Stan/Eval Newsletter
CIVIL AIR PATROL
UNITED STATES AIR FORCE AUXILIARY
105 S. Hansell Street
Maxwell AFB, AL 36112

October 2021

FAA Expands Weather Cam Coverage in Colorado, Montana (NAFI) 2
New InFO Updates Cold Temperature Restricted Airports Program 2
Foreign Object Debris (FOD) 2
Back to Basics - Latitude and Longitude 3
Picking up an aircraft from MX 6
Small Unfamiliar Airports 7
Who needs Charts? 8
Revised CAPS 72-2 8

FAA Expands Weather Cam Coverage in Colorado, Montana (NAFI)
The FAA has activated 10 additional weather camera sites in Colorado, significantly expanding weather radar coverage there. All but one is installed at airports in mountainous regions of the state where the terrain can prove hazardous to pilots. The cameras, along with weather data from the equipment, provide pilots with critical pre-flight information. The new Colorado weather cameras add to the existing 13 weather camera systems installed in the state's mountain ranges, which were activated last summer. Live images from all of the cameras are now available on the FAA's **weather camera site**. Montana, meanwhile, becomes the latest state to begin a program to test weather camera capabilities, joining Alaska, Hawaii, and Colorado. Montana's Aeronautics Division has installed two systems at airports at Lincoln and Seely Lake.
Read more here.

New InFO Updates Cold Temperature Restricted Airports Program
In a recent Information for Operators bulletin (InFO 21004), the FAA has renamed its Cold Temperature Restricted Airports program to the Cold Temperature Airports (CTA) program. Pilots are advised to check chapter 7, section 3 of the Aeronautical Information Manual (AIM) to find CTA procedures information.

You can find the list of Cold Temperature Airports and affected segments here:
www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dtpp/search.

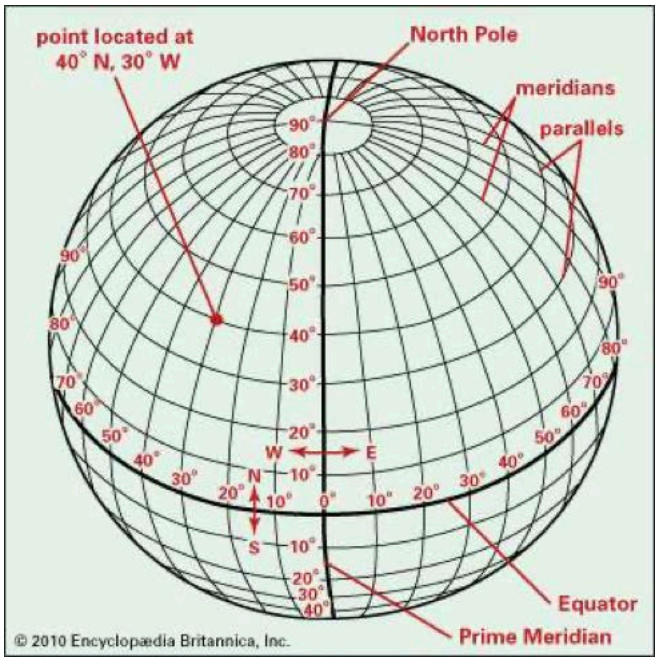
This list will remain in effect until September 8, 2022. For more details, read the InFO here:
www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2021/InFO21004.pdf.

Foreign Object Debris (FOD)
Foreign object debris is a concern to all pilots. FOD refers to any flotsam or jetsam on runways, taxiways, or aprons. FOD can cause all sorts of problems to propellers and turbines when it becomes airborne. For CAP, our propellers can kick up all sorts of trash that can damage the prop or kick the trash back damaging the aircraft. FOD is not a good thing! It is especially hazardous when landing or taking off as it can deflate a tire quickly or cause an undue "bump" ("What was that") to the unawares. The only crash of the Concorde was due to FOD on the runway which resulted in all lives lost (including some on the ground) and the loss of the aircraft. The U.S. Navy takes FOD very seriously. If you are on an aircraft carrier you will see a ritual every morning where a bunch of sailors walk every inch of the flight deck looking for FOD. It's a rare day that they don't find some.

So be aware of the hazard. It is not unusual to see FOD on the flight line. When seen, it is important that it be removed immediately. The busier the airport, the more chance of FOD. Sometimes the FOD may be somewhere that is not easy to access (like the active runway). Let the tower or FBO know right away so it can be removed safely.

Back to Basics - Latitude and Longitude

Every Mission Pilot needs a good understanding of latitude and longitude as this is fundamental to search and rescue for CAP. A sectional chart is annotated with latitude and longitude and our G1000 charts contain the same information. Latitude and longitude are used universally to determine a position and is based on a model of the earth as a sphere.



