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2019 – Another Year of Exciting Aviation Events & Opportunities In Minnesota

by Cassandra Isackson
Director, Minnesota DOT Office of Aeronautics


Cassandra Isackson

With the new year well underway, we are looking forward to another year of exciting events and opportunities in aviation around the state.

About the MAMTC

The 2019 Minnesota Aviation Maintenance Technician Conference will once again take place at the at the Earle Brown Heritage Center in Brooklyn Park, Minnesota on March 25th and 26th. Registration is open and early registration ends March 15th. There are two ways to complete your registration. You can register online at: **www.regonline.com/2432039**, or download the registration form. Complete the form and mail it with your payment, to the address listed on the bottom of the form.

There will be a host of vendors showing the latest technologies, tools and tips for aviation maintenance technicians. If you would like more information, visit the conference website at **www.regonline.com/2432039**, or contact Darlene Dahlseide at **darlene.dahlseide@state**.mn.us or 651-234-7248.

News from NASAO

I am very pleased to let you know that the National Association of State Aviation Officials (NASAO) has chosen Shelley Simi (December 14, 2018) as its new President and CEO. Shelly's extensive industry experience, as well as her deep and abiding passion for aviation, will ensure NASAO's continued success in serving the public interest to sustain, advance and promote aviation in our respective states. We will be hosting NASAO's annual Conference September 7-11th at the Intercontinental Hotel in St. Paul. We will be sending out a call for exhibitors, presentations and speakers soon. Please watch for more information and join us in September!

About The SASP

We continue to make progress on updating Minnesota's State Aviation System Plan (SASP). The SASP is part of MnDOT's Family of Plans, which stem from the Minnesota GO 50-year Vision. The Vision outlines what Minnesotans desire from the state's transportation system and identifies key guiding principles MnDOT strives to achieve. **The SASP:**

- Sets goals for the aviation system
- Identifies aviation needs, and
- Creates a direction for the future

You can review and provide comments about the SASP by going to: **https://www.dot.state.mn.us/aero/planning/sasp.html**

Please continue to be active in aviation wherever you are in Minnesota. Attend multiple FAA Safety Seminars where you will have wonderful opportunities to network with fellow aviators and learn ways to become a better, safer pilot. ❑

Listen! Are you using the right words correctly?

When you fly, do you listen to the aircraft radio when you are approaching or passing over airports? Do you really listen? Or are you busy thinking about the proverbial $100.00 hamburger you will get when you land? Hopefully you actually listen.

The purpose of the radio equipment in your aircraft is of course for communicating not only your status and intentions, but also for receiving communications from other aircraft along with their status and intentions. Let's not forget about receiving guidance and support from air traffic control (ATC) over the various aviation frequencies. But again, the question is raised, are you listening and speaking properly when using your aviation communication radio?

If you are listening, you will no doubt hear (too many) aviators using non-standard or improper language on the aircraft frequencies. Why do they do that? You'd have to ask them, but their reason(s) probably fall into one or more of three categories: lack of knowledge *(no excuse),* laziness/or complacency *(no excuse),* or, trying to sound airliner cool or military "tacticool" *(no excuse)*. None of these three reasons is acceptable in the air or on the ground.

It is important to remember two things: 1. Clear communication whenever you are in your aircraft is a very important key to your safety and 2. An aircraft radio and its usage is NOT the same as a CB (Citizen's Band) radio. There are very specific words and phraseologies developed and approved by the Federal Aviation Administration (FAA) specifically for aviation usage. Failure to use the proper words and phrases can significantly impact your safety, as well as the safety of other aviators in the air or even on the ground.

Standardized phrases and vocabulary, when used as directed by the Aeronautical Information Manual (AIM), help to assure that ATC and pilots clearly understand what is being said. Imagine if ATC was trying to control flights in an area where one pilot speaks only French, one only Spanish, and another only Japanese. Giving simple instructions to those three aircraft would be a tremendous challenge at best. But standardized phraseology in one accepted language would of course make a world of difference and enhance the safety of those three pilots and anyone flying into or out of that airport.

To learn, relearn, or review the proper words and phrases to use, read Section 2, 4-2-1 to 4-2-14 of the AIM, a total of six and a half pages. To get you started, here are a few select sentences and paragraphs taken directly from the AIM to help assure you are on the right heading to always using the proper words and phraseology, from start to finish.

