421 Aviation Way
Frederick, Maryland 21701

T. 301-695-2000
F. 301-695-2375

www.aopa.org

December 3, 2014

Mr. Frederick Matos
National Telecommunication and Information Administration
US Department of Commerce
1401 Constitution Avenue NW Room 4898
Attn: Arctic NOI
Washington DC 20230

Re: Telecommunications Assessment of the Arctic Region Docket No. 140925800-4800-01

Dear Mr. Matos:

The Aircraft Owners and Pilots Association (AOPA) is a membership organization representing almost 400,000 pilots and aircraft owners in the United States. In addition to the 3,500 members who live in Alaska, many of our members from other parts of the country fly to and within the Arctic either for business or pleasure. On their behalf, we wish to offer comments to the Notice of Inquiry regarding the Telecommunications Assessment of the Arctic Region.

Background

The Arctic within Alaska, extending from the Arctic Circle, through of the Brooks Range and northern foothills to the arctic coastal plain and the waters beyond, is a vast and sparsely populated region. Aviation plays a major role in providing year-around transportation to and among the communities in the region, as well as remote areas on land, and offshore. A single all-season 414 mile highway is the sole road that connects this region with the rest of the state. Only seasonal ship traffic provides heavy lift and resupply missions due to the short summer navigation season. Consequently, aviation is the main year-around form of access to transport people, deliver mail and supplies, fuel and other essentials needed to survive in this climate. The lack of surface transportation, particularly during the summer season, also makes aviation a major platform used to conduct wildlife surveys on land, marine mammal surveys offshore, perform mapping, air sampling and related data collection activities, as well as conduct search and rescue missions. Aircraft also transport the technicians that install and maintain the limited infrastructure found in the Arctic regions today. While this form of transportation is essential to operations in the Arctic, the infrastructure supporting aviation is minimal, which makes it an even more challenging environment to safely and efficiently operate.

Lack of Communication Services

Communications is a vital component of the infrastructure needed to support aviation. Starting with the collection of basic weather information, the Alaskan segment of the Arctic has few aviation weather reporting stations. The largest segment of the network is a less than a dozen stations, mostly distributed along the north and west coast of Alaska. Only one station operates in the central Brooks Range. An aircraft making the 436 nautical mile flight from Fairbanks to Point Barrow has only two reporting stations to evaluate conditions along this route that crosses a major mountain range and transects several weather patterns. While this may be adequate for transport category aircraft flying in the flight levels under Instrument Flight Rules (IFR), it is significantly lacking for smaller aircraft operating under Visual Flight Rules (VFR) which are used for many of the aviation missions in the Arctic. Reestablishment of an aviation weather station at Umiat, in the middle of the North Slope, would be a benefit not only to pilots, but to forecasters whose products pilots rely on for flight planning and operational decision making. The Umiat airport also provides an alternate landing site, in the event that an aircraft encounters unforecast conditions, mechanical difficulties or any other emergency situation, yet no weather information is available to aid an aircraft in distress. While Umiat provides a striking example, other interior weather stations are needed to provide improved weather forecasts and reporting for aviation safety across this foothills region, which is neither coastal nor mountainous in nature.

Other infrastructure is also in very short supply. The ability for pilots to communicate with Flight Service Stations is another need for the Arctic. Today a very limited network of Remote Communication Outlets (RCOs) is available for pilots to obtain weather information, file pilot reports, file flight plans. There are only seven NexRAD weather radars in Alaska, none of which provide coverage north of the Arctic Circle. Without this tool, pilots and weather forecasters are forced to rely on polar orbiting satellite imagery for synoptic information on weather patterns. While satellite imagery is an important tool, when high cloud layers move in, they tend to mask the activity in the lower levels of the atmosphere, leaving little more than the handful of surface weather stations to forecast and evaluate aviation weather conditions.

Future Systems

The FAA is in the process of implementing the infrastructure for Automatic Dependent Surveillance-Broadcast (ADS-B). This component of the FAA's NextGen Program allows Air Traffic Control (ATC) to monitor air traffic, while at the same time providing a communications channel to uplink weather and other data to equipped aircraft. Current plans call for four stations to be installed along the north coast of Alaska, however there are no plans to provide coverage in the central and eastern Brooks Range or providing coverage to communities such as Bettles, Fort Yukon, Arctic Village, etc. The aviation community in Alaska has requested that the FAA add additional stations to provide a "minimum operational network" for the state, which would support operations in the Arctic, and in areas that aircraft have to transit to get to and from arctic regions. Attachment A is a briefing from an industry presentation addressing this topic at a US Senate General Aviation Caucus hearing held in Alaska in May, 2014.

Need for Inter Agency Cooperation

With the lack of existing infrastructure in the Arctic and tight budgets, it is essential that the government agencies make a coordinated effort to implement creative and cost effective solutions to fill some of the gaps for communications and weather reporting systems. Two opportunities to consider:

Non-standard aviation weather stations

The National Weather Service (NWS) has identified a lower cost alternative to the standard Automated Weather Observing System (AWOS) used by the FAA at airports with instrument approaches. This system, called a Modular Automated Weather Station (MAWS), has the primary sensors included in an AWOS, but is not certified by the FAA specifically as an AWOS. The units are attractive for locations that don't have IFR approaches as they are about half the cost to procure, and appear to be significantly less costly to operate and maintain. Currently, NWS is operating three of these stations in Alaska today, however due to the certification issue the data is not distributed via normal FAA weather channels. We have requested that the FAA and NWS find a mechanism to define and distribute this data through normal channels to the aviation community. For mountain passes, VFR-only airports, or other "choke points" along VFR routes, these weather data are invaluable to pilots and weather forecasters alike.

Partnership opportunities to expand infrastructure

In addition to the small number of weather reporting stations on land, Alaska suffers from a lack of offshore stations. Observations in these areas would not only provide additional data for aviation and marine traffic in the immediate vicinity, but would provide forecasters with information about conditions before a weather pattern reaches the mainland. With increased industry activity in offshore areas, it may be possible to place stations in areas previously not accessible. In the Gulf of Mexico, the FAA partnered with the oil industry and helicopter operators to improve their situation. The FAA provided both ADS-B and AWOS units, and pays for the maintenance of these facilities. The helicopter operators provide transportation to the offshore facilities, and oil companies provide space on their offshore structures to locate the equipment. Similar arrangements could be beneficial as industry expands their activities in the Arctic. The government should maintain the flexibility to implement creative partnership solutions to expand weather reporting, ADS-B and possibly other infrastructure.

Search and Rescue

As shipping, oil exploration or other resource development activities increase in the Arctic, search and rescue support is needed. In addition to staging suitable rescue aircraft at key locations across the Arctic, the timely reception of distress signals is critical to launching a rescue effort. There are still significant occasions where an Emergency Locator Transmitter (ELT) fails to activate, or the antenna is damaged, and no distress signal is received.

