Dispatchers stated IPA-D would be used 0-2 hours prior to an estimated time of departure (ETD) to assess the most current icing conditions for a pilot briefing.
  - IPA-D would be used while pilots are inflight to provide pilots the most current icing conditions along a route and at different flight levels.

When is IPA Used?

When and how often are you using IPA-D? Prior to departure? If so how many hours prior? Have you used IPA-D enroute?

- AAWU Meteorologists: AAWU Meteorologists would use IPA-D several times a day to verify and update icing forecasts.
- CWSU Meteorologists: CWSU Meteorologists issue Center Weather Advisories (CWA) every two hours, because of the 2-hour timeframe, IPA-D was an ideal tool to use to obtain the most current icing conditions to identify areas of concern.

Time Frames

Is the 0-2 hour time frame useful? If so, what decisions are you making based on this time frame?

- All Participants:
  - The 0-2 timeframe was useful to all participants.
  - The icing information provided was used as supplemental information to aid in determining the most current icing conditions.
- GA Pilots:
  - IPA-D was used to determine:
    - The need to take an alternate route,
    - Safe altitudes with less/no icing,
    - To stay grounded, not depart due to icing conditions,
    - Flight delay,
    - Length of stay at destination,
    - The need to have an alternate destination to stop at prior to the final destination, and
    - The need to cover wings on aircraft if not hangered.
  - IPA-D was used as supplemental information to make final go/no-go decisions.

Time Frames

Is the 0-2 hour time frame useful? If so, what decisions are you making based on this time frame?

- Part 135 pilots:
  - IPA-D provided the capability to assess icing conditions along the route and at destinations allowing pilots to determine safe altitudes and routes.
  - IPA-D was used to identify route(s) with the least icing and no SLD.
  - IPA-D aided in determining how much ice is expected to accumulate on approach and decent.
  - IPA-D aided in determining the need to have an alternate destination to stop at prior to the final destination.
  - IPA-D aided in determining the speed and altitude in which to accelerate out of icing conditions.
  - IPA-D provided the information needed to aid in determining safer departure times based on icing conditions.

Time Frames

Is the 0-2 hour time frame useful? If so, what decisions are you making based on this time frame?

- Part 121/135 Dispatchers:
  - IPA-D provided the capability to see icing conditions to determine safer altitudes and routes for pilots.
  - IPA-D was used to identify safer departure times to avoid icing.
  - IPA-D was used by dispatchers while pilots were in-flight to provide updates, to the pilots, on changing icing conditions.
- AAWU Meteorologists:
  - IPA-D was used to update forecasts and compare icing information to other products to validate information.
  - IPA-D was used to update forecasts for areas reported in PIREPs having icing conditions.
- CWSU Meteorologist:
  - IPA-D provided current icing conditions that were consistently used, as supplemental information, to issue CWA's.
  - CWSU Meteorologists would compare IPA-D icing conditions to PIREPs to validate icing information.

Plots

Which plot do you view first? How often do you view this plot? What information are you getting? Which plot do you view second?

- All Pilots:
  - Severity + SLD was the first plot pilots viewed to identify locations and icing severity, including SLD potential.
  - The second plot used was the Probability, which was used to determine the likelihood of icing conditions to occur.
  - Recommended integrating Severity + SLD and Probability onto one plot to reduce the workload needed to interpret two separate displays.
- GA Pilots:
  - Severity + SLD and the Probability plots were both used repeatedly prior to a flight to assess the most current icing conditions.
  - GA Pilots used IPA-D to identify any icing along routes and at various flight levels. GA Pilots who only fly VFR and do not have de-icing equipment used IPA-D to identify any potential of icing to occur.
  - The critical information GA Pilots used on IPA-D were the flight levels, icing severity, SLD, and probabilities.

Plots

Which plot do you view first? How often do you view this plot? What information are you getting? Which plot do you view second?

