Alaska Weather Equipment Needs Summary

ALASKA
Aviation System Plan

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Introduction

Weather observations provide critical information to the aviation industry, impacting how and when aircraft can operate. Pilots are required to acquire and evaluate weather reports prior to take-off, and continue to monitor them in flight, to determine if it is possible to continue to their planned destination. Air traffic controllers, airline dispatchers and other aviation personnel use weather observations to plan and execute flight operations. Weather forecasters use weather observations as the foundation of predictions on atmospheric conditions and these weather predictions are also important to the aviation community.

Weather observations used by the aviation community typically include temperature, ceiling (cloud height), visibility, wind speed and direction, atmospheric pressure (altimeter setting), type and amount of precipitation and other variables. These weather observations are important to pilots who fly during times of good visibility, clear of clouds, under visual flight rules (VFR), as well as pilots that operate during periods of low visibility, under instrument flight rules (IFR). Observations and forecasts are also important to pilots wanting to know conditions along their route of flight and if they will be able to see the runway to land at their destination. Weather observations must meet a rigid set of standards and be certified by the FAA when they are used by pilots attempting to land under IFR conditions using FAA instrument approach procedures.

Relative Densities of Certified Weather Stations in Alaska Compared to Contiguous 48 States. *Courtesy Tom George, AOPA*

Alaska has a severe shortage of certified weather stations. According to the FAA, there are currently only 135 certified weather stations operating within the State of Alaska, which has a land mass approximately one fifth the size of the contiguous 48 States. In contrast, the contiguous 48 states have over 1,800 certified weather stations. While there are many other weather stations that may help provide weather observations of value to pilots, they are not FAA certified and their reports are not as widely distributed or easily available to pilots. Adding to this shortage of certified weather stations is the fact that there are currently twenty-one airports in Alaska that have published instrument approach procedures for landing, but do

not have a certified FAA weather station located on the field. This limits access to those airports and communities, which impacts safety and mobility in Alaska's aviation system.

The Alaska Aviation System Plan (AASP) Aviation Weather Work Group examined these issues and made recommendations to improve the aviation weather reporting system in Alaska.

Aviation Weather Work Group Membership, Goals and Tasks

The AASP Weather Work Group included stakeholders from the aviation industry, aviation organizations, the Federal Aviation Administration, staff from the Alaska Department of Transportation and Public Facilities (DOT&PF), and National Oceanic and Atmospheric Administration (NOAA) / National Weather Service (NWS) to explore weather related issues.

The work group's primary goal was to examine ways to provide additional aviation weather data throughout Alaska. To meet this goal, the work group developed the following tasks:

- Catalog location and types of existing FAA approved weather reporting stations.
- Catalog location and types of advisory (non-FAA approved) weather reporting stations that can provide weather data meaningful to pilots.
- Catalog Alaskan airports that have instrument approach procedures but have no FAA approved on-field weather reporting stations.
- Create a priority list of Alaskan airports that need on-field weather reporting capabilities to develop new approaches or to enhance existing approaches by lowering minimum approach altitudes.
- Assess suitable sites to develop weather reporting stations on individual airports.
- Create a "white paper" to explain in detail the aviation weather reporting system in Alaska, the agencies involved, how the system works, the different types of weather sensors and reporting stations, their benefits and cost, and how the funding of weather reporting stations differs in other western states. (Attached). The white paper also described:
    - Aviation Paid Weather Observers (APAID) and their importance to weather reporting in Alaska.
    - The direct benefits to aviation in Alaska from installation of additional weather sensors and stations.
    - Funding sources for weather station construction, improvement and operation.
- Review weather camera inventory and recommend new locations.

The work group met four times over the span of 18 months to review the information collected and to decide upon the next steps. The group presented its findings at the 2017 Alaska Air Carriers Annual Association Conference and Tradeshow in Anchorage. A summary of findings of the work group is below and includes:

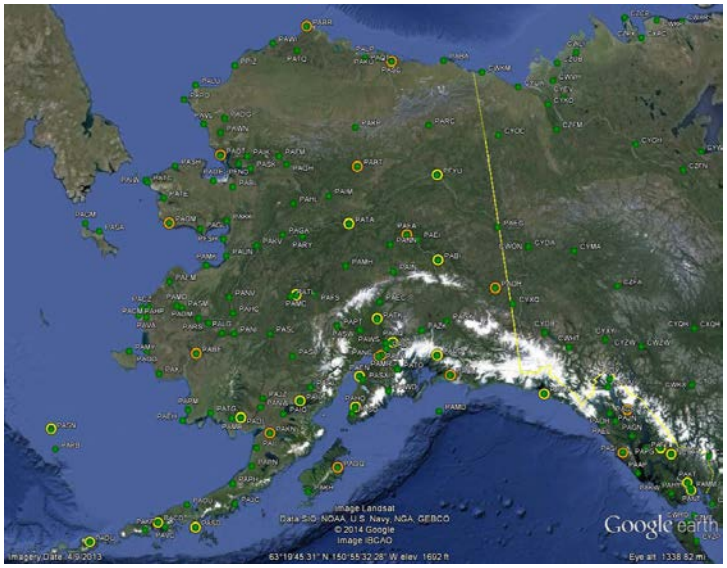
- Discussion of approved (certified) and unapproved (supplemental) weather sources.
- Cost information related to the development of approved weather stations.
- Development of a priority equation, and a prioritized list of airports that would benefit from the addition of an on-site approved weather station.
- The work groups' proposed recommendations and next steps.

Types of Weather Reporting

Certified Weather

Sources for weather observations need to be certified by the FAA and include certain weather elements if they are to be used for most commercial flight operations, when pilots are operating under IFR conditions or attempting to land using an instrument approach procedure. The combination of an on-field certified weather station and a published instrument approach procedure at an airport greatly enhances access to the community the airport serves. Certified weather observations are derived either from certified automated weather stations or by certified human weather observers.

Automated Stations: The primary source of aviation surface weather observations in the United States today is from automated weather stations - Automated Weather Observing System (AWOS) and Automated Surface Observing System (ASOS) stations. AWOS and ASOS stations contain a suite of sensors that measure ceiling, visibility, wind, temperature, pressure and other meteorological elements. The stations operate 24 hours a day, issuing reports via locally broadcast radio transmission as well as by phone and computer network to a national distribution system operated by the FAA. These automated weather stations are certified by the FAA, and must meet specific siting requirements and maintenance standards. Pilots must use the information from these stations when conducting instrument approach landings at airports. According to FAA, there are currently 135 certified automated weather stations in Alaska (https://www.faa.gov/air_traffic/weather/asos/?state=AK).



Approved aviation weather stations at the end of 2016. *Sites with a yellow circle are augmented part-time, orange circles show sites with 24-hour augmentation. Courtesy Tom George, AOPA*

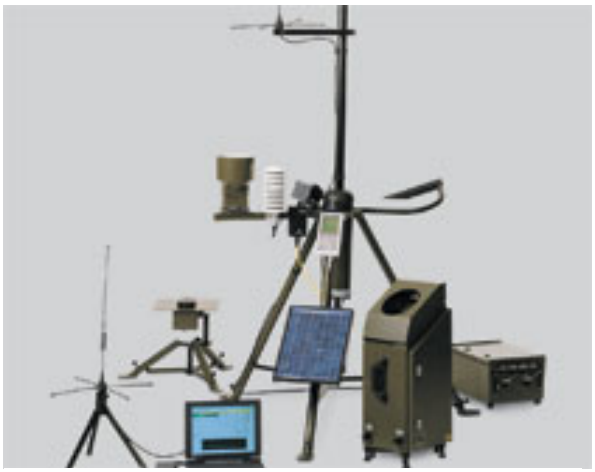
Augmented Stations: At certain airports, typically larger facilities that support higher volumes of air traffic, an AWOS or ASOS weather station may be "augmented" with human observations. In this situation, a human observer who has been trained and certified reviews the report generated by the automated sensors. The observer may modify or amend the observation if needed to make it more representative of overall local weather conditions. Augmentation not only corrects errors made by automated sensors that only sample a small portion of the sky, but may add valuable information such as the presence of thunderstorms or fog banks that are beyond the ability of the sensors to detect. Pilots have a higher level of confidence in augmented observations versus a weather report generated only by an automated station. Although automated weather stations that are augmented are usually located at larger airports, in Alaska, some remote stations are also augmented. These more remote augmented stations are typically at locations that previously had an on-field FAA Flight Service Station or at locations that have NWS staff onsite. Recent changes in NWS policy have reduced the number of stations that are augmented in Alaska.

