Fall 2023 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 <u>https://fpaw.aero/events/2023/fpaw-fall-2023</u>.



Tuesday, November 14, 2023

Plenary Meeting

Sessions 1a and 1b: Climate Change and Aviation, 9:30 AM - 2:30 PM EST

Session Co-leads: Tammy Flowe (FAA) and Tim Rahmes (Boeing)

The session focused on how climate change impacts aviation, as well as how aviation influences climate change. Tammy covered timely topics of interest, including the United States 2021 Climate Action Plan, which specifically calls for the aviation industry to collaborate with the Departments of Agriculture and Industry with regards to research into climate science. She also provided an overview of the FAA's Environment and Energy (E&E) Strategy and its mission "...to understand, manage, and reduce the environmental impacts of global aviation through research, technological innovation, policy, and outreach." Both policy documents specifically call out research into persistent contrail formation and impact on climate change, an area the Aviation Weather Division is exploring for possible collaboration with the Department of Energy. Tim covered the new European Union efforts led by EASA to address how our industry

can adapt to the impact of climate change and become climate resilient by 2050. A key objective is to provide European aviation regulators and industry with better understanding of the effects of climate change on aviation safety.

The Keynote for the session was delivered by Paul Williams of the University of Reading in the United Kingdom (right), who provided an overview of his extensive and well-publicized research into increased turbulence probability in a warming atmosphere.





Other presenters/panelists during the 5-hour session included Nicole Didyk Wells of the FAA Office of Environment and Energy (AEE) Emission Division, who discussed her work in Use of Sustainable Aviation Fuel (SAF), Contrail Modeling, Measurements, and Mitigation, James Done of the National Center for Atmospheric Research (left), who briefed the group on Climate Projections and High Impact Weather, and Ted Thrasher from MITRE, who talked about Contrail Mitigation Decisions.

In a trail blazing first, FPAW member Michael Splitt,

from the Florida Institute of Technology, and his junior- and graduate-level aviation meteorology

classes, joined the latter half of the session virtually and provided feedback to us via surveys (see below) on two of the presentations. Perhaps this will become a routine occurrence at future FPAW meetings!



Session 2: TCF Verification, 2:45 PM – 3:45 PM EST

Session Co-leads: Jason Baker (FAA) and Matt Wandishin (NOAA GSL)

Presenters Jason Baker, Kevin Stone/NWS (right) and Matt Wandishin provided a history and short description of the Traffic Flow Management Convective Forecast (TCF) product, along with an explanation of how the forecasts are currently verified. Performance of the TCF over the last six years, as measured by probability of detection, false alarm ratio and critical success index, was presented, along with statistics on the typical convective coverage within TCF polygons.

The data show that, while there is variability in the

performance from year-to-year and from month-to-month, there is no discernable trend across the six-year period. Is this because there has been no improvement during that time or is the current slate of statistics not sufficient to measure improvements than may have occurred?

Additional questions raised by the presentation and the subsequent discussion:

- Is there a consensus view on the relative important of avoiding missed events versus false alarms? (Current verification treats them as equally undesirable.)
- Does the information communicated by the TCF match with the information needed by operators to make TFM decisions?
- Do we need new verification measures that tie forecast performance to decision making?
- Newer convective forecasts are available; how does the community weigh the relative merits of these (mostly) automated forecasts compared to the merits of the collaborative process of the TCF?



- TCF convective coverage numbers rarely approach the officially defined "Sparse" and "Medium" coverage thresholds; should the official thresholds be changed?
- Is coverage the most useful information to be communicated as opposed to some type of traffic permeability value?

FPAW Steering Committee (SC) Meeting, 4:00 PM – 5:30 PM EST

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

Attending in person were Matt Fronzak and Matthias Steiner. Attending virtually were Rex Alexander, Eric Avila, David Bieger, Rick Curtis, Ian Johnson, Matt Johnson, Marilyn Pearson, John Steventon, Jennifer Stroozas, and Elizabeth Wilson. Invited and attending in virtually was Steve Darr.

