

Fall 2022 FPAW Meeting Summary

Note: This meeting recap, and all associated presentations, chat logs, meeting recordings and reference material are available to everyone on the FPAW website at <https://fpaw.aero/events/2022/fpaw-2022-fall-meeting>.



Tuesday, October 25, 2022

Plenary Meeting

Session 1, “Winter Weather,” 10:00 AM – 3:00 PM CDT (hybrid)

Session Co-leads: Stephanie DiVito (FAA) and Andrew Rosenow (CIWRO/NSSL)

The morning portion of the session focused on the impact of winter weather on airport-based ground operations. Scott Landolt (NCAR) discussed the limitations of the current surface observation network, specifically noting the tendency to dramatically overreport freezing fog. Victor Passetti (FAA) reviewed ongoing efforts to improve the present weather observing capabilities of ASOS/AWOS systems, including the ability to report more types of precipitation, mixes of precipitation types, and better handle precipitation intensity. Gordy Rother (FAA) talked about TALPA, and the types of observations needed to improve runway friction guidance. Joe Vickers (AST) discussed braking action reports and the potential for automated braking reports to decrease runway excursions through the dissemination of better runway friction information.

Nathan Polderman (United Airlines), Dave Cunningham (Denver DoA), Eric Avila (NATCA), Steve Green (Flight Operations Research), and Mark Ratzler (NWS) participated in a panel discussion focusing on current best practices for safe winter operations and identification of potential areas of collaboration and improvement. Nathan emphasized that operators need to prepare early, with airlines desiring to adjust schedules proactively to minimize stranded passengers. Dave discussed the Denver airport’s winter weather operations process, including decision points for staffing/equipment. These decisions are made using guidance provided by the local National Weather Service office. Mark shared that NWS is working on decision support to enable those operational decisions pre-event and maintains contact with operational stakeholders during events. Eric discussed the challenges of relaying important information during the event. Steve offered his thoughts on TALPA from the airline pilot perspective. The panel concluded with each panelist providing suggested action items.

After lunch, the focus of the session switched to winter weather guidance for flight operations, spanning the spectrum from crewed to uncrewed operations. Brief overviews of current and future meteorological winter guidance tools were presented. Austin Cross (NWS AWC) covered terminal area forecasts (TAFs), Icing SIGMETs and AIRMETs, Area Forecast Discussions, the Winter Weather Dashboard, and the Helicopter Emergency Medical Services (HEMS) tool, all of which are available via the Aviation Weather Center. Danny Sims (FAA) reviewed the Current Icing Product (CIP) and Forecast Icing Product (FIP) tools as well as the ongoing research and modifications to these to address shortfalls. He also mentioned the potential incorporation of Alaska coverage for FIP. Stephanie DiVito (FAA) introduced a new terminal area icing tool that

is under rapid development; description of the tool and a user assessment was provided. Andrew Rosenow (University of Oklahoma) discussed the promises and challenges of predicting the type of precipitation aloft, throughout a vertical column.

The session concluded with a panel of experts who discussed low-altitude flight and winter operations. Eric Brown (FAA, Aircraft Certification), Matt Johnson (virtual) (Metro Aviation Inc.), Henry Cathey (New Mexico State University), and John Steventon (FAA, Flight Standards) participated in the panel. Icing and visibility hazards for the low-altitude community were discussed; some panelists shared real-life experiences and encounters with these hazards. There was also acknowledgement of the weather measurement shortfalls that exist, and how these specifically relate to low-altitude operations. FAA representatives mentioned the planned development of tiered Performance-Based Weather (PBW) standards. A common thread throughout the conversation was shortfalls in education and training, and the need to increase the understanding and appreciation by users/pilots of hazards such as those introduced by winter weather and icing environments. Complicating this are UAS Remote Pilots-in-Command (RPICs), whose background, training and in-flight experiences are vastly different than those of pilots of manned aircraft with eyeballs out the window, a difference that needs to be recognized and bridged.

Inaugural Meeting of the FPAW Steering Committee (SC)

3:00 PM – 5:00 PM CDT

The FPAW Steering committee held its inaugural meeting on Tuesday, October 25, 2022, following the conclusion of the Plenary meeting. Eric Avila (NATCA), Matt Fronzak (MITRE), Ian Johnson (FAA), Nathan Polderman (United Airlines), Heather Reeves (CIWRO/NSSL), Matthias Steiner (NCAR), John Steventon (FAA), and Matt Strahan (NOAA NWS AWC) attended in-person. Rex Alexander (Vertical Flight Society), Jim Evans (MIT/LL), Marilyn Pearson (CAE), Joel Siegel (BAH) and Elizabeth Wilson (Climavision) participated remotely. Special guest Bruce Carmichael (NCAR ret.) also joined remotely.

