

Pre and In-flight Weather Resources
2024/09-10-324(I)PP

This outreach guidance is provided to all FAA and aviation industry groups that are participating in outreach efforts sponsored by the General Aviation Joint Safety Committee (GAJSC). It is important that all outreach on a given topic is coordinated and is free of conflicts. Therefore, all outreach products should be in alignment with the outline and concepts listed below for this topic.

Outreach Month: August 2026

Topic: Pre and In-flight Weather Resources

The FAA and industry will conduct a public education campaign that will acquaint General Aviation Pilots with available weather information sources for pre-flight planning and in-flight weather information acquisition.

Background: A study of selected General Aviation accidents identified inadequate or incomplete weather information as a common accident causal factor. This outreach is intended to inform GA pilots of available weather information products and technology and to suggest how to use those products to develop an accurate understanding of weather conditions.

Teaching Points:

- Pilots must be confident that weather conditions for each flight will be within pilot and aircraft capabilities.
- Pilots should be familiar with the many sources of weather information available for pre-flight planning and in-flight decision making. They should accumulate and compare data from multiple sources to develop an accurate weather picture.
- Pilots should assess present and forecast weather assessments before flight and they should confirm their assessments by contacting Flight Service.
- Pilots should be cognizant of the capabilities and limitations of weather detection technology installed in the aircraft that they fly.

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References:

- FAA H-8083-28A: Aviation Weather Handbook
- AC 91092: Pilot's Guide to a Preflight Briefing

Abstract: Lasting 15 to 20 minutes, this presentation acquaints the audience with some currently available weather information resources that are available to pilots while in flight. Because the number and availability of in-flight weather information resources is rapidly increasing, we are unable to list them all. This program covers a sampling of resources that were available as of August 2025

Format: Information Briefing - Power Point presentation

Required Personnel – FAAS Team Program Manager or designated FAAS Team Rep (s)

Optional Personnel – CFIs and DPEs who can speak on the availability and use of in-flight weather information.

National FAAS Team Support:

In addition to this guidance document, a Power Point presentation that supports the program is provided. FPMs and presenters are encouraged to customize this presentation to reflect each individual program.

Slides	Script
	<u>Slide 1</u> 2024/09-10-324(I)PP Original Author: John Steuernagle 01/30/2019; Revised by AJR B-6 07/01/2020; Revised 01/24/2025 JS; POC John Steuernagle, Office (562-264-5484). Presentation Note: <i>This is the title slide for Pre-flight and In-flight Weather Resources.</i> • Script - We have included a script of suggested dialog with most slides. The script will always appear in a non-italic font. Presenters may read

	the script or modify it to suit their own presentation style. See template slides 5 and 6 for examples of a slides with script. • Presentation Instructions - <i>(stage direction and presentation suggestions) will be preceded by a Bold header: the instructions themselves will be in Italic fonts. See slides 2, for an example of slides with Presentation Instructions only.</i> • Program control instructions - <i>will be in bold fonts and look like this: (Click) for building information within a slide; or this: (Next Slide) for slide advance.</i> • Background information - <i>Some slides may contain background information that supports the concepts presented in the program. Background information will always appear last and will be preceded by a bold Background: identification.</i> <i>The production team hope you and your audience will enjoy the show. Break a leg!</i> (Next Slide)
	<u>Slide 2</u> Presentation Note: <i>Here’s where you can discuss venue logistics, acknowledge sponsors, and deliver other information you want your audience to know in the beginning.</i>

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	<i>You can add slides after this one to fit your situation.</i> (Next Slide)
	<u>Slide 3</u> The General Aviation Joint Safety Committee is a government/industry group that looks at GA mishap experience and makes recommendations (they call them safety enhancements) for safety improvement. This program addresses their recommendation that GA pilots be apprised of advances in weather technology that can enhance the safety of flight. In this program we'll assume you got a thorough pre-flight weather briefing and discuss only those weather information resources that are available to general aviation pilots in flight. Technology is advancing so quickly that we can't claim our list of resources is at all comprehensive but rather a sampling of what's available to pilots today. Presentation Note: <i>If you'll be discussing additional items, add them to this list.</i> (Next Slide)
	<u>Slide 4</u> Much of the information presented here is taken from FAA H-8083-28A: Aviation Weather Handbook and FAA AC 91-92: Pilot's Guide to a Preflight Briefing. These publications contain a comprehensive list of weather services and products from the National

