



## Friends and Partners in Aviation Weather

25 April 2024

### Statement of Support for the Implementation of Automatic Dependent Surveillance - Broadcast Weather

The Friends and Partners in Aviation Weather (FPAW) is a volunteer professional organization that consists of more than 400 members representing four aviation weather constituency groups: users, providers, researchers/engineers/developers/academicians, and regulators.

The FPAW Steering Committee (FPAW SC), comprised of 15 representatives of the four aviation weather constituency groups, is the voice of FPAW. This position paper comes from the FPAW SC and represents the views of FPAW, confirmed through an open member comment and resolution process.

#### **Bottom Line Up Front (BLUF)**

*Aircraft-based observations provide data critical to numerical weather prediction models and enable rapid updating of forecast products. Recent developments in aircraft surveillance system standards and operational requirements now allow aircraft position surveillance systems to include weather surveillance capabilities. Weather awareness and forecasts enhanced by improved weather surveillance could increase aircraft utility, operational efficiency, and aviation safety, and help to mitigate the significant economic impact of weather events and variability within and beyond the aviation domain.*

#### **ADS-B Wx: FPAW Recommendations**

- 1) FPAW recommends that Automatic Dependent Surveillance – Broadcast Weather (ADS-B Wx) Air Report (AIREP) and Pilot Report (PIREP) capabilities be implemented by avionics manufacturers in ADS-B V3 avionics and that commercial and general aviation operators equip with ADS-B Wx capable avionics as early and as widely as possible.
- 2) FPAW recommends that the Federal Aviation Administration (FAA), the National Weather Service (NWS), and the weather and aviation communities be prepared to fully leverage ADS-B Wx data as soon as they become available.
- 3) FPAW recommends that the NWS and FAA evaluate the benefits of ADS-B Wx by conducting a large-scale demonstration of its potential, using funds appropriated in support of the Aviation Weather Improvement Act, the Weather Act and/or FAA reauthorization acts, or other appropriations.
- 4) FPAW recommends that, if ADS-B equipage incentives are again made available, the FAA uses such incentives to strongly encourage operators to equip with ADS-B Wx capable avionics and that the NWS and FAA integrate ADS-B Wx data provided by aircraft equipped through an incentive program into any demonstration of the potential of ADS-B Wx.

## **About FPAW**

Created in 1997, FPAW is the only global organization that brings together representatives of every part of the aviation weather community. FPAW is a grass roots, all-volunteer group that serves as the aviation weather community of practice. The FPAW mission is, “to increase understanding of the impact of weather on current and emerging aviation operations, identify, discuss and provide support to problem areas that need further development of accurate and timely weather guidance, and facilitate the integration of weather into the operational decision-making process.”<sup>1</sup> The ultimate goal of FPAW is ensuring the safest, most efficient, and reliable aviation operations possible in the face of all aviation weather challenges.

## **The Development of ADS-B Wx**

The broadcast of meteorological data via the ADS-B data link was first published as a potential next generation ADS-B application in the ADS-B Version 2 Minimum Operational Performance Standards (MOPS) by RTCA and EUROCAE in 2009.

Since 2012, the FPAW community has regularly been briefed on and contributed to the development of Weather Surveillance (WxS) requirements. The maturation of these WxS requirements, initially in RTCA Operational Services and Environmental Description document DO-339, and later in RTCA Minimum Aviation System Performance Standard DO-364, provided requirements for aircraft-based observations (ABO) supporting wake vortex, air traffic, weather, and other applications.

The inclusion of WxS requirements as two optional additional features, ADS-B Wx AIREP and ADS-B Wx PIREP, in ADS-B Version 3 MOPS by RTCA in DO-260C and DO-282B, and by EUROCAE in ED-102B, provide an immediate opportunity for the FAA and NWS to efficiently obtain weather data that are currently generated but not communicated beyond the flight deck during most commercial and general aviation operations.

ADS-B Wx AIREP provides for fully automated, continuous, frequent broadcast of weather and aircraft parameters derived from onboard systems that include wind, temperature, icing, turbulence, and/or water vapor. ADS-B Wx PIREP allows pilots to initiate standard PIREP parameter reporting, including cloud, icing, and turbulence information with associated altitudes, via data link communications. The National Transportation Safety Board (NTSB), in its 2017 special investigative report on PIREPs, recommended that the FAA provide submitters a reliable means of electronic submission of pilot reports (A-17-26); the ADS-B Wx PIREP capability provides one such means. Following the publication of ADS-B Wx requirements in the ADS-B V3 MOPS, the NTSB, in its 2021 safety research report on turbulence-related injuries in Part 121 air carrier operations, recommended to the FAA that Part 121 air carriers be required to equip with and operate ADS-B Wx capable avionics in ADS-B rule airspace (A-21-28, A-21-29, and A-21-30).

