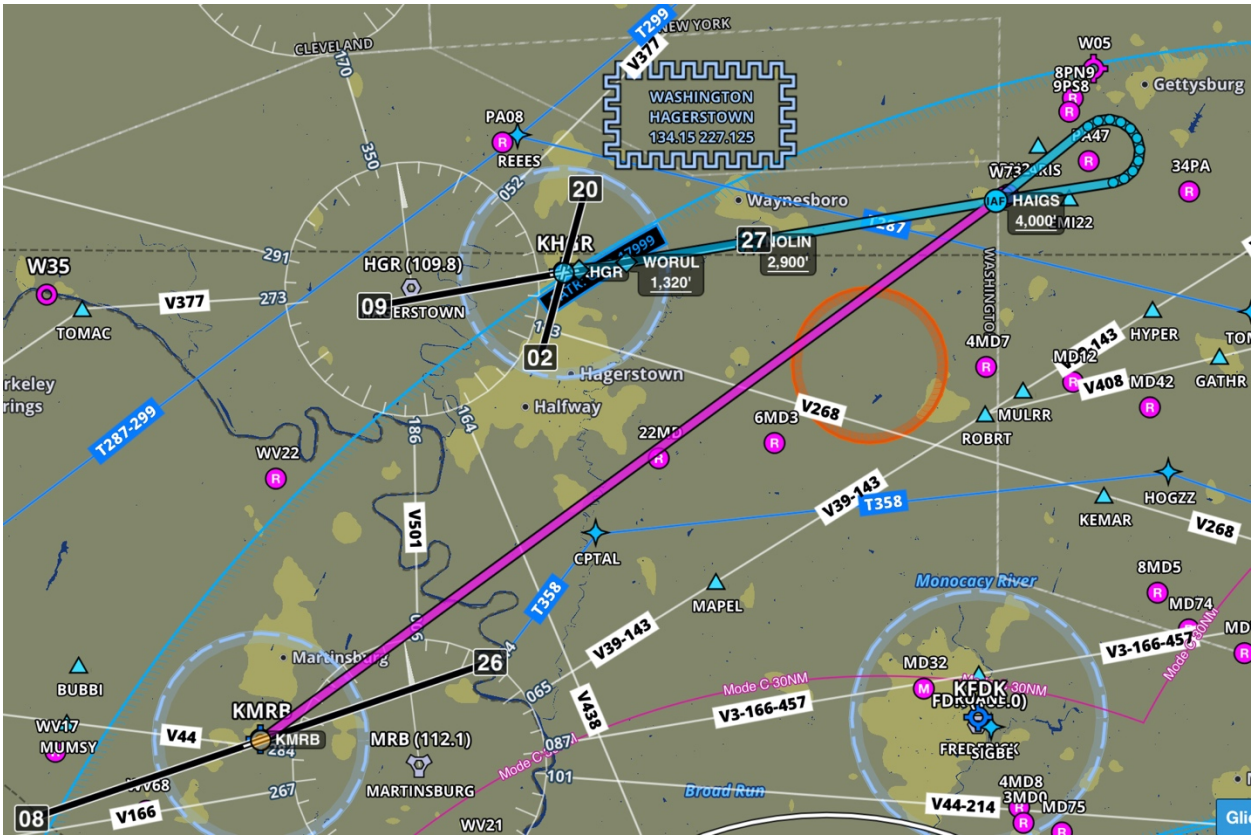
Stan/Eval Newsletter
CIVIL AIR PATROL
UNITED STATES AIR FORCE AUXILIARY
105 S. Hansell Street
Maxwell AFB, AL 36112

August 2021

Slicing a Prohibited Zone (C. Kronenburg SM, M. Walker SM)