- Part 135 Pilots:
  - Severity + SLD and the Probability Plots were both used repeatedly prior to a flight to assess the most current icing conditions.
  - Part 135 Pilots used IPA-D to identify icing condition severity and likelihood of the icing conditions to occur, along routes and at various flight levels.
  - Pilots were concerned with moderate or higher severity and probabilities greater than 50%.
  - The critical information Part 135 Pilots used on IPA-D were the flight levels, icing severity, SLD, and probabilities.
- Part 135 Helicopter Dispatcher:
  - Severity + SLD was the first plot used followed by the Probability plot.
  - The plots were used consistently to identify any current icing conditions present along routes and altitudes.

Plots

Which plot do you view first? How often do you view this plot? What information are you getting? Which plot do you view second?

- Part 135/121 Dispatchers:
  - The Dispatchers used the Probability Plot first followed by Severity > 50%.
  - The Probability plot was used, consistently, to obtain a high level picture and identify areas with a high likelihood of icing.
  - The Severity > 50% was used, consistently, to identify the probability of moderate or greater icing conditions along routes and at different altitudes.

Plots

Which plots do you view first? How often do you view this plot? What information are you getting? Which plot do you view second?

- AAWU Meteorologists
  - The Probability was the first plot viewed followed by the Severity + SLD.
  - AAWU Meteorologists used the plots consistently and focused on identifying areas having moderate or severe icing to help update forecasts and issue advisories.
  - AAWU Meteorologists used the Probability plot to identify high probability areas of icing then used Severity +SLD to determine where to update forecast.
  - AAWU Meteorologists suggested to have the capability to hide the probabilities that don't have icing.
  - AAWU Meteorologists suggested to have the capability to assign a base and top to the probabilities, this would provide the capability to only see probabilities within a certain range, for example, the range would be to display 50%-80% probabilities of icing.

Plots

Which plots do you view first? How often do you view this plot? What information are you getting? Which plot do you view second?

- CWSU Meteorologist
  - The Probability was the first plot viewed followed by the Severity + SLD.
  - The CWSU Meteorologist used the plots consistently and focused on identifying areas having moderate or severe icing.
  - The CWSU Meteorologist used the Probability plot to identify high probability areas of icing then used Severity +SLD to determine areas that need CWA's.
  - The CWSU Meteorologist issues CWA's for the entire Alaska airspace, the information provided does not go out to Japan, the icing conditions are needed in the area to determine the need for advisories.
  - The CWSU Meteorologist suggested to have the Probability plot as an overlay over the Severity + SLD to reduce workload.
  - The CWSU Meteorologist stated the need to select a range of vertical flight levels to assess instead of having to assess each vertical level individually (e.g., 8,000-10,000 feet).

Flight Levels

What flight levels are you using? What flight levels are you not using?

- All Participants stated operational use was to go through the various flight levels to assess the icing conditions at each increment.
- GA Pilots:
  - Flight levels used were 1,000 to 13,000 feet depending on the equipment the pilot was flying.
  - The GA Pilots did not use flight levels above 15,000 feet.
  - In some areas flying below 1,000 feet is common, therefore, having information below 1,000 feet may be needed.
- Part 135 Pilots:
  - Flight levels used were 1,000 to 25,000 feet.
  - Part 135 Pilots would not use flight levels above 25,000 feet.
- Part 135 Helicopter Dispatcher:
  - The flight level used was 1,000 feet due to operations, ideally, the levels would increment in 100 up to 1,000 feet.
  - Flight levels over 1000 feet are not necessary for helicopters, but lower levels would benefit helicopter operations.

Flight Levels

What flight levels are you using? What flight levels are you not using?

- Part 135 Dispatcher:
  - The flight levels used were from 1,000 to 13,000 feet.
  - Flight levels above 13,000 feet are not needed.
- Part 121 Dispatcher:
  - The flight levels used were from 1,000 to 25,000 feet.
  - Flight levels above 25,000 feet are not needed.
- AAWU Meteorologists:
  - All the flight levels were used by AAWU Meteorologists.
  - AAWU meteorologists need the ability to group the flight levels in 5,000 feet bins (e.g. 1,000-5,000, 5,000-10,000, 10,000-15,000) this provides the capability to more easily assess icing conditions across a range of flight levels, without having to individually select and assess each 1,000 feet increment.
- CWSU Meteorologist: Used all flight levels up to 45,000 feet.