AIM 4-2-1: a. Radio communications are a critical link in the ATC system. The link can be a strong bond between pilot and controller or it can be broken with surprising speed and disastrous results.

b. The single, most important thought in pilot/controller communications is understanding. It is essential, therefore, that pilots acknowledge each radio communication with ATC by using the appropriate aircraft call sign. Brevity is important, and contacts should be kept as brief as possible, but controllers must know what you want to do before they can properly carry out their control duties. And you, the pilot, must know exactly what the controller wants you to do. Since concise phraseology may not always be adequate, use whatever words are necessary to get your message across. Pilots are to maintain vigilance in monitoring air traffic control radio communications frequencies for potential traffic conflicts with their aircraft especially when operating on an active runway and/or when conducting a final approach to landing.

c. Good phraseology enhances safety and is the mark of a professional pilot. Jargon, chatter, and "CB" slang have no place in ATC communications.

AIM 4-2-2: a. LISTEN before you transmit. Many times you can get the information you want through ATIS or by monitoring the frequency. Except for a few situations where some frequency overlap occurs, if you hear someone else talking, the keying of your transmitter will be futile and you will probably jam their receivers causing them to repeat their call. If you have just changed frequencies, pause, listen, and make sure the frequency is clear.

b. THINK before keying your transmitter. Know what you want to say, and if it is lengthy, for example, a flight plan or IFR position report, jot it down.

d. When you release the button, wait a few seconds before calling again. The controller or Flight Service Station specialist may be jotting down your number, looking for your flight plan, transmitting on a different frequency, or selecting the transmitter for your frequency.

e. Be sure that you are within the performance range of your radio equipment and the ground station equipment. Remote radio sites do not always transmit and receive on all of a facility's available frequencies, particularly with regard to VOR sites where you can hear but not reach a ground station's receiver. Remember that higher altitudes increase the range of VHF "line-of-sight" communications.

AIM 4-2-9. ALTITUDES AND FLIGHT LEVELS

a. Up to but not including 18,000 feet MSL, state the separate digits of the thousands plus the hundreds if appropriate.

EXAMPLE: 12,000 - ONE TWO THOUSAND

EXAMPLE: 12,500 - ONE TWO THOUSAND FIVE HUNDRED

b. At and above 18,000 feet MSL (FL 180), state the

words "flight level," followed by the separate digits of the flight level.

EXAMPLE: 190 - FLIGHT LEVEL ONE NINER ZERO
EXAMPLE: 275 - FLIGHT LEVEL TWO SEVEN FIVE

AIM 4-2-11. SPEEDS

The separate digits of the speed, followed by the word "KNOTS." Except, controllers may omit the word "KNOTS" when using speed adjustment procedures. For example, "REDUCE/INCREASE SPEED TO TWO FIVE ZERO."

EXAMPLES: (Table 4-40[1])
(Speed) 250 - TWO FIVE ZERO KNOTS
(Speed) 190 - ONE NINER ZERO KNOTS

One more important point: Many people have allowed the improper use of the word "Roger" to creep into their daily flying and non-flying language with an associated dilution of the actual meaning. In aviation, "Roger" means, "I have received all of your last transmission." It should never be used when answering a question that calls for a YES or NO response.

As you read Section 2 of the AIM, you will realize that practicing clear and concise communications is a key factor in safe flight throughout the nation and the world. So please make it a priority to review the AIM with an emphasis on Section 2. Make sure when you fly that you listen well and always use the correct aviation vocabulary and phraseology. Safety should always be your priority one. ❑

Cassette Players, Pay Phones & NDBs

by Rick Braunig
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MnDOT Aeronautics


Rick Braunig

It's been a while since I've ridden in a car with a cassette player. I know we have a lot more old aircraft in the system than old cars. One of the Bonanzas that MnDOT operates just turned 40 and though it had an ADF in it when it was new, that panel real estate has given way to a touch screen GPS. I hear from flight schools that their ADF that was working the day before is magically placarded inoperative for flight tests. It's been a while since we at MnDOT have considered NDBs a key navigational aid in our system. As GPS became the primary navigational tool our NDBs transitioned to being radio stations for the broadcast of airport weather. We've now transitioned those weather broadcasts to VHF with the exception of Bigfork and that will happen in 2019.

MnDOT has 35 NDBs in our system. These are owned, operated and maintained by the Office of Aeronautics. Like all our navigation aids they need regular inspections and occasionally they fail and need repair. Some of the NDBs are an old design and we are having to scavenge parts to keep them running. While many of the NDBs are on airport property, 11 of ours are Locator Outer Markers on land that is off the airport and must be leased. One prominent NDB – HOPEY – is on leased land and the land owner has told us they do not intend to renew our lease. What you should understand is that NDBs cost money to keep them operating.

The FAA has started to implement their VORMON program, which stands for VOR Minimum Operating Network. If you are unaware of the details, under the VORMON program they are increasing the service area of VORs from 40 to 80 miles and eliminating VORs where there is overlap. We have seen two Federal VORs in Minnesota shutdown under the VORMON program and a number of others are on the list for the coming years. This will eliminate the VOR approaches associated with those navigational aids. Reading between the lines, if you want to operate in instrument conditions you need to have a GPS receiver with the capability to fly GPS based approaches.