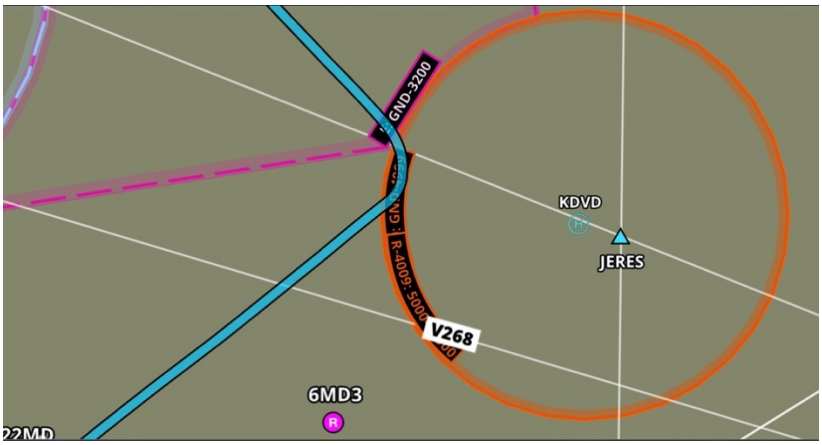
My safety-pilot and I were on a routine IFR currency flight, flying under ATC flight following and had filed a flight plan from Martinsburg (KMRB) to Hagerstown (KHGR). Both of us are IFR pilots and in the briefing, we highlighted that the Presidential P40 TFR over Camp David was not active until 17:00 EDT and our flight was in the early morning hours. As a frequent “luncher” at the Runway Grille at KHGR, the presence of P40 close to the final of 27 was a familiar factor.

Having been with Potomac (the local TRACON) and receiving vectors the entire flight, we executed the missed approach from the VOR-A approach for KMRBs RWY 26 and went back to Potomac Approach. Aiming for 4000 feet as the initial approach altitude, we turned towards the IAF (initial approach fix) for RWY 27 at KHGR. (for those with a map at hand: the direct track between the MRB VOR and the final approach fix HAIGS takes you right over P40)



Potomac was busy and decided that they could not handle our flight anymore due to workload, but we had the G1000 already set up for the approach. So, when our radar service was terminated, we went back to “pure VFR” and simply continued along our planned route of flight. We immediately contacted the KHGR tower who indicated they could not take us yet as we indicated we were flying the practice ILS and wanted to put us back with Potomac. In comes “Murphy”: In between the switching back and forth of frequencies, the workload of setting up the approach in the G1000 and the sudden change from vectors to a normal VFR flight we completely overlooked the fact that at 4000 ft we were now heading straight towards P40 which has a ceiling of 5000 ft and is strategically located in the direct line between KMRB and the IAF. Coordinating with the KHGR Tower that we would simply fly the profile of the approach and not use Potomac

took enough time to get us perilously close to P40. The safety pilot immediately called a hard left when we noticed this and we banked our way past the TFR, slicing a 0.2 NM sliver of it in the turn. A phone call to the FAA was inevitable after that. The FAA supervisor went easy on us and we both filed a NASA ASRS report.

