



November 2023 Newsletter

New Mexico Pilots Association

NMPA operates exclusively for charitable, educational, and scientific purposes for promoting general aviation, aviation safety and education, and pilot camaraderie; preserving airfields and airspace; and to engage in any activities permissible for nonprofit corporations, organized under the laws of the state of New Mexico.

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November Cover

Why We Fly – Fall in New Mexico!

The Editor's Log

by Lanny Tanning



Living the dream in N 60 BF....

Looking Back...

Every once in awhile, the world slows us down. Not often...but now and then it happens. Luckily, pilots can use this time while not flying to – think about flying! As in recalling all the places our planes have taken us. The memories are certainly more fun than the occasional brain burp that brings up something we have tried hard to forget. For me - given the past fifty or so years doing what I dreamed of as a kid watching Piper Cubs meandering above the Illinois corn fields - just sorting through the memory log calls up the seventy-seven airports I can recall having visited. And that takes me to visions of the amazing country I've seen from the air. Too bad cell phone cameras weren't around to back up the memory bank earlier...old pics in dust covered boxes just aren't the ticket these days.



Upcoming Events

NMPA Members can login and post any aviation events on the [Events calendar](#).
Or send announcements to nmpa@nmpilots.org
and we'll post for you!



Upcoming Events

November 18

[NMPA Board Meeting at Santa Teresa Airport \(KDNA\), 10am](#)

The NMPA Board will meet on Saturday, Nov 18, 2023 at 10am in the War Eagles Museum conference room at Santa Teresa Airport (KDNA). Complete registration to get the Zoom meeting link. If you are not a member and want a zoom link, send an email to zoomchat@nmpilots.org.

Be sure to check the NMPA Website (www.nmpilots.org) for updates to any and all events.

Click on links for more information.

Here is your NMPA

John Lorenz, President



John Lorenz is a 6000 hour CFII, MEII, glider, and sand-lot acrobatic pilot. He has given over 2000 hours of tailwheel instruction. During the day he is a consulting geologist.

Why NMPA?

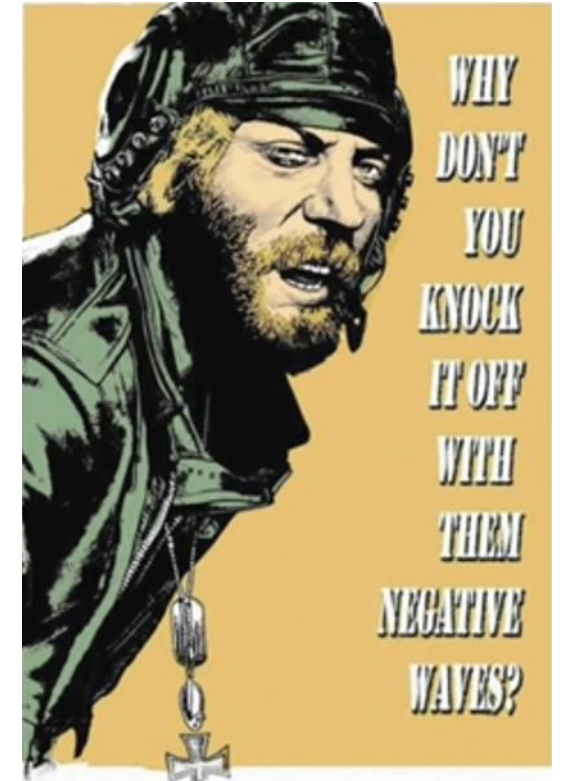
Does NMPA actually do anything that the other aviation organizations I already belong to don't do?

In short, yes. No other aviation organization routinely takes on a balanced, practical approach to address potential MOA expansions or other airspace grabs in New Mexico. No other group partners with the Aviation Division of the NM Dept of Transportation to educate the state legislature on aviation issues. We partner with the Recreational Aviation Foundation in the funding and direction of the work parties that have re-opened and maintained our state's back-country airstrips, but NMPA provides the extensive manpower for the manual labor for work parties (it's more fun than it sounds).