All the Minnesota Airports with NDB based instrument approaches have GPS based approaches that provide equal or lower minimums. That means at least two approaches exist for all of the runways served by an NDB approach. The FAA reviews all instrument approaches every two years. Right now, it takes more than two years to get a new approach. Eliminating duplicate approaches to a runway helps to reduce the FAAs workload and hopefully will help them be more responsive to new requests.

In 2019 MnDOT will start the process of decommissioning our NDBs. The dollars we save on NDB operating and maintenance costs will help to maintain and improve the system in other ways. We are seeing increased costs for our weather stations and we want to continue to improve the other navigation aids at Minnesota airports. The decommissioning process will include notice through our website and social media, as well as written notice to the local communities and surrounding airports, and will allow for users to provide feedback.

I am excited about how GPS has improved the safety of the system and provides better access to airports. Unfortunately, like cassette players and pay phones, we feel the time has come to retire the remaining NDBs in Minnesota. ❑

In Our Perfect Sky

For many centuries, humankind has longed to touch the sky and fly free and fast like the birds do. It wasn't until December 17, 1903 that we took that first small step toward that goal. Now we not only cruise throughout the sky, but we have also stepped into the heavens. As an allied group of astronauts continually circle the earth onboard the International Space Station, they learn more every day that will in time, help us to reach further and further into space.

A little closer to home, however, is our perfect sky. Everyday aviators by the thousands take to the air and travel all over the globe. Many fly only a few thousand feet above the ground, while others fly several miles high, with a few that reach the upper limits of our atmosphere. One might think that only those who go the highest can see and experience the myriad of natural phenomena that occurs in our sky.

Things like an azure blue sky, puffy white clouds, and brilliant red and pink sunsets are optical phenomena associated with small particles in the atmosphere. Rainbows, coronas and glories are types of optical phenomena associated with liquid water droplets in the air. Halos, parhelias (sun dogs), and sun pillars are optical phenomena caused by ice crystals in the air. Nearly all of these items listed can best be seen from the ground.

To understand these phenomena, we must first have a very basic understanding of light and its properties. Almost half of the solar energy has wavelengths within the visible spectrum. The human eye is sensitive to this specific portion of the spectrum. In addition, human eyes have nerves called rods and cones that allow us to see light and dark, and color. The rods sense the light and dark, and the cones sense color. We see white light when the visible light striking the cones is essentially equal in intensity. A majority of what we see is due to incident light reflection.

Incident light can be explained as the light emanating from the source, and perhaps illuminating an object that you are observing. For instance, the light coming from the Sun is incident light when it hits a tabletop. If a mirror is placed in that "beam of (incident) light," the light bounces off the mirror. In other words, it is reflected. And for the purists in the audience, the angle of incidence equals the angle of reflection.

Refracted light is light that has been bent as it passes through a more dense material. For instance, light passing through hexagonal (six sided), pencil-like ice crystals will exit the crystals at an angle different from that when it entered the crystal. This action can create a "rainbow-like" effect called "parhelia," or commonly referred to as "sundogs."

Sundogs develop when transmitted light is refracted by hexagonal, plate-like ice crystals that are falling with their long axis horizontally situated. The ice crystals bend and disperse the Sun's light. The result is a stunning prismatic effect. Because light travels in different wavelengths, we see it as different colors. Thus, when a sundog develops, the color red (long wavelength) will always be on the inside portion of the sundog, and violet (short wavelength) will be on the outer-most portion. This is because red light bends the least, while violet bends the most.

"Rainbow in flight."
Photo by Kobe Hunte, 2018. UWP Dec 2018

Air molecules are very small, yet highly selective in the light wavelengths they will scatter. They are very effective at scattering green, blue, and violet light. This is why we see the perfect sky as blue. The higher you climb, the deeper blue the sky appears because fewer and fewer air molecules are there to scatter the light. That also explains why astronauts see a black sky, because there are no air molecules in space.

Sometimes in the bright sky of day or the inky black sky of night, the Sun or Moon, under proper atmospheric conditions, can produce a halo or ring of light surrounding it. The halo is created when light from the Sun or Moon is actually refracted by ice crystals usually associated with high, thin, wispy cirrus clouds. But the result is most always visually spectacular.

So, this winter, take time every day to look up. Now that you have a little more knowledge of the natural phenomena of the sky*, when you fly, or when you are on the ground, you will be able to better observe and enjoy the magnificent natural events that occur in our perfect sky.

*For additional information about natural sky phenomena, go to a truly outstanding, information packed website produced by Dr. Les Cowley at:
https://www.atoptics.co.uk/ ❑