

Spring 2022 FPAW Meeting Recap

Note: This meeting recap, and all associated presentations, chat logs, meeting recordings and referenced material, are or will soon be freely available on the FPAW website at <https://www.fpaw.aero>.

This was the first in-person meeting (with remote participation) after two years of conducting business virtually. It was great to see people in person and reconnect after such a long time!



Planning Meeting

Tuesday, April 19, 2022, 8:00 AM – 12:00 PM EDT (hybrid)

The FPAW planning meeting was used to set the date and planned location, and identify the preliminary agenda and session leads, of the Fall 2022 FPAW Meeting. In addition, we started to assemble topics, and identify potential session leads, dates, and candidate locations for the Spring 2023 FPAW Meeting. A separate email containing a save-the-dates announcement for the Fall 2022 FPAW Meeting, along with its anticipated location, was sent out in late May 2022.

Plenary Meeting

Session 1, Tuesday, April 19, 2022, 1:00 PM – 5:00 PM EDT (hybrid)

Session 1a: “Low-altitude weather challenges for new and novel aircraft as well as traditional users of low-level airspace” (1:00 PM – 4:00 PM)

Lead: Ralph Stoffler (Raytheon Technologies)

We discussed problems associated with the use of low-altitude weather information in the context of aircraft integration, pilot training and performance standards as we navigate a transformative time in aviation. The disruptive nature of UAS and eVTOLs operating among current users of the NAS has presented challenges to our existing weather forecasting technology. New proposals for nowcasting weather were discussed as we plan for Vertiport and off-airport operations.

Key Highlights: Our efforts to develop new performance standards for weather data were addressed. The standards are designed to increase the amount of available data in the national air space. By focusing on data instead of sensors, we can expand the amount of available data from nontraditional sensors and remote sensing. It also allows the addition of more cost-effective weather sensors to the National Airspace System.

Training/Decision Making: Pilots of legacy aircraft are very knowledgeable about weather and make decisions based on what they see from the cockpit. As more uncrewed and autonomous flying takes place, remote pilots need different weather training and products, especially those that improve their level of situational awareness. Reliance on human decision makers in the cockpit is no longer a viable option.

Models and Local conditions: Models tend to provide wide swath capabilities but generally don't have the resolution to account for local effects that especially impact low-flying aircraft, drones, and helicopters. A combination of higher resolution models, more data and human-over-the-loop forecasters will be critical to the future success of these types of operations.

The government has made it clear that it cannot provide all the services necessary to support the emerging drone industry. We discussed the growth of supplemental data providers and their role in the future in the aviation industry.

Session 1b: "The role of weather in enhancing aviation efficiency and reducing carbon emissions" (4:00 PM – 5:00 PM)

Lead: Gary Pokodner (FAA)

This one-hour session featured discussions on weather-related causal factors of excessive fuel burn and carbon emissions in flight operations, and research projects to address them. The panel was composed of research representatives from industry, FAA, NASA, and the Air Force. The objectives of the session were to develop a list of weather-related causal factors that, if resolved, would result in a reduction in gaseous emissions, to provide status updates of related research to foster collaboration, and to identify causal factors that may require research to resolve.

Each panelist presented a summary of research projects currently or previously performed that included objectives to reduce gaseous emissions. In addition, the FAA presentation included identifying a model that is available to the public to assist in quantifying benefits resulting from enhanced adverse weather avoidance routing/re-routing. The projects presented varied in approach, with some focusing on cockpit enhancements while others were evaluating ground-based enhancements. The biggest takeaway from the session was that the panelists and attendees had little knowledge of other research efforts related to reducing emissions, so this panel served as outreach of ongoing research. No formal actions resulted from the panel, but multiple reports were shared between the presenters.

Session 2, Wednesday, April 20, 2022, 8:00 AM – 12:00 PM EDT (hybrid)

Session 2a: "Translating weather information for non-meteorologists" (8:00 AM – 11:00 AM)

Lead: Joel Siegel (Booz Allen Hamilton)

During this session we walked through several of the barriers we, as an industry, face regarding communicating risks and hazards to non-meteorologists. We identified the stakeholders as pilots, dispatchers, and remote pilots in command, and alluded to the overlap with air traffic controllers as well. We outlined some of the problems such as information overload, different

products showing the same weather information in different ways, and addressing the age-old question “what should I use for the best weather forecast?” Two human factors experts then provided their insight on how pilots are trained to digest weather information both in the cockpit and during preflight planning. We heard about ways pilots have indicated they would like to be notified of weather impacts and how we can help support those requests.