	Weather Service (NWS) and FAA including a list of Flight Information Service-Broadcast (FIS-B) products that are available through ADS-B-In data link. (Click) We'll list additional information resources at the end of this presentation. (Next Slide)
	<u>Slide 5</u> AC 91-92 Pilot's Guide to a Preflight Briefing that replaces 2 previous publications and offers valuable information on the conduct of self briefings. (Next Slide)
	<u>Slide 6</u> Weather analysis and decision making are big parts of every pilot's job. We know the weather at our departure airport but en route weather is less certain. (Click) And of course we need to know if weather conditions will permit a landing at our destination. calculate performance based on the weight you expect to be while flying. (Next Slide)
	<u>Slide 7</u> Weather information gathering, analysis, and decision making begin with the preflight and continue throughout. While en route we need to continually:

	(Next Slide) Perceive present weather conditions and gather additional weather information from various sources. (Click) Process weather information by comparing present weather with forecasts and by relating present and expected weather conditions to aircraft and pilot performance capabilities. (Click) Perform by making operational decisions and acting upon them. (Click) This process continues throughout the flight. Our perception of the results of our performance decisions further informs and refines our analysis. (Next Slide)
	<u>Slide 8</u> Regulations require that, during our pre-flight planning, we gather all pertinent information with regard to each flight. We can use automated weather information resources to gather weather information without contacting Flight Service Pilots can still contact Flight Service but they are highly encouraged to conduct a self-briefing prior to the call. That way they'll have a good idea and understanding of

	weather conditions before speaking with a briefer. (Next Slide)
	<u>Slide 9</u> • Flight Service uses this general list of elements for providing Standard Weather Briefings. • It is recommended that this list be used when conducting a preflight self-briefing using automated resources. • Using this list of elements when conducting a preflight self-briefing regardless of the automated resource will assist a pilot in complying with Title 14 of the Code of Federal Regulations (14 CFR) part 91, §§ 91.103. • There are also interactive graphics (eg GFA or 1800wxbrief.com Interactive map) available that depict some of these elements to assist in understanding what information is applicable to the route of flight. (Next Slide)
	<u>Slide 10</u> Listed are government resources, there are also third-party automated resources that may be used for conducting pre-flight self-briefings FAQ on using automated preflight resources. You may get some of the questions listed below. If so refer to the answer listed.

	Q1: Does my self-briefing need to be recorded or documented by the automation sites(s) I use? A1: There is no requirement for a self-brief to be recorded If you prefer to have your self-briefing preparation be recorded, consider invoking the Standard Briefing functionality on 1800wxbrief.com; third-party applications may also offer a recorded briefing functionality Q2: I like the Graphical tools (GFA, Interactive Maps) when conducting preflight planning. Do I still need to use the “Standard Briefing” functionality on the planning website or app that provides a full textual briefing? A2: Full textual (aka Standard Briefing) functionality is not required to be invoked The goal is to conduct a comprehensive preflight self-briefing; if you have done this (i.e., covered all the checklist items) using the graphical tools, you do not need to invoke a full textual briefing However, the Standard Briefing functionality is a good idea as a double check that you have not missed something in your own workflow Q3: If I conduct a self-brief and still decide to call Flight Service, will they know what I have done online? A3: YES, if you have used 1800wxbrief.com and requested a standard briefing YES, if you have used a third-party application that links
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	to your 1800wxbrief.com account and uses an approved standard briefing product (check with your particular third-party vendor) NO, if you have used just the graphical functionality on 1800wxbrief.com, AWC, or third-party sites If you plan to call Flight Service, then invoking the Standard Briefing functionality from 1800wxbrief.com (or a third-party application that shares your 1800wxbrief.com credentials) will allow the Specialist to see your briefing details and save you time (Next Slide)
	<u>Slide 11</u> Let’s begin with FAA Flight Service. FSS stations provide en route weather via voice communication in a couple of different ways. In this example, aircraft flying near the Philipsburg VOR can contact Flight Service on 122.5 Mhz. (Click) or they can receive on 122.1 Mhz. and transmit over the Philipsburg VOR on 115.5 Mhz. If you choose the VOR communication option, be sure to enable voice on your VOR receiver and adjust the audio volume so you can hear the FSS transmissions. (Next Slide)
	<u>Slide 12</u> 1. Here are some of the products available for en route access. You may receive this information via

	radio or via data link. More about data link later. 2. Whenever you access weather information it's important to know how old that information is. Some of the products in the left hand column could be more than an hour old when you receive them. Others may be quite recent. That's why it's important to note the times when observations were taken and/or the product validity time span. 3. Products in the right hand column will be older than those in the left. (Click) 4. Forecasts work best when you compare them with more current weather observations. That way you can see if weather is developing earlier or later than the forecast schedule. 5. PIREPs – Pilots are the best resource for reporting inflight weather conditions and confirming forecasts are correct or not. (Next Slide)
	<u>Slide 13</u> The letter H in a VOR data block indicates a couple of things: • the ability to receive HIWAS (Hazardous in-flight Weather Advisory broadcasts. As the name implies, these were pre-recorded advisories of hazardous weather conditions. (Click) • It also indicates that you're consulting an outdated