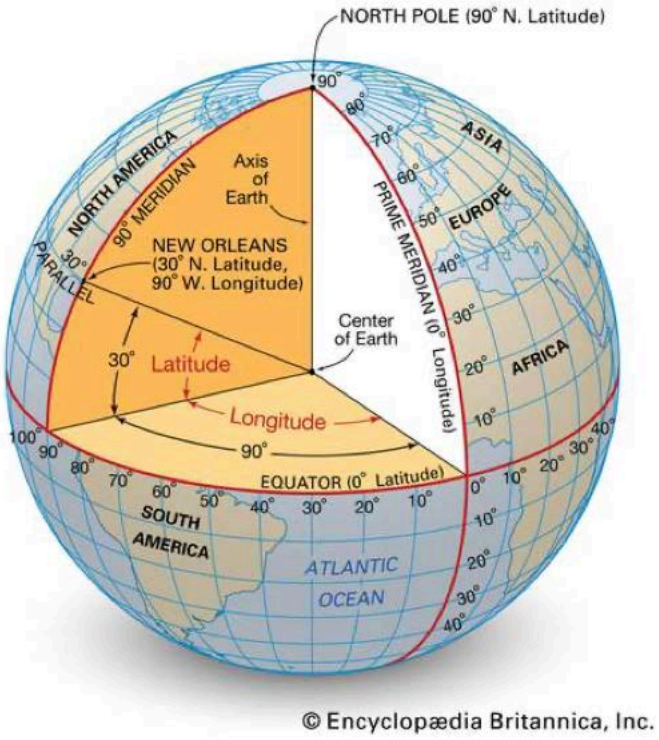
As seen in the graphic, latitude can be viewed as distance (expressed as degrees) from the equator. At the North Pole you are 90 degrees north and at the South Pole you are 90 degrees south. The equator is 0 degrees latitude. Each line of latitude is like a belt around the earth. The State of Virginia is located roughly between latitude N39 degrees and N36 degrees. Note that lines of latitude are equidistant. That is, the distance between say 40 degrees latitude and 50 degrees latitude is the same distance as between 60 degrees latitude and 70 degrees latitude. It also turns out that 1 degree of latitude is about 60 nautical miles.

Before the days of GPS, LORAN, OMEGA, and other electronic wizardry, your latitude could be determined by the angle of the sun from the horizon if you knew the day of the year and the time the measurement was taken. This was done using a sextant and took a great deal of skill in the days of wooden boats bouncing in the ocean. But even in the 1930's and 1940's aviators would use the same technique (thus the window on top of many older aircraft that provided a way to do celestial navigation using the stars as well as the sun).

Of course, just like a clock, the more exact expression of latitude is in degrees (N or S), minutes, and seconds. So, you need to be up to speed on clock arithmetic.

Well, that's great. If you tell me what latitude you are at, I can tell how far "up" or "down" you are on the globe. But of course, that's not enough. If you say you are on the equator (0 degrees latitude) I have no idea where on the equator you are and would need to travel roughly as much as 25,000 miles around the circumference of the earth to find you. Kind of like knowing you live on Maple Street, but you forgot to tell me the number of your house.

In order to pinpoint the position, we need both latitude and longitude. Longitude will tell me where on the equator you are. But unlike latitude that is measured from the poles, there is no natural feature of the earth that defines a start and stop of longitude. Lines of longitude are lines (great circles actually) drawn from north to south (or from south to north!) evenly spaced at a given latitude. We arbitrarily (thanks to the British Empire, God Save the Queen!) define the 0-degree longitude line as the longitude line that passes through Greenwich England and all other lines of longitude are measured relative to it. This longitude line is often referred to as the Prime Meridian (see below) just to confuse us all. Halfway around the world from the Prime Meridian, you are at either West 180 degrees longitude or equivalently East 180 degrees longitude. The State of Virginia is roughly West 78 degrees longitude (e.g., from the Prime Meridian if you go 78 degrees to the west and are about N38 degrees latitude you will be in Virginia.



Determining longitude was very problematic for most of history in areas of no or unknown geographic reference. On Columbus's initial voyage he had a very good idea of his latitude, but his knowledge of longitude was an educated guess based on his estimate of the ship's speed. Imagine you are floating on a raft in the middle of the Atlantic (or Pacific, or whatever). To

determine your latitude, you can make an approximate guess by looking at the elevation of the sun at noon (figuring out when noon is of course difficult if you don't have a watch and know where you are). But there is no way you can determine your longitude. For years, many very bright navigators tried to figure out this puzzle with celestial navigation and other wild ideas with no success. Of course, with GPS it's a snap. But before GPS the problem wasn't solved until extremely accurate clocks became available. Then it was possible to determine longitude. For a short but fascinating read on how longitude was conquered you can read "Longitude" by Dava Sobel.