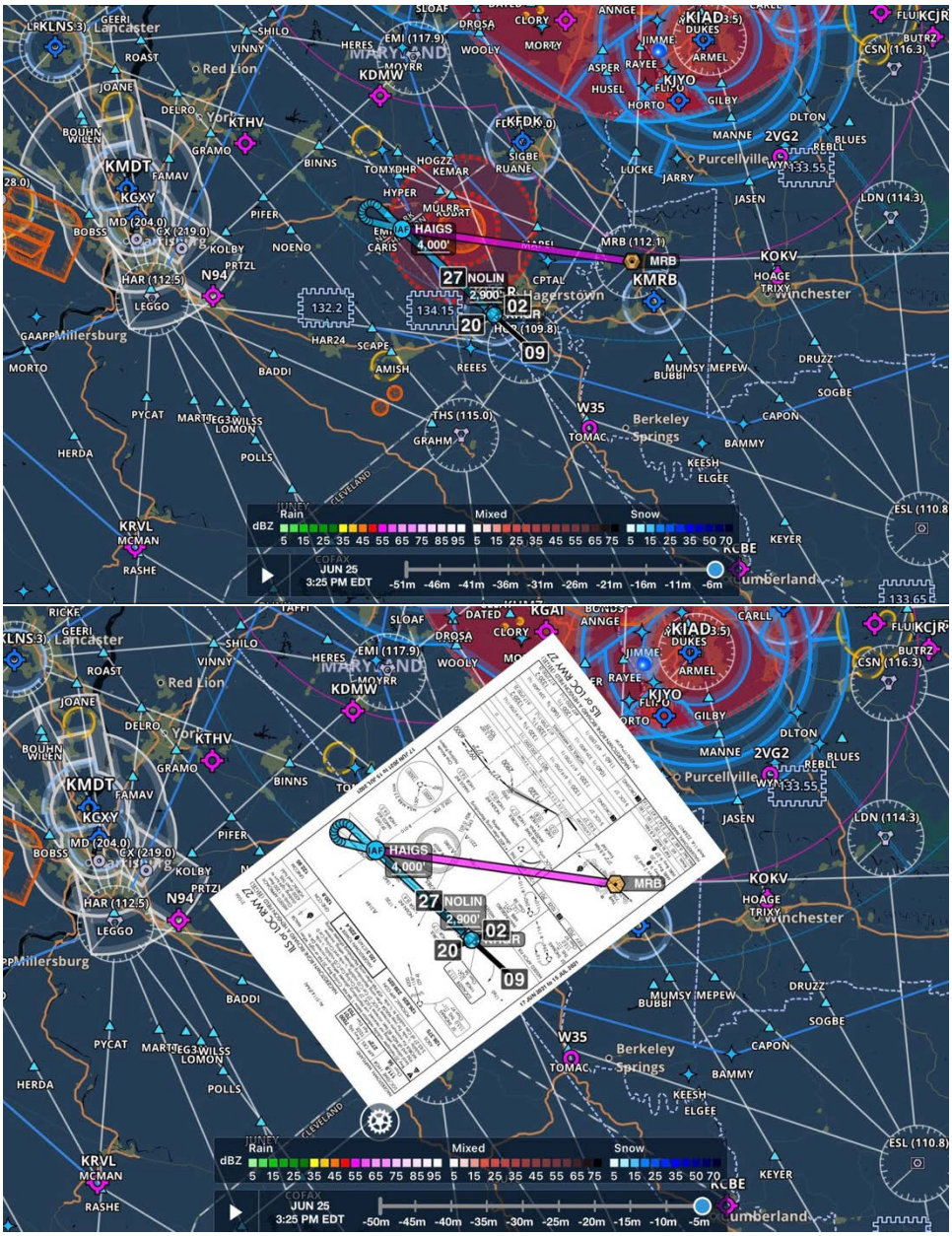


Some observations and lessons learned on the always present TFR's in our region:

- Just because we fly here often and the TFR's are almost always active, do not overlook them and become complacent. Things change. We did brief each other on the outer ring TFR NOTAM before departure, but failed to notice the eventuality that a direct track would take us over the inner ring that is always active.
- Flight following while under VFR creates a false sense of "oversight" from ATC. It is provided "workload permitting" and can be terminated immediately so always be prepared to go back to normal VFR.
- The reorientation from ATC vectors back to reestablishing the IFR approach in the G1000 and the subsequent workload require extra vigilance to avoid missing things such as terrain, or P40 on the way.

- ForeFlight, however great it is, has a few shortfalls, two of them hindered us today:
    - The large TFR shows bright colored, even though it would not be active until 17:00 EDT, so your mind wants to "acknowledge" it's there but tell you: "*it's ok, it's not until 17:00 EDT*". The smaller inner circle almost perfectly blends in under the main circle and is easy to miss when your mind is preset.
    - The helpful new approach plates on ForeFlight, that automatically pop up as an overlay over your moving map for the selected approach "mask" whatever is underneath it, except for the flight and planned fixes. This includes any TFR, which gets obscured on the plate and creates a false sense of it not being there.

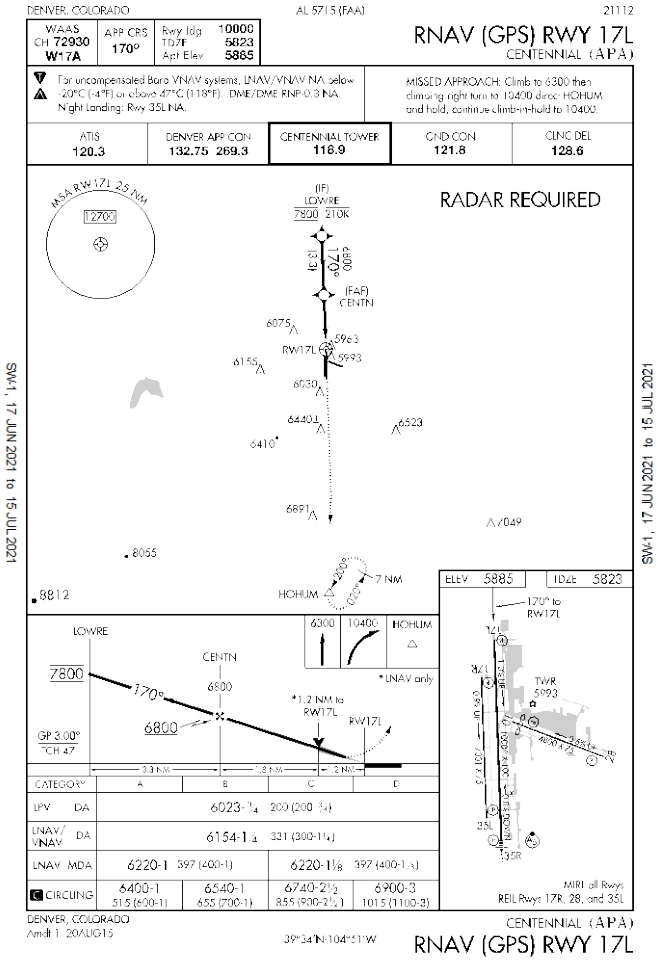
Lesson learned is that P40 is there and will always be there but it's not always the same size. Check before you fly, double check when you fly and for us local pilots be very mindful flying towards KHGR that it is almost directly between you and the ILS of 27. These lessons learned can be applied to any TFR or Restricted Area. If you aren't under ATC control, be extra vigilant and don't let ForeFlight or any EFB "feature" obscure what you need to know.



