



# 2020 Weather Survey

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Rune Duke  
Senior Director of Government Affairs

Tom George  
Alaska Regional Manager

Kelly Davis  
Senior Director of Research and Analysis

Elizabeth Bell  
Research Analyst

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## Introduction

AOPA's 2020 Weather Survey builds on knowledge from the prior four years' worth of surveys on Weather, PIREPs and Flight Service.<sup>1</sup> The present study investigated the ways in which pilots access weather information and their needs for weather resources including weather cameras, the Graphical Forecasts for Aviation (GFA) webpage, the Helicopter Emergency Medical Services (HEMS) tool, and more. Survey results were trended over time when possible and segmented by demographics (e.g., age, pilot certificate, and location) when appropriate.

## Method

A survey on weather-related topics was created using Qualtrics, an online survey tool. The survey contained 31 questions in total, including five questions specific to pilots who primarily fly in Alaska, four specific to pilots from the Continental United States (CONUS), and two specific to pilots from either CONUS or Hawaii.

Responses were collected over a four-week period in April 2020. A total of 33,193 people received an email invitation to take the survey. The email sample included 2,737 AOPA members from Alaska, 456 from Hawaii, and a random sample of 30,000 AOPA members from CONUS with current medicals. All subjects received another email reminding them to take the survey. Alaskan pilots received two email reminders encouraging them to provide feedback. No incentive was offered in exchange for participation.

## Key Findings

1. The use of Alaska Flight Service for preflight briefings continues a decreasing trend, dropping 21% since 2017. At the same time, pilots depend on it for information immediately prior to flight. The Federal Aviation Administration (FAA) needs to speed up efforts to modernize the Alaska Flight Service Program.
2. Weather cameras in Alaska provide a valuable source of information for pilots, used heavily both for initial briefings and immediately prior to flight. Pilots outside of Alaska indicate a strong desire to use this information (82% extremely or somewhat likely) when flying to remote areas. The FAA should continue to expand the program beyond Alaska.
3. The number of pilots providing unsolicited PIREPs continues to be low, despite a small uptick in 2020. More efforts are needed by government and industry to improve this situation, particularly for private pilots. There is strong support for filing PIREPs via apps or avionics, including ADS-B, with about 70% indicating they definitely or probably would submit reports via these means, if available.
4. Across the country, pilots expressed a willingness to consider the use of uncertified weather observations at airports that don't have weather reporting. Ceiling, wind, and visibility are

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<sup>1</sup> Middlestadt, S. E., Smith, T., Hu, Y., & Ison, D. (June 1, 2016). [Technical Research Report on General Aviation Pilot Beliefs About Obtaining a Standard Pilot Weather Briefing](#).

Duke, R. & George, T. (July 26, 2016). [AOPA 2016 Pilot Report Survey](#).

Duke, R. & George, T. (Aug. 4, 2017). [AOPA 2017 Weather Survey](#).

Duke, R., George, T., Davis, K., & Bell, E. (July 6, 2018). [AOPA 2018 Weather Survey](#).

Duke, R., George, T., Davis, K., & Bell, E. (June 12, 2019). [AOPA 2019 Weather Survey](#).

the elements pilots would find most useful. The FAA should aggressively pursue testing of this concept and development of suitable guidance for VFR weather station vendors.

5. The experimental Alaska Aviation Guidance, a Terminal Aerodrome Forecast (TAF)-like short-term forecast at select airports in Alaska that have an AWOS, is still not well known to the pilot community, but those that use it are largely satisfied with it (62%). The AAG provides additional information in remote areas with a shorter look-ahead than a complete TAF and is for VFR use only. The AAG should continue to be considered for broader implementation.

## 2020 Survey Results

A total of 221 pilots from Alaska, 14 from Hawaii, and 2,747 from CONUS responded to the survey. The margins of error at a 95% confidence level were 6.3% for Alaskan pilots and 1.8% for CONUS pilots. The overall margin of error (considering pilots from all regions) was 1.7% at the same 95% confidence level.

### Sample Characteristics

The sample characteristics in the 2020 Weather Survey were similar to AOPA’s previous Weather Surveys (Table 1). About half (52%) of all subjects were private pilots, and half (50%) were instrument current (Figure 1). Most respondents were at least 55 years old (71%), and most reported flying single-engine piston, fixed gear aircraft (72%, illustrated in Figure 2).

Table 1. *Highest level of pilot certificate held.*

Certificate	2017 WX Survey		2018 WX Survey		2019 WX Survey		2020 WX Survey		FAA	
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
<b>Student</b>	17	4%	71	2%	98	4%	77	3%	197,665	30%
<b>Sport</b>	0	0%	19	1%	16	0.7%	1	0.03%	6,467	1%
<b>Recreational</b>	0	0%	4	0.1%	3	0.1%	4	0.1%	127	0.02%
<b>Private</b>	191	50%	1,530	54%	1,134	50%	1,573	52%	161,105	24%
<b>Commercial</b>	107	28%	767	27%	619	27%	768	26%	100,863	15%
<b>ATP</b>	63	17%	458	16%	392	17%	573	19%	164,947	25%
<b>None</b>	2	1%	0	0%	5	0.2%	5	0.2%	-	-
<b>Total</b>	380	100%	2,849	100%	2,267	100%	3,001	100%	664,565	100%

*Note.* This table compares responses to AOPA’s 2020 Weather Survey to AOPA’s 2017, 2018, and 2019 Weather Surveys, and the current FAA numbers. FAA estimated active airmen certificate numbers also include 14,248 rotorcraft (2%) and 19,143 glider (3%) pilots, and are current as of the most recent update on 12/31/19 (source: [FAA U.S. Civil Airmen Statistics](#)).

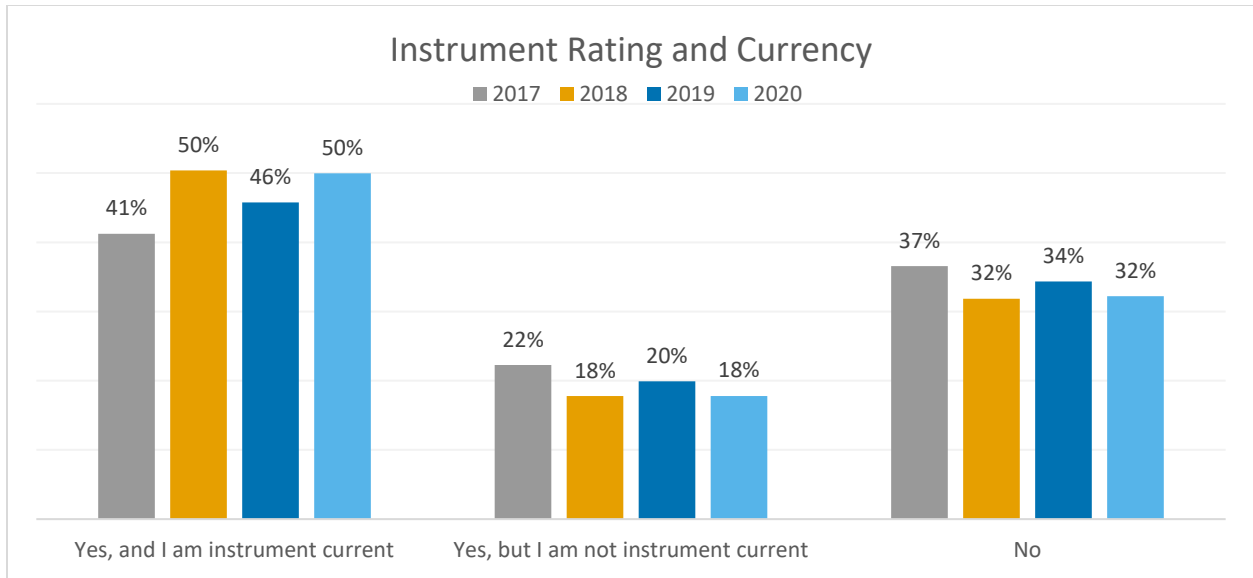


Figure 1. Responses to “Do you currently hold an instrument rating?” (n<sub>17</sub> = 364; n<sub>18</sub> = 2327; n<sub>19</sub> = 2071, n<sub>20</sub> = 2696). The FAA reported 314,168 instrument rated pilots as of 12/31/19 (47% of total pilot number, a decrease of two percentage points from the previous year; source: [FAA U.S. Civil Airmen Statistics](#)).

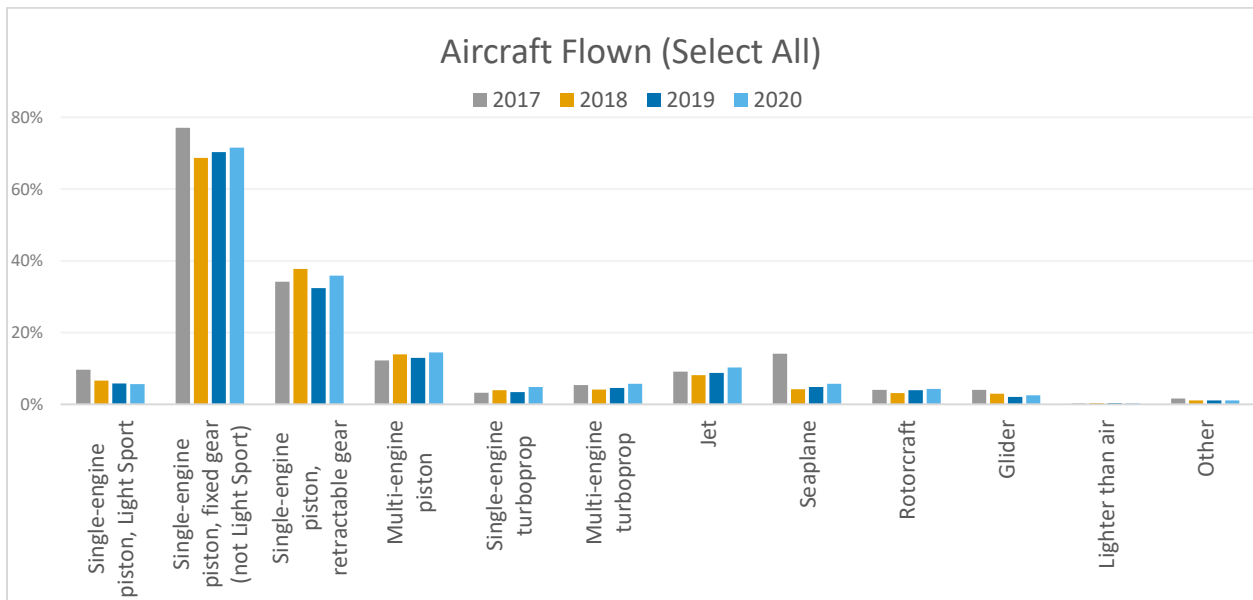


Figure 2. Responses to, “Which kind(s) of aircraft do you currently fly? (Check all that apply).” Percentages reflect the number of people who selected that response out of the total number of subjects who answered the question (n<sub>17</sub> = 375; n<sub>18</sub> = 2344; n<sub>19</sub> = 2073; n<sub>20</sub> = 2699).

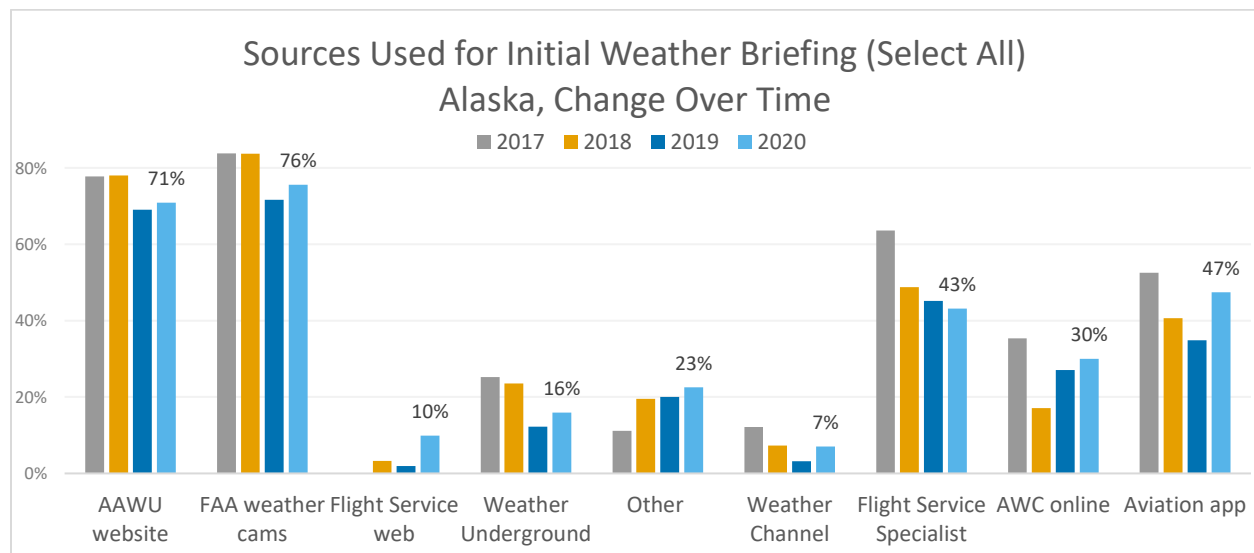
### Preflight Weather Resources

The survey posed questions regarding sources pilots used for their initial weather briefing and immediately prior to flight under challenging conditions. Responses for pilots flying in Alaska and CONUS were tabulated separately, as information sources differ between these two regions.

**Initial source used.** As in previous years, Alaskan pilots used FAA weather cameras<sup>2</sup> and the Alaska Aviation Weather Unit (AAWU)<sup>3</sup> website frequently (Figure 3). Pilots from CONUS continued to rely on aviation applications and the Aviation Weather Center’s (AWC) website more often (Figure 4). Common responses for “other” sources used during an initial weather briefing included publicly available weather reports (e.g., AccuWeather, Fltplan.com, Windy.com, etc.) Notably, Windy.com has grown in popularity over the years, becoming the most popular write-in for pilots from both Alaska and CONUS in 2020. Fltplan.com and AOPA were popular write-ins for pilots from CONUS, but not Alaska.

The percentage of pilots in both Alaska and CONUS using Flight Service specialists for *initial* weather briefings continued to decrease over time. The percentage of Alaskan pilots using a Flight Service specialist peaked at 64% in 2017 and fell to a low of 43% in 2020 (a decrease of about 21 percentage points). The percentage of CONUS pilots using a Flight Service specialist peaked at 54% in 2017, and has since fallen by about 24 percentage points, with 30% reporting usage this year.

Contrary to previous trends, use of aviation applications (e.g., ForeFlight, Garmin Pilot) in Alaska increased since last year. Use of aviation applications in Alaska peaked at 53% in 2017 and dipped to a low of 35% in 2018 but increased to 47% this year. Aviation applications remain the most popular source for initial preflight planning by pilots from CONUS.



*Figure 3.* “What weather source(s) do you use for your initial weather briefing during preflight planning? (Select all that apply).” Percentages reflect the number of people who selected that response, out of the total number of people who answered the question, for Alaskan respondents. Sample sizes were: n<sub>17</sub> = 99; n<sub>18</sub> = 123; n<sub>19</sub> = 155; n<sub>20</sub> = 213. Windy.com was the most common source listed in “other” comments (19/47 comments in 2020).

<sup>2</sup> The FAA Weather Camera Program is an activity in Alaska that provides web camera views updated every 10 minutes to improve situational awareness regarding weather conditions for aviation use. Views are available at 235 locations across the state. For more information, visit [avcamsplus.faa.gov](http://avcamsplus.faa.gov).

<sup>3</sup> The Alaska Aviation Weather Unit is the counterpart of the Aviation Weather Center serving Alaska, also operated by the National Weather Service.