The first portion of the meeting was used to allow the FPAW SC members to get to know one another, with each member verbally providing biographical information about themselves. In addition, each participant was encouraged to identify at least one thing they hoped the FPAW SC would accomplish during their tenure. Several common themes (e.g., data sharing, breaking down siloes, education and training) emerged from the discussion.

Next, the motivation for the formation of the FPAW SC was discussed. To help with that conversation, the “father” of FPAW, Bruce Carmichael (NCAR ret.), was invited to join this inaugural meeting, in part to share his thoughts on what has and has not worked for FPAW over the past 20 years. Bruce observed that many successes came about in part because the FPAW is the only forum in which the aviation weather community is brought together as a whole. He offered that assigning action items to governmental organizations did not have the intended effect of “getting things done,” and instead drove some former governmental participants away from FPAW.

Finally, the group next discussed “What’s Next for the FPAW SC.” An approach that resonated was to have individual SC members contribute relevant objectives, and then have the group identify the one or two most important an approach to be adopted at future meetings of the SC.

Administratively, the group decided to meet monthly from November through the first part of CY 2023, and then consider transitioning to quarterly meetings when appropriate.

Wednesday, October 26, 2022

Tours of the National Weather Center

8:00 AM – 9:00 AM CDT, 9:00 AM – 10:00 AM CDT

Before the start of Day 2 of the Fall 2022 FPAW Plenary Meeting, Pat Hyland (CIWRO/NSSL) led two groups of FPAW participants on comprehensive, back-to-back one-hour tours of the National Weather Center, providing a great deal of insight into and stories about this meteorological jewel in Norman, OK. The FPAW participants raved about the tours; we encourage any FPAW member who is in Norman to find time to visit the facility and take advantage of offered tours.

Plenary Meeting

Session 2, “Probabilistic Forecasting for Aviation,” 10:00 AM – 3:00 PM CDT (hybrid)

Session Co-Leads: Brian Pettegrew (MITRE) and Jennifer Stroozas (NOAA/AWC)

The Probabilistic Forecasting for Aviation session was divided into three segments.

The opening segment featured four presenter/panelists with significant experience and expertise in probabilistic forecasting. Leading off the discussion was Judy Ghirardelli from the NOAA Meteorological Development Laboratory. Judy has been involved with the development and operational use of the Gridded Local Aviation MOS Program (Gridded LAMP). The Gridded LAMP outputs statistically generated probabilities of key aviation weather fields including convection, lightning, and ceiling and visibility restrictions. Next, Frank Brody, a retired NOAA forecaster and Meteorologist-in-Charge for the NOAA/Aviation Weather Center’s National Aviation Meteorologists gave a presentation on use of probabilistic forecasts in an operational setting and discussed lessons learned as part of the development process to continually improve translation. John Williams from The Weather Company/IBM talked about the development of their proprietary ensemble model along with work to enhance probabilities through impact translation. Steve Weygandt closed out panelist presentations with ongoing development at the NOAA Global Systems Laboratory on improving probabilistic fields in the High-Resolution Rapid Refresh (HRRR) and its successor, the Rapid Refresh Forecast System (RRFS). During the following panel discussion, panelists continued to cover the development of probabilistic forecasts and the importance of identifying, communicating, and acting on uncertainty.

The second segment pivoted from focusing on probabilistic weather forecasting to the role of social science and communication in successfully developing and disseminating probabilistic forecasts. Kodi Berry and David Hogg, both social science and emergency management specialists at the NOAA National Severe Storm Laboratory, led off the segment. Their presentation focused on the user experience and the evaluation of probabilistic interpretation

from a user perspective, along with the importance of producers to effectively translate their message. Next, Jason Godwin, a forecaster at the NOAA/CWSU office in Dallas-Fort Worth, TX, presented his unique experience in working alongside the FAA in communicating probabilistic forecasts relevant to air traffic management, along with demonstrating an internal tool used by the office to help effectively translate uncertainties. Finally, Stephanie Klipfel/Delta Air Lines discussed the use and impact probabilistic forecast information from the perspective of a commercial airline. A key takeaway was that probabilistic forecasts have many unique impacts and uses within various areas of the commercial industry, including flight planning.