Contract Weather Observers (CWO): In select locations that lack an AWOS or ASOS, the FAA, NWS or private entities have contracted with individuals that are certified weather observers to make periodic weather observations. In addition to military and some industrial locations, both the NWS and FAA have contracted with CWOs in remote areas to provide much needed observations. In the past few years, the number of CWO locations has been reduced drastically as the NWS has moved away from this program. In some locations, the NWS has replaced the humans with non-FAA certified Modular Automated Weather System, (MAWS), described below.

Supplementary Weather

While FAA certified weather observations are required to be used by pilots planning an IFR flight or during instrument landing procedures, pilots are also encouraged to use other sources of weather information. This helps pilots develop better situational awareness and a well-rounded picture of the weather conditions affecting their flight. The types of weather reporting equipment described below are typical non-FAA certified weather sources in Alaska that pilots routinely rely on.

Modular Automated Weather Systems (MAWS): NWS has recently started to install MAWS systems in Alaska, replacing the CWOs in some locations. These units have a sensor package closely matching an AWOS or ASOS, including ceiling and visibility. MAWS units, however, are not certified by the FAA and weather observations from these stations are not approved for use by pilots planning an IFR flight or for instrument approaches. Due to the lack of certification, the FAA does not allow the information from MAWS units to be distributed in the same way or over the same network as certified weather stations, such as AWOS or ASOS. Aviation industry groups and the NWS are working to change this and allow MAWS information to be provided in the same way and over the same network as FAA certified weather observations. This would increase the number of weather observations readily available to pilots.



A MAWS weather station. *This type of station is configured by NWS in Alaska and uses the same sensors as a certified AWOS, but the FAA has not approved distribution of the data. Photo courtesy of Vaisala Inc.*

FAA Weather Cameras: The FAA owns and operates a network of internet linked cameras at over 220 locations in Alaska. At each location, between two and four cameras record views in different directions once every ten minutes. These images are then uploaded and made available over the internet. Each camera image provided on the related website also has an accompanying “clear day” reference image to help users evaluate the current weather conditions. Many of these cameras are at locations near existing AWOS or ASOS stations, allowing pilots and weather forecasters to compare the view from the station with automated sensor measurements to get a more complete picture of current weather. These webcams only operate during daylight hours which is a serious limitation during winter operations since pilots may have to make go/no go decisions before enough light is available for the cameras to produce usable images.

Other supplemental weather sources: Some government agencies have other types of remote weather stations deployed across Alaska. The NWS has a network of remote stations to support its forecasting needs, including Remote Automated Weather Stations (RAWS). These stations monitor weather in support of fire control, air quality and climate. These units typically record temperature, humidity and wind. RAWS stations lack measurements for ceiling and visibility, which are critical to aviation operations.

There are 165 advisory NWS weather stations in Alaska. One of the most significant discoveries of the work group was that many of these units produce weather reports using similar equipment found on FAA certified weather stations. Allowing the information produced by these types of stations to be easily available to pilots in Alaska would greatly enhance safety.

Funding Sources and Need for Additional Aviation Weather Stations

For many decades, a national system of certified aviation weather reporting stations supplied by NWS and FAA was responsible for nearly all official aviation weather. Beginning in 1995, the FAA took over the primary responsibility for aviation weather needs. The FAA currently continues to upgrade and repair existing automated weather stations, but the agency has no official program to independently procure, install and maintain additional stations. During a visit to Alaska in the summer of 2017, FAA officials acknowledged the need for more stations and indicated they would continue to explore and consider possible avenues for additional stations. The following sections describe some current alternatives available for the development of certified weather stations.

FAA Non-Fed Program

The FAA's Non-Fed Program regulates facilities that are used within the federal aviation system, but are not wholly owned or operated by the federal government. Some types of facilities that may be included are navigation aids, visual aids, air traffic control towers and automated weather stations. Many of these facilities in the United States are partly owned or operated by entities other than the federal government. The Non-Fed program makes provisions for these facilities to be owned and operated by public or private third parties and be incorporated into the National Airspace System (NAS). In order for this to occur, the facilities and their maintenance must meet strict requirements. In the case of automated weather stations, this includes the type, components, siting, design, commissioning, connectivity and maintenance. In the case of a Non-Fed AWOS, the FAA may also require a cost-benefit analysis to be conducted. Technical details regarding the FAA Non-Fed AWOS requirements are located in FAA Advisory Circular 150/5220-16E. National policy regarding the Non-Fed Program is defined in FAA Order 6700.20B.

***The Akutan Airport AWOS**. This weather station was procured by the State of Alaska and is an example of a Non-Fed AWOS Photo Courtesy of Jim Miller*

One of the ways the FAA's Non-Fed program can be used for weather station development is through the sharing of costs for the acquisition of an AWOS by the FAA and a local airport sponsor. The FAA Airports Division, which oversees most aspects of the planning and development of FAA obligated airports across the nation, may assist an airport owner (sponsor) in funding the design, purchase and installation of an AWOS to enhance IFR operations and instrument landings at the airport. This funding is usually made available through the FAA's Airport Improvement Program (AIP). Only airports that meet FAA eligibility requirements and are included in the FAA's National Plan of Integrated Airport Systems (NPIAS) are eligible for AIP funding. AIP funding normally covers 90% of the project costs, with the airport sponsor and

other state or local agencies supplying the remaining match. The sponsor is also required to fund all maintenance and connectivity costs associated with the station since those expenses are not eligible for funding under AIP rules.

There are many airports across the United States that are home to certified AWOS stations that were funded in part by the FAA Non-Fed Program. The observations from many of these stations, however, are only available via a short range radio broadcast over an AM radio antennae mounted to the unit or by dial-up by telephone. In order to have AWOS data uploaded into the FAA's national distribution system, FAA approval must be secured and connections between the station and a secure phone and internet ports must be made. This results in some additional costs, but greatly enhances the ability of the information to be made available to FAA Flight Service Stations, Air Traffic Control, weather forecasters and pilots. A collection of Frequently Asked Questions regarding this process as well as a list of providers is available at: https://www.faa.gov/airports/planning_capacity/non_federal/faq/media/awos_wmscr_faq.pdf .

AWOS Case Study: Chenega Bay.

Access to Chenega Bay, a small native community on Evans Island in Prince William Sound, is limited to boat and air. The FAA created a non-standard GPS approach to the community which has a 3,000' gravel runway, however pilots can't use the approach without weather reporting. Supported with a grant from the US Department of Interior Bureau of Indian Affairs (BIA), the community of Cenega Bay installed an AWOS. As soon as the telecommunications link is completed to transmit the weather data, the community expects to receive more reliable air service. This is an example of another way to acquire certified weather reporting, and improved access to remote communities in Alaska.

Other Government or Private Funding:
Private or public entities may purchase AWOS systems without federal financial assistance. Several existing AWOS stations in Alaska were funded by the oil industry as well as an AWOS in Akutan that was purchased by the DOT&PF. Another example includes the community of Chenega Bay, which acquired a grant from the Bureau of Indian Affairs to obtain an AWOS to increase accessibility (see case study in sidebar). If data from an independently acquired AWOS stations is to be used by pilots for IFR flight planning or instrument landing procedures, the station must be included and regulated as part of the FAA's Non-Fed Program, as previously described.

The FAA Non-Fed Program is arguably the most practical avenue for increasing the number of AWOS units within the State of Alaska at this time. One problem, however, is that many communities and the State of Alaska lack available budget to provide match funding to leverage the required FAA AIP money to develop stations as well as the additional annual costs of maintaining them after installation, an expense which is not eligible for FAA AIP assistance. The financial

burden of existing aviation infrastructure and other needs already exceeds many local and state financial resources. This makes it difficult to allocate AIP money and sponsors requisite match for weather equipment acquisition and maintenance.

Costs

The total cost to design, purchase and install a basic AWOS unit usually ranges between $150,000 and $250,000. The cost to add a ceilometer to upgrade the unit to an AWOS-III is approximately $25,000. Some examples of specific costs of AWOS installations in Alaska include Point Thompson and Chenga Bay, which totaled $165,000 and $210,700 respectively.

In order to meet FAA AWOS certification standards and comply with the provisions within the FAA Non-Fed Program and FAA grant agreements, the sponsor must provide an FAA approved maintenance plan for the AWOS. The AWOS manufacturer or other qualified technicians commonly provide these maintenance and inspection services. Maintenance of an AWOS unit involves inspection and routine care, usually three times per year, depending upon the system and location. If the unit is located at an airport open year round and connected to an accessible road system, annual maintenance costs usually range between $10,000 and $15,000 annually. For units located off road, or in remote areas, these costs could be significantly higher. One example of a recently installed unit that had higher than average costs due to its location, connectivity issues and special equipment needs was an AWOS IIIP, installed at Akutan Airport (Akun Island). Total costs for the unit were approximately $568,000.