The committee's discussions covered the following topics:

FPAW Website Updates

• FPAW web site needs to be updated with the latest FPAW SC information

ADS-B Wx White Paper

- The FPAW SC was briefed on a proposed ADS-B Weather white paper produced by Steve Darr and Elizabeth Wilson
- Lively discussion took place covering multiple topics relevant to the contents, impact and ultimate disposition of the proposed white paper

FPAW Process to Endorse and Publish a White Paper

- The development of the ADS-B Wx White Paper highlighted the need to create an FPAW white paper endorsement and publication process
- More spirited discussion then occurred, resulting in the decision to adopt a vetting process similar to that used by industry standards committees, e.g., RTCA, and apply it to the proposed ADS-B Weather White Paper
- At the end of the meeting, the FPAW SC members in attendance agreed unanimously to move forward with position paper

Wednesday, November 15, 2023

Tour #1 of the MITRE IDEA Lab, 8:30 AM - 9:00 AM EST

The first of two 30+-minute tours of the MITRE Integration, Demonstration and Experimentation for Aviation (IDEA) Lab took place. It was conducted by MITRE Group Leader Jacob Richkus.

The IDEA Lab is a robust environment capable of handling a range of exploratory concepts and simulation domains, while also providing necessary realism for a high-quality user experience. It is an extensible, scalable, real-time distributed simulation environment based on an open, layered architecture, and it brings together a broad set of integrated capabilities for Human-in-the-Loop (HITL) simulations, fast-time simulations, demonstrations, and visualizations.

Participants were shown the various air traffic control workspaces, including the Air Traffic Control Tower (ATCT) simulator (below left), along with the Part 121 cockpit simulator (below right) and the General Aviation (GA) cockpit simulator.



Plenary Meeting

Sessions 3a and 3b: A Day in the Life of an Input to the ANG-C6 Weather Needs Portal, 9:30 AM – 1:45 PM EST

Session Co-leads: Matt Eckstein (Delta Air Lines) and Rebecca Kotten (FAA), with a huge assist from Brandon Smith (FAA)

The Policy and Requirements Service branch of the FAA Aviation Weather Division (ANG-C64) led a session that focused on user-submitted weather needs. The session highlighted the status of recent entries into the portal. It began with an overview of the Aviation Weather Division, which showcased the mission and vision of ANG-C64 and how coordination and collaboration with FAA and external partners is paramount to ensuring weather is integrated into all aspects of NAS operations. An overview of various programs within ANG-C64 was also given, which highlighted how user entries into the Weather Needs Portal (WNP) are prioritized and vetted to the best group for work. The National Weather Service also spoke about their requirements process, which is imperative in executing weather-related requirements that are levied by the FAA.

Ample time for discussion and group collaboration was given and resulted in robust discussion about the benefits of the WNP and suggestions for improved processes. The benefits to the FAA and the user community include increased collaboration with partners and potential improvements to ANG-C6 processes.

FPAW Planning Meeting, 2:00 PM – 4:00 PM EST

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

The group discussed dates, locations and main session topics for the upcoming Spring 2024 and Fall 2024 FPAW meetings. The FPAW SC, as part of its December 2023 and January 2024 meetings, took the information from the FPAW Planning meeting and adjusted it based on newer information.

The exact location and dates of the Spring 2024 meeting are still being finalized. However, the target location is the Dallas/Fort Worth area, while the preferred dates remain Tuesday through Thursday, April 30-May 2, 2024.

The Spring 2024 FPAW meeting will focus on the identification of *Aviation Weather Information and Education Gaps*. One of the main sessions will explore this topic from the perspective of legacy operators, while another will look at problem space from the perspective of emerging operators. And this helps explain why Dallas/Fort Worth, home to the headquarters of two major U.S. airlines and a major commercial UAS initiative, is our target location; we expect to attract a significant number of local attendees to the meeting. The final day's main session will brainstorm the ideas generated during the first two days and translate them into FPAW action items.

In addition to the main session topics described above, key NOAA personnel will use one of the short sessions to brief the group on their work to identify the user needs associated with the system intended to replace the WSR-88D radars, also known as NEXRADs. An update from the leadership of the FAA Weather Community of Interest (Wx COI) will be the focus of another of the short sessions. Finally, Steve Darr will dish out some FPAW Slaw in the final short session.