We borrowed from Monty Python and did something “new and completely different” in the final segment. Virtual and in-person participants were separated into diverse groups of ten or more. Each group discussed problems and advancements in the field of probabilistic weather forecasts from the perspectives of their various roles, including but not limited to air traffic control, flight planning, air traffic management, pilots, meteorologists, and researchers. Some of the common discussion points centered on the unique needs from the different interest groups, converging on the idea that a one-size-fits-all approach to probabilistic aviation weather forecasts may not be the right answer. Other shortcomings noted were the difficulty in interpreting probabilistic vs. deterministic forecasts, along with a lack of confidence in the usefulness of the probabilistic ones. Some recommended actions included development of a strategy to understand how probabilistic forecasts can co-exist with legacy deterministic forecast products, along with the need for analyses of the paradigm shift from deterministic to probabilistic forecasts, and how humans and machines alike make use of the information.

Summarized Actions from each Breakout Group

Group 1

- Develop strategy for communication to aviation community
- Develop probabilistic demonstrations with a focus on interpretation of probabilistic information
- Find use cases and impacts to demonstrate success stories

Group 2

- Survey users to ensure there is a desire to develop probabilistic aviation weather information
- Run demonstrations or surveys to decide if everyone needs direct access or have meteorologists remain in an interpreter role
- Determine what hazards probabilistic information would be most useful for

Group 3

- Determine ways to communicate in terms of risk (ex. turbulence during dinner service vs. not) as risk tolerance is key component
- Policies and procedures that are in place can already lead to possible actions once risk tolerances are defined
- Run scenarios through testbeds to simulate a flight from start to finish to understand how decisions are made
- Determine value of trends in addition to probabilities

Group 4

- Focus probabilities beyond 0-3 window → planning phase + rapid updates

- Run any probabilities development through FAA AWDE group
- Ensure ICAO requirements (present and future) are considered and incorporated
- Develop training with a focus on probabilistic piece of and confidence level

Group 5

- Develop study / testbed following NSSL broadcast case already done to incorporate and hear from a wide variety of aviation weather hazard users
- Develop a baseline of knowledge
 - What is probabilistic information?
 - How is probabilistic information currently used?
 - What does deterministic mean to users?
- Run users through scenarios to set a baseline before exploring probabilistic information

Planning Meeting

3:00 PM – 5:00 PM CDT (hybrid)

Session Co-Leads: Matt Fronzak (MITRE) and Matthias Steiner (NCAR)

The FPAW Planning Meeting was held immediately after Session #2 of the FPAW Plenary Meeting and was led by Matthias Steiner. Following considerable discussion with both in-person and virtual participants, the following dates, locations, session topics (session leads) were set up for the next two FPAW meetings.

Please note that the order of sessions in these lists is NOT the order that will be used at the actual meeting. Also, the nominal definitions of long sessions are those that are expected to span 3-4 hours of total time excluding lunch breaks, while short sessions are those planned to last 1-2 hours of total time, again excluding any lunch breaks.

Spring 2023 FPAW Meeting

Location: NOAA NWS Aviation Weather Center, Kansas City, MO

Dates: May 16-18, 2023¹

Topics:

- Long Session: Research to Operations (R2O)
(Danny Sims/FAA and Apoorva Bajaj/Climavision)
- Long Session: Exploring New Observation Methods and Standards
(Scott Landolt/NCAR and John Steventon/FAA)
- Long Session: Testbed Activity – End User Engagement in the R2O Process, Part 1
(David Bieger/NOAA NWS and Frankie Velazquez/FAA²)
- Short Session: FPAW Topic Updates
(Steve Darr/Dynamic Aerospace)

¹ These dates are different than those initially identified at the Fall 2022 FPAW Planning Meeting, based on the unavailability of meeting space at the Aviation Weather Center

² There is a possibility that one or both co-leads for this session may change, most likely to a different person within the same parent organization

- Short Session: FPAW Organizational Updates
(Matt Fronzak/MITRE and Matthias Steiner/NCAR)

Fall 2023 FPAW Meeting

Location: FAA William J. Hughes Technical Center, Atlantic City, NJ

Dates: November 14-16, 2023

Topics:

- Long Session: Climate Change and Aviation
(Randy Bass/FAA)
 - Long Session: Operator Perspectives on Aviation Information Gaps
(Nathan Polderman/United Airlines)
 - Long Session: Testbed Activity – End User Engagement in the R2O Process, Part 2
(Ian Johnson/FAA)
 - Short Session: FPAW Topic Updates
(Steve Darr/Dynamic Aerospace)
 - Short Session: FPAW Organizational Updates
(Matt Fronzak/MITRE and Matthias Steiner/NCAR)
-

Thursday, October 27, 2022

Tour of the OU Advanced Radar Research Center

8:00 AM – 9:00 AM CDT

Before the start of Day 3 of the Fall 2022 FPAW Plenary Meeting, a tour of the Oklahoma University (OU) Advanced Radar Research Center at OU was conducted by David Schwartzman (OU) and Gus de Azevedo (OU/OSU). The center does research in radar technology in general, but more than half of its projects are focused on weather radar. One of the main research focuses is mobile weather radars for high impact weather studies. During the tour, Gus (center right, speaking) presented his doctoral research about UAS-based weather radar measurements for winter weather, which has direct applications for Urban Air Mobility and Terminal Area Icing. For more information on the OU ARRC, go to <https://arrc.ou.edu/>.