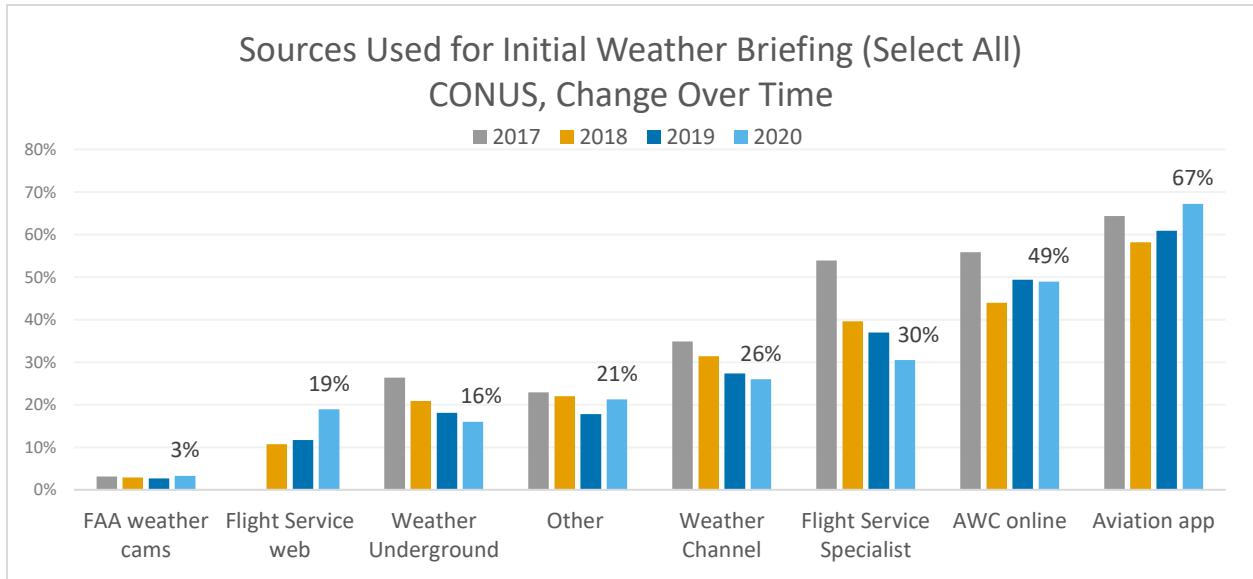


Figure 4. “What weather source(s) do you use for your initial weather briefing during preflight planning? (Select all that apply).” Percentages reflect the number of people who selected that response, out of the total number of people who answered the question, for respondents from CONUS. Sample sizes were as follows:  $n_{17} = 258$ ;  $n_{18} = 2650$ ;  $n_{19} = 2003$ ;  $n_{20} = 2698$ . Common “other” responses in 2020 included: windy.com (88/539 comments), fltplan.com (54/539 comments), AOPA (35/539 comments), AccuWeather and other local TV (30/539 comments).

**Sources used immediately prior to flight.** Pilots from all locations more often call a Flight Service specialist immediately prior to flight than for initial preflight planning, as noted in previous years. In 2020, the top three primary weather sources used immediately prior to flight for Alaskan pilots were: Flight Service specialists (32%), FAA weather cameras (31%), and aviation applications such as ForeFlight and Garmin Pilot (17%). For pilots from CONUS, the top three primary weather sources used immediately prior to flight were: aviation applications (46%), Flight Service specialist (23%), and AWC online (12%). The popularity of aviation applications in CONUS continued to increase over time, just as the popularity of Flight Service specialists continued to decline.

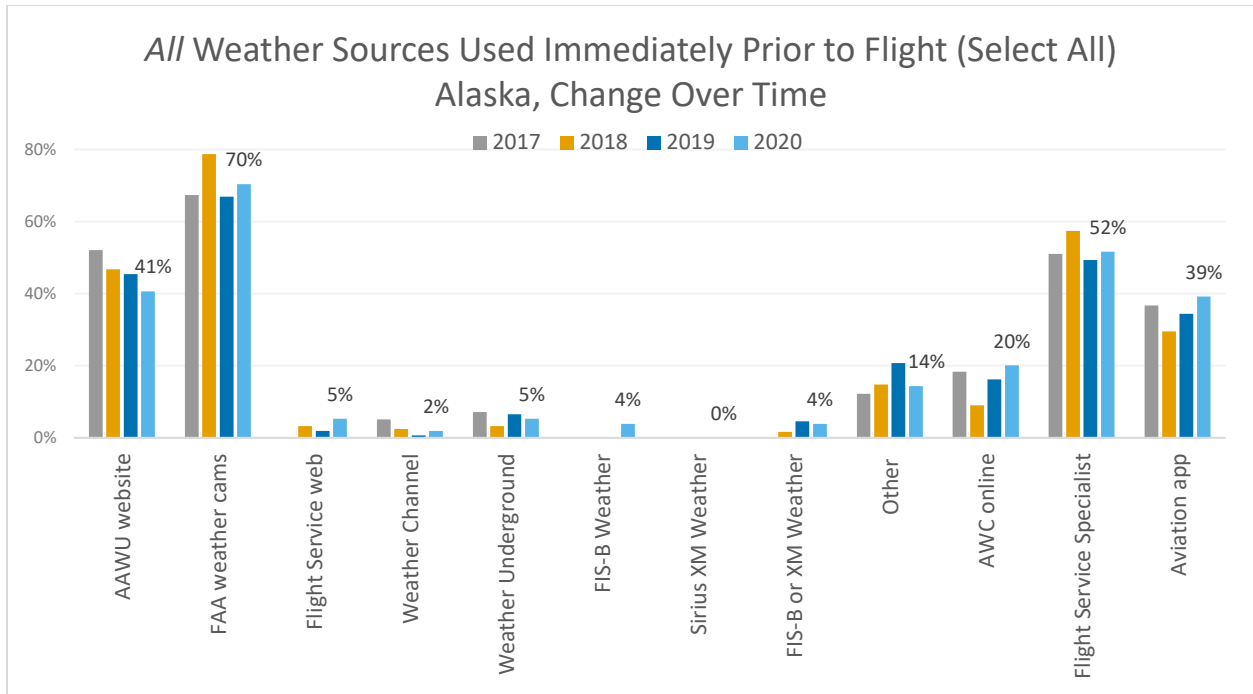


Figure 5. “What weather source(s) do you use immediately prior to flight under challenging conditions? (Select all that apply).” Percentages reflect the number of people who selected each option, out of the total number of subjects in Alaska. Sample sizes were as follows:  $n_{17} = 98$ ;  $n_{18} = 122$ ;  $n_{19} = 154$ ;  $n_{20} = 209$ .

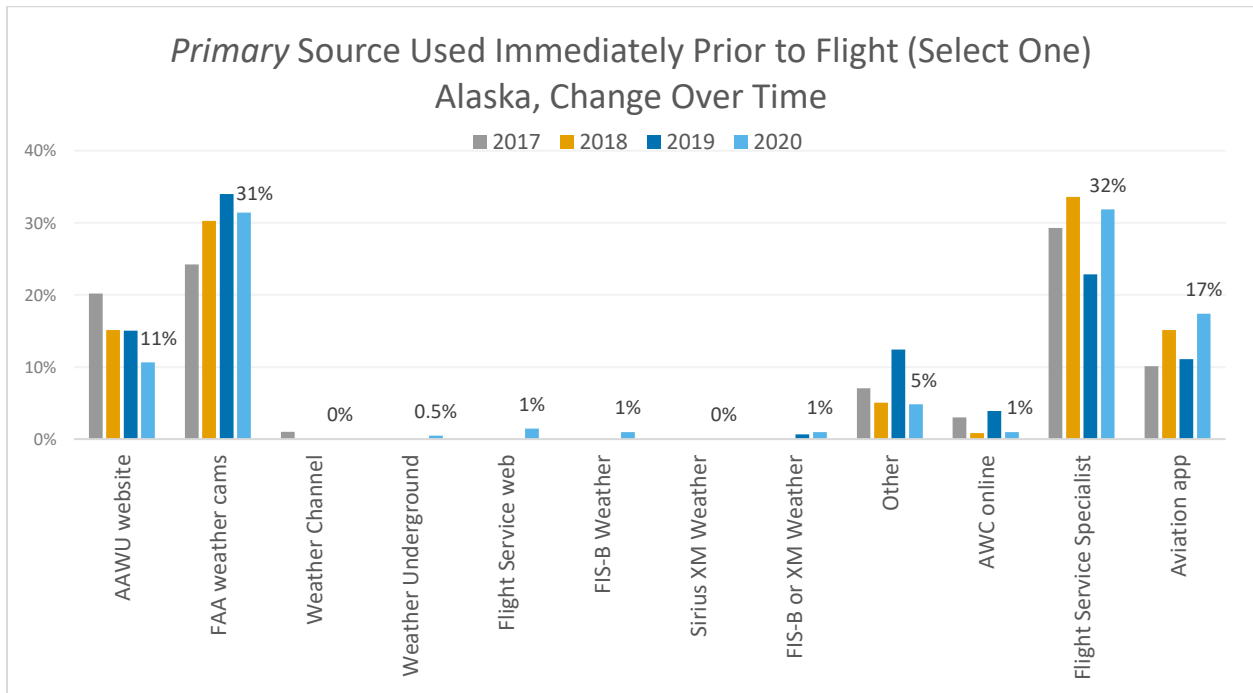




Figure 6. “What is the **primary** source you use to check the weather immediately prior to flight under challenging conditions? (Select one).” Results for Alaskan pilots only. Sample sizes were as follows: n<sub>17</sub> = 99; n<sub>18</sub> = 119; n<sub>19</sub> = 153; n<sub>20</sub> = 207.

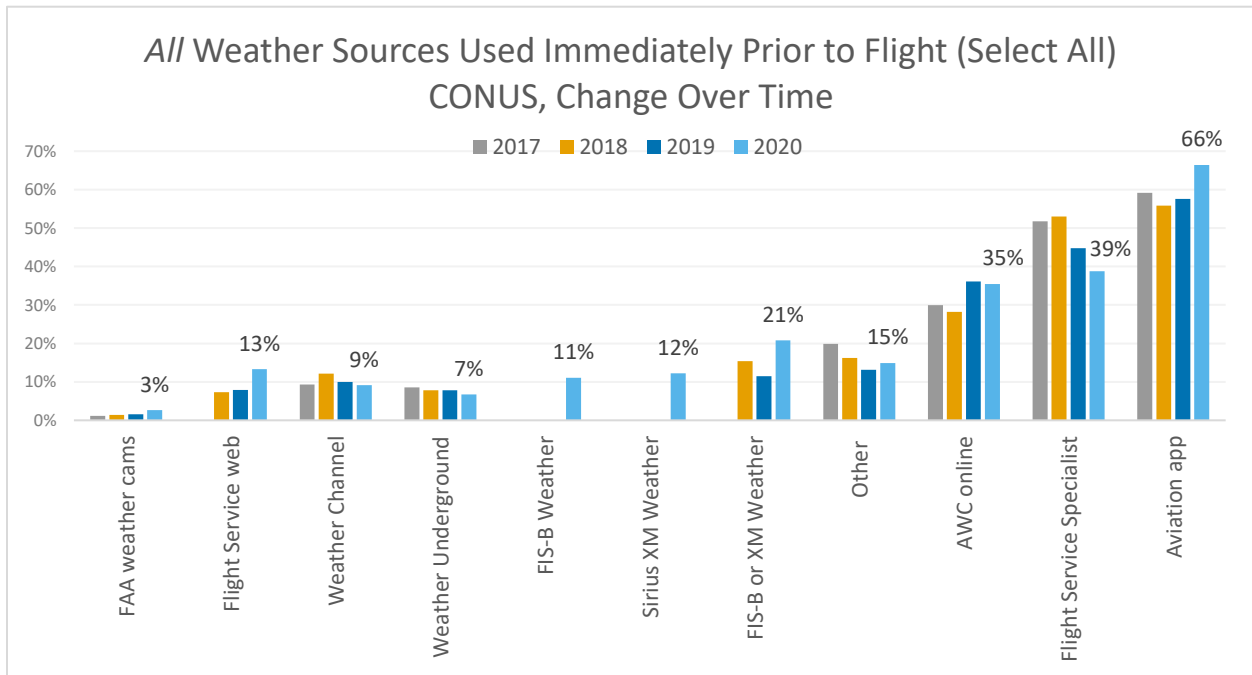


Figure 7. “What weather source(s) do you use immediately prior to flight under challenging conditions? (Select all that apply).” Percentages reflect the number of people who selected each option, out of the total number of subjects from CONUS. Sample sizes were as follows: n<sub>17</sub> = 257; n<sub>18</sub> = 2638; n<sub>19</sub> = 1991; n<sub>20</sub> = 2687.

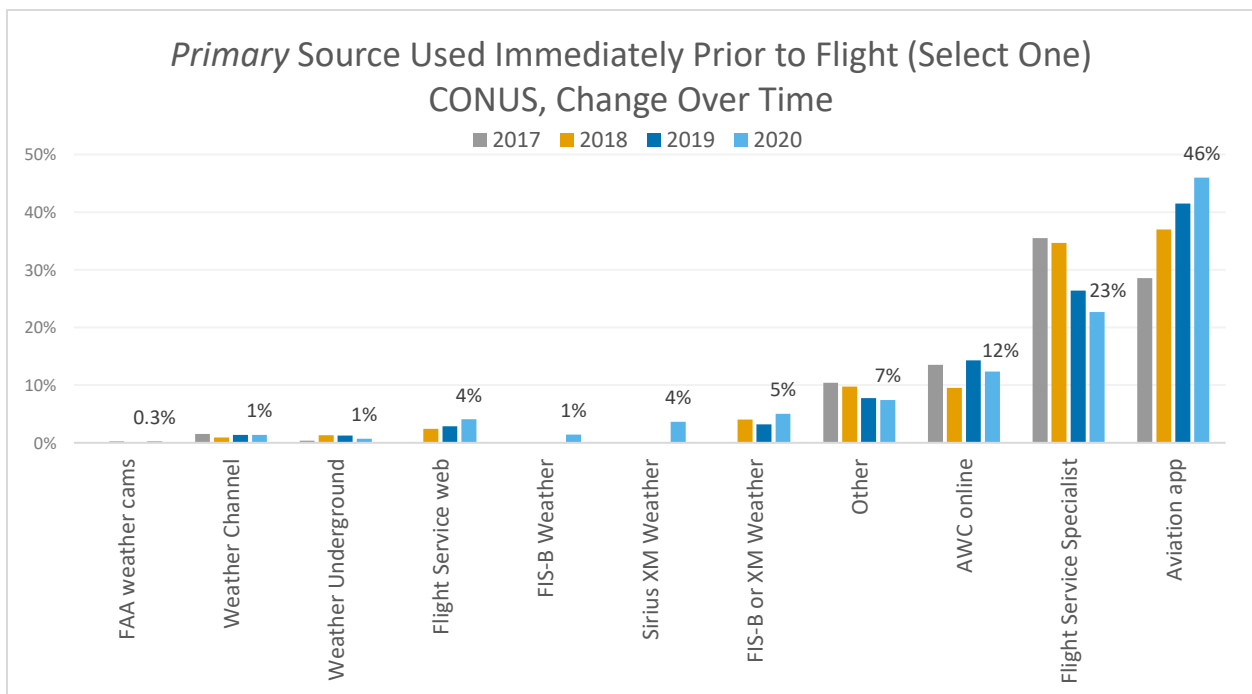


Figure 8. “What is the **primary** source you use to check the weather immediately prior to flight under challenging conditions? (Select one).” Results for CONUS pilots only. Sample sizes were as follows:  $n_{17} = 259$ ;  $n_{18} = 2512$ ;  $n_{19} = 1956$ ;  $n_{20} = 2652$ .

**Aviation applications and Flight Service.** Two of the most universally popular resources for checking weather information immediately prior to flight were aviation applications (including ForeFlight or Garmin Pilot) and Flight Service. CONUS pilots’ use of aviation applications has steadily grown over time (Figure 8, above). In 2020, 46% of pilots from CONUS listed an aviation application as their primary source of weather information – an increase of 8 percentage points from last year, 9 percentage points from two years ago, and 17 percentage points from three years ago. Aviation applications have not seen such consistent adoption in Alaska, though these apps did replace the AAWU website as Alaska’s third most consulted primary weather source this year. Reported use of aviation applications as a primary source in Alaska was low last year – close to the level of usage reported in 2017 (10% in 2017, 11% in 2019, as seen in Figure 6, above), but increased again this year (17% in 2020).

About 15% of all respondents in 2020 reported *not* contacting Flight Services, which was not a significant change from last year (Figure 9, below). Of those that did contact Flight Services at some point, about half (52%) *always* conducted self-service planning activities beforehand. The percentage of pilots from all locations relying on Flight Service specialists as their *primary* weather source immediately prior to flight decreased from 2018 to 2019. For pilots in CONUS, that trend continued in 2020, as the use of Flight Service specialists dropped another 13 percentage points (Figure 8, above). In Alaska, the percentage of pilots who relied on a Flight Service specialist in 2020 (32%) was similar to levels of use seen in 2018 (34%, Figure 6).