The Fall 2024 FPAW meeting will be held at the FAA William J. Hughes Technical Center (FAATC) in Atlantic City, NJ. While the dates have not been finalized, we are targeting Tuesday through Thursday, October 29-31, 2024.

Based on both the discussions that took place at this FPAW Planning Meeting, and those that occurred at subsequent FPAW SC meetings, two main session topics have been identified, with a third still TBD. One, tentatively titled *The Art of the Possible (Technical Capability Demonstrations Arising from Gaps Identified in Spring Meeting)*, will be focused on solutions to the gaps in aviation weather information and education identified in the previous meeting. Another, titled *AI and Aviation Weather*, will explore the relationship between artificial intelligence and aviation weather, especially in the context of those same gaps.

We anticipate that the FAA Wx COI will, once again, have a standing short session at this meeting, and that Steve Darr will be serving another helping of his FPAW Slaw.

Session 4: FPAW Organizational Update, 4:15 PM - 5:00 PM EST

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

The FPAW Co-Leads briefed the group on FPAW organizational changes.

The terms of four FPAW SC members, Eric Avila/NATCA (Users), Jim Evans/MIT-LL (RED/Academia), John Kosak/Priester Aviation (Users) and Jennifer Stroozas/NWS AWC (Providers) were scheduled to end on September 30, 2023. Twelve highly qualified individuals, including three of the four members whose terms were expiring, self-nominated for the four open seats. In mid-September, current FPAW SC members voted to fill the open FPAW SC slots. Incumbent FPAW SC members Eric Avila and Jennifer Stroozas were re-elected to the FPAW SC, along with new members Matt Johnson/Metro Aviation (Users) and Rick Curtis (RED/Academia). We congratulate Eric, Jennifer, Matt J. and Rick, and offer a sincere thank you to Jim and John for their service on the FPAW SC!

An ADS-B Wx White Paper was presented to the FPAW SC at its meeting the previous day. Its authors requested that FPAW review, adopt and publish the white paper. The FPAW SC is in the process of reviewing the white paper and finalizing an FPAW White Paper publication process. Both topics will be discussed at the next FPAW SC meetings.

FPAW Dinner

About two dozen in-person FPAW participants made their way to The Italian Kitchen in McLean, VA on Wednesday evening for a night of aviation weather camaraderie and delicious Italian food. Alas, nobody took any pictures, so you'll have to take our word that we had a great time and left in wonderful, fully sated spirits.

Thursday, November 16, 2023 <u>Tour #2 of the MITRE IDEA Lab, 8:30 AM – 9:00 AM EST</u>

The second of two 30+-minute tours of the MITRE IDEA Lab took place. Once again, it was conducted by MITRE Group Leader Jacob Richkus (right, with coffee cup in hand).



Plenary Meeting

Sessions 5a and 5b: Testbed Activities – End User Engagement in the R2O Process Part Deux, 9:30 AM – 2:30 PM EST

Session Co-Leads: Sonia Alvidrez (FAA) and Ian Johnson (FAA)

This session consisted of presentations covering three separate research areas. Input from the FPAW audience was sought for each.

Utility of a Cockpit Cognitive Assistant (Digital Copilot) (Presenters: Ian Johnson and Matt Pollack/MITRE)

The overall goal of the first activity was to provide the FPAW attendees an overview of the Cognitive Assistant concept, with an emphasis on weather capabilities, and to present and discuss results from a Weather Technology in the Cockpit (WTIC) program study that evaluated the use of the MITRE Digital Copilot as a cognitive assistant.

Matt Pollack introduced the group to the tool (right), giving the audience a comprehensive overview of Digital Copilot and discussing and demonstrating the weather capabilities of this cognitive assistant.



Ian Johnson then presented WTIC research that evaluated the potential benefits in decisionmaking derived from the use of Cognitive Assistance Tools (CATs). Ian discussed the purpose of the study, presented the results, and discussed next steps.