Other significant costs for AWOS development can include connection of the station to power and phone lines or the internet. Costs to connect to a power source can vary widely dependent on location and existing infrastructure. Two lines of reliable data connectivity (via phone or internet) are also required for connection of the unit to the FAA weather network. The price for data connection can also vary depending upon available access to a phone line, cell tower, or satellite dish.

Airport Weather Station Development Prioritization

One of the priority tasks for the weather work group was to examine gaps in reliable aviation weather reporting throughout the State and prioritize locations for additional certified weather station development. The work group established a fundamental ranking equation and priority list for new weather stations. One of the most important aspects of the prioritization list is the consideration of those airports in Alaska with existing instrument approach procedures without an existing or planned FAA certified on-site weather reporting station. The priority ranking equation and a summary of the point value system is as follows:

Fundamental Priority Equation

National Plan of Integrated Airport Systems (NPIAS) Level of Service
+ Enplanements
+ Classification
+ Distance from a FAA Approved Weather Station
= Priority Rank

CRITERIA	**POINT VALUE**
NPIAS Level of Service	**Points Possible**
Primary	30
Commercial Service	20
General Aviation	10
Non-NPIAS	0

Number of Enplanements	**Points Possible**
Bethel	20

Bethel had the highest number of enplanements of all of the airports included on the final list. Their total operations number was then used as the highest point possible baseline when determining the enplanement point values for the other airports. Other airports' enplanement point value percentages were determined by dividing their individual total enplanements by Bethel's enplanement total of 148,168, and then multiplying by 20.

AASP Classification	**Points Possible**
Regional Class	10
Community Off Road	9
Community On Road	8
Local NPIAS Higher Activity	7
Local NPIAS Lower Activity	6
Non NPIAS	5

Distance to Certified Weather Station and Points Possible

70-75 miles	20	65-70 miles	18	60-65 miles	16
55-60 miles	14	45-55 miles	12	35-45 miles	10
25-35 miles	8	15-25 miles	6	5-15 miles	4
0-5 miles	2	(*Weather Station on airport – 0 points*)			

The highest priority for new weather station development was assigned to the 21 airports in Alaska that currently have an FAA approved instrument approach, but have no certified on-site weather station. In situations like these, the altitude at which a pilot may descend before having to abort the landing is significantly increased. As a consequence, aircraft have a much higher chance of not being able to land at the airport, especially during periods of low visibility. Many commercial aircraft operators are restricted from using instrument approaches into airports that do not have on-field weather stations. This greatly limits their ability to provide essential services, such as delivering passengers, groceries and mail. The following figure identifies the 21 Alaskan airports that have published instrument landing procedures but have no associated FAA certified on-site weather station.

Airport	Distance to Approved Weather Station (NM)	Airport	Distance to Approved Weather Station (NM)
Akiak	19.32	Kokhanok	19.70
Allakaket	33.95	Napaskiak	4.87
Beaver	53.50	Nondalton	13.72
Central	61.19	Nulato	29.25
Chignik	33.95	Perryville	22.02
Chuathbaluk	36.31	Tatitlek	9.39
Coldfoot	37.18	Tok Junction	35.65
Eek	34.53	Valdez	20.45
Kasigluk	20.98	Venetie	37.39
Kobuk	25.48	Willow	18.30
Kotlik	30.13		

The work group also conducted surveys of pilots and other stakeholders to enhance the data collected and gain more understanding of the impacts and deficiencies of Alaska's current weather reporting system. This also assisted in helping to determine the airports most impacted (according to users) by the lack of weather reporting.

Conclusions, Recommendations, and Alternatives

The State of Alaska, the FAA, Alaskan communities and aviation industry stakeholders agree that there are significant deficiencies and gaps in the official FAA aviation weather reporting system in Alaska. Steps toward improving this system include advocacy, technical assistance and additional funding. The weather work group urges the following recommendations for policymakers:

- Advocate for the FAA to re-establish a federally funded weather station development program, and an appropriate budget to support it.
- Cooperate with aviation stakeholders to oppose FAA and NWS defunding and deactivation of human augmented weather observation programs until additional automated stations are able to provide for safe and efficient stand-alone weather reporting capabilities.
- Encourage DOT&PF leadership and the federal congressional delegation to press for additional FAA certified AWOS stations.
- Maintain the airport weather station prioritization list to help allocate additional state and federal monies when they become available.

- Advocate policy changes to allow weather stations that collect AWOS type weather, such as the NWS MAWS units, to have their weather reports be widely distributed and available over the FAA aviation weather network for flight planning purposes.
- Assist communities by providing information on how to seek BIA grants or other potential funding sources to install FAA certified AWOS weather stations.

Attachments

- **Aviation Weather Reporting in Alaska**
- **Aviation Weather User Survey Results**

Aviation Weather Reporting in Alaska

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Introduction to Aviation Weather Observations and Reporting

Weather observations are critical to pilots and aviation safety. Having accurate weather is crucial to all types of aircraft operations, from local visual flight rules (VFR) flights by small general aviation aircraft, to international instrument flight rules (IFR) flights in large commercial aircraft. Pilots must check current and forecast weather prior to every flight to make go, no-go decisions, and continually monitor updated weather information enroute to determine if continued flight to the destination airport is possible or if deviations to the flight plan are necessary. Routine weather observations provided by a network of interconnected mechanical sensors and human observers are used by meteorologists to generate weather forecasts and are used by aviation professionals in a multitude of ways.

Alaskans rely heavily on aviation due to the State's lack of roads and other transportation infrastructure. Comparatively to the continental U.S., Alaska's network of approved weather reporting stations available to pilots is relatively sparse. Alaska currently has approximately 160 approved weather observation stations. To replicate the density of weather reporting stations in the continental U.S., Alaska would need approximately two hundred additional stations throughout the State. Alaska pilots routinely utilize both conventional and unconventional weather sources to provide the information needed to satisfy their need for reliable information to be safe for their flight operations. Information from approved weather reporting stations, weather cameras and other types of non-standard weather observations are blended by pilots in Alaska to help understand weather conditions that influence their flight.

What are “Approved” and “Advisory” Aviation Weather Sources?

“Approved” Aviation Weather

All weather information that pilots use in making their decisions can be classified as either “Approved” or “Advisory”. Title 14 of the Code of Federal Regulations (CFR) and the Federal Aviation Administration (FAA) Order 8900.1 set the regulatory requirements for “Approved Aviation Weather” in relation to pilots and aircraft operators (Federal Aviation Regulations [FAR] Part 91, 135, 121, and others) and defines what type of weather is “Approved” for use by pilots and aircraft operators. Title 14 CFR states that all approved aviation weather, (observations, reports and forecasts), must be via sources approved by the National Weather Service (NWS), (including the National Oceanic and Atmospheric Administration (NOAA)), and a few other specifically identified ones, such as international organizations like ICAO and the Department of Defense (DOD). The collaboration between the FAA and the NWS of how aviation related weather is collected and disseminated for aviation purposes is outlined within the FAA Order 7000.2.

“Advisory” Aviation Weather

Federal Aviation Regulations allow pilots to augment approved weather sources with “Advisory” weather reports from unapproved sources to assist with making prudent decisions concerning flight operations. The type and purpose of any particular flight determines the type of weather information that must be obtained prior to and during the flight. For instance, for a local, VFR flight, all that may be required of a pilot may be no more sophisticated than simply looking out of the window or calling a friend to see what the winds are like at the airfield. Advisory weather can consist of almost any information that an aircraft operator or pilot uses in support of a flight. One example of advisory weather might be a pilot watching a local news weather forecast for an area they will be flying to the next day. The Alaskan FAA aviation weather webcam network is also an example of advisory weather.

Aviation Weather and Instrument Flight Operations

Aviation weather reporting plays an especially crucial role in terms of approved “Instrument Approach Procedures” (IAPs) at airports. The creation and regulated use of IAPs is very stringently controlled by the FAA, and pilots that wish to fly “on instruments” must endure many hours of training and be properly licensed to do so. Many airports in Alaska have one or more federally approved IAPs, which enable properly equipped private and commercial aircraft to attempt landings at the airports solely by reference to instruments. Although the types and sensitivity of these IAPs varies widely from airport to airport, one key factor in the usability of all of them is the availability of on-field weather reporting. Those airports with an IAP that have a certified weather station located on-field that broadcasts approved aviation weather have a tremendous advantage over those airports with an IAP with no approved weather. The addition of a certified weather station on-field greatly enhances the capability of any existing IAP that might exist there. It also significantly improves those chances of adding an IAP to those locations that do not have an IAP.