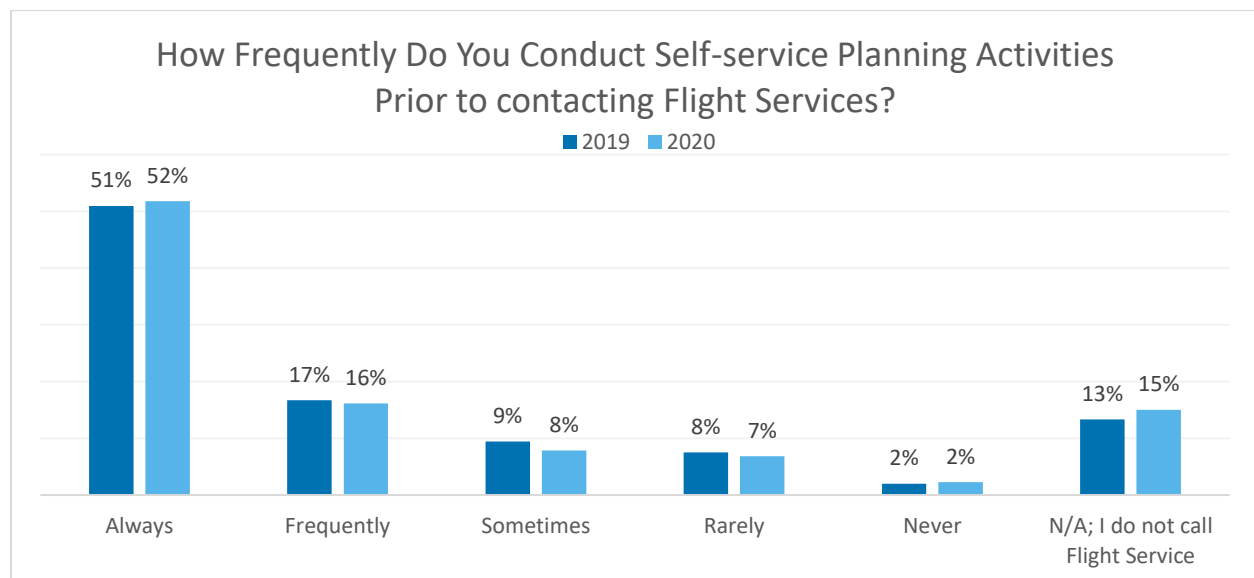


Figure 9. “How frequently do you conduct self-service planning activities prior to contacting Flight Services?” Including those who selected “N/A”,  $n_{19} = 2105$  and  $n_{20} = 2792$ . Excluding those who never contact Flight Services,  $n_{19} = 1824$  and  $n_{20} = 2372$ . Percentages shown above include those who selected “N/A” option.

Usage trends noted last year based on instrument rating and age persisted this year. Current, instrument rated pilots used aviation applications more than other pilots, while VFR pilots were more likely to rely on a Flight Service specialist (Figure 10). Younger pilots preferred aviation applications, while older pilots were more likely to call a Flight Service specialist (Figure 11). In all groups, use of aviation apps immediately prior to flight increased over time, with an accompanying decline in calling Flight Service primarily driven by CONUS pilots.

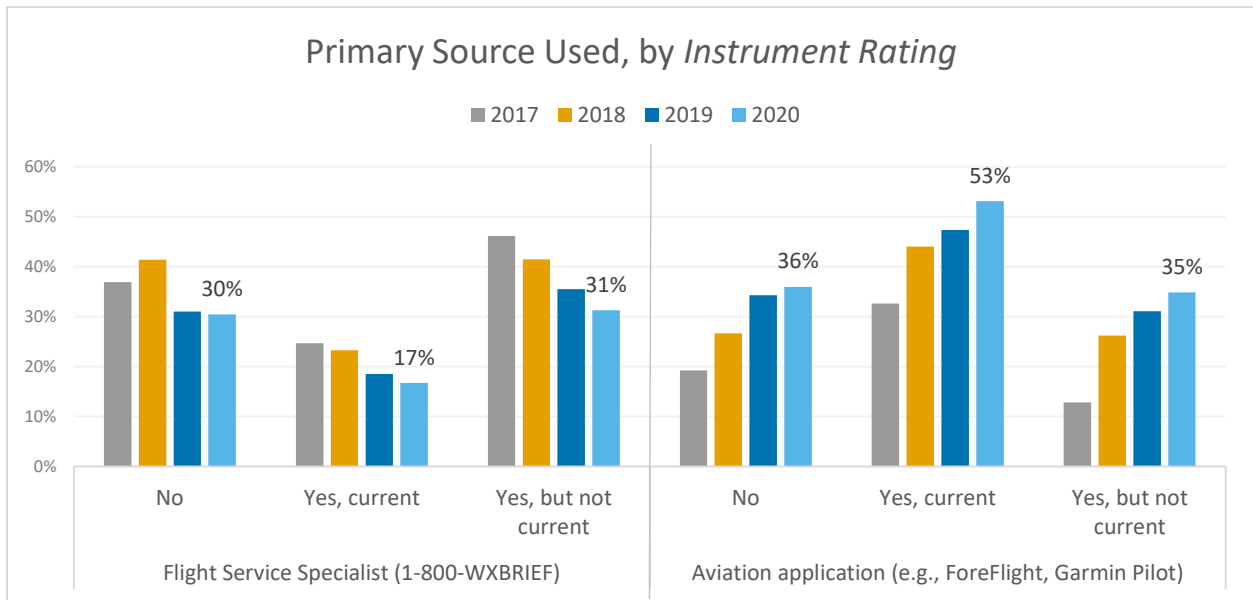


Figure 10. Top 2 most commonly selected primary sources used to check weather information immediately prior to flight, by instrument rating/currency, over time.

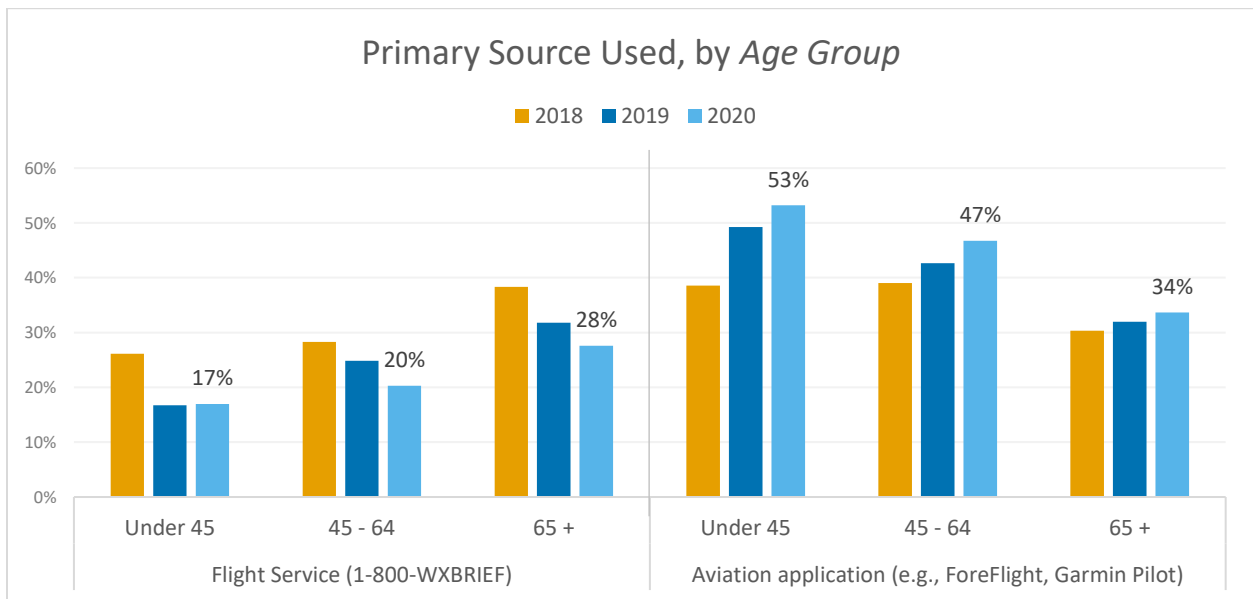


Figure 11. Top 2 most commonly selected primary sources used to check weather information immediately prior to flight, by age group, over time. Percentages reflect the number of people from each age group who selected each source, out of the total number of people in that age group.

Echoing results from the past two years, most respondents who used a Flight Service specialist as their primary source of weather information immediately prior to flight did so for the ability to ask questions or receive a professional opinion (83% of CONUS pilots and 76% of Alaskan pilots; Figures 12, 14 - 15). More Alaskan pilots (48%) than CONUS pilots (34%) cared about Flight Service specialists’ reliability.

Pilots from CONUS and Alaska also differed in why they chose to use aviation applications. CONUS pilots cared more about the graphics; 58% of CONUS pilots and 33% of Alaskan pilots cited graphics as a reason why aviation applications are their primary weather source (a difference of 25 percentage points; Figures 13 - 15). Alaskan pilots cared more about portability and user-friendly interfaces. About 67% of Alaskan pilots and 41% of CONUS pilots valued the portability of aviation applications (a difference of 26 percentage points). The user-friendly interface was important to 58% of Alaskan pilots, but only 37% of CONUS pilots (a difference of 22 percentage points). As seen in previous years, less than 1% of respondents used aviation applications for the ability to ask questions or receive a professional opinion, though 83% of pilots called a Flight Service specialist for that reason.

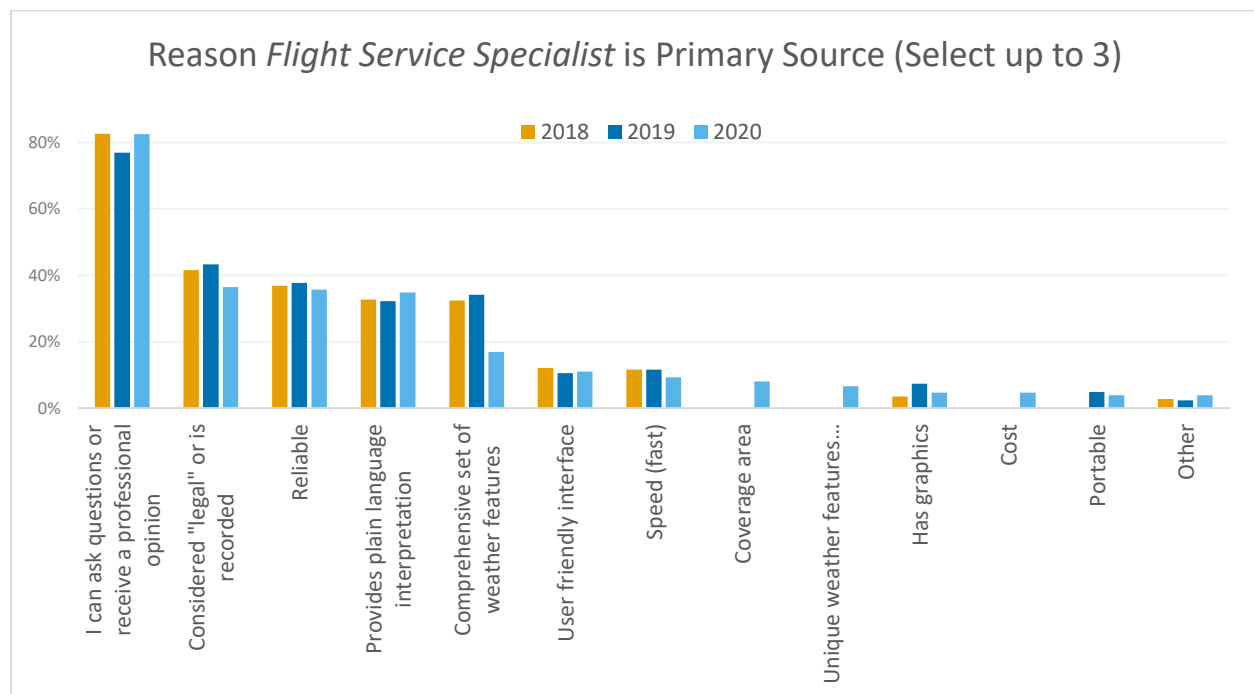


Figure 12. Close-up look at subjects’ reasons for selecting Flight Service (n<sub>18</sub> = 896; n<sub>19</sub> = 559; n<sub>20</sub> = 670) as their primary source, over time. The response choice “portable” was added to the survey in 2018, while choices “coverage area,” “unique weather features not available with other services,” and “cost” were added in 2020.

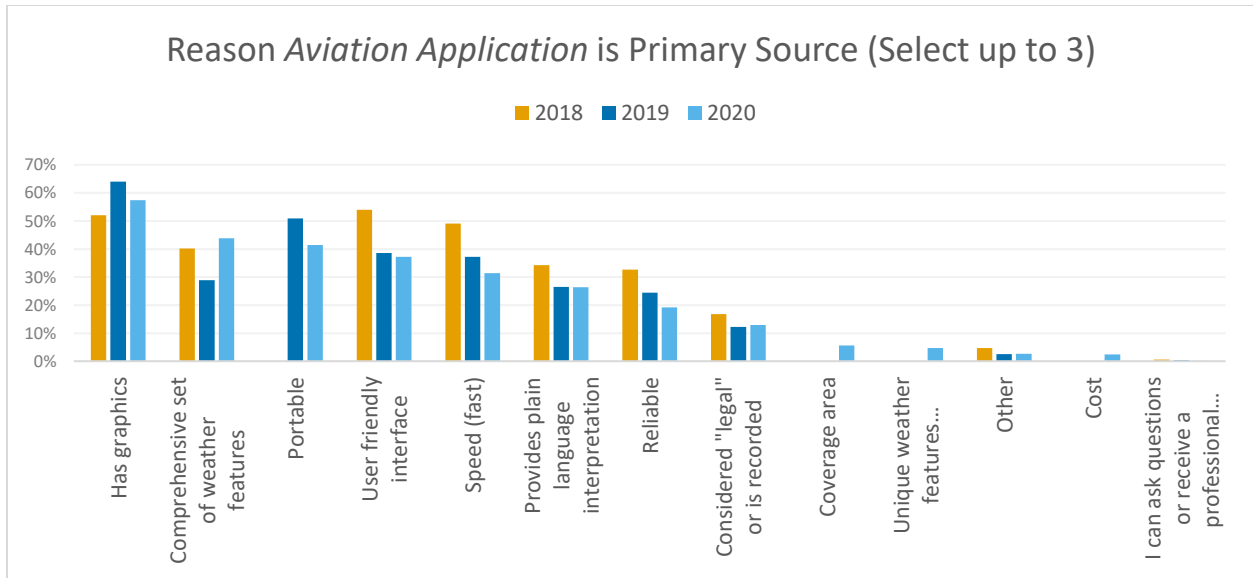


Figure 13. Close-up look at subjects' reasons for selecting an aviation application (n<sub>18</sub> = 932; n<sub>19</sub> = 839; n<sub>20</sub> = 1260) as their primary source, over time.

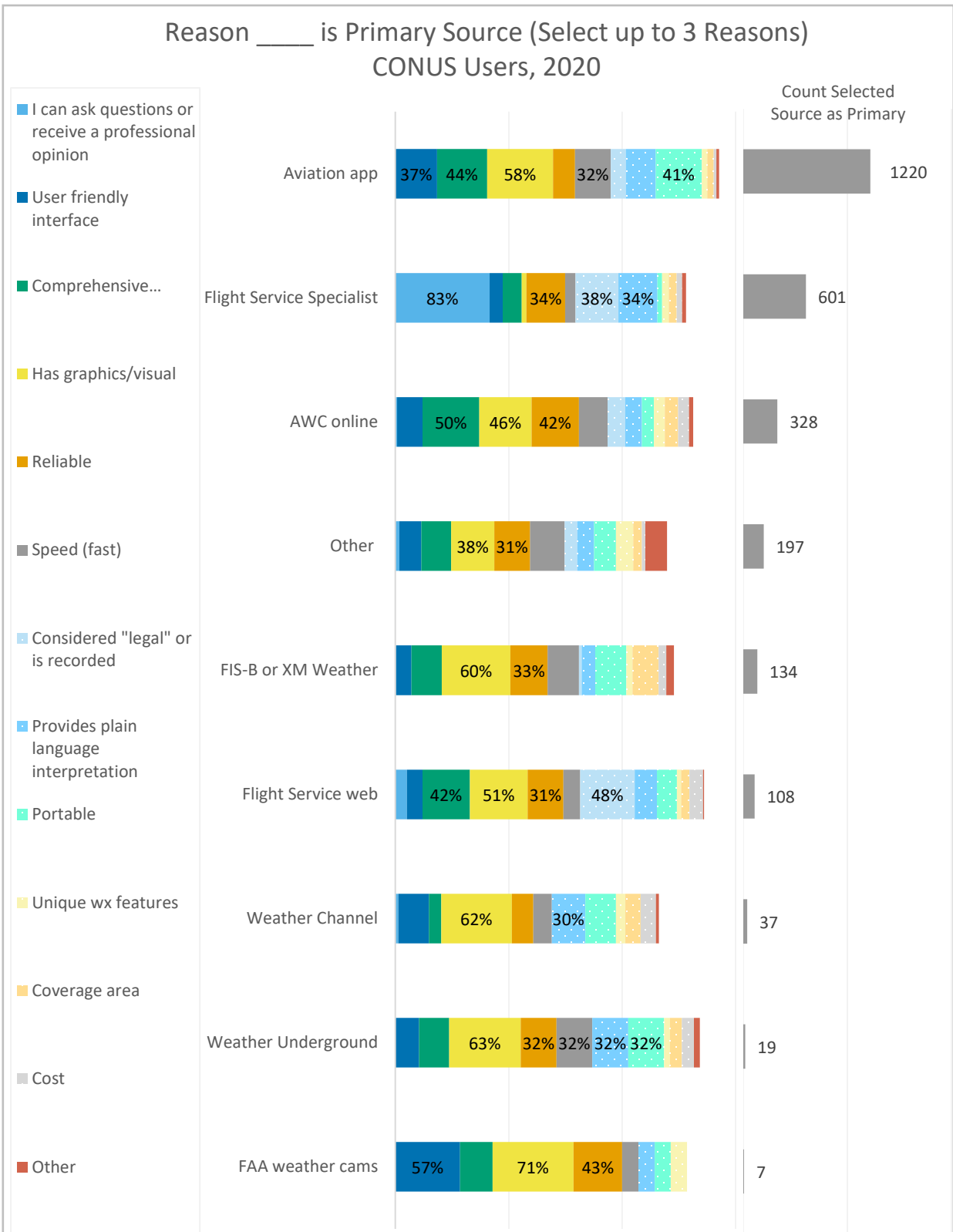


Figure 14. Reasons for choosing given preferred source, CONUS. Percentages reflect the number of people who chose each given reason, out of the total number of people who selected that source as their primary source. Subjects could select up to 3 reasons for their preference, so summed percentages may exceed 100 percent. 2020 data only.