Testbed Session: LAMP Flight Category Onset/Cessation Forecasts (Presenter: Sonia Alvidrez)

The FAA Aviation Weather Demonstration and Evaluation (AWDE) Services Team, ANG-C63, co-led the Testbed Session, which began with an overview of the Localized Aviation MOS Product (LAMP) Flight Category (FC) Onset/Cessation product. The Aviation Weather Division (AWD), ANG-C6, is currently funding research to further refine the LAMP capability. Currently, LAMP provides ceiling and visibility (C&V) forecasts for the Core 30 Airports. However, in addition to C&V, there is a need to have a capability that provides information on FC onset and cessation. In response, NOAA NWS developed both text-based and graphic solutions. To provide the solutions to users, the Aviation Weather Center Testbed (AWT) is developing and hosting a website to showcase the text and graphic solutions. AWT and AWDE are working together to gather feedback from FPAW members to aid in determining if the solutions provide the necessary information for FC onset and cessation and if the solutions are suitable to support decision making strategies.

During the Testbed session, participants, both in-person and virtual, were encouraged to ask questions and provide feedback pertaining to the mock-up interface designs of the graphic solution of the LAMP Flight Category Onset/Cessation. After the overview was complete participants were asked a set of questions focused on obtaining feedback on the design of the graphic solution and how to integrate the solution into operations. Feedback, obtained through discussion and real-time on-line polling, will be used to aid in the next iterative design of the graphic solution.

Automated Precipitation Type and Intensity Changes (Presenters: Victor Passetti/FAA and Steve Maciejewski/FAA)

The final presentation came from Victor Passetti and Steve Maciejewski, like the previous presenters also from the FAA Aviation Weather Division Weather Engineering and Evaluation Branch (ANG-C63). They led a fascinating talk centered around the challenges associated with totally automated (not human augmented) sensing of winter precipitation types and intensity changes. After verbally priming the audience, they visually demonstrated the difficulties associated with this problem space using a mixed winter precipitation video and sought input of the FPAW audience via interactive polling software. An open discussion on the utility of automated precipitation type and intensity improvements followed. Upon conclusion of Victor

and Steve's talk, it was crystal clear that, as is so often the case, the real-world problem is much more complicated and nuanced than it may have seemed at first glance.

At the conclusion of Session 5, someone pointed out that there were multiple "Matts" in the room, five to be exact (right). With apologies to Pentatonix, should this motley crew ever take a run at making it big in the music business, they'd probably call themselves Pentamatics.



Session 6: Review of Prior FPAW Topics, 2:45 PM – 3:45 PM EST

Session Lead: Steve Darr (Dynamic Aerospace)

FAA Weather Community of Interest (Wx COI) Co-Lead Randy Bass (FAA) presented an overview of the Wx COI – what it is, what it does, and how it does it, noting that the Wx COI focuses on identifying issues through the collection and categorization of problem statements associated with the FAA's provision of weather services. He then provided a summary of the Wx COI's work since the last FPAW meeting. Next, Randy previewed anticipated Wx COI changes and the need for, approach to, and work done on developing an FAA Weather Strategy in 2022 and 2023. He asked whether a formal relationship between FPAW and the Wx COI would create a means for the external (non-FAA) weather community to provide feedback to the Wx COI through an open public Weather Data/Information Exchange and Coordination Meeting between FPAW and the FAA Wx COI. He concluded by previewing the Spring 2024 FPAW Wx COI briefing, which will include updates on the Wx COI Strategic Planning Team, more information on an FPAW/Wx COI formal relationship, and a review of open Wx COI problem statements.

Steve Darr summarized the status and next steps associated with the implementation of ADS-B Weather, presenting progress against the major elements of its development and implementation. The primary focus of his presentation was on the progress made on message broadcast, receipt, and data delivery, including progress towards signal in space, air-to-air and air-to-ground receipt, and data distribution. Steve noted recent development in ABO sensing, regulations, and standards, that progress to date had come mostly from 'push' efforts, and that more rapid and certain progress needed increased 'pull' efforts. He then asked FPAW members to help answer the question, "If you build it, will they come." Steve concluded by reviewing the support from various aviation and weather community stakeholder organizations that encouraged the development and implementation of ADS-B Wx and outlined the position paper that the FPAW Steering Committee is reviewing, which recommends early and broad implementation of ADS-B Wx to the avionics, operator, regulator, and ABO data user communities, and the conduct of a large-scale demonstration of the potential of ADS-B Wx data.

If you'd like more information on ADS-B Wx, please contact Steve at <u>sdarr@dynamicaerospace.com</u>.