Briefing Decision Altitudes and Minimums

Briefing an approach always includes briefing the approach minimums specific to the approach and category you are flying. For example, consider the following approach to RWY 17L at Centennial in Denver (KAPA). Many pilots will brief the LPV minimums as 6023 feet. But that is not a minimum. That is a decision altitude which is NOT a minimum. Brief it as a decision altitude with minimums (visibility) of three-quarter miles. The visibility IS a minimum. But wait, if we make this approach don't we have to go missed when we get to the decision altitude if we don't have the required conditions in place? So how is the DA not a minimum? It's not a minimum because Sir Isaac Newton said it wasn't (when you quote Sir Isaac Newton that always ends the argument). Huh?

Just a review of what a decision altitude (DA) is. A decision altitude is the lowest altitude at which we must make a decision (see CFAR 91.175). That's it. Make a decision on whether to go missed or continue. If we make a decision at 6023 feet in a hunk of aluminum going 120 knots with a descent rate of about 500 fpm, there is no way you are NOT going to go below 6023 feet. Think momentum and Newton's Laws. Relax. Its ok. When approaches with decision altitudes are designed, they are designed knowing that you will go (slightly) below the DA. That having been said, a DA does not mean one can tarry after making the decision to go missed. According to CFAR 91.175 you may not continue an approach below DA unless you meet certain conditions. You must immediately commence the missed approach procedure. But you will necessarily go below the DA unless you make the decision prior to getting to DA.



If we are executing the LNAV approach, the altitude of 6220 is a minimum (it's an MDA) and should be briefed as such along with the required visibility of one mile. The LNAV essentially has two minimums (altitude and visibility) while the LPV has only one minimum (visibility). Likewise for an ILS and a LOC approach.

If the LPV or ILS is briefed with the statement "minimums are 6023 feet and three quarters mile" I wouldn't correct it. As long as I'm sure they know it's really a DA. But if minimums are briefed as 6023 feet with no visibility mentioned, I would amend the briefing. Visibility is critical and is the actual minimum.

CAP, sUAS, and the New TRUST requirement (Capt C. Freeze)

The latest in sUAS (small Unmanned Aerial Systems, or "drone") is the long-awaited release of The Recreational UAS Safety Test (TRUST). The Knowledge and Safety Test is a congressional mandate in the FAA Reauthorization Act of 2018. All UAS users must pass the test in order to operate a recreational model aircraft (UAS) within the National Airspace System (NAS).

Any CAP member, cadet, or student who flies a CAP issued sUAS recreationally (including the outdoor sUAS STEM kits: Quadcopter, RC Aircraft, VTOL) are now required by the FAA to take The Recreational UAS Safety Test – a 23 multiple-choice questions about basic safety guidelines and recreational flying knowledge - which is free to take online through the Academy of Model Aeronautics (AMA) website. At this time, recreational flyers only need to take the test once to comply, but you must also have your completion certificate on hand when flying an sUAS.

To take the TRUST, click on the orange start button located on **this page**:
https://trust.modelaircraft.org/group/4?tour=1

TRUST certificates will now need to be uploaded as "other," please see below for instructions on how to upload your certificate. If you have previously uploaded as an FAA Certificate, this still needs to be completed.