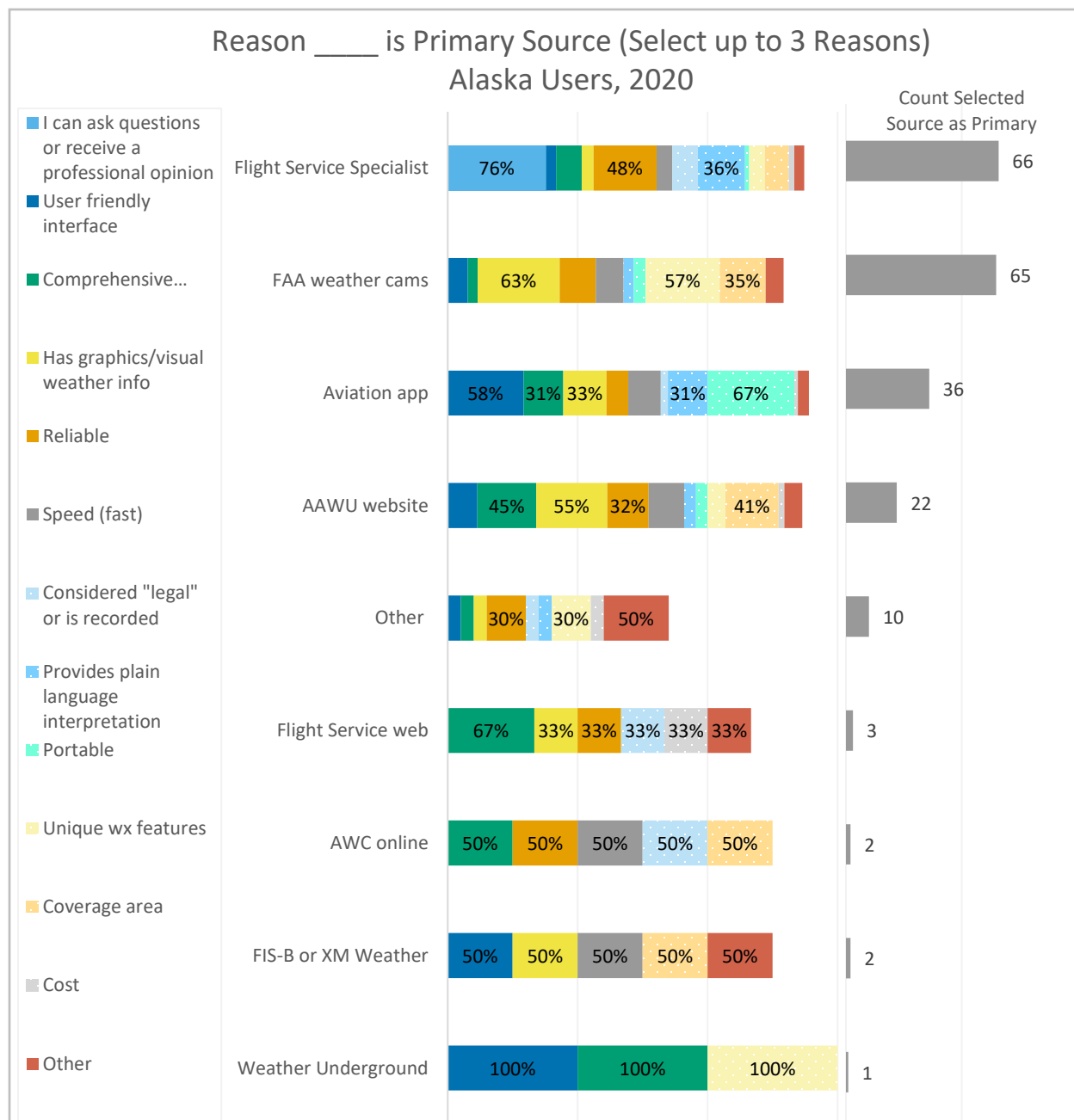


Figure 15. Reasons for choosing preferred source, Alaska. No subjects from Alaska selected the Weather Channel as their primary source. Subjects could select up to three reasons for their preference, so summed percentages may exceed 100 percent. 2020 data only.

**FAA weather cameras.** The FAA Weather Camera program was established in Alaska to provide supplementary information on weather conditions to help compensate for the lack of conventional certified weather reporting stations. Currently, the program has camera constellations at 235 locations across the state, and hosts data from 220 Canadian stations. The FAA program is currently expanding its range to install sites in Hawaii and partner with other stakeholders in western states to host additional cameras.

In 2020, 76% of Alaskan pilots checked FAA weather cameras during initial preflight planning (Figure 3). About 70% of Alaskan pilots used FAA weather cameras immediately prior to a flight, with 31% relying on the cameras as their primary source of information (Figures 5 - 6). Pilots appreciated the graphics, unique weather features, coverage area, and reliability of FAA weather cameras. Most “other” responses in all years explained that the source allowed pilots to see actual conditions in real-time (“a picture is worth 1,000 words”).

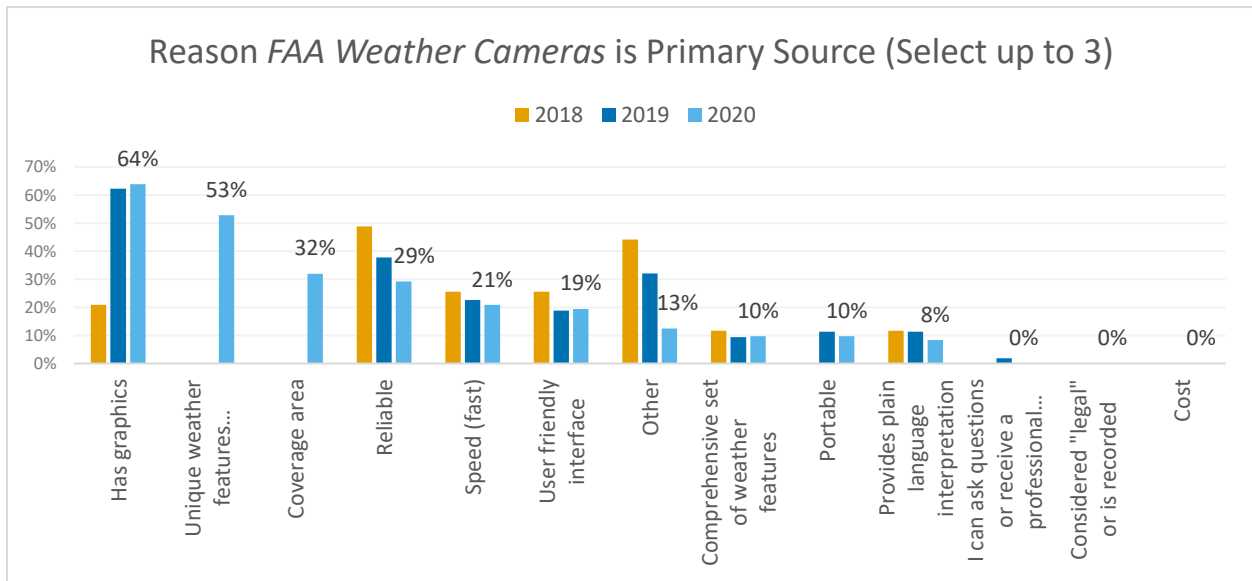


Figure 16. Reasons for choosing FAA weather cameras as preferred source (n<sub>18</sub> = 43; n<sub>19</sub> = 53; n<sub>20</sub> = 72). Only one respondent from CONUS chose FAA weather cameras as his/her primary source of weather information. The response choice “portable” was added to the survey in 2018, while choices “coverage area,” “unique weather features not available with other services,” and “cost” were added in 2020.

Pilots from CONUS and Hawaii do not currently receive information on local weather cameras via an FAA website, but about 82% of those respondents said they would *probably* or *definitely* access the information provided by a weather camera if it was available in their area, and/or at remote airports in their area, specifically (Figures 17 - 18). Current instrument rated pilots less often said they would check the weather cameras if available in the area and/or at the remote airports to which they fly. About 41% of current instrument rated pilots said they would be extremely likely to check a weather camera if available, compared to 48% of VFR-only pilots and 50% of instrument rated but not current pilots. About 45% of current instrument rated pilots said they would definitely check a weather camera if available at a remote airport, compared to 49% of VFR-only pilots and 52% of instrument rated but not current pilots.



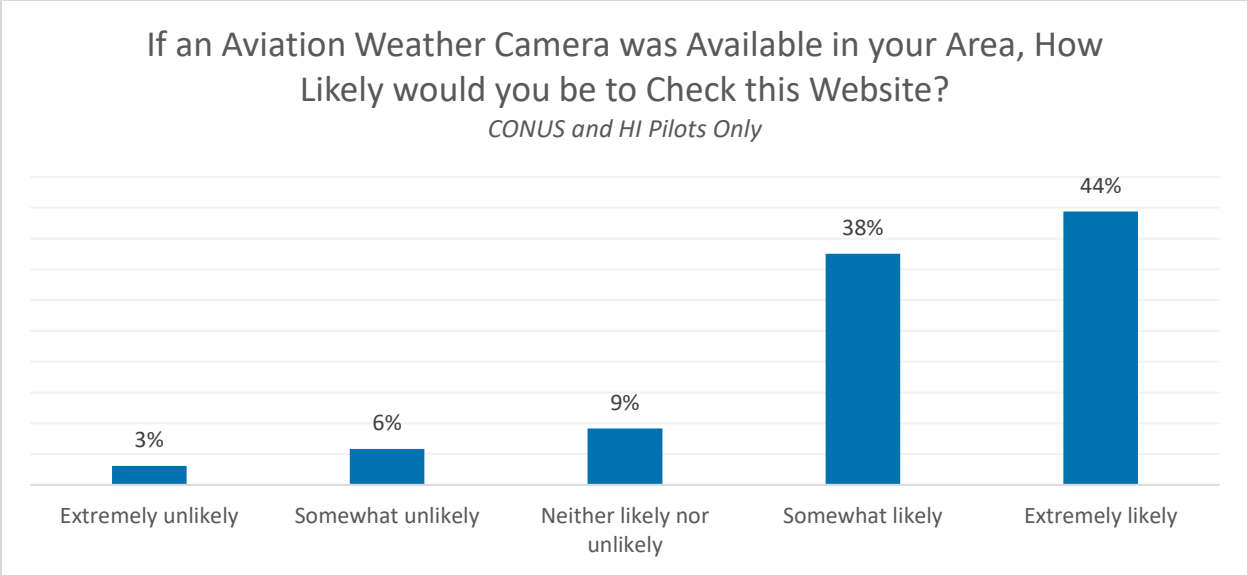


Figure 17. Responses to “If an Aviation Weather Camera was available in your area, how likely would you be to check this website?” (n = 2518). Only shown in 2020 to respondents from CONUS or HI.

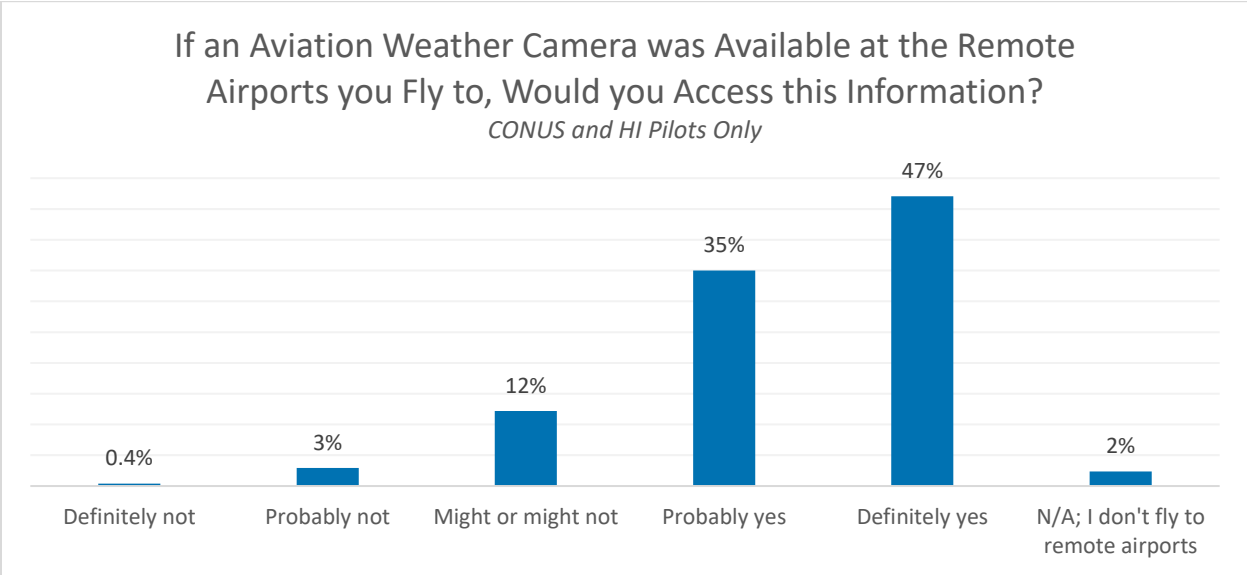


Figure 18. Responses to “If an Aviation Weather Camera was available at the remote airports you fly to, would you access this information?” (n = 2517). Only shown in 2020 to pilots from CONUS or HI.

**Alaska Aviation Weather Unit (AAWU).** The AAWU is the counterpart of the AWC, providing aviation forecasts, surface observations, and pilot reports for Alaska. Operated by the National Weather Service (NWS), it hosts a website as a primary means to serve products to pilots operating in the state.

The percentage of Alaskan pilots who always or frequently consult the AAWU website before a flight has slowly declined over time, from 79% in 2018, to 75% in 2019, and finally 65% in 2020

(Figure 19). Furthermore, the percentage of pilots who use the AAWU website as their primary source of weather information before a flight in challenging conditions decreased from 15% in 2018 and 2019 to 11% in 2020 (Figure 6). Those who do rely on AAWU as their primary source did so because of the graphics (52%), comprehensive set of weather features (43%), and coverage area (39%; Figure 20). The percentage of pilots who believe the site is reliable (30% in 2020) and has a user-friendly interface (20% in 2020) declined substantially from 2018 to 2019 following major website changes and has not recovered (Figure 20).

When accessing the AAWU website, about 59% of pilots commented that they use the forecasts available (82/138 comments), and 52% commented that they check on current conditions. About 27% of respondents specifically mentioned looking at the Significant Weather Charts, including the 24-, 36-, 48-, and 60-hour charts, as well as the 4-panel display. About 14% of respondents said they accessed weather cameras from the AAWU site, 13% checked the METARs, and 14% checked the TAFs. Only 3% of respondents mentioned looking at any hazard information on the AAWU site, including AIRMETs and SIGMETs.