United Airlines, the Air Lines Pilots Association, the Airline Dispatchers Federation, the National Weather Service and its Aviation Weather Center, the World Meteorological Organization, the Aircraft Owners and Pilots Association, Airlines for America, the International Air Transport Association, the FAA Air Traffic Organization Top-5 Safety Team, the FAA NextGen Weather Division, and others have expressed support for the development and implementation of ADS-B Wx.

## **ADS-B Wx: A Deeper Dive**

ADS-B Wx will allow operators to avoid costly upfront and continuing investments in aircraft communications equipment and data link services to secure ABO data in support of their operations.

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<sup>1</sup> <https://fpaw.acro/about> (accessed on 31 October 2023)

Such costs have limited the willingness of operators to communicate and share ABO data and led the government to incentivize their collection through cost-sharing incentives.

ADS-B Wx data will be received through existing ADS-B receiver networks upgraded to receive ADS-B V3 messages. Numerous studies<sup>2</sup> have shown ABO data are among the most important inputs to global and regional numerical weather prediction models. Making ADS-B Wx AIREP and PIREP data available to the NWS will improve both aviation and general weather forecasts. ADS-B Wx AIREP will provide critical atmospheric boundary layer, vertical profile, and upper air observations of wind, temperature, icing, turbulence, and/or water vapor whenever and wherever properly equipped aircraft are flown. These data will be used for initialization of rapid update numerical weather prediction models. They will also provide a permanent record of atmospheric observations whose frequency and distribution cannot be matched by current systems.

Although achieving consensus among the aviation and weather communities in developing ADS-B Wx standards demonstrates progress, additional investment is needed to ensure its implementation. NWS has identified ADS-B Wx data as a bona fide data acquisition requirement and is awaiting their availability. The conduct of a large-scale demonstration of the benefits of ADS-B Wx data has been discussed with FAA, NWS, and other stakeholders.

### **ADS-B Wx: Current Events**

As of 18 December 2023, aviation operating rules allow ADS-B V3 compliant avionics to be used, including those that incorporate ADS-B Wx capabilities. While they do not specifically address ADS-B Wx, legislative efforts related to aviation weather and FAA reauthorization may provide opportunities to perform a large-scale demonstration of the potential of ADS-B Wx.

The Aviation Weather Improvement Act (H.R. 3915) was passed by the House Committee on Science, Space, and Technology on 27 July 2023 with unanimous, bipartisan support. H.R. 6093, Weather Act Reauthorization, was similarly passed by the committee on 08 November 2023. H.R. 6093 incorporates language from H.R. 3915 that authorizes the appropriation of \$50M over five years for the procurement and analysis of ABO data by the NWS. Both bills are awaiting action by the full House of Representatives. Discussions with Committee and Representative staff indicate that using appropriated funds to conduct a large-scale demonstration of the potential of ADS-B Wx would be consistent with the legislation's intent.

On 20 July 2023, the House of Representatives passed the *Securing Growth and Robust Leadership in American Aviation Act* (H.R. 3935), a bill to reauthorize the FAA and aviation safety and infrastructure programs for the next five years, with broad bipartisan support. It authorizes appropriation of up to \$25M in incentives for ADS-B avionics installation.

### **ADS-B Wx: FPAW POCs**

The FPAW points of contact for this subject are FPAW SC member Elizabeth Wilson, Director of Weather Programs at Synoptic Data PBC ([elizabeth.wilson@synopticdata.com](mailto:elizabeth.wilson@synopticdata.com), (919) 758-5689) and Stephen Darr, President of Dynamic Aerospace Inc. ([sdarr@dynamic aerospace.com](mailto:sdarr@dynamic aerospace.com), (339) 364-0955).

On behalf of the Friends and Partners in Aviation Weather community:



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<sup>2</sup> <https://community.wmo.int/en/activity-areas/aircraft-based-observations/data/benefits> (accessed on 15 February 2024)