An interesting historical note to the Prime Meridian is that Adolph Hitler had plans in place to move the Prime Meridian to coincide with Berlin rather than Greenwich. If he had won the war, we would have had to update all our maps and charts to reflect this. Fortunately, he lost.

Unlike latitude, longitude lines get "closer together" towards the poles and "farther apart" as you near the equator. At the equator, one degree of longitude is about 60 miles. But at the poles that goes to zero. The distance that one degree of longitude represents is one-mile times the cosine of the latitude.

Now for the confusing part. In the Garden of Eden everyone understood latitude and longitude as they all spoke the same language. But at the tower of Babel, they all decided to use different ways to record latitude and longitude just to confuse things from which we have never recovered. For example, let's consider the latitude and longitude of VAWG headquarters. Jotting this down we find that there are several ways the position can be expressed:

- N37 24' 24" W077 31' 30" (latitude N 37 degrees, 24 minutes, 24 seconds, longitude W 077 degrees, 31 minutes, 30 seconds), or
- N37 24.4', W077 31.5' (same thing but degrees decimal minutes), or
- N37.41, W077.53 (same thing but decimal degrees)
- 37.41 -077.53 (same thing but +/- indicates north/south or east/west)

And there are a few more around. This can cause a lot of confusion on missions when the aircrew is using one notation and the ground crew another. Or someone has their ForeFlight set up for one notation but the G1000 is set for another. Or CAP is using one notation but FEMA or the Air Force is using another. It's important to try and get all involved to use the same notation. But short of that there are many apps that will do the conversion for you assuming you know which notations are being used. Of course, there is good old clock arithmetic for us old timers who don't know what a digital read out is.

Just to emphasize the point, let's say you are in flight and the ground team calls you on the FM radio with a position. They state: "Latitude 3-7-4-1-2-2 Over". Does that mean:
N37 41' 22", or
N37 41.22', or
N37.4122?
Those positions are miles apart!

The G1000, ForeFlight, and many other electronic packages can be set up for different formats. If you use any of these, know what format you want and set the defaults up properly. Not hard to do but it can be a real problem when you are bumping along in the air, and someone gives you a position in one format and now you must convert it on the fly. Not easy.

Just in case you are not confused enough, there are different kinds of latitude—geocentric, astronomical, and geographic (or geodetic)—but there are only minor differences between them. In most common references, geocentric latitude is implied. For more information you can go to the Britannica Encyclopedia site (I got most of this info from this site) or Wikipedia.

Picking up an aircraft from MX

It's important to understand the hazards associated with flying an aircraft just out of maintenance and some good practices to avoid any untoward event. We recently had a safety incident occur on just such a flight. The aircraft had been in MX to replace an elevator damaged on the ground. The repair was completed, and the aircraft signed off. The pilot, being an avid reader of the Stan/Eval newsletter, performed a thorough preflight of the aircraft with particular emphasis on the horizontal stabilizer. It was a Sunday, so the pilot was not able to discuss the repair with the MX facility. But no anomalies were noted on preflight, and the horizontal stabilizer appeared to be correctly installed. As part of the normal pre takeoff procedures (it was a C182 NAVIII), trim and autopilot were checked, and trim set for takeoff. Autopilot was switched off. Everything looked good.

The throttle was advanced, and the takeoff roll commenced. All went well until the aircraft reached flying speed. Without any back pressure on the yoke, the aircraft nosed up suddenly in a very steep unsustainable climb. The pilot immediately pushed the yoke forward (not easy, it took all his strength) and dialed in full down trim. With full down trim the aircraft stabilized and could maintain level flight. The pilot immediately returned to the airport and landed without further incident. An incident was subsequently filed in CAPs Safety Information and Reporting System (SIRS) as well as alerting the FRO and others.

A subsequent investigation determined that although the elevator had been installed correctly, the trim had not been adjusted properly. The result was that when the trim was set at the takeoff position, it was actually in a position to cause the un-commanded nose up attitude. The trim was adjusted properly, and the aircraft returned to service without further incident.

What are the lessons learned from this?