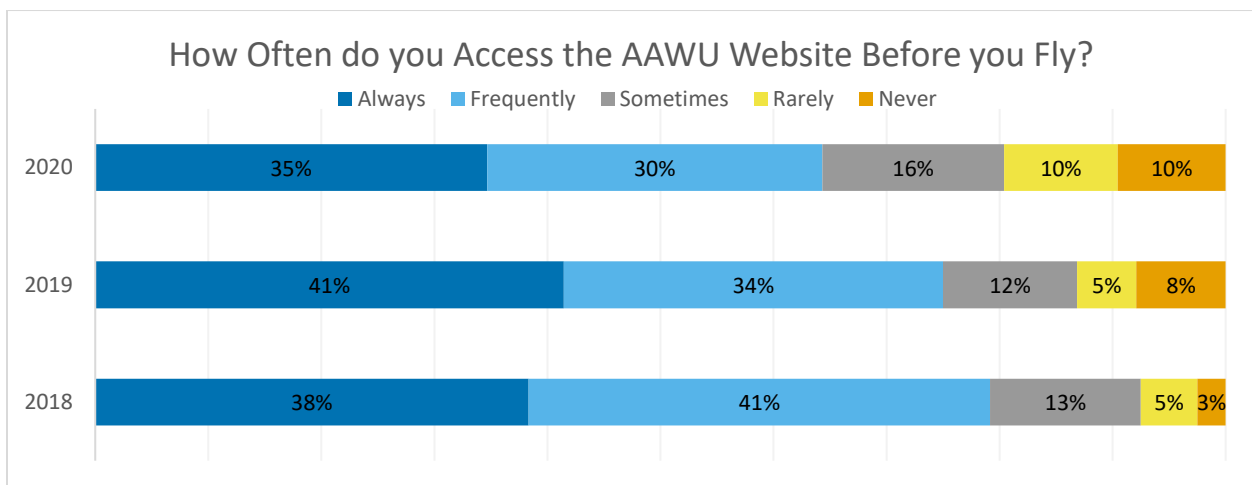


Figure 19. “How often do you access the AAWU website before you fly?” over time. Question was directed only towards Alaskan subjects (n<sub>18</sub> = 120; n<sub>19</sub> = 152; n<sub>20</sub> = 199)

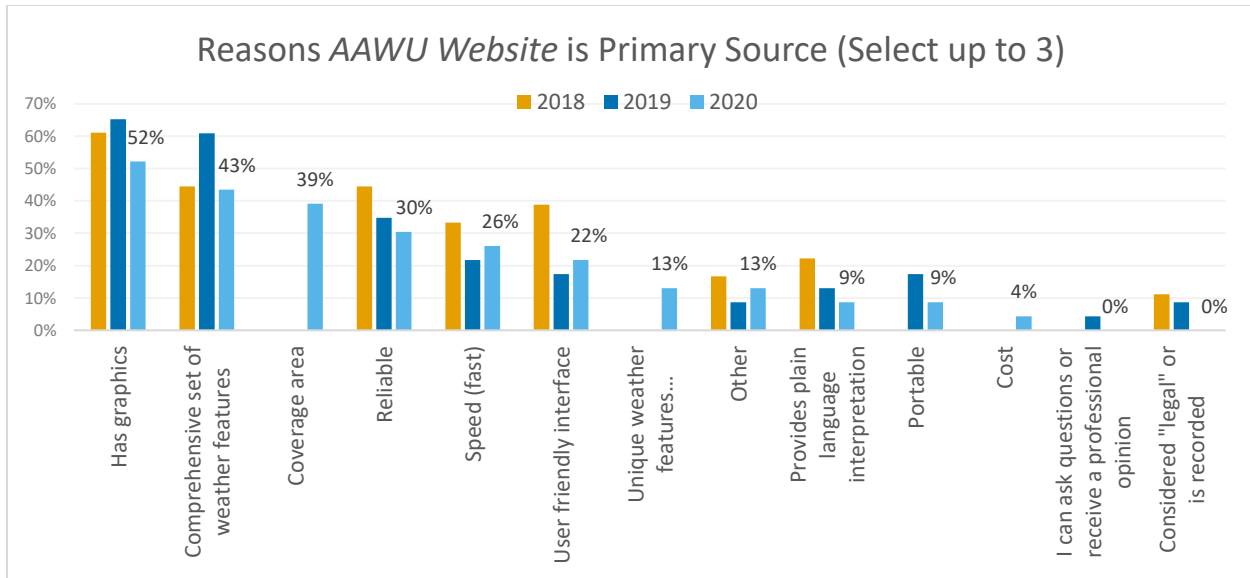
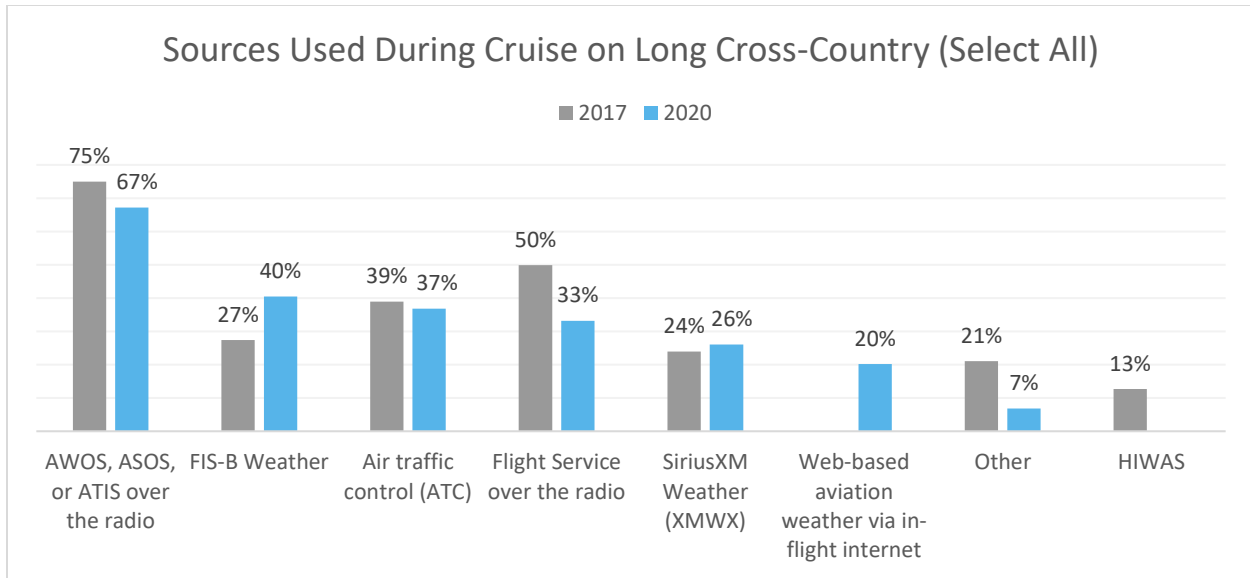


Figure 20. Reasons why the AAWU website is the primary source of weather information immediately prior to flight ( $n_{18} = 18$ ;  $n_{19} = 23$ ;  $n_{20} = 23$ ). No respondents from CONUS selected AAWU as their primary source of weather information in 2018 or 2019, but one respondent from CONUS selected AAWU in 2020.

### Cruise weather resources

Once airborne, communication channels and pilot needs change. To assess those needs, a question was posed asking pilots how they obtained inflight weather while on a long cross-country flight. The percentage of pilots accessing AWOS, ASOS, or ATIS over the radio during a long cross-country has decreased slightly since 2017, though it remains the most popular source for that phase of flight (Figure 21). Use of Flight Service over the radio has also decreased over time, from about half of pilots (50%) to about one-third (33%) using the source. FIS-B Weather, however, has grown in popularity since 2017; about 40% of respondents reported using the source in 2020, an increase of 13 percentage points since 2017. Current, instrument rated pilots more often used FIS-B during long cross-country flights, and less often used Flight Service, AWOS, ASOS, or ATIS over the radio.



*Figure 21.* Responses to the question, “When on a long cross-country flight, how do you get in-flight weather information during the cruise phase?” Only asked in 2017 and 2020 ( $n_{17} = 347$ ;  $n_{20} = 2807$ ). Percentages are out of the total number of respondents who answered the question. Since respondents could select more than one answer, the total percentage may exceed 100% each year.

## Technology

**EFB, FIS-B, and SiriusXM Weather.** Electronic Flight Bags have continued to increase in popularity over time (Figure 22). SiriusXM Weather has become more commonplace in CONUS, though its adoption remains low in Alaska, most likely due to the lack of coverage in that area. In all survey years, each of these forms of technology (EFBs, FIS-B, and SiriusXM Weather) were more commonly used by instrument current pilots than other pilots.

Those who reported using FIS-B either frequently or always answered follow-up questions on their satisfaction with the service. Each year, CONUS pilots were more satisfied with the FIS-B service than Alaskan pilots were, though the discrepancy has shrunk over time (Figure 23). In 2018, 69% of Alaskan pilots and 84% of CONUS pilots were satisfied or extremely satisfied with the service – a difference of 15 percentage points. In 2020, that difference shrunk to just 3 percentage points, as 96% of Alaskan pilots and 99% of CONUS pilots reported being satisfied or extremely satisfied with the FAA’s FIS-B service.

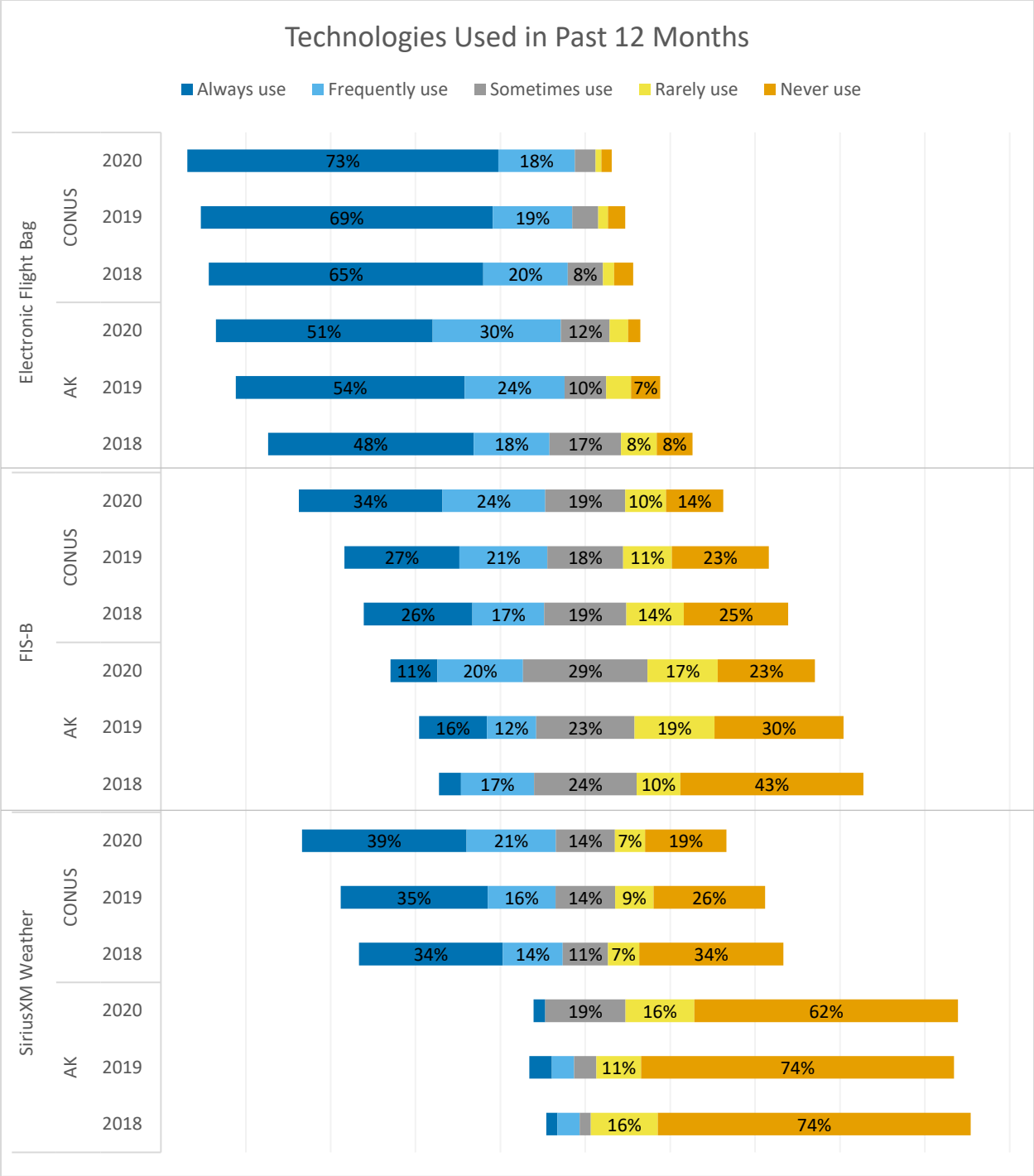


Figure 22. “Which of the following technologies have you used in the past 12 months?” by location and year.

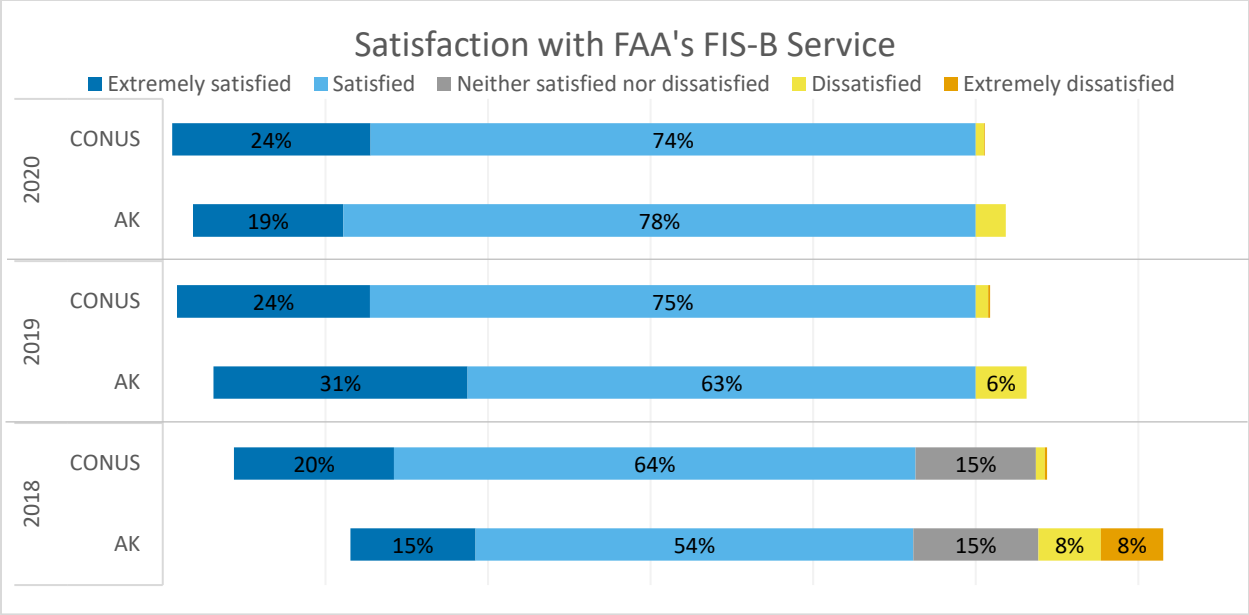


Figure 23. Responses to, “How satisfied are you with the FAA’s FIS-B service?”. Question only asked of those who used FIS-B at least “frequently.” In 2018, n = 13 for Alaska and n = 731 for CONUS. In 2019, n = 16 for Alaska and n = 455 for CONUS. In 2020, n = 27 for Alaska, and n = 962 for CONUS.

**Pilot Reports (PIREPs).** PIREPs continue to be an emphasis topic both with the FAA and the general aviation industry. In 2020, most pilots were *not at all* or only *slightly* familiar with the AWC’s web-based submission portal for PIREPs, though familiarity has increased by about 4 percentage points each year since 2018 (Figure 26). About half of all respondents (49%) reported giving an unsolicited PIREP at least sometimes. Alaskan pilots, current instrument rated pilots, ATP, and commercial pilots were more likely to provide unsolicited PIREPs than other pilots were each year (Figures 24 - 25). Both groups showed a dip in providing unsolicited reports between 2018 and 2019, followed by an increase this year. It is too soon to tell if this increase is the result of government and industry efforts to encourage filing.

Regarding new means of filing PIREPs, respondents were generally more open to the idea of submitting a PIREP via app or avionics using ADS-B Out than via voice or speech recognition (Figure 27). About half (51%) felt neutral about how much they would trust voice recognition technology for submitting PIREPs, 31% thought they would *trust* or *strongly trust* that technology, and 18% felt they would *distrust* or *strongly distrust* the technology (Figure 28). Younger pilots and instrument current pilots were more likely to say they would use apps or avionics and ADS-B Out to submit a PIREP than other pilots were. Those who trusted voice recognition technology were more likely to say they would be willing to use it in the future (Figure 29). Interestingly, older pilots were more often neutral or trusting of voice recognition technology than younger pilots and were correspondingly somewhat more likely to say they would probably use the technology.