1. Click on https://www.capnhq.gov/CAP.OPSQuals.Web/Pilot/WhatDoINeed.aspx to log into eServices.
2. Type in your CAPID, then click the magnifying glass to pull up your profile.
3. Click "View/Upload Documents".
4. A new window will pop up, make sure you are in the "Pilot" tab.
    a. For "What would you like to upload?", select OTHER.
    b. For "File Name" identify the document as "Trust Certificate"
    c. For "Aircraft Type" leave as is.
    d. Click "Choose File" and add your saved completion certificate.
5. Select "Upload Pilot Files". You should see your document appear at the bottom under "Documents Uploaded" along with the date

But I already have a current FAA Part 107 'remote pilot' certificate, do I also need to complete TRUST? Well… it is a good idea! Part 107 does not dictate why you fly, whether for only business, fun or any other reason; you must only adhere to the Part 107 rule. However, if you wish to fly under the Exception for Limited Recreational Operations of Unmanned Aircraft rule (PL 115-254 Sec. 349/USC 44809), then you must take the TRUST.

Interesting Article on ADS-B

Flying magazine had a good article on ADS-B. Worth reading.
Click here

Unstable Instrument Approaches

A recent Boldmethod article discussed unstable approaches in instrument conditions (I'm against unstable approaches just for the record). They suggest the following acronym/checklist to verify you are stabilized. I'd suggest you do this before the Final Approach Fix but go missed if any of these are no longer true after the Final Approach Fix. The acronym is C-FLAPS.

- Checklists complete
- Flight path proper
- Landing configuration set (e.g., landing checklist complete)
- Airspeed at approach speed
- Power setting adjusted
- Sink rate proper (no high sink rates)

ForeFlight Releases Holding Pattern Advisor (AINalerts)

An update to the ForeFlight electronic flight bag app allows pilots to set up holding patterns at any waypoint. ForeFlight v13.5 also added new augmented procedures to help show minimums for approach procedures, as well as more aircraft to its runway analysis service and visualization of engine-out procedures (EOP) on a preview map.

Hold Advisor is accessed by tapping on a waypoint on the moving map or in the flight plan bubble editor or using the Procedure Advisor. A hold can also be set at any arbitrary lat/long coordinate. ForeFlight chooses the holding pattern entry according to the course that will be flown to the waypoint. The user can adjust parameters associated with the hold, including inbound or outbound course, leg length or time, left or right turns, and options such as altitude, speed, and expect further clearance time.

Once the parameters are selected, the hold can be added to the route, which displays the hold and the proper entry. The navlog then shows the hold details, including headings to be flown during the entry and hold.

The augmented procedures feature shows approach minimums based on aircraft category and airport equipment status and displays the applicable minimums as part of the route.

The 10 and 50 rule for ground effect (Maj J. Wedemeyer)

Near the ground the airflow over wing changes in a way that lessens the induced drag, but ground effect is not some discrete layer of air above the runway that the airplane climbs out of or descends into. Rather, the effect increases the closer the wing approaches to the ground. The 10 and 50 rule is an approximation of the magnitude of ground effect at different heights: at 50% of the wing span above the ground there is a 10% reduction of induced drag; at 10% of the wingspan above the ground the induced drag is reduced by 50%.

The CAP L 23 Super Blanik glider has wingspan of 53 ft. 50% of wingspan is 26.5 ft (about the height of a 2-story house) where induced drag is less by about 10%; 10% of wingspan is 5.3 ft (about eye level) where induced drag is 50% less. At touchdown the wings are about 2.5 ft above the ground where reduction in induced drag would be about 80%. No wonder the glider can float the length of the runway on landing.

By contrast the wing span of the C182 is approximately 36 feet; thus at 18 ft above the ground there is reduction of the induced drag by 10%. Ten percent of the wingspan would be 3.6 ft, but at rest, the wing is about 7 ft above the ground; thus, at the moment the C182 wheels leave the ground the reduction of induced drag would be about 25%. Put differently, we could say that at the moment of lift off the induced drag is about 75% of what it would be at 35 ft. Soft field takeoff technique suggests lifting off at lower than normal airspeed, lowering the nose and accelerating in ground effect. For the C182 one could assume that the nose would be lowered after the wheels are 2-3 feet above the runway and the wings are at a height of 8-10 feet (22-28% of wingspan). At that height the reduction would be 25-30%. My own experience is that the airplane climbs pretty quickly and by the time I have lowered the nose my wheels are 5-10 feet above the ground and the wings are at 12-17 feet where reduction would be 10-20%, significant but not a spectacular reduction.