In January, 2013, the FAA's Alaska Flight Service Program launched a new service, Enhanced Special Reporting Service (eSRS) which utilizes commercial satellite tracking devices, and links them to FAA Flight Plans. The specifics of the service vary with the tracking device selected by the aircraft operator, but basically distress signals are forwarded to Flight Service, matched to a Flight Plan and the combined location and flight plan information provided to the Rescue Coordination Center for a response. While not yet a replacement for an ELT, certain models of satellite tracking devices appear to offer a more positive means of alerting search and rescue officials in an emergency situation. Attachment B contains additional background and details on this service.

R&D for Weather Cameras

The FAA has developed a system of web cameras, located at airports and other key locations, which provide supplemental weather to the aviation community. These have proved invaluable to overcome some of the limitations of automated weather sensors. In other places, a stand-alone webcam array may provide the only weather information available. There are currently about twenty of these sites in Alaska north of the Arctic Circle, and while tremendously valuable during summer months with 24 hour daylight, at other times of the year observations are very limited. New low-light cameras or infrared sensors used at night may eventually allow this network to provide valuable information around the clock. A significant research effort is required to evaluate sensors, and to consider human factors on how other sensor imagery is presented and interpreted for weather analysis.

We have touched on some of the areas where telecommunications and related infrastructure is in need of improvement, as activities in the Arctic increase. Additional documents are provided with this letter including Attachment C, *Alaska is a 'weather poor' state*, and Attachment D, a white paper published by the Alaska Airmen's Association addressing weather reporting issues. There are many challenges to operating in the Arctic, and we look forward to working on these and related issues as activities in the Arctic expand.

Sincerely,

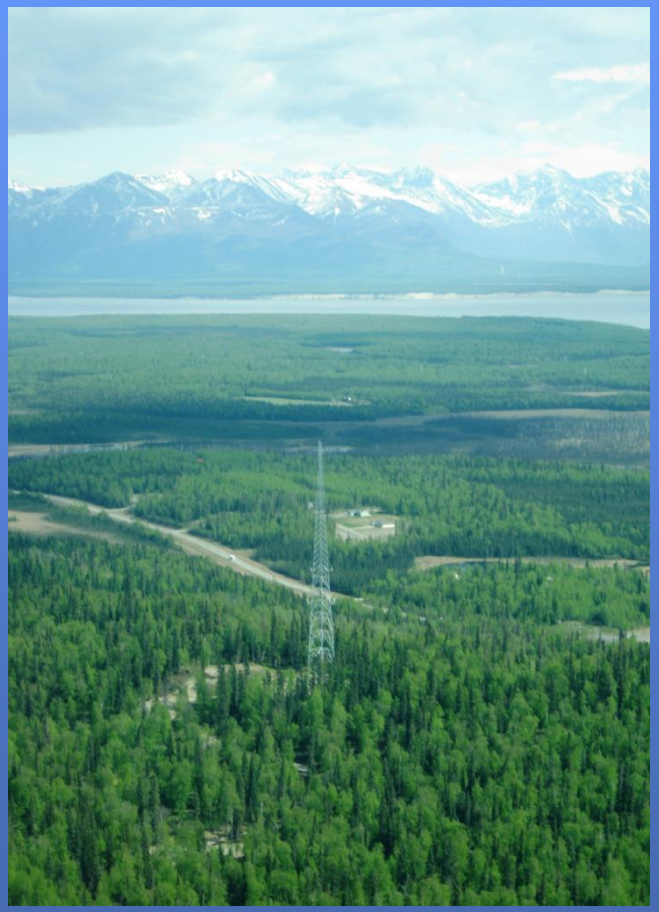
Tom George, Alaska Regional Manager

Attachments:

Attachment A: ADS-B Minimum Operational Network Briefing
Attachment B: eSRS satellite tracking
Attachment C: Alaska Weather Poor State
Attachment D: Alaska Aviation Weather Concerns