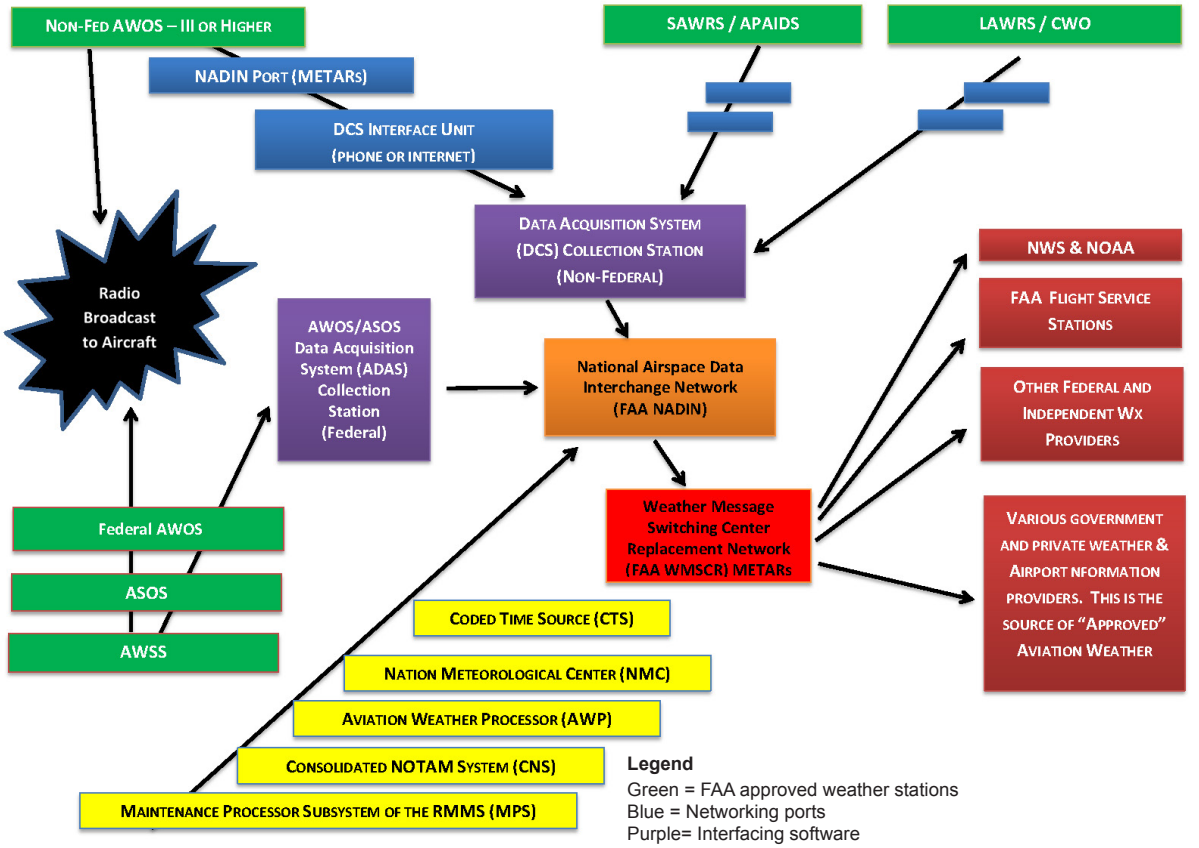
Akutan Airport AWOS Photo By: Jim Miller / AWOS Inc.

The FAA's Weather Network

To collect and disseminate all of the observed weather from approved stations all around the country, the FAA uses a self-contained private data network, similar to the internet, accessible only to official sources and those approved for connection to the system. Most of the approved weather stations, including automated units like ASOS, and contract weather observers (CWO) are connected or have access to this system. This system is called the National Airspace Data Interchange Network (NADIN). This system is significantly different and completely separate from the public internet and does not use the same communication protocols as the public internet. The NADIN is specifically isolated from the public system for security reasons. There are some FAA certificated weather sensors that are not connected to the NADIN, because the FAA feels that their connection to the system is either redundant, or not cost-effective for the FAA. In addition to weather, the NADIN transmits NOTAMs, flight plans and other aviation critical information.

One of the access points on the NADIN is a sophisticated organization known as the Weather Message Switching Center Replacement (WMSCR). The WMSCR accepts, organizes and distributes weather observations from approved weather stations from all around the country. These weather observations, known as "METARs", constitute the core of reportable surface weather from the US. Access to both the NADIN and the WMSCR is strictly controlled. Reports generated by the WMSCR are used as the informational source for surface weather observations provided by nearly all public and private agencies.

Also central to the sharing of approved weather information within the FAA NADIN is the Data Collection System (DCS). Several years ago, the National Association of State Aviation Officials (NASAO) signed a memorandum of agreement with the FAA that would allow individual states to assist with the creation of a uniform DCS specification to help allow non-fed AWOS units be assured of connectivity to the system, which paved the way for connections of non-FAA administered AWOS units to the DCS.



Legend
Green = FAA approved weather stations
Blue = Networking ports
Purple= Interfacing software
Yellow = Other official integrated weather and code sources
Brown = FAA NADIN secure information network
Red = FAA WMSCR organization that collects weather observations
Pink = Independent public and private weather reporting outlets
Black = Radio broadcast transmissions directly from weather stations
Source - JRG

“Approved” Weather Sensors and Observers

Weather Sensors

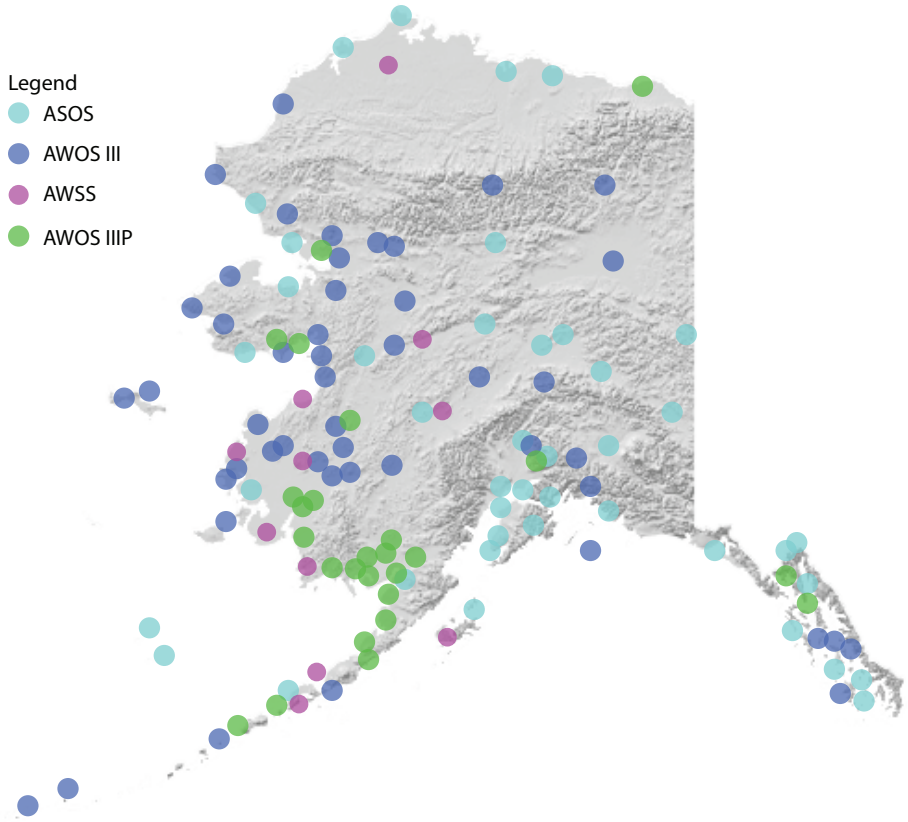
Most surface weather observations in the U.S. are collected by sophisticated, automated sensors that accurately measure various aspects of the environment. These automated observations are sometimes the only source of weather at a station, or sometimes they augment human observations at a station, or just the opposite. In order for weather sensors to be “approved” by the NWS and accepted as part of the aviation weather system, the units themselves must meet rigorous FAA certification standards, be placed and sited according to strict standards, and then commissioned on-site by the approving agency before the data is used. Most of these sensors are connected to the NADIN and WMSCR.