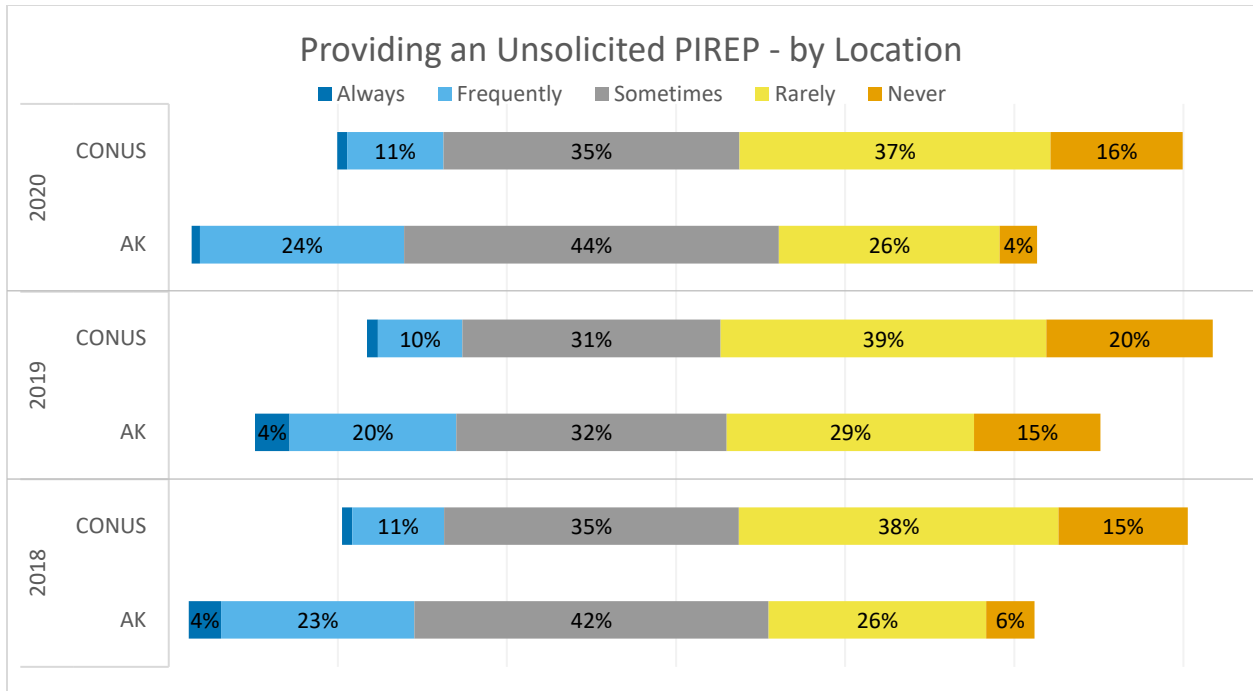


Figure 24. “How often do you usually provide an unsolicited PIREP?” broken down by location and year.

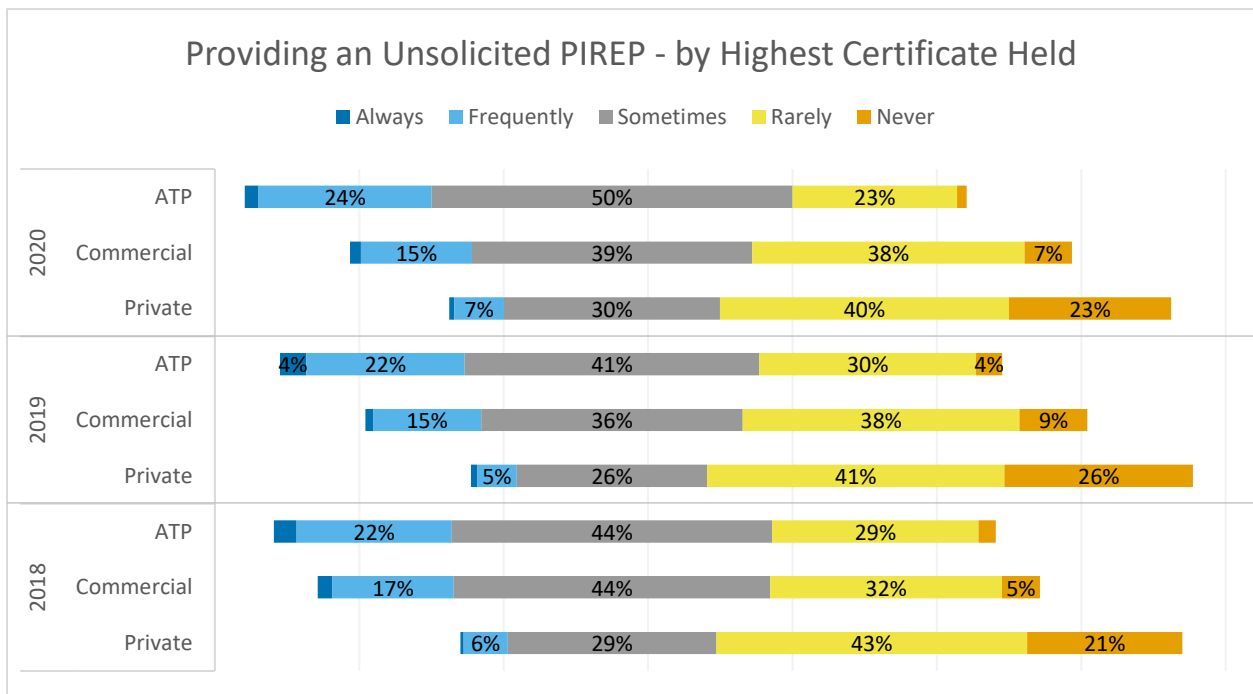


Figure 25. “How often do you usually provide an unsolicited PIREP?” broken down by highest certificate and year.

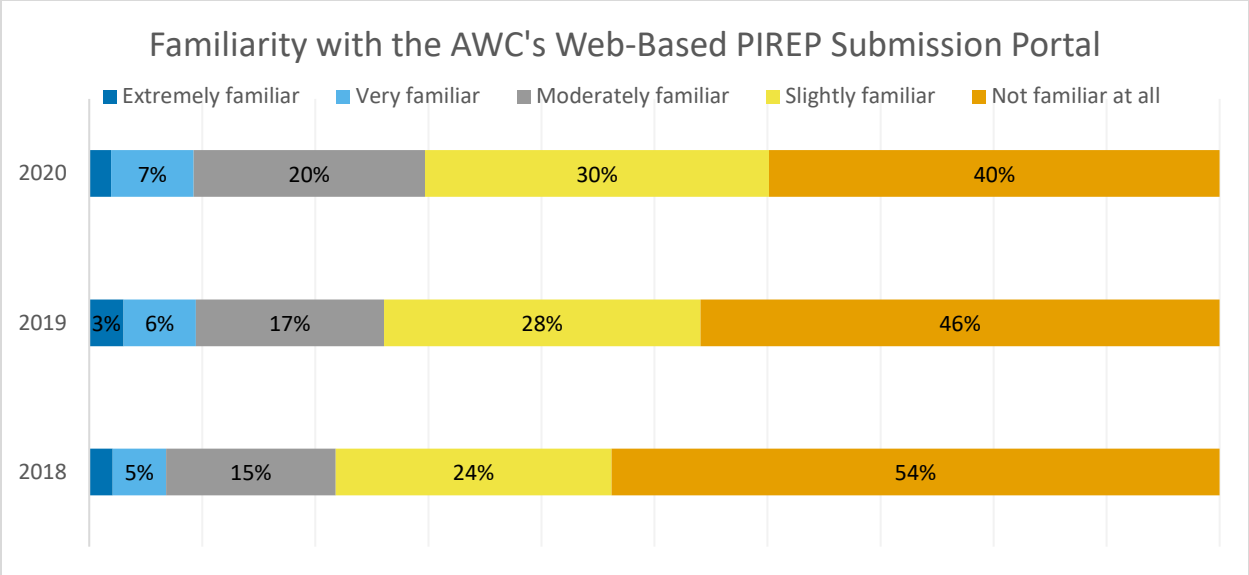


Figure 26. “How familiar are you with the Aviation Weather Center’s web-based PIREP submission portal for pilots?” broken down by highest certificate and year.

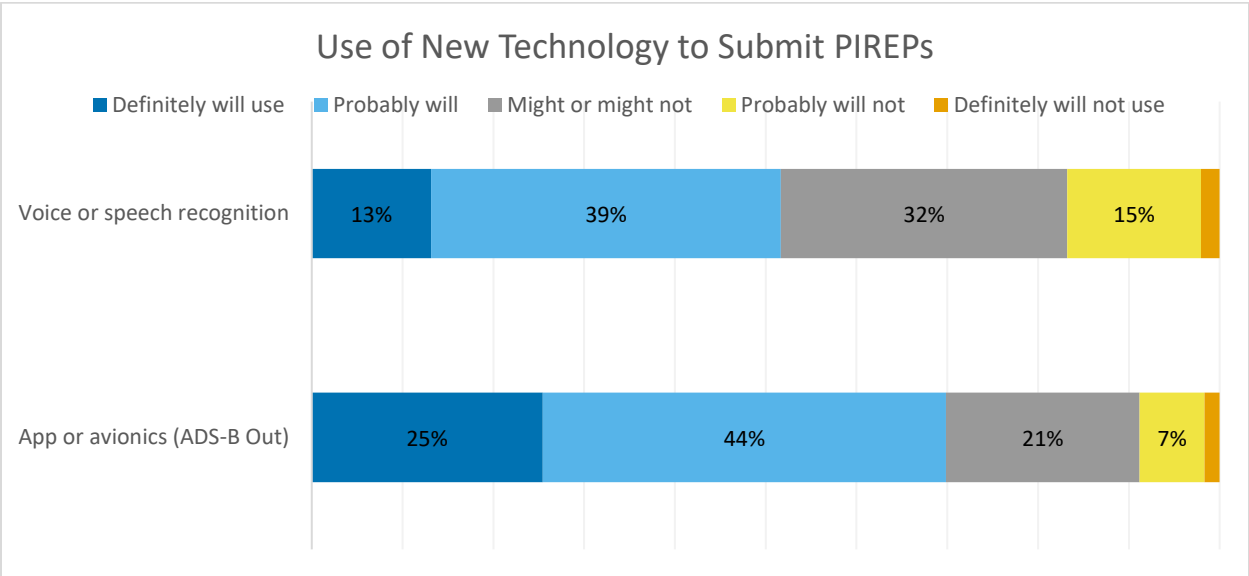


Figure 27. Responses to “In the future, if you could submit a PIREP electronically via an app or your avionics, using ADS-B Out, would you use this capability?” (n = 2757) and “In the future, if you could submit a PIREP electronically via voice or speech recognition, would you use this capability?” (n = 2754). Only asked in 2020.



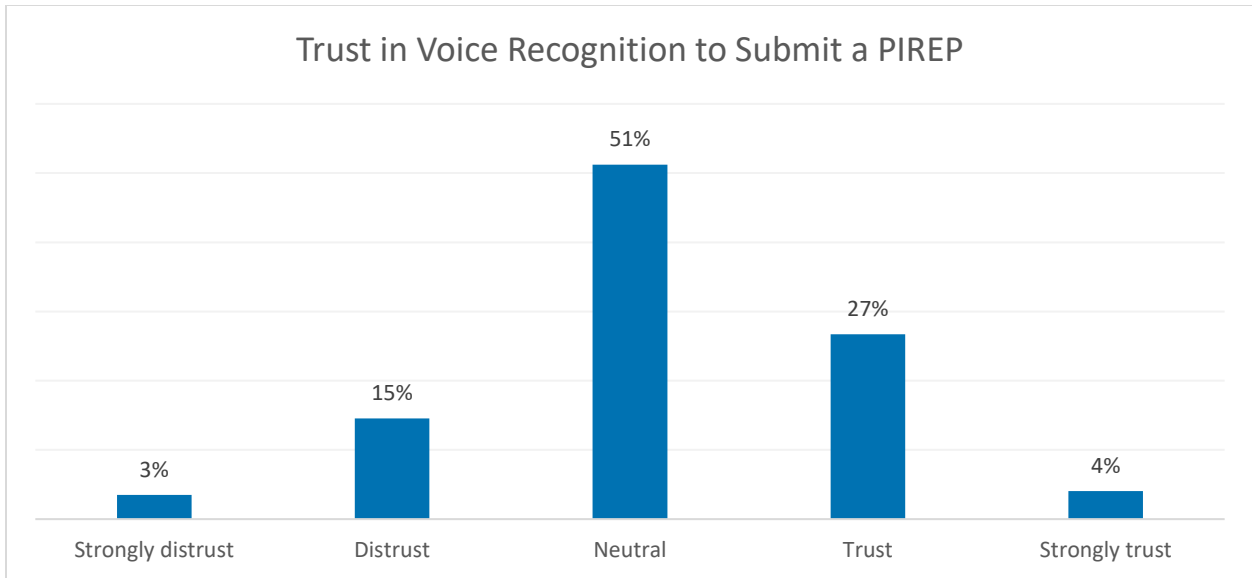


Figure 28. Responses to “How much would you trust using a voice recognition app to submit a PIREP?” (n = 2756). Only asked in 2020.

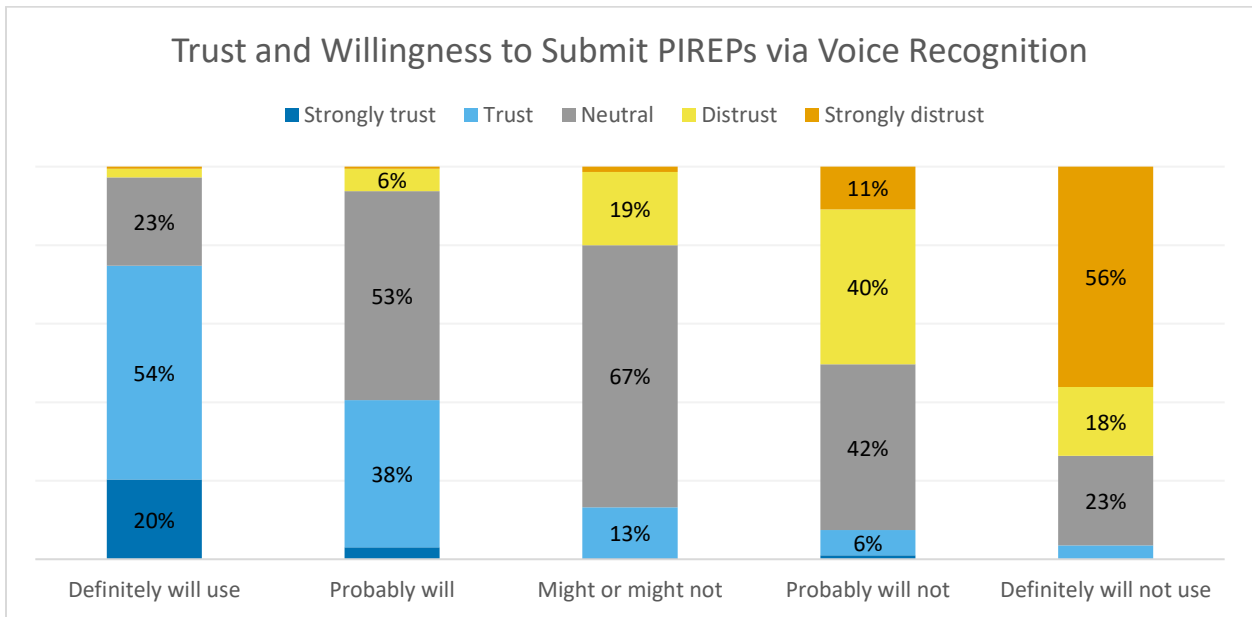


Figure 29. Responses to “In the future, if you could submit a PIREP electronically via voice or speech recognition, would you use this capability?” and “How much would you trust using a voice recognition app to submit a PIREP?” Only asked in 2020.

## New Technology

**Uncertified weather.** The FAA plans to test an uncertified weather station concept in Alaska in 2020. To assess user interest and needs concerning weather elements related to that effort, AOPA’s 2020 Weather Survey contained additional questions on uncertified weather systems. Most pilots (73%) said they would be willing to use the information from an uncertified weather

observation if available at an airport without AWOS or ASOS (Figure 30). Alaskan pilots were more likely than CONUS pilots to say that they would use the information; about 82% of Alaskan pilots and 72% of CONUS pilots said “yes,” a difference of 10 percentage points.