No other organization puts on in-person safety clinics across the state: while virtual clinics are an option and we use them, we much prefer getting the point across in the more effective format of face-to-face clinics. NMPA's event calendar and Newsletter help advertise aviation events statewide. Our Newsletter and website are also "go to" resources for aviation safety and tourism.

Sure New Mexico aviation would be alive and well without NMPA, but I submit that we help it *thrive*. Not bad for your twenty-five-buck dues. (You didn't ask, but to quote Paul Newman as Butch Cassidy: "I figured secretly you wanted to know so I told you." Besides, I was hurting for topics for this month's column).

Attitudes Change With Experience: We smile inwardly, knowingly, when we hear well-meaning but uninformed expressions of enthusiasm from new pilots ('I'll just buy an airplane and make money giving rides!'). There are so many regulatory, financial, and practical obstacles to aviation aspirations that it's easy to quash such enthusiasm with a short



Don't rain on someone's enthusiasm for getting into an aviation business. [Donald Sutherland as "Oddball" in *Kelly's Heroes*.]

dose of reality, but we were all that raw once, and if all aspirations are immediately squelched, we would make no progress. Maybe it's equal parts enthusiasm and ignorance that allow folks to dive into aviation businesses. Be realistic yet supportive when you hear a newbie wax enthusiastic about starting an aviation enterprise.

Frost Aviation: For an example of a successful enterprise, I have been blissfully, perhaps even negligently unaware an outfit owned by Denise and Chris Frost called, appropriately, Frost Aviation in Las Cruces. They offer a wide range of flight instruction, rare enough these days, and they have had significant success sending their students on to paying professional positions in aviation. Aviation businesses, especially flight schools, tend to be ephemeral, coming and going, merging and diverging, as personnel move up and on and as the market demands change. Frost has been at it a while, and I hope they stay at it a lot longer.

November 18 in Santa Teresa: The next NMPA Quarterly Board Meeting will be held on November 18th, at 10 AM in Santa Teresa, NM, at the War Eagles Museum. As always, members are encouraged to attend and to both contribute to the discussions and bring up topics for discussion. The museum itself is world class (see <https://www.wareaglesairmuseum.com/home/>). How many other places will you find a Fiesler FL-156 "Storch", one of the most ungainly aircraft from WWII outside of those designed in the UK? (The lovely Spitfire is an exception of course.) I am trying to arrange a guided tour of the museum, so keep track of the NMPA website "Events".



One of the successful students from the Frost Aviation flight school who is now working professionally in aviation (see <https://frostaviation.com>).

Ken Summers, NMPA Vice President and owner of the most recognizable and most recognized airplane in the state, represents NMPA at the recent Las Cruces fly-in.



The War Eagles Museum's Fiesler Storch FL-156, a very effective German STOL aircraft from WWII. Come to Santa Teresa and attend the quarterly NMPA board meeting on November 18th, and visit the museum as a bonus!



NMPA member Lorenzo Rocca from the Houston, TX area, recently camped with his father at the Negrito airstrip and shared this great 180-degree photo of the strip.

Backcountry Beat

by Ron Keller



Ron Keller flies a C-182 and has been involved in aviation for the better part of his life. Ron retired from FAA Technical Operations in 2011 and has stayed busy ever since, including working for the New Mexico Aviation Division, and currently serves on the NMPA Board of Directors and as Co-Chair of the NMPA Backcountry Committee. Ron is a Recreational Aviation Foundation Liaison and serves on the New Mexico Airstrip Network Steering Committee.

November Newness...

In last month's article, I said I would be observing the installation of the new vault toilet at Rain Creek Trailhead, adjacent to Sacaton Landing Strip. Well, that didn't happen due to crane scheduling conflicts. As I write this, the new dates are October 23-24. The USFS likes this better because they weren't sure they could report to work after the end of the fiscal year, but now have at least a window of opportunity in the short term. In addition, unbeknownst to me, they still were working on NEPA paperwork to authorize the installation on FS managed lands. That paperwork has been finished, so it all looks like a go.