The following are the individual types of approved aviation weather sensors:

ASOS - Automated Surface Observation System

ASOS units are fully automated weather sensors connected to the NADIN and WMSCR and generally report surface observations at hourly intervals, but also report special observations if weather conditions change rapidly and cross typical aviation operational thresholds, such as minimum visibility or minimum ceilings for VFR flight. ASOS units generally report all the parameters included of the AWOS-III, while also having the additional capabilities of reporting temperature and dew point in degrees Fahrenheit, present weather, icing, lightning, sea level pressure and precipitation accumulation.

Besides serving aviation needs, the ASOS system serves as a primary surface climatological observing network in the United States, making up the first-order network of climate stations. Because of this, not every ASOS is located at an airport. Like AWOS units (described in the next section), ASOS units that are located at airports will typically broadcast weather information over discrete radio frequencies available to pilots over a limited range, or be used to append ATIS information at towered airports. Alaska currently has 44 ASOS units throughout the State.



Surface Weather Observation Stations - ASOS/AWOS

AWSS - Automated Weather Sensor System
AWSS units are multi-sensor automated weather sensors similar to ASOS units, but incorporate the latest technology and are built for ruggedness. AWSS units are connected to the NADIN and WMSCR and generally report surface observations at hourly intervals. Alaska currently has 16 AWSS units throughout the State.

AWOS - Automated Weather Observation System
AWOS is the most common variation of approved automated weather sensors located at airports in the U.S. and Alaska. AWOS units are currently manufactured by several different companies. AWOS III or higher units are eligible to be connected to the NADIN and WMSCR. AWOS units usually broadcast their information over a discrete radio frequency to pilots. There are many different types of AWOS units available, and they can be equipped with a number of different types of sensors. AWOS units generally produce automated surface reports at 20-minute intervals and do not report special observations for rapidly changing weather conditions. Alaska currently has 79 AWOS units throughout the State.

The following describes different types of AWOS units:

AWOS A: altimeter setting (barometric pressure)
AWOS I: altimeter, density altitude, wind and gust speed & direction, temp. and dew point
AWOS II A/V: all AWOS I parameters, plus visibility and precipitation
AWOS III: all AWOS II parameters, plus cloud height, density and sky condition
AWOS III P: all AWOS III parameters, plus sensor which describes type of precipitation
AWOS III P/T: all AWOS IIIP parameters, plus thunderstorm detection via lightning detector
AWOS IV Z: (Also called AWOS III PTZ) all AWOS III P/T parameters, plus freezing rain detection
AWOS IV Z/R: all AWOS IV Z parameters, plus runway surface condition.

Automated Unicoms
A relatively low cost option for providing local, approved weather for an airport can be the Automated UNICOM. These FAA certified automated units can provide pilots with basic weather information and a certified altimeter source, necessary for instrument approach operations. These Automated UNICOMS are certified by the FAA to meet the same capability as a traditional AWOS A/V. These units are not approved to be connected to the NADIN and WMSCR.

Human Observers - SAWRS, SAWRS II, and BSAWRS (Supplemental Aviation Weather Reporting Stations)

SAWRS is a weather station where human weather observers provide primary weather observations or augment other automated weather sensors. These SAWRS observers are certified and trained according to NWS standards and in accordance with methods in FAA Order 7900.5. A SAWRS is usually established at an airport (includes offshore platform helipads), when the FAA has determined that the augmented weather observations are needed to satisfy FAA Regulations for Part 121 or 135 operations, or for the safe conduct of other aircraft or commercial operations. It is common for SAWRS stations to be supported and funded by private companies dependent upon aviation in a particular area. There are currenly 10 SAWRS type stations located in Alaska funded by various private industries as well as the FAA and the DOD. These stations all provide information to the NWS and many provide information via radio and phone lines.

There are three distinctly different types of SAWRS operations:

SAWRS - A station where a manual observation is the primary source of reporting the weather observation and there is neither a commissioned ASOS or AWOS at the station. The SAWRS observer is the source of the official observation if no other federal or contract weather observers are on duty.

BSAWRS - A staffed station where a commissioned AWOS or AWSS is the primary source of weather observations. The BSAWRS observer provides backup if no other federal or contract weather observers are on duty.

SAWRS II - A staffed station where a commissioned ASOS is the primary source of weather observations. The SAWRS II observer provides backup if no other federal or contract weather observers are on duty.

A-Paid - (Aviation Paid Weather Observer)

A-Paid weather observers are individuals trained by the NWS and/or the FAA and stationed in locations the NWS feels is necessary to take weather observations to help provide for NWS forecast responsibilities. A-Paid observers are certified by the NWS to take surface observations (i.e., hourly reports of temperature, dew point, estimated cloud cover, estimated visibility, pressure, weather, and wind direction and speed) using equipment provided by the NWS. As their name suggests, these observers are compensated for their work on a per-observation basis, usually by the NWS or airline operators. The purpose of A-Paid observations is to provide information necessary to support aviation forecasting by the NWS. The FAA has no direct requirement for A-Paid stations. The FAA has helped support the program with funding in the past, but does not currently fund any A-Paids in Alaska. Presently, there are 6 A-Paid observation stations in Alaska funded by the NWS: however, this program is currently tenuous and under scrutiny by the NWS to find other solutions for the weather it provides.

CWO - FAA Contract Weather Observers

The FAA's contract weather observer program provides human augmentation to automated weather observations at both towered and non-towered airports throughout the U.S. These contract weather observers are paid for by the FAA. The airports with CWOs are usually higher volume airports that require special attention to rapidly changing conditions, or those other airports that the FAA considers to have special weather observing needs. There are currently 21 CWOs at non-towered airports in Alaska.

LAWRS - Limited Aviation Weather Reporting Stations

LAWRS are air traffic controllers that are trained by the NWS to take weather observations in addition to their duties as tower controllers. These individuals are essentially the same as CWOs. In 2013, the FAA began implementing a program to transition all of the CWOs at towered airports to LAWRS to save money. Alaska was exempted outright from this process.

Funding of Approved Weather Stations and the FAA Non-Fed Program

ASOS

The ASOS program was a joint effort between the FAA, the NWS and the DOD to deploy a network of high-grade weather monitoring stations across the United States. In 1991, Systems Management Inc. (now All Weather, Inc.) was awarded $250M via the FAA Facilities and Equipment program to develop and deploy ASOS systems. As a result of this program, roughly 1,000 ASOS weather stations were installed and commissioned throughout the country, with the first ones in Alaska being installed in 1994. Throughout the 1990's there were 569 ASOS sites sponsored by the FAA, and 313 ASOS sites sponsored by the NWS. The ASOS program officially ended in 2004. The ASOS development program no longer exists, and no new ASOS units are currently planned. ASOS sensors were 100% paid for by the federal agencies that installed them, and they are maintained by those same agencies today.

AWSS

In 1999, All Weather, Inc. was awarded a $4.3M contract to design, develop, and manufacture an advanced AWOS system known as AWSS, and to carry over the original ASOS development program. The original contract called for installation of 33 AWSS sites throughout the U.S.: however, a series of engineering changes requested by the FAA resulted in a reduction to only 17 systems. The AWSS units are entirely owned, controlled and maintained by the FAA.

AWOS

Ownership and maintenance of the AWOS units is diverse, with some units having been 100% paid for and maintained by the FAA, some paid for by an FAA grant and maintained by the airport sponsor, and still others paid 100% and maintained by airport sponsors or other private, public or corporate entities or by combination. Some AWOS units that were originally purchased by individual airport sponsors were eventually given to the FAA for ownership and maintenance as well. Due to FAA funding cuts several years ago, the FAA put on hold the new installation or FAA takeover of any existing AWOS units paid solely by the FAA. New AWOS units today are only available to individual airport sponsors or other public or private entities by either purchasing the units themselves, or through the use of an FAA grant. The cost to purchase, install and maintain an AWOS can vary considerably for new units, depending on the manufacturer and type sensors, but usually range from about $150,000 to $300,000, depending on the complexity, with annual maintenance costs that are usually over $5,000/year.

Automated UNICOMs

These units have the advantage of providing certified altimeter information for an airport at a fraction of the cost of an AWOS. The cost of an Automated UNICOM is usually about $75,000. The units are self-contained, and come ready to hang and plug. The units are usually FAA AIP eligible as well, and do not require an FAA cost-benefit analysis, as is the case for purchase of an AWOS III. Their drawbacks are their obvious limitations for detailed weather information as compared to an AWOS III, and the units cannot be connected to the NADIN or WMSCR. All maintenance costs for the units are the responsibility of the airport sponsor.