Information and Decision-Making

What specific information are you looking at when using IPA-D? Does IPA-D have all the information needed? What types of operational decisions would you be able to make if IPA-D is used as supplemental information?

- All Pilots used IPA-D to:
  - Assess the most current icing severities,
  - Assess the likelihood of icing to occur,
  - Make go/no-go decisions,
  - Determine safe departure times,
  - Determine safe altitudes,
  - Determine safe routes, and
  - Determine safe alternate arrival locations.
- Due to short flights, typically less than 2-4 hours roundtrip for all pilots, the IPA-D provided critical current icing information to determine the safest overall trip with less icing.

Information and Decision-Making

What specific information are you looking at when using IPA-D? Does IPA-D have all the information needed? What types of operational decisions would you be able to make if IPA-D is used as supplemental information?

- GA Pilots:
  - The critical IPA-D information used included flight levels, icing severity, SLD, and probabilities.
  - Additional information GA Pilots need to support decision-making include the capability to:
    - Display geographical features such as rivers and mountain ranges/passes.
    - Obtain surface temperatures (icing conditions below 1,000 feet).
    - Easily access severity definitions.
    - View IFR and VFR routes.

Information and Decision-Making

What specific information are you looking at when using IPA-D? Does IPA-D have all the information needed? What types of operational decisions would you be able to make if IPA-D is used as supplemental information?

- Part 135 Pilots:
  - The critical information Part 135 Pilots used on IPA-D were the flight levels, icing severity, SLD, and probabilities.
  - Part 135 Pilots were concerned with moderate or greater severity of icing and probabilities of 50% or greater.
  - The icing information assessed aided in determining the safest flight level above the icing conditions.
  - When the probability of icing occurring was 50% or greater, pilots would delve further into the icing information and leverage other sources to confirm icing conditions.
  - Additional information GA Pilots need to support decision-making include the capability to:
    - Easily access severity definitions.
    - Display geographical features such as rivers and mountain ranges/passes.
    - View Low Altitude Victor Airways, IFR, and VFR routes.

Information and Decision-Making

What specific information are you looking at when using IPA-D? Does IPA-D have all the information needed? What types of operational decisions would you be able to make if IPA-D is used as supplemental information?

- Part 135 Helicopter Dispatcher:
  - The critical information the Part 135 Helicopter Dispatcher used on IPA-D were the flight levels and icing severity, both were used to identify current changes in conditions to notify pilots.
  - The helicopters do not have de-icing equipment, therefore, the identification of any icing is necessary along routes and at flying levels.
  - Due to short flights, less than an hour, the IPA-D provided critical current icing information to:
    - Determine the most current icing severities,
    - Make go/no-go decisions,
    - Determine safe departure times,
    - Determine safe altitudes, and
    - Determine safe routes.
  - Additional information the Part 135 Helicopter Dispatcher needed for decision-making are:
    - Icing information at lower flight levels in increments of 100 up to 1,000 feet.
    - The capability to view rivers and mountain passes.
    - The capability to access/view PIREPs.

Information and Decision-Making

What specific information are you looking at when using IPA-D? Does IPA-D have all the information needed? What types of operational decisions would you be able to make if IPA-D is used as supplemental information?

- Part 135 Dispatcher:
  - The critical information the Part 135 Dispatcher used on IPA-D were the flight levels, icing severity, and probabilities, all were used to identify current changes in conditions to notify pilots.
  - Part 135 Dispatchers were concerned with moderate or greater severity of icing and probabilities of 50% or greater.
  - When the probability of icing occurring was 50% or greater, dispatchers would delve further into the icing information and leverage other sources to confirm icing conditions.
  - IPA-D provided critical current icing information to:
    - Determine the most current icing severities,
    - Make go/no-go decisions,
    - Determine safe departure times,
    - Determine safe altitudes (also to get above the icing conditions), and
    - Determine safe routes.
  - Additional information the Part 135 Dispatchers need for decision-making include the capability to:
    - Display geographical features such as rivers and mountain ranges/passes.
    - View and filter airports and NAVAIDs at all zoom levels.
    - View Low Altitude Victor Airways, IFR, and VFR routes.