The first phase of the Reserve Airport pilots' lounge is complete, with engineers and architects drawing up plans for a remodel/reconfiguration of the interior of the modular building to better serve as a pilots' lounge. It was previously an Army barracks at Fort Bliss, complete with a sink in all 6 bedrooms. I guess the Army puts high priority on shaving. As you could tell from a photo in the October newsletter, the building was moved in one piece, and barely cleared rock walls on either side of highway 12. It is now set in place on the airport, and some windows were replaced, and concrete was poured in front.



Brand new at the factory



Looking good so far!

Backcountry Beat, continued

The remodel is already funded with a generous grant from the state, and the engineering firm has received input from some of us pilots on what we need. It should turn out very nice and hopefully will be ready by spring or summer. In the meantime, it may be locked until they put a cypher lock on it, and the utilities are not yet connected. Another plus is that now, an AWOS can be installed at the airport with a room in the building for the electronics. That could happen as soon as next year.

As a reminder, Jewett Mesa Airstrip is now closed for the winter months. It gets more snow than the other Gila area airstrips. It will reopen May 1st. The other locations are in pretty good shape, last I checked. I still need to mow the other half of the crosswind runway at Negrito. The Wilderness District Ranger sent me a nice email saying that he visited Me-Own Airstrip and was pleased at how nice it looked. And I sent an introduction email to the new District Ranger for the Black Range and briefed him on who we are and how we volunteer on the Gila airstrips, including Beaverhead on his district. He is looking forward to an in-person meeting someday.

Until next month,
Fly Safe and Often!
Ron

Safety Briefings are available on the NMPA website for all the [Gila USFS Airstrips](#). Note that some require prior permission – just a phone call.

Another great resource, is www.Airfield.Guide, thanks to the Recreational Aviation Foundation (RAF)



Mountain Alternates



Mountain Flying

by Cliff Chetwin



Cliff is a retired National Park Service pilot and a Master/Gold Seal CFI with over 40 years experience flying in the Rockies, Sierras, and Alaska. He currently lives in Kremmling, Colorado and owns a Superhawk.

One of the key concepts we present in NMPA's Mountain Flying Clinic is the need to include alternates in all mountain flight planning. This always gets raised eyebrows and quizzical looks from the often predominantly VFR student body.

The instrument rated pilots in the Clinic understand the concept of including an alternate in their IFR flight plan, although only when required by regulation. Note the regulation only requires planning for a single alternate. Planning is usually limited to whether there is an approach that the aircraft is equipped for, is there enough fuel on board to meet 91.167, and if the forecast weather complies with minimums specified under 91.169. Actually getting there is often ignored. Most pilots consider this a pro forma exercise and have no intent to really fly to the alternate so little additional planning goes into the process.

In the Clinic we teach that IFR in the mountains is generally a poor idea, at least in most general aviation aircraft. Given the harsh IMC conditions common in New Mexico wise instrument rated pilots often avoid flying when these conditions exist anyway. As a result, they rarely have had to actually execute their alternate plan. Was the alternate plan really a good one, who knows?



Mountain convective activity blocking flight path

All well and fine for IMC but why would alternates, note the plural, be needed in VMC? After all, if things aren't going as planned most of us were taught to simply land at the nearest airport and sort things out. This works pretty well in most of the country where communications are more robust, flight obstructions are more limited, radar coverage is virtually everywhere, and airfields are more abundant and usually have some level of services available. None of this is true in the mountains. Additionally, consider how many of your flights have been completed as planned; it should be pretty much all of them so why assume the opposite? Most of us hopefully don't even launch if the projected successful outcome is in any doubt.

However, ask any experienced mountain pilot and they will tell you that almost every mountain flight has an element of doubt in it and over their career a good number of flights have not gone as planned. A number of factors contribute to this. Pilot mountain experience, aircraft performance limitations, density altitude, TFRs, underestimating fuel burn, turbulence, convective activity, lack of expected destination airfield services, and of course the vagaries of localized mountain weather are all common contributors. Less common contributors are in-flight medical issues affecting the pilot and/or passengers, security issues (remember 9-11?), GPS jamming, aircraft system(s) failure, and bird strikes.