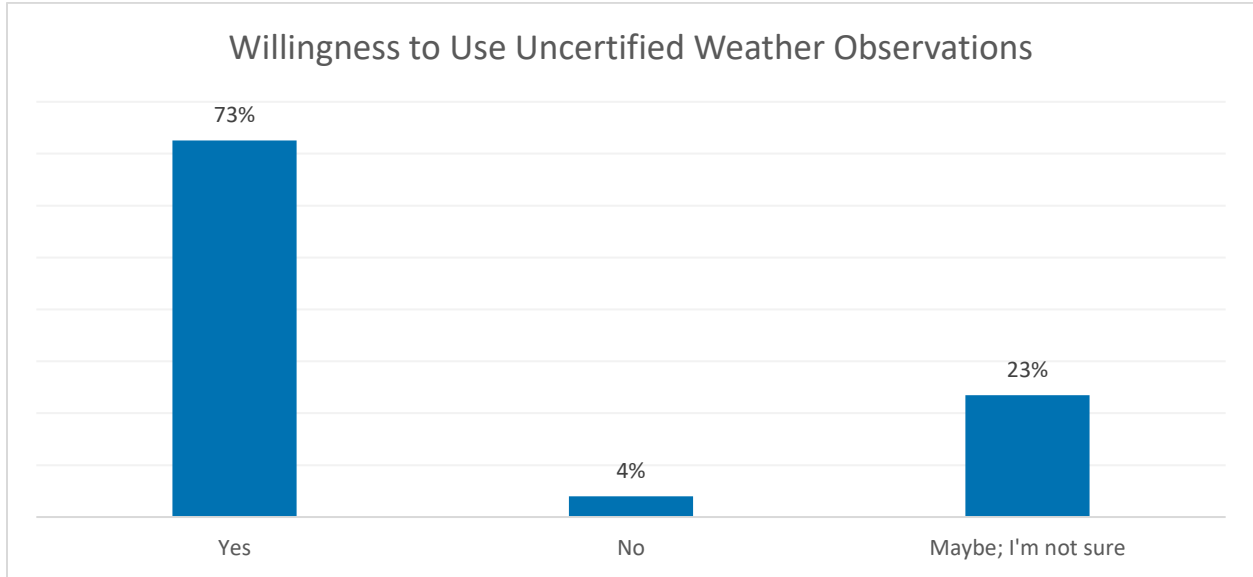


Figure 30. Responses to “If an uncertified weather observation was available at an airport you fly to that currently does not have AWOS or ASOS, would you use this advisory information?” (n = 2734). Only asked in 2020.

Respondents in 2020 also ranked the usefulness of several weather observation elements (Figure 31). Information on ceilings, winds, and visibility were generally considered the most useful, while temperature, barometer (altimeter), and dewpoint were among the least desired. CONUS pilots tended to rank visibility and dewpoint as slightly less useful than Alaskan pilots did. Alaskan pilots tended to rank the barometer (altimeter) and winds as slightly less useful than CONUS pilots did.

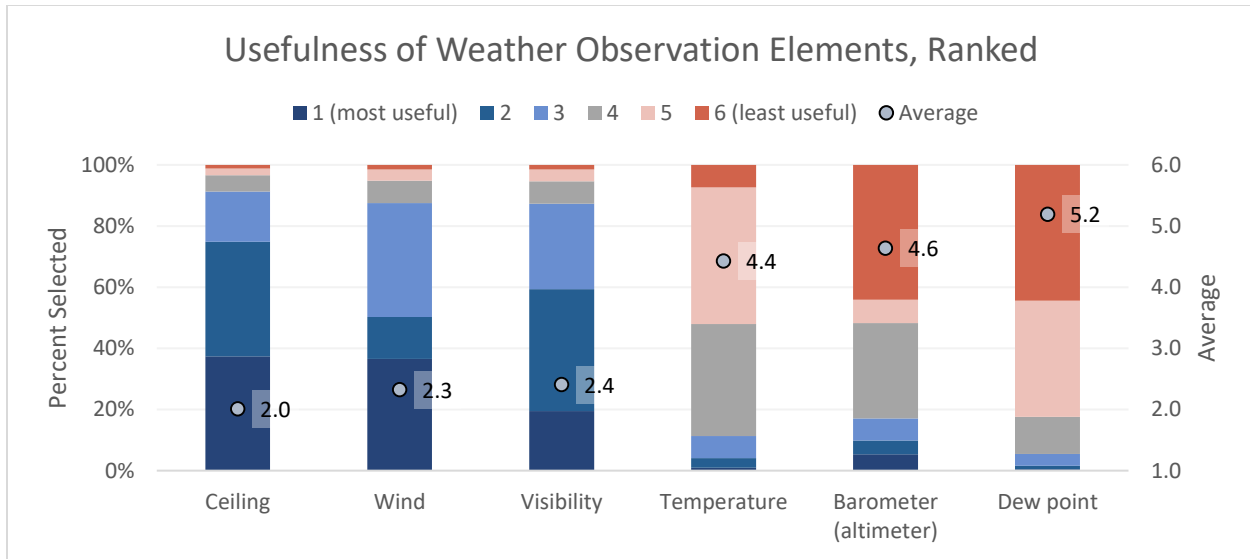


Figure 31. Responses to “How useful are the following weather observation elements? Drag then drop the items below to rank them from 1 (most useful) to 6 (least useful).” (n = 2692). Only included in 2020 survey.

**Alaska Aviation Guidance (AAG).** Another experimental effort is being conducted in Alaska for an automated, TAF-like product called the Alaska Aviation Guidance (AAG). These forecasts are made available via an NWS website for select airports across the state that have certified weather stations but no TAFs. Questions were included in this year’s survey to gauge pilot response to this product. About 22% of respondents were familiar with the AAG product (Figure 32). Of those familiar with the product, almost half (48%) *frequently* or *always* checked the AAG before a flight (Figure 33). Most users were *satisfied* with the product; less than 5% (2 out of 44 respondents) were *dissatisfied* or *extremely dissatisfied* with the AAG product (Figure 34). There were no statistically significant differences in familiarity, use, or satisfaction with the AAG product by certificate type, instrument rating or currency, or age.

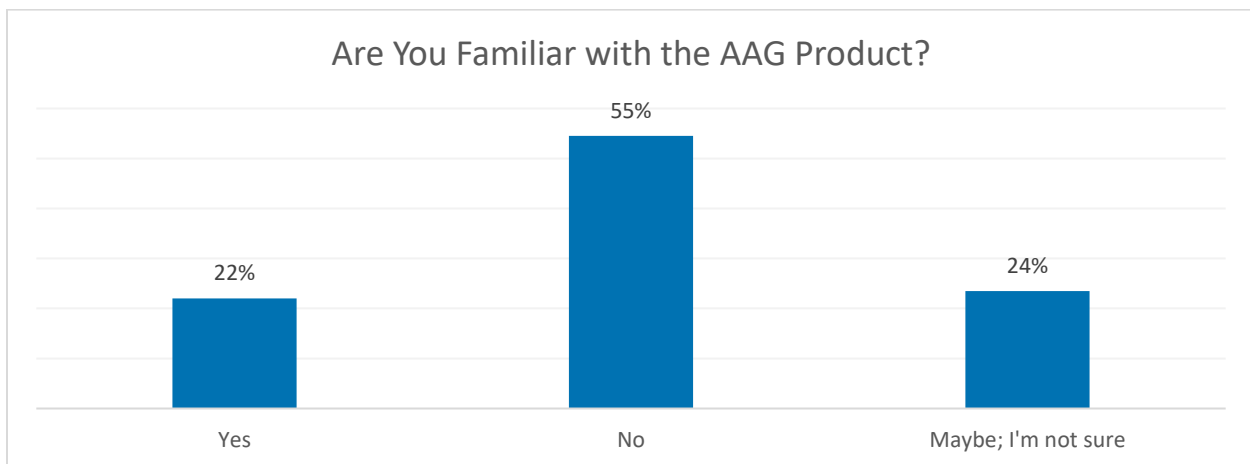


Figure 32. Responses to “Are you familiar with the Alaska Aviation Guidance (AAG) product?” (n = 200). Only shown in 2020 to Alaskan respondents.

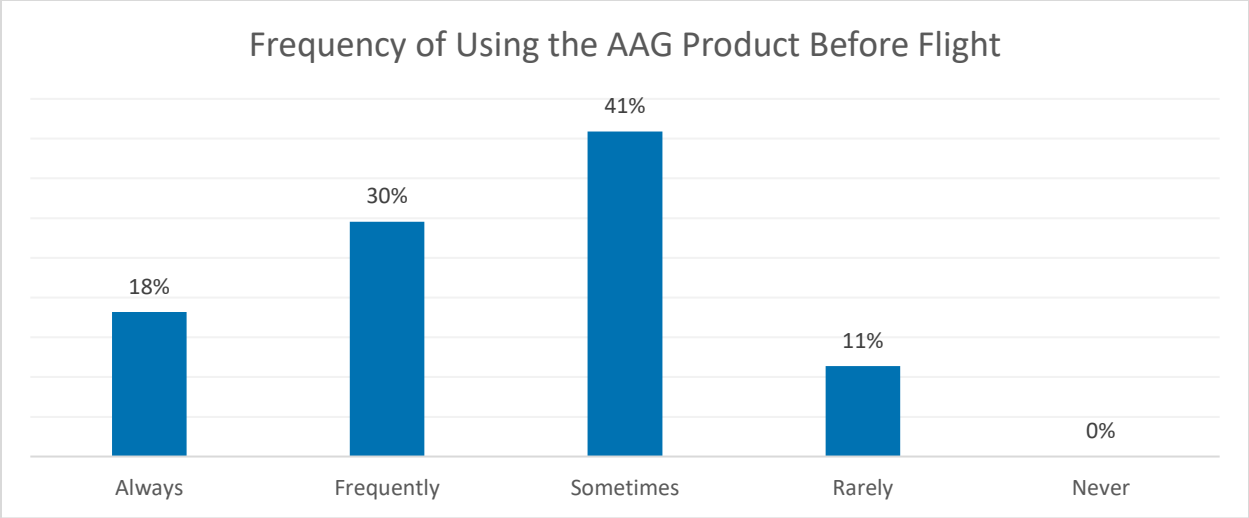


Figure 33. Responses to “How often do you use the Alaska Aviation Guidance (AAG) product before you fly?” (n = 44). Only shown in 2020 to Alaskan respondents who were familiar with the AAG product.

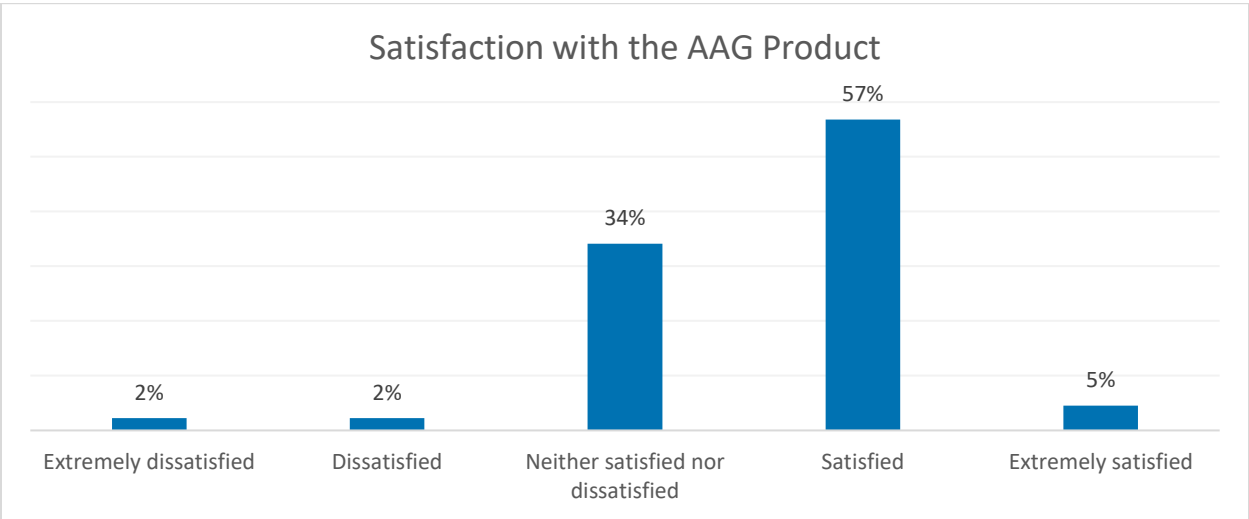


Figure 34. Responses to “How satisfied are you with the Alaska Aviation Guidance (AAG) product?” (n = 44). Only shown in 2020 to Alaskan respondents who were familiar with AAG and used it before flying at least “rarely.”

**Graphical Forecasts for Aviation (GFA).** The GFA is an interactive and graphical weather tool for pilots that was developed as part of the discontinuance of textual Area Forecasts. About 73% of CONUS pilots were at least moderately familiar with the Aviation Weather Center’s GFA product (Figure 35). About 68% of CONUS pilots used the GFA at least sometimes before a flight (Figure 36). Those who were more familiar with the product tended to use it more often. Current instrument rated pilots in particular were more familiar with the product and used it more often than other pilots. Commercial pilots and younger pilots were more familiar with the tool than private pilots and older pilots, respectively, though the frequency with which they used the tool did not differ.

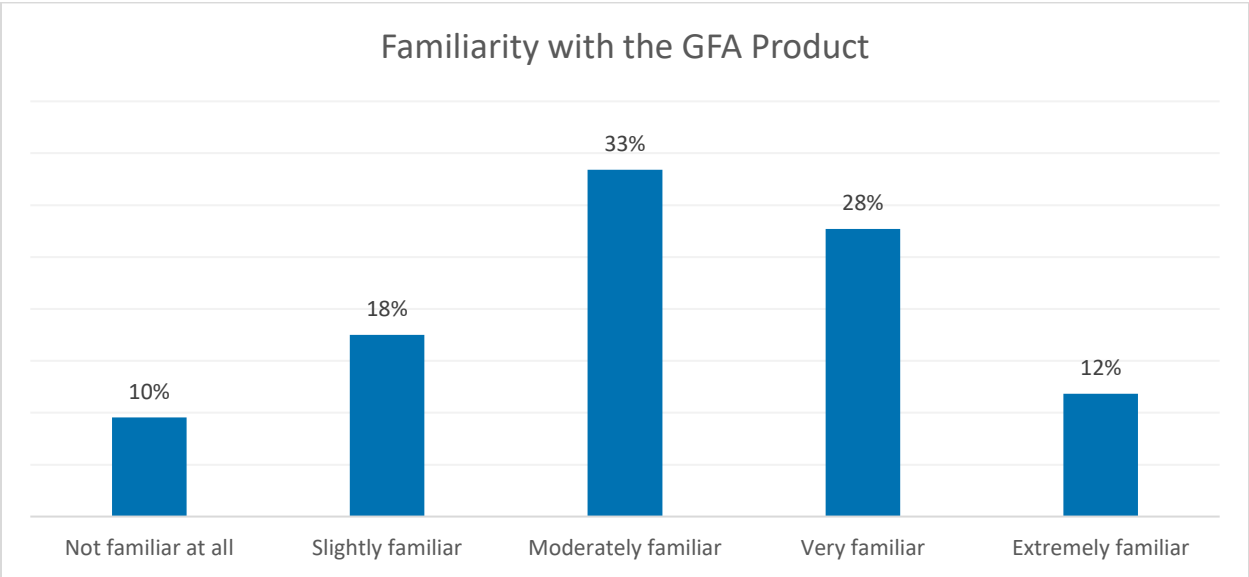


Figure 35. Responses to “How familiar are you with the Aviation Weather Center's Graphical Forecasts for Aviation (GFA) Product?” (n = 2479). Only shown in 2020 to respondents from CONUS.