Attachment A: US Senate GA Caucus Briefing

Automatic Dependent Surveillance-Broadcast (ADS-B) in Alaska



Jim Cieplak
Alaskan Aviation Safety Foundation
May 3, 2014

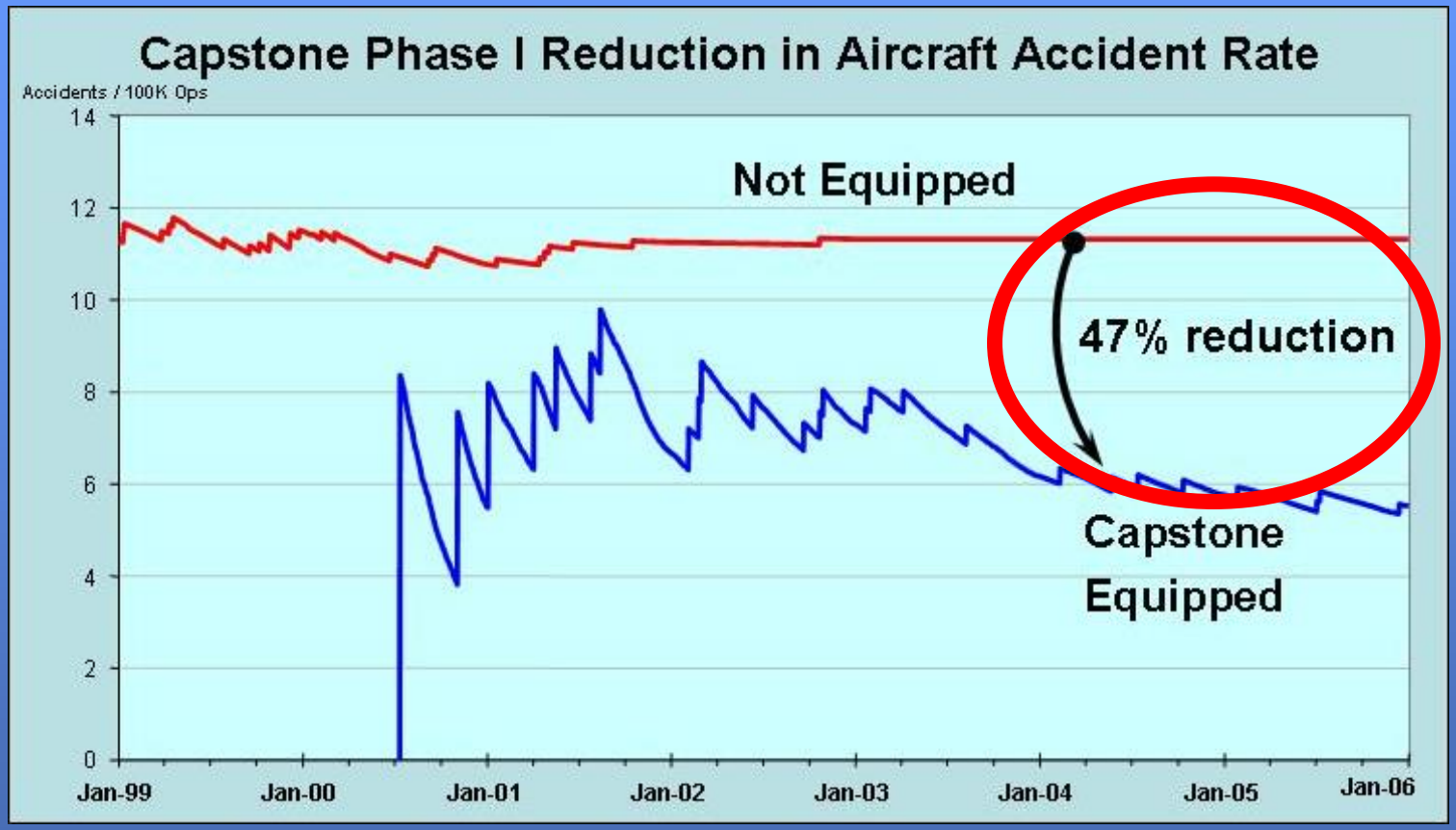
Capstone Investment in Safety

History

- "The Capstone Project was a joint industry and FAA research and development effort to improve aviation safety and efficiency in Alaska. … The Capstone Project operated from 1999 to 2006, and its success in Alaska laid the groundwork for the nationwide deployment of ADS-B."
- "In December 2006, the FAA announced that it would integrate Capstone into the FAA's Surveillance and Broadcast Services (SBS) program office tasked with implementing ADS-B across the national airspace system. The consolidation was intended to streamline national ADS-B activities and make them more cost-effective. It was also intended to accrue safety benefits for Alaska more quickly by accelerating the deployment of ADS-B technologies."

http://www.faa.gov/nextgen/implementation/programs/adsb/wsa/archival/

Success = Improved Safety



(http://www.faa.gov/nextgen/implementation/programs/adsb/wsa/media/Phase%201%20Final%20with%20appendices.pdf

➡ FAA projected a 33% reduction in fatal accidents if Capstone implemented statewide.

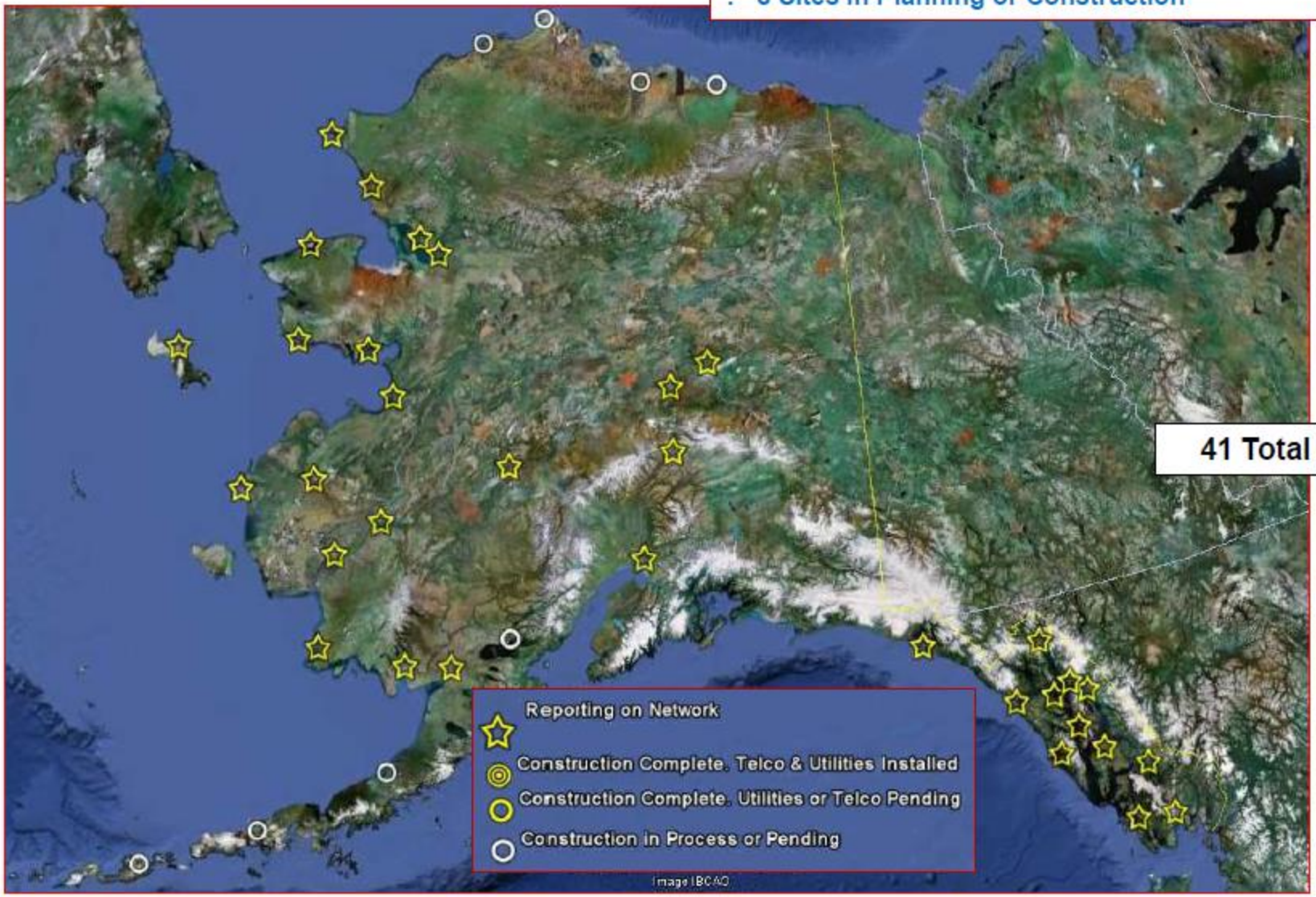
General Aviation Benefit Summary

Location	Application	Outcome	Risk Adjusted PV $M
CONUS, Hawaii, and Caribbean Broadcast Services	Enhanced Visual Acquisition and Conflict Detection	Fewer aircraft-to-aircraft conflicts	$203.6
	Weather and NAS Status Situational Awareness	Fewer encounters with hazardous weather	$232.5
		More efficient routes in adverse weather	$4.9
		Reduction in user costs to obtain weather info	$26.1
		Fewer aircraft-to-terrain conflicts	$284.3
Gulf of Mexico Surveillance	Non-Radar Airspace ATC Surveillance (includes weather and comm as needed)	Low Altitude - Increased Capacity	$84.2
		Low Altitude - Reduction in Weather Related Accidents	$5.0
Alaska Surveillance and Broadcast Services	Weather and NAS Status Situational Awareness Enhanced Visual Acquisition and Conflict Detection	Fewer aviation accidents in Alaska	$300.1
	Non-Radar Airspace ATC Surveillance	Access to lower altitude routes in Alaska	$19.5
		Fewer aircraft-to-aircraft conflicts (JNU)	$0.0
		Improved search and rescue services in Alaska	$7.0
Alaska Airport IFR Upgrade Services	Weather Automation upgrade and IFR Approach Development	Increased access to remote villages in Alaska	$90.0
		Increased Medevac access to remote villages in Alaska	$175.4
Total			**$1,432.6**