Information and Decision-Making

What specific information are you looking at when using IPA-D? Does IPA-D have all the information needed? What types of operational decisions would you be able to make if IPA-D is used as supplemental information?

- Part 121 Dispatcher:
  - The critical information the Part 121 Dispatcher used on IPA-D were the flight levels, icing severity, probabilities, and SLD, all were used to identify current changes in conditions to notify pilots.
  - Part 121 Dispatchers were concerned with moderate or greater severity of icing and probabilities of 50% or greater.
  - When the probability of icing occurring was 50% or greater, dispatchers would delve further into the icing information and leverage other sources to confirm icing conditions.
  - IPA-D provided critical current icing information to:
    - Determine the most current icing severities,
    - Make go/no-go decisions,
    - Determine safe departure times, and
    - Determine best location and altitude to get out of the icing conditions.

Information and Decision-Making

What specific information are you looking at when using IPA-D? Does IPA-D have all the information needed? What types of operational decisions would you be able to make if IPA-D is used as supplemental information?

- Part 121 Dispatcher:
  - The majority of aircraft flown by Part 121 operators have de-icing equipment, but would use IPA-D to identify areas of icing, especially when icing equipment is damaged or not working properly, to ensure the Master Minimum Equipment List (MMEL) standards are met.
  - Additional information the Part 121 Dispatchers need for decision-making include the capability to:
    - View and filter airports and NAVAIDs at all zoom levels.
    - Easily access severity definitions.
    - Display geographical features such as rivers and mountain ranges/passes.

Information and Decision-Making

What specific information are you looking at when using IPA-D? Does IPA-D have all the information needed? What types of operational decisions would you be able to make if IPA-D is used as supplemental information?

- AAWU Meteorologists
  - AAWU Meteorologists focused on identifying areas having moderate or severe icing to help update forecasts and issue advisories.
  - AAWU meteorologists use IPA-D to verify information and conditions as PIREPs are received and update the AAWU icing forecast.
  - AAWU Meteorologists used the Probability plot to identify high probability areas of icing then used Severity + SLD to determine where to update forecast.
  - Additional information the AAWU Meteorologists need for decision-making are:
    - Provide the flight levels in bins of 5,000 feet (1,000-5,000, 5,000-10,000) to reduce the workload needed to asses icing condition at the various flight levels. These flight level bins coincide with issued forecasts.
    - Reduce the amount of mental workload needed to interpret the severity and probability plots by integrating into one using overlays.
    - Provide the capability to select and display specific probabilities.

Information and Decision-Making

What specific information are you looking at when using IPA-D? Does IPA-D have all the information needed? What types of operational decisions would you be able to make if IPA-D is used as supplemental information?

- CWSU Meteorologists
  - CWSU meteorologists focused on identifying areas having moderate or severe icing to help update forecasts and issue advisories.
  - IPA-D provided the most current icing conditions needed to issue CWAs, which are issued every 2 hours.
  - Additional information the CWSU meteorologists require to support decision-making are:
    - A drawing tool capability.
    - Integration capabilities with the CWA Generator or vice-versa.
    - Reduce the amount of mental workload needed to interpret the severity and probability plots by integrating into one using overlays.
    - Provide the capability to select and display specific probabilities.
    - Provide the capability to select a range of vertical flight levels.
    - Ability to see route structures.
    - Freezing level information.
    - PIREP viewing capability.
    - Expansion of coverage area to include airspace near Japan as the CWSU is responsible for all of Alaska's airspace.

Overlays

Which overlays are valuable? Which overlays are not needed?