The session then shifted gears to discuss some of the educational resources that have been implemented in today’s environment, such as online training materials provided by FAA Safety.gov. Additionally, our friends in the airline world gave us insight into the requirements for recurrency training and how they weave weather information into that training. Do jump seat rides really help transfer knowledge? But how do jump seat rides translate into the future with urban air mobility and remote pilots now operating from the ground? We looked 10 years into the future to discuss perceived barriers to effectively translating weather information for those non-meteorologists as well. Overall, we have been left with a need to better train our pilots and dispatchers, as we have an abundance of information and a lack of understanding.

Session 2b: “Ongoing FPAW topic review – 5G and aviation” (11:00 AM – 12:00 PM)

Lead: Tom Ryan (AvMet Applications)

This session included presentations from the FAA and IATA providing comparing and contrasting views and topics dealing with the relatively new 5G effect on aviation. Christina Clausnitzer from the FAA’s Flight Standards organization provided a briefing entitled “FAA Radio Altimeters and 5G C-Band Deployment”. She synopsized the 5G C-band Spectrum Deployment in the US National Airspace, spoke to the mitigations the FAA has utilized along with the cooperation of industry, and then addressed the global 5G C-band Deployment and the national regulatory power limits. Stefano Prola, from IATA, followed that with a presentation entitled “Radio Altimeters and 5G, A European Perspective”. He offered a brief description of the challenge faced with this issue in Europe, provided some comparison coverage to Christina’s thoughts on the global issues, and finally described some of IATA’s considerations for the future. The presenters had coordinated their talks to provide the broadest possible amount of information and challenges allowed by the short time they had. It was a succinct and accurate representation of what is happening both similarly and differently in the US and EU.

Session 3, Wednesday, April 20, 2022, 1:00 PM – 5:00 PM EDT (hybrid)

Session 3a: “NextGen weather: Past, present and future” (1:00 PM – 4:00 PM)

Lead: Le Jiang (IMSG) and Bill Baumann (FAA)

This session reviewed the original vision of NextGen Aviation Weather and ATM-Weather Integration, which includes four levels of integration ranging from weather on the glass, to weather translation, ATM impact conversion, and then ATM decision support. The so-called “Ketchup-Mustard” chart depicted this vision intuitively. A later, unpublished version of this chart emphasized the necessary overlapping between the weather translation and ATM impact conversion steps, given the complexity of the problem space. In practice, developing useful

decision support tools requires strong buy-in from ATM operations and close collaboration among the aviation weather and ATM decision support research communities. Successful examples that were mentioned included the FAA's Terminal Precipitation on the Glass (TPoG) and NWS efforts tailored to aviation weather.

Future capabilities will need to use aviation weather forecasts as actionable information, incorporate more heterogeneous datasets, utilize NWP modeling capabilities more effectively, and take advantage of evolving technologies, as highlighted by FAA's Aviation Weather Research Program (AWRP) and FAA's roadmap towards 2035.

On the other hand, the community has not gone much beyond a "Weather on the Glass" capability in the past decade. The panel discussions and Q&A revealed that the actual development of ATM-Weather Integration has deviated from the original vision in terms of lacking end-to-end decision support tools (DSTs) that encompass all levels of the integration. The reasons for this include the uncertainty that is part of any weather forecast, complexity and difficulty in weather translation, and lack of the actual personnel structure and funding mechanism (across agency lines of business) for building end-to-end DSTs.

Session 3b: "FPAW organizational update" (4:00 PM – 5:00 PM)

Lead: Matt Fronzak (MITRE Corporation) and Matthias Steiner (NCAR)

The FPAW Co-Chairs went over an organizational change they propose to implement in the coming months: the formation of an FPAW Steering Committee. This group, which would meet four times annually, would be charged with setting the direction of FPAW, to include identifying topics and presenters for upcoming FPAW meetings, producing FPAW position papers on issues deemed worthy of FPAW input, and other evolving responsibilities. It would be comprised of 12 members, each representing one of the four primary aviation weather constituencies: Users; Providers; Educators/Researchers, Engineers and Developers (REDs); and Regulators. There would be four representatives from the User constituency, three each from the Providers and Educator/RED constituencies and two from the Regulators constituency. The FPAW Co-Chairs would also be part of the FPAW Steering Committee.

The Co-Chairs ended the presentation by soliciting nominations (including self-nominations) for the FPAW Steering Committee from the attendees, several of whom expressed interest in serving in this capacity.