ADS-B Out ADS-B In ADS-B In / Out

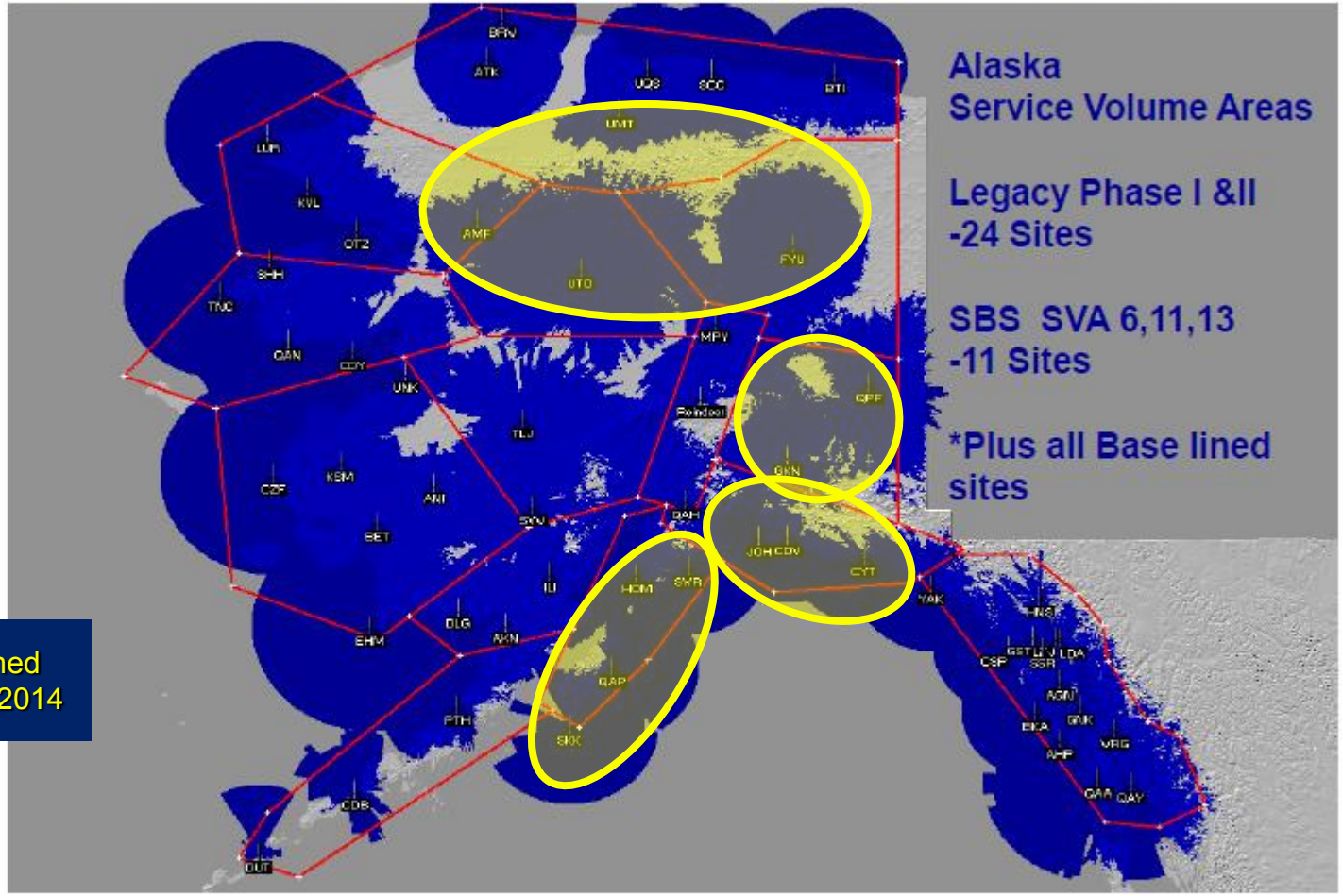
Alaska Status

33 Sites Reporting on Network : 33 Sites Constructed
: 8 Sites in Planning or Construction



41 Total Sites

Proposed Alaska Coverage, 5000ft. AGL (with approximately 4,000 equipped aircraft)



Note: This is Draft Predicted Coverage based on Visual Line of Sight (VLOS)

Surveillance and Broadcast Office
February 15, 2008

Federal Aviation Administration

Advanced Safety Avionics Needed!

- **Alaska needs widespread avionics equipage to achieve benefits**
  - **Currently ~335 ADS-B equipped to legacy standards, FAA upgrading**
- **FAA mandated ADS-B Out equipage effective Jan 1, 2020 for certain airspace**
  - Current compliant aircraft = 3817 (Mar 24, 2014)
  - ~175,000 aircraft to equip nationally (~2500 per month)
  - Not required in much of Alaskan airspace

… need to maximize the equipage of general aviation and commercial operators with advanced safety avionics at the earliest possible date <u>because they want to equip</u> – not due to mandate.

Discussion

AOPA Views From the

Regions

Flight Service integrates satellite trackers in Alaska

Posted on **January 28, 2013** by **Tom George**

0

After almost two years in the making, the Alaska Flight Service Program issued a Letter to Airmen last week, announcing a new service that combines two of the popular satellite tracking devices with VFR flight plans. The program is called the **Enhanced Special Reporting Service** (eSRS), originally designed to track pilots operating over mountains or water using frequent radio calls. Of course, in much of Alaska there aren't nearby radio outlets to receive those calls— so enter the era of satellite tracking devices. These units combine the features of GPS positioning and a satellite communication network to send *"Help"* messages to a ground facility somewhere on the planet, which forwards them to the email or text message address of our choice. So why not send those to Flight Service, the people holding your VFR flight plan?

In a nutshell, that is what this service does. Pilots who own either a SPOT or Spidertracks tracker may sign up to have alert messages from their devices sent directly to Flight Service. In the event of an emergency, FSS will relay the messages to the Rescue Coordination Center, including your location. Signing up is fairly simple. Fill out, or update, a Master Flight Plan indicating that you want to participate in the eSRS program, and list the type of satellite tracker you have. (The service is currently limited to SPOT or Spidertracks, however other devices are expected to be tested and added in the future.) Upon receipt of that plan, Flight Service will email the information needed to add them to your contacts list. You can still have your family or friends receive the message at the same time. A few details to be mindful of:

- FSS is NOT actually tracking your flight. They only expect to receive a message if you are in distress and

need help.

- This supplements, but does not take the place of the legal requirement to have an ELT.
- There is no charge by FAA for this program; however both SPOT and Spidertracks charge an ongoing fee for their tracking and messaging services.

— An example Spidertracks track from a 191 nm photo mission flight into the Alaska Range. Had anything gone wrong, FSS would have received an email with my flight track and my reported position within the last two minutes before the unit quit transmitting. It would have been hard to describe this route precisely for FSS in a flight plan.