FAA Non-Fed Program

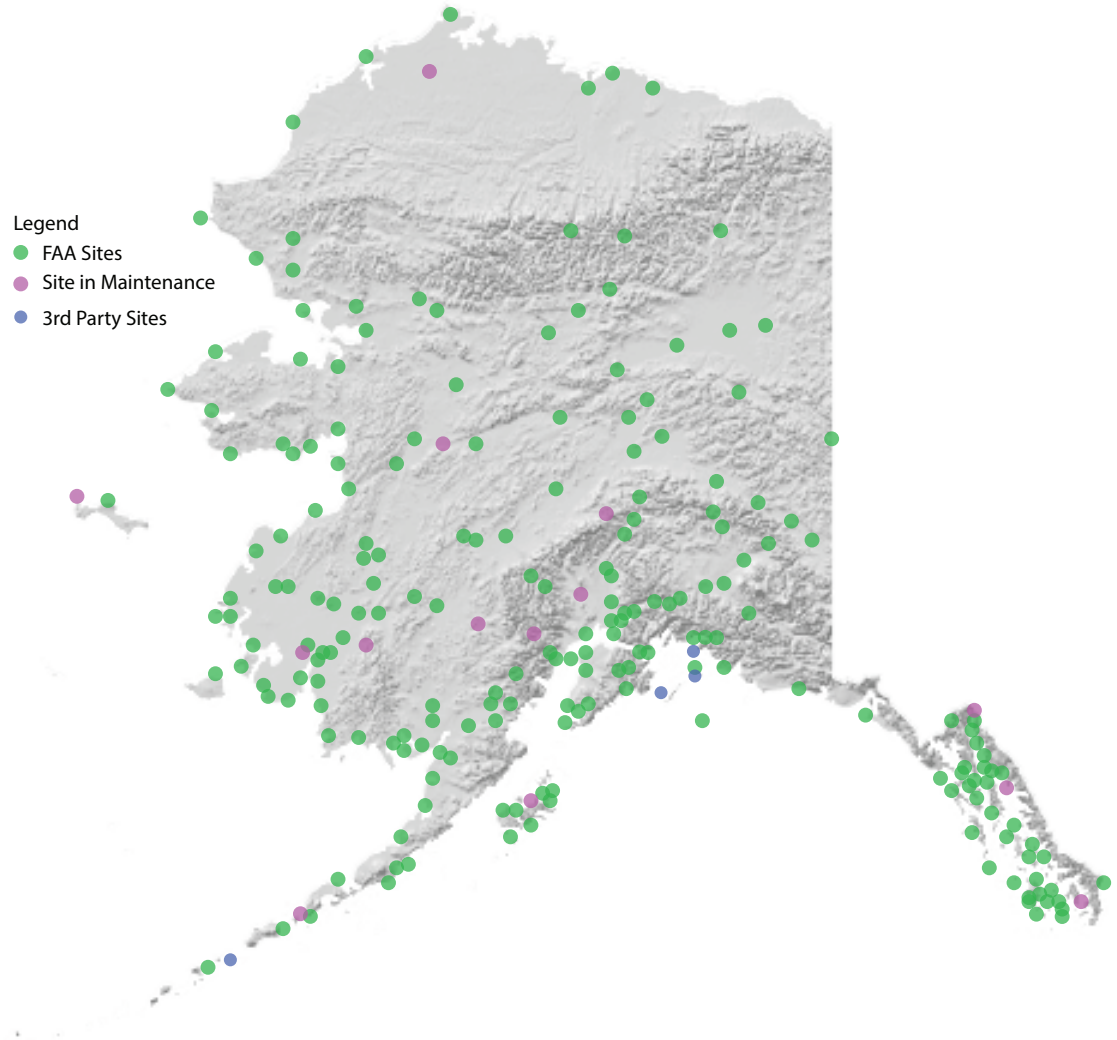
The FAA encourages the continued development of aviation weather reporting stations throughout the United States. With current budget constraints, it is impractical for the FAA or the NWS to fund massive installations and maintenance of federally owned and operated weather sensors, similar to the old ASOS program. One method to increase the number of stations in their system is through the FAA inclusion of similar certified and approved automated weather sensors, such as AWOS units, paid by grants provided by FAA AIP money, or purchased outright by other public or private entities. The mechanism to include these units in the system is known as the FAA Non-Fed program. The program is detailed within FAA AC 150/5220-16D, and supplemented by FAA Orders 6700.20B and 5100.38D. The program essentially allows individual airport sponsors the ability to acquire and install FAA certificated AWOS equipment with FAA AIP or other funding. Ownership and maintenance of the AWOS units is the responsibility of the sponsor. There are certain eligibility requirements that the sponsor must meet, and if the sponsor wishes the unit to be connected to the NADIN and have the information disseminated through the WMSCR, a cost/benefit analysis must be completed and pass FAA standards.

“Advisory” Weather Sensors

Advisory weather observations by definition meet no specific FAA criteria, and can encompass just about anything that can be considered an “observation.” Some common sources of “advisory” weather used in Alaska include:

FAA Aviation Weather Cameras

Aviation weather cameras have become a very popular source of weather information for pilots flying in and around Alaska. The FAA has established a large network of these cameras throughout Alaska and has plans for more installations in the future. The FAA also has a very easy to use interactive website for pilots to access the cameras. Obviously, these weather cameras are of limited use for IFR flight, and the visual information found on them is only useful in an advisory way to pilots. Of all of the “Advisory” weather available to pilots in Alaska, these cameras have become the biggest staple to many pilots throughout the state.



FAA Aviation Weather Cameras

HANDAR

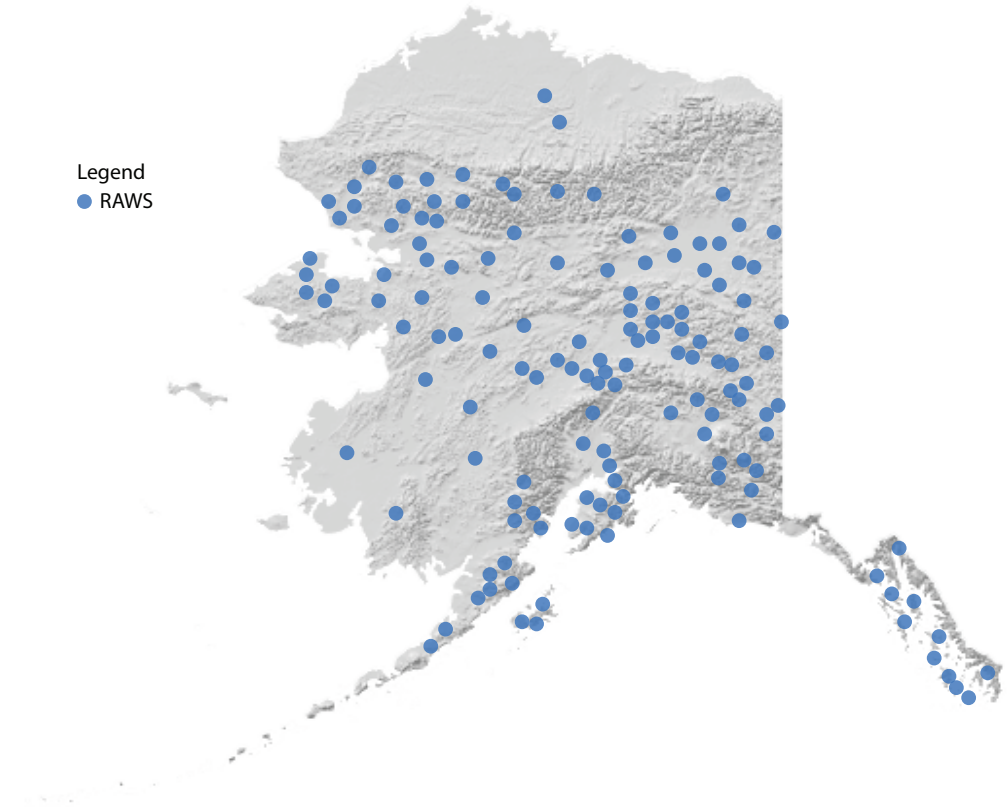
HANDAR was a company that was acquired by weather sensor manufacturer Vaisala in the late 1990s. Occasionally you will see weather units labeled as HANDAR throughout Alaska: however, as is the case with MAWS and RAWS, these units are not FAA certified and have no direct role with producing official aviation weather observations, and are not connected to the NADIN or WMSCR. They are considered advisory only.