- Even if you do everything right in preflight expect to be surprised on a MX pickup flight. Be ready. Come to think of it, that's probably good advice for any flight!!!
- It's not required by any checklist but know what the trim tab angle should look like when the trim is set for takeoff (no, for a C182 the tab when set correctly will not be level). Make this part of your preflight. To make the check, make sure the elevator is level when you examine it.
- Don't even think of retrieving an aircraft from MX in anything but daytime VFR. If this had occurred in IFR or at night, it may not have ended well.
- You may want to only assign more experienced pilots to MX pickups. A less experienced pilot could well have come to grief in this instance.
- We have excellent maintenance facilities, but you should perform the most thorough preflight of your flying career anytime you pick up a plane from a maintenance facility. Check for damage and anomalies. A highly experienced pilot told me that his copilot performed the preflight of an aircraft (not CAP) they were picking up from a paint shop. The flight was uneventful until the flare when the aircraft performed an uncommanded roll. The pilot flying used the control wheel and rudder to realign the aircraft for landing. Post flight inspection showed that the aileron control rod bolt was missing. Further inspection discovered that the aileron control rod bolt/nut on the other side was still attached, but only three threads kept it together. The paint shop

had taken the ailerons off but failed to cotter pin the control rod bolts during reassembly. Everyone makes mistakes, so don't fall into the trap that if it is signed off by the maintenance shop that everything is perfect….and that was only one of the maintenance pick-up stories that I've heard.

Small Unfamiliar Airports

Many of us fly in and out of airports with 5,000-foot runways that are not much of a challenge. In fact, just taxiing from the tie down to the runway may well qualify as a cross country. Mission pilots in particular, need to be ready for operations into and out of small unfamiliar airports as it's a bit late to find out you are having trouble landing on any runways less than 5,000 feet when the call comes late at night, and you need to land at some small out of the way airport. Practicing short field landings at Dulles or LAX isn't quite the same as the real thing. Same goes for soft field landings.

Landing at small unfamiliar airports can be challenging if you aren't prepared. Although landing at an unfamiliar big airport is a challenge, if you aren't ready, for most of our missions its landing at a smaller airport we are not familiar with that is the challenge. If you are not familiar with the airport it pays to do a little preparation and maybe even take an instructor or fellow pilot with you who is familiar with the airport. Note that the ORM matrix on WMIRS considers landing at an unfamiliar airport an added risk.

Here are some guidelines for flying into unfamiliar airports:

- Any time you fly into an unfamiliar airport, you should do some preparation on the ground. This is doubly true if the airport has some challenges. Check runway length, runway condition, runway slope, obstacle information, pattern altitude, pattern direction (e.g., left, or right pattern), noise abatement procedures, and any other relevant information.
- Talk to a pilot who is familiar with the airport. Maybe even get him/her to go with you the first time you land there.
- Watch out for windy and gusty conditions. Although you may have no problem with a 15-knot cross wind on the 200' wide Denver International runways, you could come to grief when the runway is only 30'. Not much room for error.
- Same rule applies for touching down at a certain point. If the wind is gusting, it's hard to get down exactly where you planned. If you miss your planned touchdown point at Dulles, not a problem. But if you miss your touchdown point on a 1500' runway that could mean a go around. A good rule of thumb for any airport is if you are not down in the first third of the runway go around.
- Small narrow runways can give you a sense of excessive speed and being higher than usual, so pay attention to the ASI.
- Small airports often have sloping runways which means that landing with a tailwind uphill may be preferable to landing with a headwind downhill. Know what you are going to do ahead of time.
- Consider the airplane you are flying. Flying a C172 into Sky Bryce (VG18) is reasonable, but I wouldn't even think of flying there in my Mooney (if I had one).
- Landing at night can make a familiar airport into an unfamiliar airport. Make sure you are really prepared and use a steeper approach than normal. Know how to turn on the runway lights. Check if there is any sort of VASI/PAPI. Review any obstacle information available. Review ODPs, if there are any. Some airports shouldn't even be attempted at night. If there is an instrument approach, use it even if VFR.

So, it's good practice to go to an unfamiliar airport occasionally for proficiency. But don't just blindly go there. Do the preparation required before you takeoff so that you can do so safely.

Who needs Charts?
This is a good article on the requirement for charts in the age of iPads. Read it here.

Revised CAPS 72-2
Numerous changes have been made to CAPS 72-2 which contains the list of mission symbols that we use. You can review it here. There are numerous changes to flights involving cadets but other changes as well. Specifically, the 1 October 2021 version features the following changes:

- Removed mission symbols: A16, B3, and B17.
- Edited Mission Symbols: A22, A26, A42, A52, A62, A63, B10, B13, B14, B21, B22.
- Added Mission Symbols: B40 and B41

Articles for the National Stan Eval Newsletter:

These articles have been written to present ideas, techniques, and concepts of interest to CAP aircrews rather than provide any direction. The articles in this newsletter in no way should be considered CAP policy. We are always looking for brief articles of interest to CAP aircrews to include in this newsletter. CAP has many very experienced pilots and aircrew who have useful techniques, experiences, and tips to share. Please send your contribution to stephen.hertz@vawg.cap.gov. You can view past issues here.