I have used both SPOT and Spidertracks devices. Before the FAA offered this service, my wife was my primary contact to receive a distress message. This was fine until she was riding in the airplane with me. And even though I have other friends set up to receive my messages, they don't necessarily know where I am going, and who is on board. So having an alert message go straight to Flight Service, where it can be matched up with my flight plan, brings the information together needed to get help headed my way. This seems especially well suited for people flying to remote areas where there are no phones or radio outlets to close a flight plan. While we have always had the option to file a long-duration, "round robin" flight plan, it didn't offer much protection until we came up overdue, which might be several days. Combined with a satellite tracking device, Flight Service will respond when they get the help message. It also makes sense for pilots who fly on complex routes on a "round robin" flight plan where it is difficult to precisely describe to Flight Service where you intend to go. How well this works does depend on what tracker you have, and how you chose to use it. Do your homework before investing in a device.

This program didn't just happen. Adam White, at the time serving as the President of the Alaska Airmen's Association, and I approached the FAA about this concept. It took a team of Flight Service staff from the three "parent" flight service stations (Juneau, Kenai and Fairbanks), the Alaska Flight Service Program Office in Anchorage and support from FAA headquarters to develop the concept and operational procedures. While Adam and I served as the initial "parties in distress" to test the system, before the service was declared operational, a dozen other pilots from the interior, south central and south east Alaska participated in the beta-testing phase of the program. Spidertracks Ltd. loaned the FAA a system for test purposes while a member of the Flight Service staff loaned their personal SPOT tracker for the test period. My thanks to all that donated their time, talents and resources to incorporate this new technology, which I hope in the future will get pilots help sooner, and reduce the time spend searching for overdue aircraft.

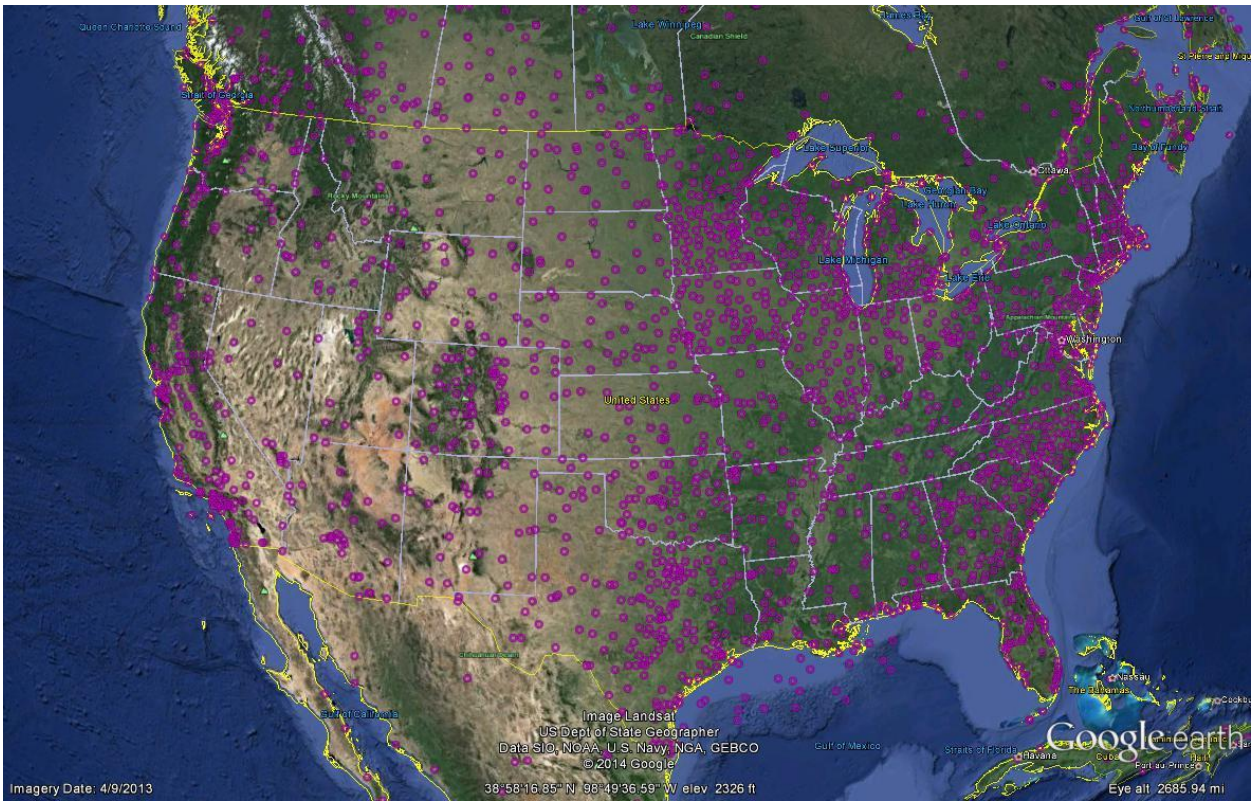
To learn more or to sign up, Flight Service has developed a brochure and other background information to explain how the system works. It could someday save your bacon!

This entry was posted in **Alaska** and tagged **Flight Service**, **satellite tracking**, **Search and Rescue** by **Tom**

Alaska is a "weather-poor" state

Tom George, AOPA Alaska Regional Manager

Alaska pilots are poor (impoverished) when it comes to the amount of weather data available to make critical go/no-go decisions involving whether to take-off or continue a flight. According to the FAA's surface weather observation stations website, Alaska has 133 weather station locations. In comparison, the "contiguous 48 states" have over 1,800 AWOS or ASOS sites. Based on average density of stations nationwide, Alaska would need 183 additional stations to be on par with the rest of the country. That is 2.4 times as many observations as we have today. I am not expecting to see that number of conventional stations in Alaska, but it does point to the need for Alaskan pilot to be creative, and look to non-conventional sources of information. But first, let's dig a little deeper into our weather observing system of today.



Not all weather reports are equal

Not all weather observations are the same quality. The standard weather observation today is an unattended FAA Automated Weather Observing System (AWOS) and it's National Weather Service counterpart the Automated Surface Observing System (ASOS). These devices operate 24 hours a day, and report weather based on sensors that measure wind speed and direction, temperature dew point, altimeter, ceiling and visibility. Some models may detect precipitation type and accumulation and/or thunderstorms. Advanced as they may be, the unattended stations have some significant limitations. The ceiling is measured based on a small laser beam directly overhead and a computer calculates the cloud cover based on a 30 minute average of readings. For example, if a low fog bank is creeping up on the airport, the unit won't know about it until the field has gone IFR. Another well-known limitation of these devices is the visibility sensor, which measures the particles within a 1 meter beam of light, and calculates the "up to 10 miles" visibility value we see in the reports. A frustration with this sensor at rural Alaska airports results when a four-wheeler parks next to the sensor (perhaps waiting for an arriving aircraft) and its exhaust drifts into the visibility sensor's "view," reducing the reported visibility to 1/8 mile. A mere annoyance to most pilots flying under Part 91, but a commercial pilot flying under Part 135 regulations can't even shoot the approach with reported conditions lower than the allowable minimums. Automated stations operating unattended contain the word AUTO in the report to alert pilots to that fact. The omission of that term lets the pilot know that either a human is making the observation in the first place, or the observation is being augmented by an observer.