While chances are still good that that in most cases you will end up at your planned mountain destination (or why would you fly?) the overall point here is that the odds are not as good as you are probably used to when flying in other parts of the country. For instance, 20V and GBY, my county airfields, were out of 100LL for over a week three times this year. Taos, which is often used as a fuel stop in NMPA's Mountain Flying Clinic, was out of fuel during this year's Clinic. Mountain airports are not all that close together and flights often require legs approaching the aircraft's range. Not finding fuel where it's expected can be a pretty nasty surprise and the only remaining option is to wait for the weekly fuel tanker. The local hospitality industry wins but you don't.

You are probably saying to yourself that many of these factors also apply to flights everywhere else so what's the big deal? First, we need to remember that when something goes wrong out in the flatter areas of our country you can generally turn in almost any direction and find an variety of choices whether an airfield or a reasonable off field landing spot. In the mountains, density altitude related limitations coupled with relatively narrow valleys surrounded by very high terrain are usually significant limiting factors and frequently reduce your immediate choices, unless you've already planned alternates out, to straight ahead, straight behind, or straight down. Depending on the nature of the problem all three of these are often poor choices. I suppose the good news is that you wouldn't have to commit much brain time analyzing other choices while the flight conditions are probably rapidly getting worse since it is now too late. The bad news of course is that the outcome isn't likely going to be very good.

No one keeps detailed statistics of instances where mountain flights had to be altered but its my experience that it is safe to assume that exposure to density altitude, mountain micro weather, hypoxia, moderate to severe turbulence, TFRs, and aircraft system(s) failure occur often enough that we should plan on one or more occurring on our mountain flight and wisdom dictates having a well planned alternate or two up our sleeve.

We all practice various aircraft related emergencies even though today's aircraft are really quite reliable and catastrophic failure is rare. If the failure is catastrophic you're going down now and having alternates won't make any difference. This is a risk that we accept in all flights. In mountain flying the only defense is planning your route over the most survivable terrain possible and hoping for the best. But what about non-catastrophic failures in VMC? With today's overreliance on GPS few pilots have maintained their dead reckoning and pilotage skills. If you lose GPS can you still safely navigate your planned route? Worse, can you quickly find new, unplanned, but safe routes to an alternate? How about that vacuum pump deciding it's had enough? Can you keep the shiny side up without your gyroscopic instruments? Alternators and voltage regulators have a disconcerting tendency to take the day off. Do you have enough battery power remaining to make it to your planned destination? OK, remember we're day, VFR so most system failures should not be overly taxing to the skilled pilot although they can be when also faced with flying in the more stressful mountain environment. Where things now can get a bit dicey is when we consider part 91.213. Recall that unless immediate safety of flight is compromised we are allowed to continue our flight with failed system(s) to a point of safe landing. But if the failed items are listed in the Type Certificate (check that long and boring list in the back of your POH/PIM), are in STCs that apply to your aircraft, or are specified by regulations you cannot take off again, absent a ferry permit, until repairs are completed. When you planned your flight did you consider whether repairs were available at your mountain destination? What about at your backup airfield(s)? The nearest A&P for my home field is over 100 miles away in Denver and none of them are sitting idly by the phone waiting for me to call nor are any of them particularly eager to add a scenic mountain drive to their work day. Add in the poor availability of even common repair parts at many mountain airfields and you



Density altitude exceeded aircraft performance



Hayden Pass Fire and TFR blocking Hayden Pass and Poncha Pass

could be stranded long enough to establish residency. The wise mountain pilot always has an alternates planned where system repairs can be completed and the aircraft returned to airworthy status in reasonable time. You also consider if ground transportation is available, and lodging, or you may be living in the back of the aircraft for a few days.