	chart because HIWAS was decommissioned in January of 2020. (Click) Most US-registered aircraft are equipped with ADS-B Out. For those of us who are also equipped with ADS-B In, FAA is providing an impressive set of weather information products collectively known as Flight Information Services – Broadcast or FIS-B. (Next Slide)
	<u>Slide 14</u> Although ADS-B In equipment is not required, there are some compelling reasons why pilots are installing it. As you can see from the coverage map, en route ADS-B In service is available throughout the country. With ADS-B In you get a suite of traffic, weather, and flight information products. Let’s take a look at how it works. (Next Slide)
	<u>Slide 15</u> UAT equipped ADS-B In aircraft receive traffic information directly from UAT ADS-B out aircraft. (Click) ADS-R rebroadcasts traffic information derived from UAT and 1090 Extended Squitter positions so that even though the two systems don’t exchange information directly, traffic information is available to both. There’s also a way for ADS-B in users to see aircraft that are not ADS-B Out equipped. (Next Slide)

	<u>Slide 16</u> The ADS-B system transmits TIS-B data on both links to equipped aircraft flying within coverage. TIS-B uses data from ADS-B, radar, Wide Area Multilateration (WAM), and surface multilateration systems like ASDE-X to create accurate near-real-time position reports. In order to receive TIS-B information you must be ADS-B In equipped, within coverage of an ADS-B ground station and an FAA radar or multilateration system. Background: Multilateration systems are employed to provide surveillance outside of radar coverage. • Wide Area Multilateration (WAM) is comprised of a network of relatively small sensors that can be deployed in areas that are problematic for radar installations. WAM capabilities can be combined within a set of ADS-B ground stations. • Surface Multilateration consists of sensors deployed on airports. The data provided by these sensors is integrated with airport surveillance radar and ADS-B sensor data to create an accurate picture of ground traffic on the airport. The equipment and sensors is collectively known as Airport Surface Detection Equipment (ASDE-X) (Next Slide)
	<u>Slide 17</u> ADS-B In is not guaranteed to display all traffic in a given area. It's a great situational awareness and collision

	avoidance tool but it's also a compelling distraction. We still need to look outside our windows. (Next Slide)
	<u>Slide 18</u> FIS-B information is available to UAT (Universal Access Transceiver) equipped aircraft only. The system broadcasts aeronautical information products from the FAA and weather products from the National Weather Service. (Next Slide)
	<u>Slide 19</u> Here's a list of text and graphical FIS-B products – available free of charge to ADS-B In users. As you can see – it's quite extensive and more products may be added in the future. (Next Slide)
	<u>Slide 20</u> We're all familiar with the Automated Terminal Information Service available at most towered airports. ATIS provides basic weather and runway information but what about non-towered airports? (Next Slide)
	<u>Slide 21</u> Many smaller airports are served by ASOS or AWOS automated weather observing systems. In fact, most of the weather data used to produce aviation weather

	reports and forecasts is now gathered by automated systems. These systems are constantly updating weather observations and averaging the data to give an accurate picture of present conditions. There are about one thousand ASOS and even more AWOS systems deployed throughout the United States. (Next Slide)
	<u>Slide 22</u> Here's a chart of what's available from an ASOS installation. At some locations information may be augmented by human observers. Presentation note: <i>Take a minute or so to discuss the information provided by ASOS, then:</i> (Next Slide)
	<u>Slide 23</u> As you can see there is a wide range of information available from AWOS depending on the type of equipment installed. (Click) Most of the AWOS installations are a variation of AWOS-3 so you'll have Altimeter Setting, Wind, Temperature (older installations may report in degrees Fahrenheit), Dew Point, Density Altitude, Cloud and Ceiling data. Newer installations may add precipitation type and thunderstorm/lightning information. (Next Slide)

	<u>Slide 24</u> For those of us who can afford it, Airborne Weather Radar is a very useful information source. It does require interpretation though and there are some limitations to consider. (Next Slide)
	<u>Slide 25</u> Airborne radar looks at precipitation and pilots know that the heavier the precipitation – the greater the associated turbulence will be. Because radar returns are immediate it's a good choice for tactical weather avoidance. Heavy precipitation can mask additional precipitation behind it so it's best to find wide clear areas so you can get a good picture of what's beyond the radar return. If you're a new radar user be sure to get some instruction on operation and interpretation before you base tactical decisions on radar information. (Next Slide)
	<u>Slide 26</u> Another real time solution is lightning detection equipment. Although it doesn't show precipitation it does indicate lightning strikes that accompany convective weather. Some installations integrate radar and storm scope information on a multi-function display. As with radar, instruction is highly recommended for new users.