Augmented Weather Stations

Given these limitations in automated stations, the FAA has contract weather observers augment the equipment at select locations. Airports with significant volumes of traffic, such as Anchorage and Fairbanks are augmented. One of our Alaska adaptations has been that when the network of Flight Service Stations was reduced in the mid-1990's, locations that were identified as important strategic locations were provided with a contact weather observer to ensure that the known limitations of automated units didn't catch a pilot off guard. In the summer of 2013, the weather augmentation contract at Gulkana was cancelled. Recently we have reason to believe that FAA is looking to make changes that may reduce or eliminate augmentation services around Alaska. More on augmentation and how it works in another post.

Five more weather stations closed

One of the means of obtaining weather information at remote locations that don't have an automated station is to contract with a local resident under the A-PAID Program. Under this program, an interested person is trained and certified by the NWS to make a set number of weather reports per day the old fashioned way, but looking at the sky and making manual observations, such as using the distance to local landmarks to estimate visibility. A-PAID observers don't report 24 hours a day, and if the observer has to come to town, is sick or otherwise not available, no report gets filed. A-PAID observers also don't file Special reports, to alert pilots when conditions change, but often they are the only source of weather information in remote areas, or along VFR routes, that help pilots make informed decisions on whether to initiate a flight. A few days ago I learned that the FAA had cancelled the contracts for the last five stations that they had funded for years, leaving us with no weather reports from **Farewell Lake, Merrill Pass West, Manley Hot Springs, Nabesna** and **Chandalar Lake**. Five more points, of our already sparse weather network, went dark.

Replacements for A-PAID stations

In 2011 the National Weather Service announced its intention to phase out the A-PAID program, and for those areas that they felt they needed continued observations, replace them with an automated observations similar but not identical to AWOS units. The package they identified is called a Modular Automated Weather Station (MAWS). It is built by a company that makes AWOS systems, and the sensors used are all certified by FAA for use in an AWOS system. MAWS stations record the main elements we need for aviation weather, including ceiling and visibility, but don't have a VHF radio to transmit the data to an aircraft. They are not certified by FAA as an AWOS, and cost about half as much as a fully certified unit. For these reasons, at least so far, the FAA and NWS haven't been able to agree on a basis to consider the reports to be considered METARs, and distributed through the normal FAA weather channels. This is a real problem for John and Suzy Q Pilot, because unless they know exactly where to look, these observations don't exist. To date these stations have been deployed in the Central/Circle Hot Springs area, and at Whittier. AOPA and other Alaskan aviation groups are pushing both NWS and FAA to find a way to distribute these observations through the normal channels, given that

they are intended for use at VFR airports, or at non-airport locations that are along key VFR routes. Given the lack of progress solving this issue between two federal agencies, we have asked Senator Begich, who sits on the Senate Commerce, Science and Transportation Committee, for help getting the two agencies to come up with a practical solution to this issue to make the observations available. We will continue to push to make this weather fully available to pilots.

Weather Cameras

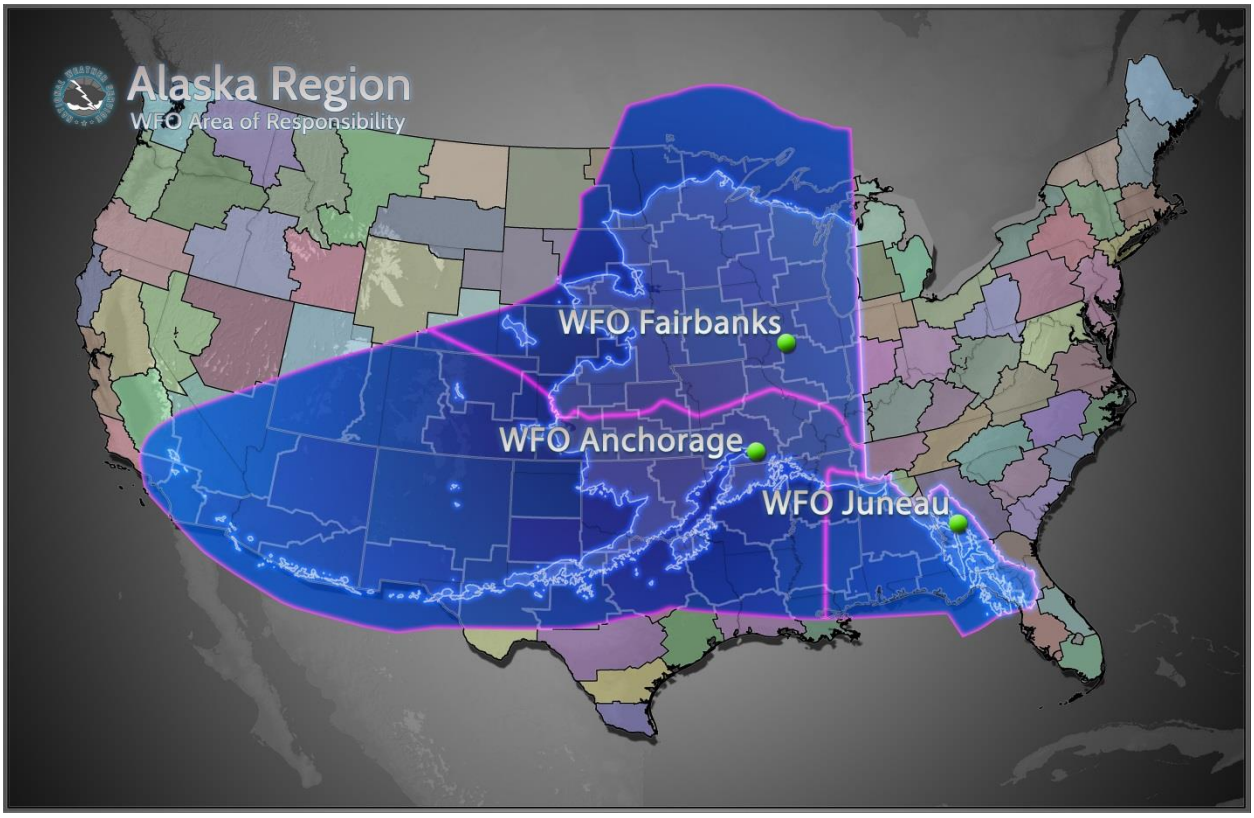
The FAA Weather Camera Program is the one bright spot that adds weather information to a pilots bag of tricks when it comes to making go/no-go flight decisions. A set of cameras looking multiple directions, updated every 10 minutes, available on the internet from 221 locations across the state provides a tremendous amount of information for flight planning and decision making. As just one example, the camera at the McKinley Park airstrip is co-located with the AWOS unit there. The camera has helped me "interpret" the AWOS report, which one morning was reporting 1/8 mile visibility. A look at the weather camera revealed blue skys in multiple directions with a few wisps of ground fog in the foreground that let me know I was good to launch for a flight thorough Windy Pass. On another occasion, while the AWOS was reporting "clear below 12,000" a look at the big, ugly cumulus clouds both to the north and south of the station, due to the siting of the station in the middle of the valley between two sets of ridges, let me know that this was not a good time to expect smooth sailing through the mountains.