MAWS - Modulated Automated Weather System

MAWS units are owned and operated by the NWS and manufactured by the same companies that make AWOS units. MAWS units are not FAA certified and have no direct role in producing approved aviation weather observations, and are not connected to the NADIN or WMSCR. Although there have been discussions between various agencies as to the feasibility of incorporating the information from the MAWS units into the NADIN and WMSCR, no movement has been made and these units are considered advisory only.

RAWS - Remote Automatic Weather Stations

There are nearly 2,200 Remote Automatic Weather Stations (RAWS) strategically located throughout the U.S., with many located throughout Alaska. These stations are usually affiliated with the United States Forest Service or the Bureau of Land Management and are monitored by the National Interagency Fire Center in Boise, ID. Like MAWS units, RAWS units are not FAA certified and have no direct role with producing official aviation weather observations, and are not connected to the NADIN or WMSCR. They are considered advisory only.



Remote Automatic Weather Stations

Abbreviated Table of Weather Reporting Stations, Common Benefits, Costs and Connectivity

Sensor Type	Purpose/Aviation Benefits	Who Pays to Install?	Who Maintains?	Typical Sponsor Costs	FAA Cert	NADIN WMSCR
FAA Approved Weather Stations						
ASOS	Original automated FAA/NWS/DOD certified weather stations. Program has been discontinued	FAA, NWS, DOD (no more being installed)	FAA, NWS, DOD	None	Yes	Yes
AWOS	FAA certified automated stations, FAA may co-sponsor installation costs with FAA grant (90/10 split) Can be funded by other public / private entities	FAA 90% Sponsor 10% (or 100% Sponsor or other entity)	Sponsor thru private Contract Some FAA	10% of $100,000 to $250,000 plus $5,000+/- annually to maintain (100% without FAA help)	Yes	Yes for AWOS III or better
AWSS	FAA owned and operated. Units are 100% federally owned and operated Not FAA AIP eligible	FAA (Program currently on hold)	FAA	None	Yes	Yes
Automated UNICOM	Low cost alternative to AWOS units, provides certified altimeter for IFR approaches. Some units are FAA AIP eligible	FAA 90% Sponsor 10% (or 100% Sponsor)	Sponsor	Usually 10% of $50,000 & $5,000 or more annually to maintain	Yes	No
SAWRS/ APAID/ CWOs/ LAWRS	Primary and/or Supplemental human observers that may be co-located with an ASOS, AWOS or AWSS. Airport sponsors cannot demand human observers	NWS, FAA or airlines	N/A	None (Contracts vary and are paid by NWS, FAA or airlines)	N/A	Yes and No
Other Advisory Stations						
MAWS/ RAWS/ HANDAR	Non-FAA approved automated weather reporting stations. Advisory info only for pilots.	Various Federal agencies (not FAA)	Various Federal agencies (not FAA)	N/A	No	No
Aviation Weather Cameras	Cameras that area great advisory tool for VFR pilots. Well liked. Not eligible to individual airport sponsors through FAA AIP.	100% by FAA or individual sponsors if non-FAA	Virtually no routine maintenance necessary	Varies greatly depending upon camera type, location and power source	No	No

Existing Alaska Weather Stations

The NWS Alaska Region Headquarter website (http://www.arh.noaa.gov/obs.php) provides a list of all NWS administered weather observation stations in Alaska.

This list does not include other sites, such as some DOD operated stations and some A-Paids. All of the FAA approved automated aviation weather stations (ASOS, AWSS and AWOS) can be found at the FAA's air traffic weather webpage at (http://www.faa.gov/air_traffi c/weather/asos/?state=AK). There are also approximately 230 aviation weather cameras available at (http://avcams.faa.gov/).

- 72 airports have an AWOS-III or better
- 16 airports have an AWSS
- 44 airports have an ASOS
- 6 stations have NWS supported paid observers (A-paids)
- 21 stations have some type of CWO augmentation
- 27 sites are administered by the DOD

How Other Western States Assist with Aviation Weather Reporting Needs

Idaho
Idaho DOT will contribute up to 20 percent of NPIAS airport sponsor's cost for eligible federal aid projects, which can include weather reporting equipment. Non-NPIAS airports are not eligible.

Montana
Weather equipment, maintenance costs, and connection fees for all publicly owned airports are eligible for funding through the Montana Department of Transportation aeronautics loan and grant program with a 50/50 sponsor split: however, aviation weather reporting equipment is usually considered a lower priority for these funds unless special circumstances can be shown. MDT also provides a web page that acts as a portal to view a number of various outdoor private and public web cams throughout the state that might be beneficial to pilots.

South Dakota
The South Dakota Aeronautics Commission will consider assistance with the funding of Automated UNICOMS, usually in direct support of Part 135 air charter and ambulance operators for instrument approach procedures. The sponsor must agree to pay for the automated UNICOM installation and operating costs, including utilities, data connection to the vendor's web server, and maintenance. Currently, only 8 of the state's 56 NPIAS airports lack weather reporting equipment

Utah
Acquisition of weather equipment is eligible under Utah's grant program with a 90/10 sponsor split. Utah considers aviation weather reporting equipment a lower priority use for its airport grant dollars in comparison to many other items, such as runway rehabilitation. Bringing existing units into the NADIN is a higher priority for the state, but funding to do this is very limited. Automated UNICOMs are eligible, but the state discourages installation of these types of units.

Washington
Weather reporting equipment is eligible for funding through the Washington Airport Aid Grant Program with a 50/50 sponsor share split: however, aviation weather equipment for NPIAS airports is usually considered a lower priority for these funds, and equipment for non-NPIAS airports are usually considered a very low priority. Maintenance and connection costs are not eligible under this program. Airport sponsors can apply for up to $5000 of funding of non-weather-specific airport security cameras, which can indirectly aid pilots utilizing them to help ascertain local weather conditions. Washington has a website which enables users to link to various non-weather-related pan-tilt-zoom web cams located at airports which take 4 pre-set directional pictures every 15 minutes, as well as other real-time airport webcams.

Wyoming
Wyoming Department of Transportation Aeronautics Division's grant program will assist airport sponsors with aviation weather equipment procurement at an 80/20 sponsor share split. Weather reporting equipment is given a high priority ranking. WYDOT will fully pay for any airport sponsors annual maintenance costs incurred in association with non-federal AWOS units. WYDOT has brought all existing AWOS units in the State up to full III-PT capability. WYDOT has installed and maintains 5 state owned AWOS-III units located in various critical mountain passes. Wyoming is in the midst of creating a GIS web based program and web page that will disseminate all AWOS information through the website, and will assist with connection of all AWOS units to the NADIN. WYDOT financially supports airport sponsors with the procurement of weather web cams through its Airport Aid Grant Program.

Recent Changes in the System

Between 2011 and 2013, Alaskans have seen a net loss of nine weather reporting stations that were previously used in making important operational and flying decisions. While nine AWOS stations were added in western Alaska, eighteen A-Paid observer sites were closed in the interior and south central portions of the state. In 2011, at the request of the FAA Alaska Regional Administrator, a business case study was conducted, which made a positive business justification for Automated Weather Observing System (AWOS) type stations at airports with instrument approaches in thirteen Alaska communities.

Who is Involved?

Alaska Department of Transportation & Public Facilities (DOT&PF)
Role: DOT&PF owns and operates 249 airports across Alaska. Statewide Aviation oversees the AIP grant program, the Alaska Aviation System Plan, and many other aviation planning functions.
Contact: Rebecca Rauf, Statewide Aviation Planner, 907-269-0728

Maintenance and Operations
Role: Operates one AWOS station at the Akutan Airport.
Jeff Doerning, Maintenance and Operations Supervisor, 907-269-0751

Federal Aviation Administration (FAA)
FAA Alaskan Region Airports Division
Role: Provides AIP grant funding
Contact: Byron K. Huffman, Division Manager, 907-271-5438

FAA Flight Service (FSS)
Role: Assists pilots and provides weather dissemination throughout Alaska
Contact: Fairbanks, Juneau or Kenai FAA FSS at 1-800-992-7433

FAA Western Service Center
Role: Provides shared services for Air Traffic, Technical Operations, & System Operations
Contact: Kyle R. Christiansen, Flight Procedures Team, 907-271-5187

Surveillance Broadcast Services (SBS) Western Service Area (WSA)
Role: Provides oversight and management of all ADS-B activities in the Western Service Area, including ADS-B implementation, budgeting, and planning.
Contact: Jere Hayslett, 907-271-5870

Enterprise Services, FAA Headquarters, Washington DC
Role: Serves as Enterprise Services Alaska Liaison for oversight and support of Alaska data communication, navigation and weather program activities
Contact: JoAnn Ford, 202-267-4543

National Weather Service (NWS)
Role: NWS collects weather data. Prepares weather forecasts and is under contract with the FAA to maintain 17 of the FAA's ASOS stations within Alaska.
Contact: Angel Corona, 907-271-5119
Contact: Michael Couch, 907-271-5125

For more information about this or other Alaska Aviation System Plan work please contact:
Rebecca Rauf
Statewide Aviation Planner, State of Alaska Department of Transportation & Public Facilities.
907-269-0728
Rebecca.Rauf@alaska.gov
or visit
www.AlaskaASP.com

Aviation Weather User Survey Results

Airport Weather Stations in Alaska

Pilot Survey and Air Carrier Survey

Results and Summary

June 2016

Who Was Surveyed

Pilots attending the annual Alaska Aviation Gathering and air carriers serving Alaskan communities were provided surveys in order to help prioritize airports for potential weather station funding.