	Next Slide)
	<u>Slide 27</u> If you don't want to equip with a panel-mounted ADS-B In, there are many portable ADS-B Receivers to choose from. These receivers can transmit text and graphics to a variety of portable devices and displays. One caution here – you'll need to have sufficient battery capacity or auxiliary power available to power receivers and displays for the planned duration of your flight and any delays or diversions that may occur. (Next Slide)
	<u>Slide 28</u> XM Radio is a subscription service that provides text, graphical, and audio information to en route users. XM Weather imagery is processed in near real time – usually at two and a half-minute intervals. But the imagery information could be older so, as with any weather information, be sure to check the time that the graphic data was collected. (Next Slide)
	<u>Slide 29</u> And here's another free service from FAA Flight Service. Simply text your request for Metar or TAF information to 358-782 and you'll get a quick reply. (Click) Texting MT followed by an airport identifier will return

	Metar and TAF information as shown here. Presentation note: <i>Pause briefly if audience members are copying slide information. Then:</i> (Next Slide)
	<u>Slide 30</u> For plain text just append “PT” to the end of your request. (Next Slide)
	<u>Slide31</u> Air traffic controllers are another in-flight weather information resource. They do have the ability to show weather on their displays but that capability is limited and when you most need information they may be too busy – dealing with re routing requests – to provide it. You can learn a lot by monitoring air traffic control frequencies though. You’ll hear what pilots are requesting and what ATC can provide. If you make your weather decisions with that in mind your requests are more likely to be granted. Once again – don’t wait till the last minute to request a diversion. ATC needs some time to process your request. (Next Slide)

Slide 32

In-cockpit information displays can be compelling distractions. Don't fixate on the box to the exclusion of other flight management tasks. Cockpit displays – no matter how sophisticated and comprehensive they may be – don't tell the whole story. A big part of our job is still looking out the window. **(Click)**

It's important to thoroughly understand what the displays are telling you, and just as important, what they aren't. Displays may not depict all the traffic in your area or all the weather ahead. **(Click)**

It's best to make in-flight decisions early rather than waiting until the last minute to act. Landing to refuel is much less stressful if you have an hour or so of fuel remaining. Likewise rerouting or diversion is easier if you have some maneuvering room and time to select the best alternative. By continuous reference to all weather resources available to you in the cockpit, you'll have a comprehensive picture of the weather and any decisions will be well informed. **(Click)**

One more thing – weather flying proficiency is perishable. It really is a case of, exercise your knowledge & skills regularly so they'll be there for you when you need them.

(Next Slide)

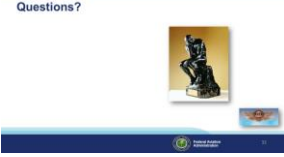
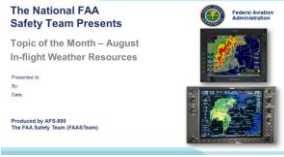
	<u>Slide 33</u> Can you imagine how well professional athletes would perform if they didn't practice between games or stay in shape during the off season? (Click) Would you choose to be treated by doctors who had no continuing education since graduating from medical school? (Click) Or how about a professional pilot flight crew who never train for emergencies? Pros know that proficiency is not a destination but rather a journey that never ends. Regular training keeps the them at peak performance every time they take to the air. (Next Slide)
	<u>Slide 34</u> Proficiency training works for General Aviation pilots too. Pilots who participate in the FAA WINGS Pilot Proficiency program fly with more confidence. They and their passengers are comfortable in the air. And proficiency training can expand our horizons by exploring the operational capabilities of our present aircraft or introducing us to more complex and capable planes as well as more challenging destinations. Most importantly - proficiency training keeps us safe.