As valuable as the network of cameras is, there is a very serious limitation. Currently, the cameras are good during daylight hours only. Great in the summer, but as days shorten, pilots are back "in the dark" having to make go/no-go decisions before camera observations are available. Even in mid-October a local pilot told me this past week he had to wait until 10 a.m. to get a usable image from an interior camera to tell if he could conduct a flight down the Tanana and middle Yukon Rivers. And we aren't yet into really short winter days! There are now low-light level cameras on the market that might extend the utility of the camera network, however we need a serious research and development effort to evaluate available sensors, and consider the human factors of how to present other than standard color video data for pilots to use in their decision making process.

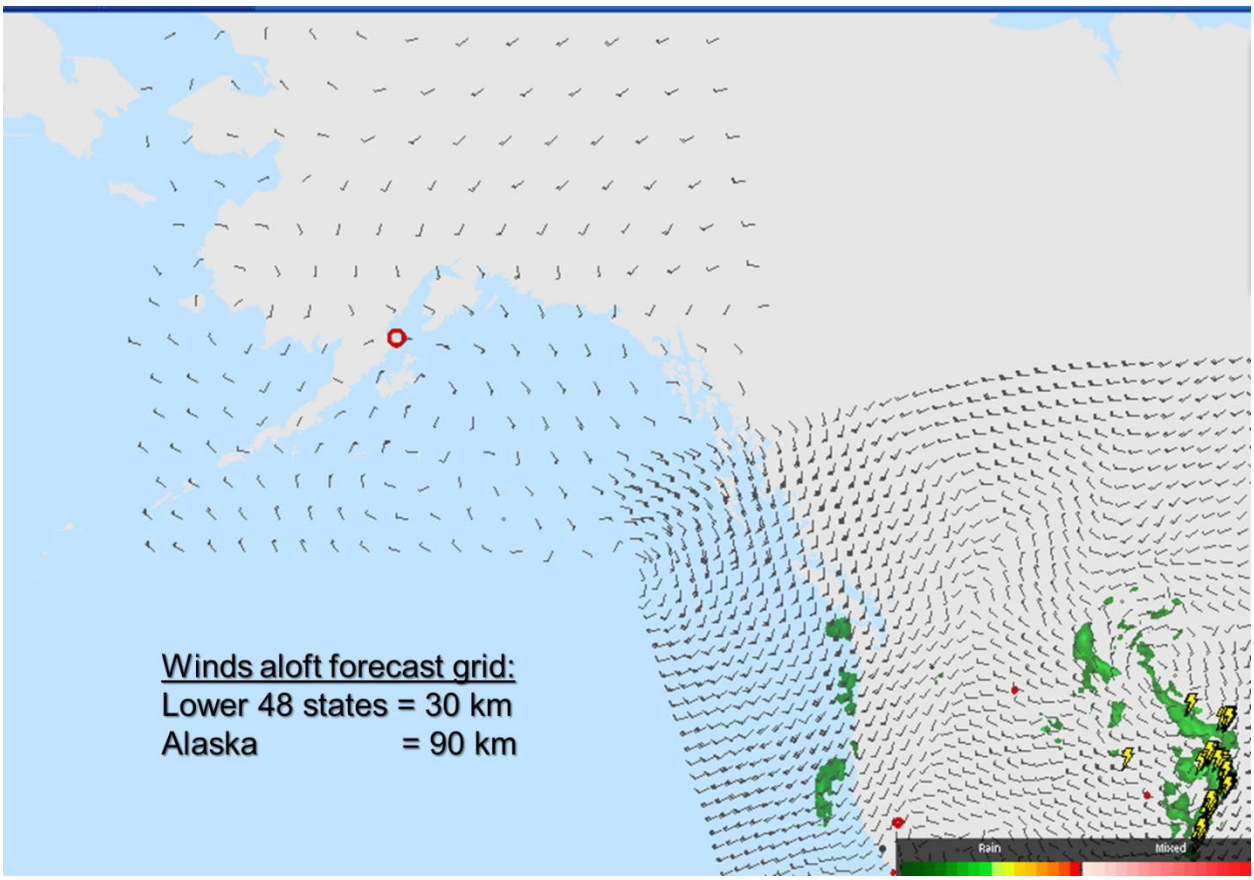
Alaska forecasts also have limitations

The sparse network of weather observations impacts pilots in more ways than one. In addition to our own weather interpretation, the NWS forecasters are a major consumer of surface observations. They count on them to make and verify the Area and Terminal Forecasts that we use to anticipate what conditions will be like in a few hours, along a cross country route of flight. Or how fast a weather system is approaching that will impact even local operations. At a recent conference I saw a map (see below) showing how the Alaska weather forecast areas correspond to a similar size area "outside." NWS forecasters in three weather offices (Anchorage, Fairbanks and Juneau) turn out forecasts for areas that would be covered by 68 forecast offices in the

lower-48. Even if you discount the marine areas in Alaska our forecasters over the land areas alone are doing the job of 30 offices down south. Another way to look at it is that 40 forecasters in Alaska issue products for an area that is covered by about 400 forecasters "outside."



They manage this because the forecast grids are larger in Alaska. Just looking at the winds aloft products— Alaska uses a 90 kilometer grid, in contrast to a 30 meter grid used elsewhere in the country. Pilots flying in Alaska have to bear in mind that while the forecast products look the same across the nation, the spatial content of our forecasts is lower than if we were planning a route across other portions of the country.



We need all the observations we can get

Given the size of our state, the reliance on the airplane to provide basic transportation, and the diversity of terrain and climate, we need all the weather observations we can lay our hands on. The lack of conventional weather stations enjoyed by the rest of the country means that:

a) We need to continue to have augmented weather in key regional locations.
b) It is essential that observations from lower cost MAWS sites fully distributed.
c) We need fully certified AWOS units at airports with instrument approaches.
d) It is important to expedite research into expanding the use of weather cameras beyond daylight hours, to obtain better utilization of this innovative program.

In the current budget climate it will not be an easy sell, but for aviation safety and access, we must make the effort.

Tom George serves as the Aircraft Owners and Pilots Association's Regional Manager for Alaska, and is a member of the Denali Overflights Advisory Council. He resides in Fairbanks, and flies a Cessna 185. Information on other Alaska aviation activities and events may be found at: www.aopa.org/region/ak

Source: *The Transponder*, Alaska Airmen's Association, Oct./Nov. 2014 edition, pages 11 & 12

Alaska Aviation Weather Reporting Concerns

Overview:

Weather observations are critical to pilots. They are evaluated prior to flight when deciding if it is safe to take off. Pilots monitor weather conditions as they fly to make decisions regarding their route, or when to deviate to an alternate airport, if necessary. The observations are also used by meteorologists who generate the aviation weather forecasts on which pilots base their flight plans.