Plenary Meeting

Session 3, “Review of Prior FPAW Topics,” 10:00 AM – 11:00 AM CDT (hybrid)

Session Lead: Steve Darr (Dynamic Aerospace)

Alfred Moosakhanian (FAA), Weather Community of Interest (Wx COI) co-lead, focused on the activities of the FAA Wx COI. Alfred presented an overview of the Wx COI’s organization, purpose, and governance to provide context for its work, which focuses on identifying issues through the collection and categorization of problem statements associated with the FAA’s provision of weather services. He then provided updates on the nine Special Weather Action Teams (SWATs) organized to focus on each problem statement category, by highlighting Wx COI plenary actions taken over the prior year. Alfred wrapped up his presentation with a brief on upcoming COI activities and encouraged FPAW members to work with the COI to provide lessons learned and to help shape the COI’s response to the FAA’s recently published strategic plan, “[Charting Aviation’s Future: Operations in an Info-Centric NAS.](#)”

Bob Avjian (MITRE) provided information on the FAA’s PIREP modernization plans, focusing on the motivating factors for PIREP system modernization, findings and recommendations, status, engagement with stakeholders, and next steps. Notable was a key recommendation to consolidate PIREP modernization within a single agency-wide strategy coordinated by the FAA Office of Enterprise Services through the creation of an FAA PIREP Modernization Strategic Plan (PMSP). Bob’s briefing then focused on the PMSP, the PIREP Modernization Roadmap it incorporates, and multiple PMSP elements that will introduce extensive automation and collaboration to the modernization effort and future PIREP generation. Bob concluded his briefing by identifying the PIREP modernization next steps being taken in FY2023.

Steve Darr (Dynamic Aerospace) summarized the status and next steps associated with the implementation of ADS-B Weather, presenting progress against the three major elements of the ConOps and identifying the data transmitted in Air Reports and Pilot Reports. The primary focus of Steve’s presentation was on the need to bridge the research to operations “Valley of Death”. He noted that progress to date had come mostly from ‘push’ and that more rapid and certain progress needed increased ‘pull.’ Steve then asked FPAW members to let him know what ADS-B Wx can do for them and to consider what they can do for ADS-B Wx, encouraging them to “Get on the ADS-B Wx wagon!” If you’d like more information on ADS-B weather, please contact Steve at sdarr@dynamicaerospace.com.

Session 4, “FPAW Organizational Update,” 11:00 AM – 12:00 PM CDT (hybrid)

Session Co-Leads: Matt Fronzak (MITRE) and Matthias Steiner (NCAR)

Matt and Matthias reviewed the background and thinking behind the formation of the FPAW Steering Committee (SC).

Next, the members of the FPAW SC were identified and introduced, and those at the meeting, either in-person or virtually, were given an opportunity to say a few words. More information about the FPAW Steering Committee members can be found on the FPAW website at <https://fpaw.aero/about/organization>.

Finally, the group was briefed on “What’s Next for the FPAW SC.” More information about and from the FPAW SC will be shared with the group in the coming months.

Seminar/Tech Talk, “Back to the Future – Aviation Weather Opportunities for the Research Community,” 1:00 PM – 2:00 PM CDT (hybrid)

Speaker: Matthias Steiner (NCAR)

This seminar was FPAW’s way of saying “thank you” to the National Weather Center and the National Severe Storms Laboratory (NSSL) for hosting our meeting. It was also a way for FPAW to engage with and give back to the local student and academic communities.

Matthias Steiner (NCAR), in this engaging talk aimed at students and academicians, reviewed the aviation/aerospace industry, and explored opportunities for the aviation weather research community to engage and create actionable guidance for emerging flight operations under a changing climate system. It examined the rapidly evolving technologies, industry stakeholder groups and procedures, as well as key aspects of the weather and climate system. The presentation highlighted the myriad ways the operational environment must be considered an integral part of flight operations and must be used to stimulate innovation in applying meteorological research for the benefit of air transportation.