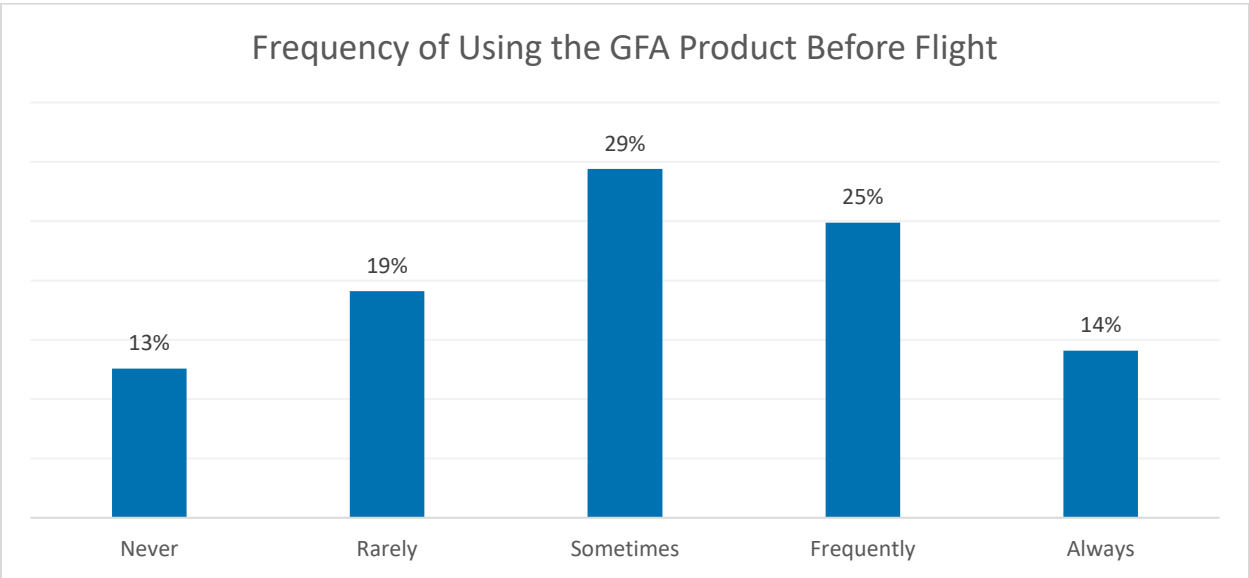


Figure 36. Responses to “How often do you access/use the Aviation Weather Center's Graphical Forecasts for Aviation (GFA) before you fly?” (n = 2473). Only shown in 2020 to respondents from CONUS.

**Helicopter Emergency Medical Services (HEMS).** Most CONUS pilots (81%) were not at all familiar with the HEMS tool (Figure 37), though familiarity has increased over time. In 2020, 60% of CONUS respondents had never heard of the tool, a decrease of 12 percentage points from two years prior (Figure 38). Even those pilots who have heard of the tool have often never

used it, though use has increased over time. In 2020, 65% of pilots who had heard of the HEMS tool had never used it, a decrease of 23 percentage points since 2018 (Figure 39).

ATP and commercial pilots were more often familiar with the HEMS tool than private pilots were, though many had still never heard of the tool. About 76% of ATPs, 77% of commercial pilots, and 85% of private pilots were not at all familiar with the HEMS tool. Instrument rated pilots, regardless of currency, were also more often familiar with the HEMS tool than VFR-only pilots. About 79% of instrument rated but not current pilots, 80% of current instrument rated pilots, and 85% of VFR-only pilots said they were not at all familiar with the tool.

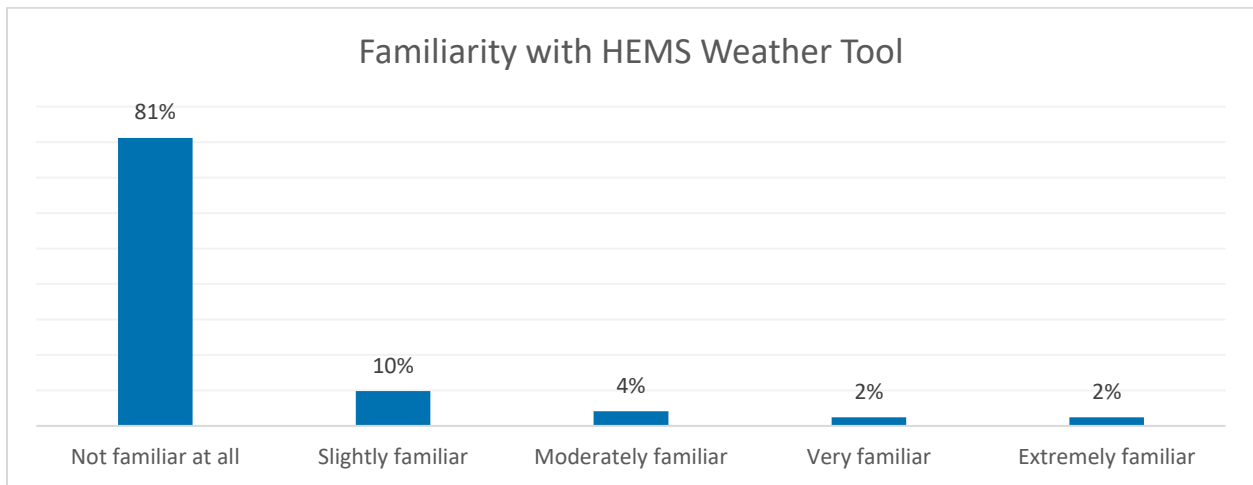


Figure 37. Responses to “How familiar are you with the Aviation Weather Center’s Helicopter Emergency Medical Services (HEMS) weather tool product?” (n = 2465). Only shown in 2020 to respondents from CONUS.

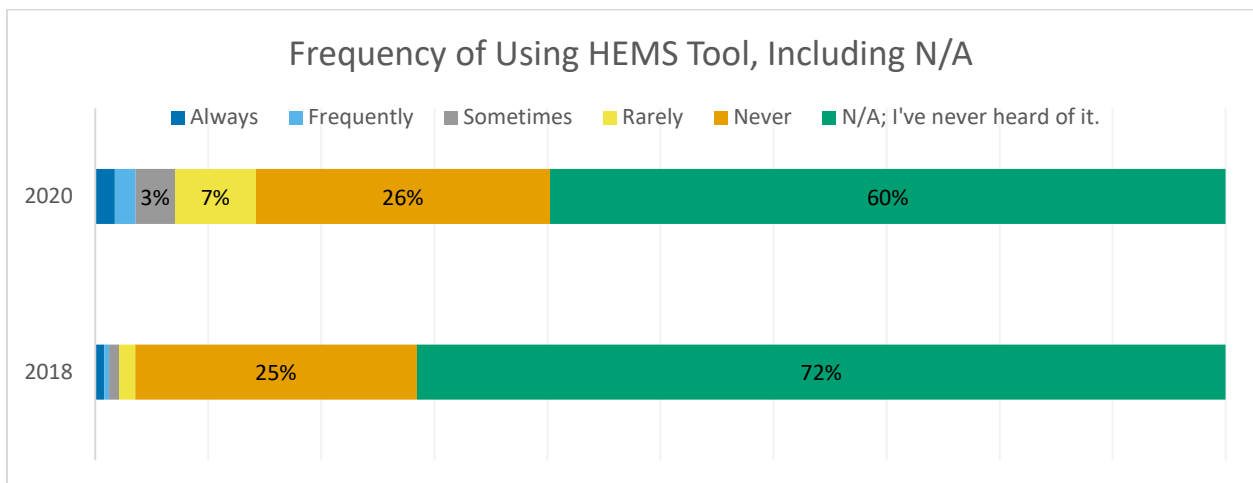


Figure 38. Responses to “How often do you use the Helicopter Emergency Medical Services (HEMS) weather tool on the Aviation Weather Center website?” including those who selected N/A (n<sub>18</sub> = 2517 and n<sub>20</sub> = 2469). Only shown in 2018 and 2020 to respondents from CONUS.

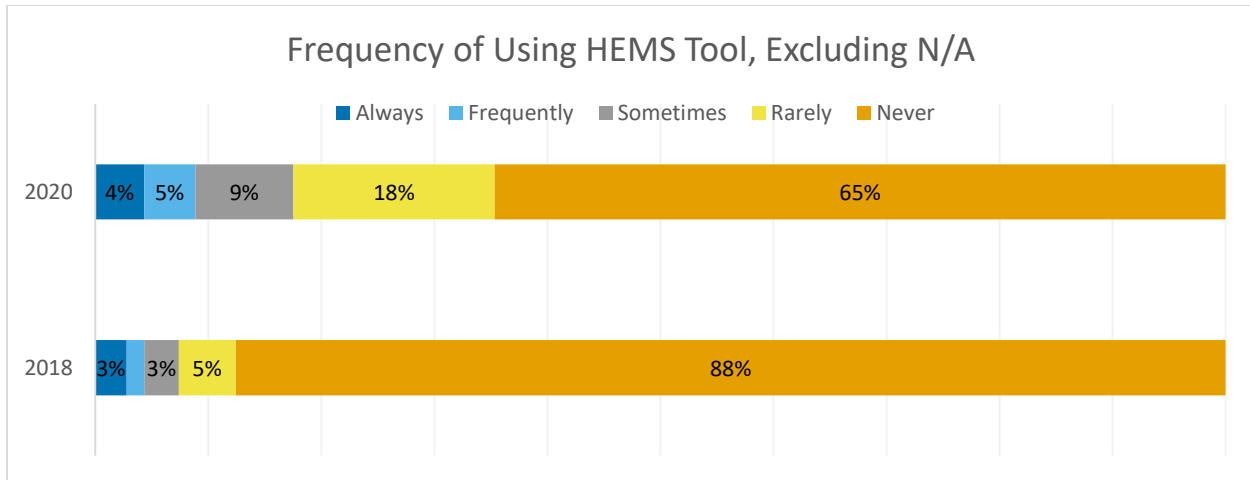


Figure 39. Responses to “How often do you use the Helicopter Emergency Medical Services (HEMS) weather tool on the Aviation Weather Center website?” excluding those who selected N/A (n<sub>18</sub> = 716 and n<sub>20</sub> = 993). Only shown in 2018 and 2020 to respondents from CONUS.

## Discussion

The present survey followed up on results from AOPA’s previous research conducted since 2016, with the goal of understanding how general aviation pilots access and use weather information. This report highlighted trends in the use of various sources of weather information, use of specific weather products before and during flight, and feedback obtained on current experimental and possible future weather-related products.

### Role of Flight Service

The trend of declining utilization of Flight Service specialists for preflight planning by pilots both in CONUS and Alaska continues. The decreasing trend in Alaska is most concerning with a drop of 21% of pilots who use Flight Service as their source for an initial weather briefing since 2017. There have been consistent drops in use year over year for Alaska Flight Service, yet there has been an underwhelming response from the FAA in any effort to modernize the program. This negative use trend is countered by the positive increase in the use of aviation apps and online weather sources, which show increasing popularity.

Flight Services continues to be relied on heavily by pilots immediately prior to flight in challenging weather conditions, and during en route phases of flight. While aviation apps and online sources are gaining ground, it is important to keep in mind that in some cases, particularly when flying into remote locations with limited communication infrastructure like Alaska, the ability to access a specialist by phone remains a critical need. As the role of new technologies continues, Flight Service needs to continue to evaluate their services and evolve to meet the changing needs, or risk becoming irrelevant. As more forecast and current condition data is directly available to the pilot, the role of Flight Service specialists to help with data interpretation, maintaining situational awareness of weather and airspace status, and as consultants to help pilots locate the information they need becomes increasingly important.

## FAA Weather Cameras

The Weather Camera Program continues to be the most frequently used source of preflight information for Alaska pilots (76% for initial briefing and 70% immediately prior to flight). Pilots outside Alaska expressed a strong desire to integrate the technology into their list of weather data sources (82% were *extremely* or *somewhat likely* to use a webcam, if available). As the program expands into areas of Hawaii and CONUS that lack surface observations, pilots' awareness and training must be considered for the large number of pilots unfamiliar with, but very interested in, this capability. Survey results support this expansion of the program.

## PIREPs

The number of pilots rarely or never provide an unsolicited report continues to be a concern. After a drop in pilots volunteering reports between 2018 and 2019, we see a small uptick in 2020 for pilots who *frequently* or *always* file (2% increase in both CONUS and Alaska). More effort on behalf of government and industry is needed to improve upon this situation. There is also strong support for new ways of filing PIREPS. In response to questions about willingness to file with an app or using avionics, 69% indicated they *definitely* or *probably* would submit a report using this technology, if it were available. A slightly smaller percent (52%) indicated they would try voice recognition methods to file.

## Uncertified Weather

Pilots across the country expressed a willingness to consider using uncertified weather observations at airports that currently have no weather reporting. Almost three-quarters of the pilots responding indicated that they would use this advisory information. When asked which weather elements they would find most useful, ceiling, wind, and visibility ranked highest. The FAA Weather Camera Program is planning a test of an uncertified, low-cost station in Alaska this summer, which should provide additional information.

## Alaska Aviation Guidance Product

This experimental product generates a TAF-like forecast at locations where an AWOS observation is available. The six-hour look-ahead gives pilots an idea of expected conditions, but lacks some of the elements of a TAF, and is a completely automated product. It is currently available at 61 airports across the state but could potentially be expanded to hundreds of locations in the United States. The survey results show that less than a quarter of Alaskan pilots are familiar with this product; however, for those who are familiar with it, half are *frequently* or *always* using the product, and 62% are satisfied with it. While limited to VFR use only, and for a limited time frame, products like these offer promise for providing additional forecasts in remote areas that don't qualify for a TAF.

## Recommendations

The following recommendations are made based on the results from this survey.



- 1) The FAA must refine the role of Alaska Flight Service and modernize the program in response to changing preflight and inflight weather briefing use patterns by their customers.
- 2) The FAA should continue with their expansion of the Weather Camera Program both within and beyond the state of Alaska.
- 3) Industry and government should continue outreach and educational efforts to encourage pilots, particularly private pilots, to supply unsolicited PIREPs as they fly.
- 4) The FAA and industry should continue efforts to develop and field a means to file PIREPs using aviation apps and onboard avionics, such as ADS-B.
- 5) The FAA should vigorously pursue testing of uncertified aviation weather stations, and the development of suitable guidance for VFR weather station vendors.
- 6) The NWS and FAA should continue evaluation of the Alaska Aviation Guidance product to help fill forecasting gaps in underserved areas. The possibility of combining this type of product with a low-cost VFR weather station holds significant potential to improve aviation safety.

### **Survey Limitations**

The main limitations of this survey include sample size, margin of error, and the potential for bias. The margin of error is a statistic that estimates how close observed results from a sample are to the actual population values. Small sample sizes lead to larger margins of error and greater uncertainty in results. The margins of error for the 2020 Weather Survey, at a 95% confidence level, were 6.3% for Alaskan pilots, 1.8% for CONUS pilots, and 1.7% overall (for pilots from all regions). In other words, if AOPA were to repeat this survey 100 times, we would expect the results to differ from the real population value by about 6.3% for Alaskan pilots and 1.8% for CONUS pilots, 95% of the time. Note that since the sample size of Alaskan pilots was much smaller than that of CONUS pilots, the margin of error for Alaskan pilots is also larger than that of CONUS pilots. The margin of error will also be higher (and estimates will be less reliable) where individual questions have fewer responses recorded. AOPA's recent weather surveys (from 2018 through present) have benefitted from large sample sizes, with significantly lower margins of error than the earlier 2017 report. Recent surveys have also had larger numbers of Alaskan pilots respond, reducing the margin of error for that cohort as much as possible.

Next, the potential for response bias towards AOPA exists. The survey was released by AOPA, to AOPA members. Invitees who recognized the survey's source (AOPA) and had favorable opinions towards AOPA and its products and services may have been more likely to respond. This bias was similarly noted in previous reports of AOPA's annual Weather Survey.

The next potential source of bias is in interpretation of open-ended responses. Coders who read, interpret, and summarize answers to free-response questions must avoid making assumptions

about vague responses. For example, a respondent in the present study wrote that the reason he or she used a particular weather resource was “self explanatory.” This comment is difficult to interpret – perhaps the respondent felt the answer was obvious, or perhaps the respondent was making a comment about how easily understandable that weather resource was. The coder must avoid making guesses about the respondent’s intention – no matter how well-informed those guesses may seem. Bias and a resulting lack of accuracy in coding free-response questions will always exist, though it may be mitigated by having multiple trained readers. AOPA uses a single coder, which precludes calculation of interrater reliability (a measure of accuracy and similarity in judgment between multiple coders).

Finally, it is important to note that the 2020 Weather Survey was released during the COVID-19 pandemic. The pandemic had a substantial impact on day-to-day life. The sample of pilots who responded to the survey were likely affected by the pandemic in some way. It is possible that more people responded to the survey in 2020 than in previous years because they were at home and available when the email invitations were released, due to stay-at-home orders or other quarantining precautions. It is unclear whether the pandemic would have changed how respondents answered questions throughout the survey. No additional questions about the pandemic were asked in the survey, and no respondent left a comment concerning the pandemic.

AOPA aims to provide thorough, accurate, and reliable assessments of all available data, and so openly recognizes these limitations.

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The Aircraft Owners and Pilots Association (AOPA) is a not-for-profit individual membership organization of general aviation pilots and aircraft owners. AOPA's mission is to effectively serve the interests of its members and establish, maintain and articulate positions of leadership to promote the economy, safety, utility and popularity of flight in general aviation aircraft. Representing two thirds of all pilots in the United States, AOPA is the largest civil aviation organization in the world.

For more information about this study you may contact:

Tom George  
Alaska Regional Manager  
Aircraft Owners and Pilots Association  
[tom.george@aopa.org](mailto:tom.george@aopa.org)  
(301) 695-2092