We have all heard of the overloaded airplane which lifts off but can't climb out of ground effect and crashes off the end of the runway. For a low wing airplane, the induced drag at lift off may be only 50% of what it will be at 30 ft, meaning that induced drag will double by the time it reaches one wingspan above the ground. Rate of climb is related to excess power. It is easy to see how the engine could have excess power allowing climb close to the runway but quickly run out of power as induced drag doubles in a climb of 20-30 feet. For the high wing Cessna, the induced drag at lift off would be at least 75% of that at 35 feet, so if the Cessna can get into the air it is more likely to be able to climb.

Ground effect is less pronounced for high wing aircraft like Cessna's while more pronounced with low wing airplanes simply because of the height of the wing on touchdown. There is less gain in performance achieved by lowering the nose close to the runway for a high wing airplane compared to a low wing airplane as we teach in a soft field takeoff, but it is noticeable. Lowering the nose right after takeoff near stall speed increases risk if you botch it. Is it worth the risk? It does increase risk, but it also teaches precise aircraft control close to the runway. If you don't level off near stall speed in ground effect, you aren't really doing a soft field takeoff. However, on the Form 5 the soft field takeoff and landing is optional and can be skipped. So, it's really up to the instructor and check pilot whether or not to do these.

If you want the full Monty on ground effect you can read the following article or others like it here.

When to Declare an Emergency (1Lt C. Hastings)

When we train as pilots, we receive extensive training on what to do in certain emergency situations, but very little on when we should declare an emergency. Pilot's do not hesitate to exercise their authority under CFAR 91.3(b) when something major goes wrong, like a flight control malfunction or an engine failure, but there is often hesitation when something "minor" happens like a lower-than-expected fuel level or getting lost.

The FAR's and the AIM are very clear on the responsibilities and authority of the pilot in command. CFAR 91.3 (a) states "The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft." 91.3 (b) state "In an in-flight emergency requiring immediate action, the pilot in command may deviate from any rule of this part to the extent required to meet that emergency." Most pilots have a firm grasp on this, it means that as PIC, the buck stops with you. You are 100% responsible for the safe operation of your aircraft and if there is a situation where you can't follow the rules and safely operate the aircraft, you can break the rule to the extent needed to safely get on the ground.

But what constitutes an emergency? It's easy when something important on the plane breaks, but what about less clear situations? When does a minor issue become an emergency? Thankfully, the AIM and the pilot/controller glossary have some guidance for us. The pilot/controller glossary define distress and urgency for us. Distress is "a condition of being threatened by serious and/or imminent danger requiring immediate assistance." Urgency is "a condition of being concerned about safety and of requiring timely but not immediate assistance, a potential disaster". Chapter 6 Section 1 of the AIM also gives us some guidance. Pilots generally understand when there is a distress condition, but they hesitate when there is an urgency condition. "An aircraft is at least an urgency condition the moment the pilot becomes doubtful about position, fuel endurance, weather, or any other condition that could adversely affect flight safety. This is the time to ask for help, not after the situation has developed into a distress condition. Pilots who become apprehensive for their safety for any reason should request assistance immediately."

In my day job as an air traffic controller, I have seen numerous pilots dance around the issue they were having with their aircraft. One pilot went from VFR into IMC and was afraid to ask for help, another pilot had to shut down one engine on a multi-engine aircraft as a precaution, and yet another got lost while low on fuel in marginal weather. All the pilots had one thing in common: they did not declare an emergency. Time was wasted with the pilot and controller playing 20 questions to determine the extent of the issue and the pilot's desires. In all three of those cases ATC declared an emergency for the pilot because in their judgement it was warranted. As pilots, the moment we find ourselves asking "is this an emergency" we should be declaring an

emergency. The answer is yes, it is. Our certainty about the safe outcome of the flight is in question because we are asking if we should declare. There is often no paperwork or report required by ATC or the FAA after declaring an emergency, but as mentioned in the June 2021 CAP Stan/Eval Newsletter, you should fill out a NASA ASRS report about the incident so others can learn from it. On occasion, the ATC facility handling your emergency will ask for a phone call after the fact so they can fill out their internal report more accurately, but it is rarely more than asking you to tell your side of the story.

It's time to break the old myths about declaring an emergency; nothing will happen to you; it can only help you. Delays in action have caused accidents and cost lives. The time to act is as soon as you become aware of a problem, not when the problem grows large enough that you're certain it qualifies as an emergency. Safety is not a luxury. Take action and declare the emergency before it has a chance to progress to a distress condition.

Articles for the National Stan Eval Newsletter:

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