Number of respondents

Air Carriers

Thirteen (13) air carriers responded to the survey. The respondents and the point of contact information they provided included:

- **Taquan Air:** George W. Curtis
- **Arctic Air Alaska Inc.:** James Hamilton
- **Alaska Air Transit:** Dan Owen
- **Northern Pioneer Helicopters:** Jim Archer
- **Alaska Central Express:** Mike Murphy
- **Lake Clark Air, Inc.:** Glen R. Alsworth
- **Air Arctic/Warbelows:** Darren Young
- **Katmai:** Sonny Peterson
- **Willow Air Service:** Steve White
- **Rusts Flying Service:** Todd Rust
- **Illiamna Air Taxi:** no contact given
- **Wright Air:** David Fagre
- **Denali Flying Service:** Barry Stanley

Pilots

Fifteen (15) pilots responded to the survey. The survey allowed for the option of having respondents provide their names and contact information. Those pilots who provided a name and contact information included:

- Mark Kapsner
- Brandon Forst
- L.J
- Michael
- Ed White
- Robert Rountree
- Bryan Emerson
- Thomas Scarboro
- Rod Combellick
- Bruce Carter

Survey Response Summary

Respondents were provided a list of 22 pre-selected airports with existing instrument approach procedures as well as 5 blank spaces. Respondents were then asked to:

1. Circle the top 3 airports on the list where they would like to see a weather station installed.
2. List the top 5 airports in order of priority (that were not already included in the list) where they would like to see a weather station installed.

Results

Question 1: Circle your top 3 airports where you would like to see a weather station installed

- The most popular responses were: Willow (21%); Nondalton (12%); Tok (9%)
- The least popular responses were Kotlik and Koyukuk.

These responses are summarized in **Table 1**

Table 1: Responses to Question 1:

Airports	Number of Responses	Percentage of Responses
Akiak	3	5%
Allakaket	2	3%
Beaver	3	5%

Central	1	2%
Chalkyitsik	1	2%
Chuathbaluk	1	2%
Coldfoot	4	7%
Eek	2	3%
Kasigluk	1	2%
Kobuk	1	2%
Kokhanok	4	7%
Kotlik	0	0%
Koyukuk	0	0%
Napaskiak	1	2%
Nikolai	1	2%
Nondalton	7	12%
Nulato	1	2%
Perryville	4	7%
Tatitlek	3	5%
Tok	5	9%
Venetie	1	2%
Willow	12	21%
Total Responses	58	

Question 2: List your top five airport priorities for a certified weather station

- The greatest number of respondents included: Good news Bay, Tununak, Shageluk, Scammon Bay, Chignik Lake and Levelock (all received 6% of the total number of responses).

A breakdown of the total number and percentages of responses for question 2 is summarized in **Table 2**.

A further analysis of the results for question 2 is provided in **Table 3**

Table 2: Responses to Question 2:

Airports Listed	Number of times listed	Percentage of Responses
Goodnews Bay	2	6%
Tununak	2	6%
Shageluk	2	6%
Crooked Creek	1	3%
Nightmute	1	3%
Mcarthy	1	3%
Scammon Bay	2	6%
Craig Seaplane	1	3%

Hyder Seaplane Base	1	3%
Coffman Cove Seaplane Base	1	3%
Farewell	1	3%
Nikolski	1	3%
Umiat	1	3%
Thorne Bay Seaplane Base	1	3%
Healy River	1	3%
TPO – Port ALSWORTH	1	3%
KCL – Chignik Lagoon	1	3%
A79 – Chignik Lake	2	6%
9Z8 – Levelock	2	6%
4K0 – Pedro Bay	1	3%
Chenega Bay	1	3%
Whittier	1	3%
Cantwell	1	3%
Manley Hot Springs	1	3%
Circle City	1	3%
Silver Salmon Lakes – west of Cook Inlet	1	3%
Hayes River	1	3%
Farewell	1	3%
Total Responses	34	

Table 3 – Analysis of Results to Question 2

Level of Priority	1st	2nd	3rd	4th	5th	Overall Priority
Goodnews Bay	2					10
Tununak		1	1			7
Shageluk				2		4
Crooked Creek					1	1
Nightmute					1	1
Mcarthy	1					5
Scammon Bay		1	1			7

Craig Seaplane Base	1					5
Hyder Seaplane Base		1				4
Coffman Cove Seaplane Base			1			3
Farewell	1					5
Nikolski		1				4
Umiat	1					5
Thorne Bay Seaplane Base				1		2
Healy River	1					1
TPO – Port Alsworth	1					5
KCL – Chignik Lagoon		1				4
A79 – Chignik Lake	1		1			8
9Z8 – Levelock		1		1		6
4K0 – Pedro Bay					1	1
Chenega Bay	1					5
Whittier	1					5
Cantwell		1				4
Manley Hot Springs		1				4
Circle City			1			3
Chalkiyitsik				1		2
Silver Salmon Lakes – west of Cook Inlet	1					5
Hayes River		1				4
Farewell			1			3
Key to Priority Rating						
	1st	**2nd**	**3rd**	**4th**	**5th**	
	5 Points	4 Points	3 points	2 points	1 Point	

Comments Received:

Alaska Air Transit gave comment:

1. FWL is Located at west side of Alaska Range, main VFR flyway Rainy Pass. High Volume during fall hunting season has no weather source.

Alaska Central Express gave comment:

1. Tatilek and Chenega Bay are the only places that would affect our operations.

Lake Clark Air gave comment:

Port Alsworth is the home base for Lake Clark Air, Inc. as well as Lake & Pen Air, the headquarters of Lake Clark National Park and Preserve, Operational Heal our Patriots, Alaska's Fishing Unlimited, The Farm Lodge, Alaska's Wilderness Lodge, Lake Country Lodge, The General, Canoe Bay outfitters, and other business as well as the location of Tanalian Bible Camp, which serves up to 400 youth from Southwest Alaska each summer. It is also the home base for True North Aviation, a local flight school.

In 2015 alone, LCA Inc. had 2,175 enplanements there, not counting our seaplane operations nor our backcountry operations. 2014 had 2,086. Any questions please call or email.

Rusts Flying Service gave comment:

1. Willow is important to Su-Valley flight as the lowest ceiling & visibility is often located there.

Wright Air Service gave comment:

1. For the airports listed above, communication on the ground with air traffic control or flight service is not possible (this is also true for Kaltag and Arctic Village).
2. Weather cameras area also very useful and can be a critical component if flight decision making and assessment.
3. All of the airports referenced here do not currently have cell phone service.

Denali Flying Service gave comment:

1. Need one at Hayes River area & Farewell

Ed White gave Comment:

1. Back country group has typically gone out June.

Robert Rountree Gave Comment:

1. Property at end of Valley runway west end.

Bruce Carter Gave Comment:

1. There is one (airport certified weather station) at McKinley strip PAIN, but the weather is usually quite different at the two strips and the winds in Healy are almost always different and stronger.
2. The Summer Season especially sees elevated traffic with flight seeing tours and charters along with all other traffic, local and transient.

Rod Combellick gave comment:

Whittier and Cantwell are not heavily used airports, but they are both close to passes that have frequently changing weather conditions and can serve as emergency landing strips

Conclusion:

1. The results gathered from the survey suggest that the top priorities of the respondents for the installation of an approved weather station at airports with an existing instrument approach procedure are Willow, Nondalton, and Tok.
2. The results gathered from this survey suggest that the top priorities of the respondents for the installation of an approved weather station an airport not listed as one of the 22 included in the first question are Goodnews Bay, Chignik Lake, Tununak, Scammon Bay and Levelock.
3. The results of this survey help to provide clear priorities for prioritization of approved airport weather stations installations due to the number of respondents and the relative concentration of responses.