	(Click) And pilots who earn WINGS phases also qualify for a flight review. (Next Slide)
	<u>Slide 35</u> So why WINGS? Well proficiency is key to success in almost every thing worth doing – especially flying. Proficient pilots are confident, capable, and safe. WINGS is a proficiency training system specifically designed for general aviation pilots and, regular participation will keep you on top of your flying game. (Next Slide)
	<u>Slide 36</u> Every time you earn a WINGS phase, you’re eligible to enter the WINGS Sweepstakes sponsored by the WINGS Industry Network. Flight Instructors can also enter once for each WINGS phase they validate. Click on the QR code for details. (Next Slide)
	<u>Slide 37</u> Safety Management Systems are a set of policies and processes that can increase the safety and efficiency of any flight operation. And FAA is bringing SMS to General Aviation. You may have heard of SMS but thought it was only for large organizations but actually, SMS can be

	scaled to fit any operation large or small. There are 4 major components to a Safety Management System (Click) Safety Policy – a documented commitment to safety that runs from the head of an organization to its newest member. (Click) Safety Risk Management – a process that identifies hazards within an operation, determines to what extent an identified hazard may impact flight safety, and controls the risk of occurrence to an acceptable level. (Click) Safety Assurance – By collecting and analyzing information derived from safety performance data Safety Assurance ensures the performance and effectiveness of Safety Risk Controls. (Click) Safety Promotion communicates safety information and commitment throughout the organization. (Click) You can find more information about Safety Management Systems at the URL on the Screen. (Next Slide)
	<u>Slide 38</u> In addition to the Aviation Weather Handbook cited earlier, here are a few references for additional information: I'll leave this slide on screen while I take some questions

	from the audience. AC 00-63A Use of Flight Deck Displays of Digital Weather and Aeronautical This AC addresses both the Federal Aviation Administration (FAA) FIS–Broadcast (FIS-B) provided through the Automatic Dependent Surveillance–Broadcast (ADS-B) Universal Access Transceiver (UAT) network and non-FAA FIS systems provided through commercial data link services. AC 90-114B Automatic Dependent Surveillance-Broadcast Operations AC 91-92 Pilot’s Guide to a Preflight Briefing. Presentation note: <i>Take questions from the audience while they copy information from the screen. Then:</i> (Next Slide)
References • AC 00-45H Aviation Weather Services – https://www.faa.gov/documentLibrary/media/Advisory_Circular/ac_00-45.pdf • Aeronautical Information Manual – Chapter 7 – Safety of Flight – Section 7-1-1.1 • FAA ADS-B Information – https://www.faa.gov/adsb/faq • Automated Surface Observing Systems – https://www.faa.gov/atsos/ 	<u>Slide 39</u> Presentation note: <i>Take questions from the audience while they copy information from the screen. Then:</i> (Next Slide)

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	<u>Slide 40</u> Presentation Note: <i>You may wish to provide your contact information and main FSDO phone number here. You can also add WINGSPro contact information.</i> <i>Modify with your information or leave blank.</i> (Next Slide)
	<u>Slide 41</u> Your presence here shows that you are vital members of our General Aviation Safety Community. The high standards you keep and the examples you set are a great credit to you and to GA. Thank you for attending. (Next Slide)
	<u>Slide 42</u> (The End)

Appendix I – Equipment and Staging

Equipment:

- Projection Screen & Video Projector suitable for expected audience
 - Remote computer/projector control available at lectern or presenter location
 - In lieu of remote – detail a Rep to computer/projector control.

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- Presentation Computer
 - **Note:** It is strongly suggested that the entire program reside on this computer.
- Back up Projector/Computer/Media as available.
- PA system suitable for expected audience
 - Microphones for Moderator and Panel
 - Optional Microphone (s) for audience
- Lectern (optional)

Staging:

- Arrange the projection screen for maximum visibility from the audience.
- Equip with PA microphones
- Place Lectern to one side of screen. This will be used by presenters and moderator

IMPORTANT – Once you have completed outreach on this topic, please help us track the outreach you have done by entering a SAS record.

NPP14: GAJSC Safety Outreach Topic of the Month

SAS Activity Code	National Use	Primary Area	Keyword	Description	Performance Target	Date Due	LDR 12XXFAFAAST
1983	NPP14	K	032	Promote “Topic of the Month” within the FSDO area.	Assigned by Office Manager	Assigned by Office Manager	OR0010
RESOURCES: • Topics of the Month materials are available at the National FAASite KSN site under Approved Resources. • Each resource supports 10 to 20 minutes of program time.				COMMENTS: • GAJSC Topic of the Month: ○ Industry and the FAASite will nationally promote each monthly topic. ○ Use the “teaching points” on the Presenter Notes & Outreach Guidance Document to promote the topic locally in any way possible.			
NOTES: • 1 SAS activity entry at the conclusion of each GAJSC Topic of the Month outreach. • Record the type of outreach conducted in the comment section of the SAS. • Points of contact for this NPP item: ○ John Steuernagle - National FAASite Products Manager, (301) 471-3954, John.W.Steuernagle@faa.gov ○ Kevin Clover - National FAASite Ops Program Manager, (562) 888-2020, Kevin.L.Clover@faa.gov							