While there are many sources of weather data today, the reports most critical to pilots are observations designed for aviation use called **Aviation Routine Weather Reports** (**METARs)**. The majority of these come from automated weather systems that record wind, temperature, atmospheric pressure, ceiling (height of the clouds above the surface) and visibility. FAA certified weather stations designed for aviation use include the **Automated Weather Observing System** (AWOS) and a follow on, the **Automated Weather Sensor System** (AWSS). In addition, there are still human observers at some locations who report weather intermittently, under the **A-Paid** program. These observers are based at airports without instrument approaches, or at non-airport locations in proximity to mountain passes, or along VFR routes.

Alaskans rely on aviation due to the lack of roads and other transportation infrastructure, yet the network of aviation reporting stations available to pilots is sparse. Alaska currently has a little over 130 aviation weather stations. Nearly two hundred additional stations would be needed to have a network density comparable to those located in the contiguous 48 states. Consequently, Alaska pilots must combine normal and unconventional weather sources to provide the information needed for access and aviation safety in the state. Weather cameras, human observers, weather augmentation, non-standard observations are blended to compensate for the AWOS network the rest of the country enjoys. Currently there are federal program changes that impact several aspects of the Alaska weather reporting network, which are causes for concern.

Weather for Instrument Approaches

In 2011 at the request of the FAA Alaska Regional Administrator, a business case study was conducted, which made a positive business justification for AWOS stations at airports with instrument approaches in thirteen Alaskan communities. These airports are still lacking AWOS capabilities. To date, a lack of resources seems to be the main limitation to improving access for these communities.

Desired action:

Determine the appropriate FAA program, and budget resources to acquire and install AWOS units at these communities.

Certification of NWS weather stations

In 2011, the National Weather Service (NWS) announced that it intended to modernize their network of surface observations, and phase out A-Paid (human) observers. In some cases existing stations would

be replaced with an automated system called a **Modular Automated Weather Station** (MAWS), which collects the observations needed by pilots, including ceiling and visibility. These stations are about half the cost of basic AWOS stations, but lack some features, such as direct radio broadcast of their data to pilots.

While built by a company that also manufactures AWOS units, the MAWS system is not separately certified by the FAA as an AWOS unit. The sensors are identical to those used in certified AWOS stations; however the observations are not distributed to pilots through the normal channels, making them effectively invisible to much of the aviation community. At the request of the Alaskan aviation community, the NWS and FAA have been in discussion at a headquarters level regarding how to provide these observations to pilots. NWS has asked the FAA for a waiver to distribute the data from these stations in the normal METAR format, with the understanding these will be used at VFR airports, or in non-airport locations. This would allow the data to be distributed normally to aviation users. Another option is to classify these observations as "supplemental weather"—and make the necessary provisions to distribute them with that caveat. Until these observations are fully distributed through the normal channels to pilots, these locations are effectively "blind" to pilots who have to make operational safety of flight decisions.

Desired action: **The FAA either needs to:**

(a) Grant NWS a waiver to distribute MAWS data in METAR format for non-IFR airports or,
(b) Define MAWS observations as a "supplemental weather" and make provisions for the observations to be distributed with appropriate labeling.

FAA Augmented Weather

Automated weather stations are known to have limitations at times resulting in observations not representative of the current conditions. For example, these systems will fail to detect an advancing cloud layer until it arrives over top of the station. When the airport changes from VFR to IFR status without warning, it creates a hazard to pilots already in flight. In recognition of these limitations, the FAA established a program where certified weather observers are on station and maintain a "weather watch" to detect and correct errors in the automated observations at key locations. They also augment the observations by adding significant information to the reports for pilots—such as the presence of fog layers or approaching thunderstorms not detected by the weather sensors.

When Alaskan Flight Service Stations (FSS) were consolidated in the 1990's, locations that served important flight routes were assigned contract weather observers to compensate for the loss of the FSS staff that had previously performed that function. It was recognized at the time that the locations of the observers didn't necessarily meet the national criteria established for weather augmentation, which normally relies on aircraft operation counts, etc. The observers also support the high percentage of VFR traffic which is often the main transportation mode that serves 82 percent of the communities in the state.

On July 31, 2013 an FAA Memorandum announced that the weather observation contract for Gulkana was cancelled. The memo cited the environmental condition of the building as the justification to cancel the contract, but went on to state that the Gulkana airport "does not qualify for contract weather support." While the traffic count at this airport doesn't meet the standards called for by the FAA Order, the FAA Western Service Center failed to take into account the role Gulkana serves for flights operating between Anchorage, Valdez, Cordova, the McCarthy area, and aircraft headed to Fairbanks or northern Alaska via Isabel Pass. For aircraft operating along these routes, dependable weather reporting from Gulkana is essential to know when conditions are changing, and if the Gulkana airport, with instrument approaches, a paved runway and fuel, is available as a viable alternate for their flight. This airport is the only alternate in the Copper River Basin, ringed by mountain ranges, more than 100 miles from other airports with suitable infrastructure.

Desired action:

Conduct a review of Alaska stations that have augmented weather observations to re-validate the needs for this service prior to cancelling any weather augmentation.

FAA A-Paid Program

Separate from the NWS operated stations, the FAA currently supports A-Paid observations at four additional locations that are important to aviation users. In mid-September, 2013, the observer at Manley Hot Springs received a letter from the National Weather Service indicating cancelation of the weather observation contract on September 31, and also stating that the FAA's contract with the National Weather Service was not being continued. AOPA contacted both NWS and FAA's Alaska Regional offices to inquire about this change. A few days later the cancelled contracts for four A-Paid sites in Alaska (Manley, Nabesna, West Merrill Pass and Farewell Lake) were reinstated, and were continued for another year.

While these stations might be candidates to migrate to automated stations, cancelling these contracts without making provisions for the future further reduces the network of weather available to pilots. This also highlights the lack of a consultative process to plan for changes in the system regarding weather observations.

Action desired:

Collaborate with users to develop a plan for continued weather data collection at these sites.

Weather Camera Research

The FAA Weather Camera Program has been a tremendous success, adding weather information not captured by automated weather stations. By placing these stations at airports and in mountain passes or along flight routes, FAA has added an element of aviation safety by providing information to help pilots make better go/no go decisions. The program has also lowered costs by reducing the number of times pilots can't complete a flight due to weather. If a pilot can see that the mountain pass is fogged in, he or she has information needed to wait for better conditions prior to taking off, thus lowering cost while increasing safety.

While this program has improved access to weather information, it is currently limited to daylight hours only. During short winter days, pilots often must make go/no go decisions before enough light is available to provide useful information. Consequently, cameras alone don't alleviate the need for augmented weather reporting in key locations, nor do they provide a 24 hour solution in places where the camera is the only device collecting data. Commercially available cameras that operate in low-light conditions are now on the market. Other imaging devices detect thermal wavelengths of radiation that may provide usable information outside daylight hours. Research and development is needed to evaluate the utility of low-light cameras, thermal imaging systems or other devices for aviation weather purposes. Human-factors should be considered when determining how the information is presented to pilots. We strongly suggest that research teams studying this include members with aviation and operational systems experience.

Desired action:

Develop and fund research studies to evaluate other sensors to extend the utility of the weather camera program from daylight only to 24 hour operations.