- The overlays used by all participants were Airports and NAVAIDs.
- ARTCC Boundaries were used by the CWSU Meteorologists.
- The overlays not used by participants were:
  - Highways,
  - Roads, and
  - Counties.

Additional Comments

- The shading along the coastal regions is very similar to light icing and could cause confusion.
- A demonstration of IPA was provided to the Alaska Aviation Coordination Council (AACC) and received positive feedback. The FAA Weather Camera program lead attending the demonstration suggested adding IPA-D to the FAA Weather Camera website.
- Participants were asked if the term Heavy or Severe should be used in IPA.
  - GA and Part 135 Pilots stated to change the term Heavy to Severe to match FAA terminology used in PIREPs and SIGMETs.
  - Dispatchers stated using Heavy to describe icing severity was acceptable.
  - Meteorologists stated using the term Severe would close the airspace while using the term Heavy would not.

Conclusions and Recommendations

Objective 1

Determine if IPA-D provides operational decision-making support for AAWU Meteorologist, Part 135/121 Pilots and Dispatchers, and GA Pilots located in the Alaska region.

- All participants stated IPA-D would be used routinely as supplemental icing information to obtain the likelihood and severity of icing conditions.
- All pilots and dispatchers stated IPA-D provided critical, supplemental icing information, needed for:
  - Making go/no-go decisions,
  - Determining the safest departure time,
  - Determining the safest route,
  - Determining the safest flight level(s).
- All dispatchers stated IPA-D provided critical icing information needed to update pilots on changing conditions while enroute.

Objective 1 Continued

Determine if IPA-D provides operational decision-making support for AAWU Meteorologist, Part 135/121 Pilots and Dispatchers, and GA Pilots located in the Alaska region.

- The AAWU Meteorologists stated IPA-D provided information to aid in updating forecasts and easily identify areas that have high probability of moderate to severe icing conditions.
- The CWSU Meteorologists stated IPA-D would be used to aid in creating and issuing the 2-hour CWA's.

Objective 2

Determine the usability of IPA-D incorporated into the GFA product.

- Pros:
  - All participants stated IPA-D was easy to use.
  - All participants stated IPA-D was easy to navigate and clearly identified areas of light, moderate, and severe icing and SLD.
  - All participants stated the probabilities were easy to use and distinguish.
- Cons:
  - All participants stated when an overlay is selected, the overlay should be visible regardless of the zoom level selected (e.g. airports can't be seen unless zoomed in).
  - Pilot participants stated the map becomes pixelated when zooming in beyond a scale of 50 miles. The pilot participants stated a need to be able to zoom closer in to assess conditions and see terrain and other overlays accurately.
  - Pilot participants stated the need to filter by type of airport to ensure the map doesn't become cluttered.
  - When in full screen mode, the severity and probability legend become hidden, participants stated a need to always be able to see the legend.

Recommendations

Based on assessment results, the following recommendations are offered:

- Include overlay capabilities to enable a Probability overlay on Severity + SLD.
- Provide the capability to select and view a terrain map.
- Improve the zoom feature to ensure all overlays selected can be viewed at any zoom level and the map does not become pixelated.
- Provide a capability to view AIRMETs, SIGMETs, and PIREPs.
- Provide a capability to display Low Altitude Victor Airways, IFR, and VFR routes.
- Include a draw feature that allows users to draw routes on the IPA-D map.
- Create a function to allow groups of flight levels to be viewed together (e.g., 5,000-10,000 feet).
- Create a function allowing users to select and view specific ranges or values of icing probabilities (e.g., 50%-80% and/or 60%)
- Ensure probability or severity legend is always visible.
- Recommend removing the County, Road and Highway overlays.

Next Steps

Next Steps

- Identify the need, then develop use cases for:
  - GA Pilots
  - Part 135 Pilots
  - Part 121/135 Dispatchers
  - AAWU Meteorologists
  - CWSU Meteorologists
- Aid in the development of the IPA-D Concept of Operations (CONOPs).