Most of us are very familiar with the adverse effects of density altitude (DA) on available aircraft performance. We usually assume it is only our flat land brethren that will be surprised when they can't out climb the surrounding rocks, but NTSB records are replete with instances of experienced mountain pilots who failed to properly judge the insidious effects of density altitude, Scott Crossfield and Sparky Imeson being among more notable examples. Another common operational error is to assume that DA is not a factor during winter flying conditions. While it is often less of a factor you should remember that DA is a reflection of the difference between ISA standard temperature and existing temperature. In the mountains the existing temperature, even if below freezing, is often still warmer than the ISA standard temperature for a high-country location and thus DA will be an adverse issue. The bottom line here is what's your plan if you find the rocks are getting higher and you aren't?

Medical related incapacitations are fortunately very rare but mountain flying exposes all of us to various levels of hypoxia. Remember that we humans were designed to be sea level creatures. Common symptoms of mild hypoxia are headaches, tunnel vision, loss of color saturation, reduced cognitive function (you are no longer making good decisions!). Severe hypoxia can be life threatening. Ah ha, you say, you have an onboard oxygen system, either installed or portable. When was the last time you verified the regulator flow rate? Do you know the actual flow rate required for your personal physical condition (it will differ than the manufacturer's generic flow rate table). Do you know the density altitude at which you personally require supplemental oxygen and at what specific flow rate? Remember that the FAR supplemental oxygen mandates are based upon three specific pressure altitudes, but your body responds to the partial pressure of the existing density altitude. In the mountains this is almost always long before you reach the altitudes specified in the regulations. Many pilots consider pressurized aircraft as immune to hypoxia exposure, but cabin altitudes are usually held only between 6,000' and 8,000'. This is a mildly hypoxic environment for many people, especially those who live at lower elevations. Do you want to be in the position of trying to plan one or more alternates on the spur of moment, in the limited confines of the mountain environment, while things are going wrong, and while having some level of degraded physical and mental capability?

TFRs are a common airspace modification in the mountains, especially during wildfire season. These are bit more insidious since it's not unusual for one or more to pop up after you have launched. They often have ceilings higher than you can fly under existing conditions, especially without supplemental oxygen. It's also common for the TFR lateral boundaries to completely block the lower terrain where you had planned to fly. TFRs also tend to attract a large number of helicopters and fixed wing aircraft focused on traversing to/from the incident and not necessarily on avoiding you. Needless to say, it's a good idea to stay well away from all TFRs but what's your plan should your route be unexpectedly blocked?

Of all the factors weather is most likely going to be the one that prevents you from completing the flight as planned. Pilots unfamiliar with the mountains are often shocked at how localized and variable mountain weather can be over very short distances and how fast it can change. With the volatility of mountain micro weather it is not unusual for winds, turbulence, virga, density altitude, wildfire smoke, or convective activity to not only block your path ahead but also your retreat and even your preferred VFR alternative, assuming that you planned one.

Mountain flying is a unique and enjoyable aviation opportunity, but the wise pilot understands the increased level of risk associated with flying in this environment and the need for preplanned alternates even under VMC. As Jim Viola, HAI CEO and former director of the FAA's General Aviation Safety Assurance program, likes to say, "every pilot should plan for the worst." Thus, as we teach students in the Clinic, much more planning is required for safe flying than many pilots have become used to in their "saddle up and go" home flying environment and if you're using your last alternate plan, it had better be for landing now. My hope is that your flights always go as planned and you never have to implement plan "B" or plan "C". But we know that over the course of time all of us will have a flight challenge or two and as the Boy Scouts say, we must be prepared. Spend the extra time to have a few well planned out options in your hip pocket and each of your mountain flights should come to a satisfactory and safe conclusion.

Until next month, enjoy the mountains and fly safely.

Obscure and Scenic New Mexico

by Jeff Gilkey



Jeff Gilkey has been flying his Aerotrike Cobra (ELSA, weight shift control) since 2004. He has logged over 2200 hours on cross country adventures into nearly every corner of New Mexico, with many extending into Colorado, Arizona, Utah and Texas. For more information, visit his YouTube Channel at <https://www.youtube.com/user/jefftrike>

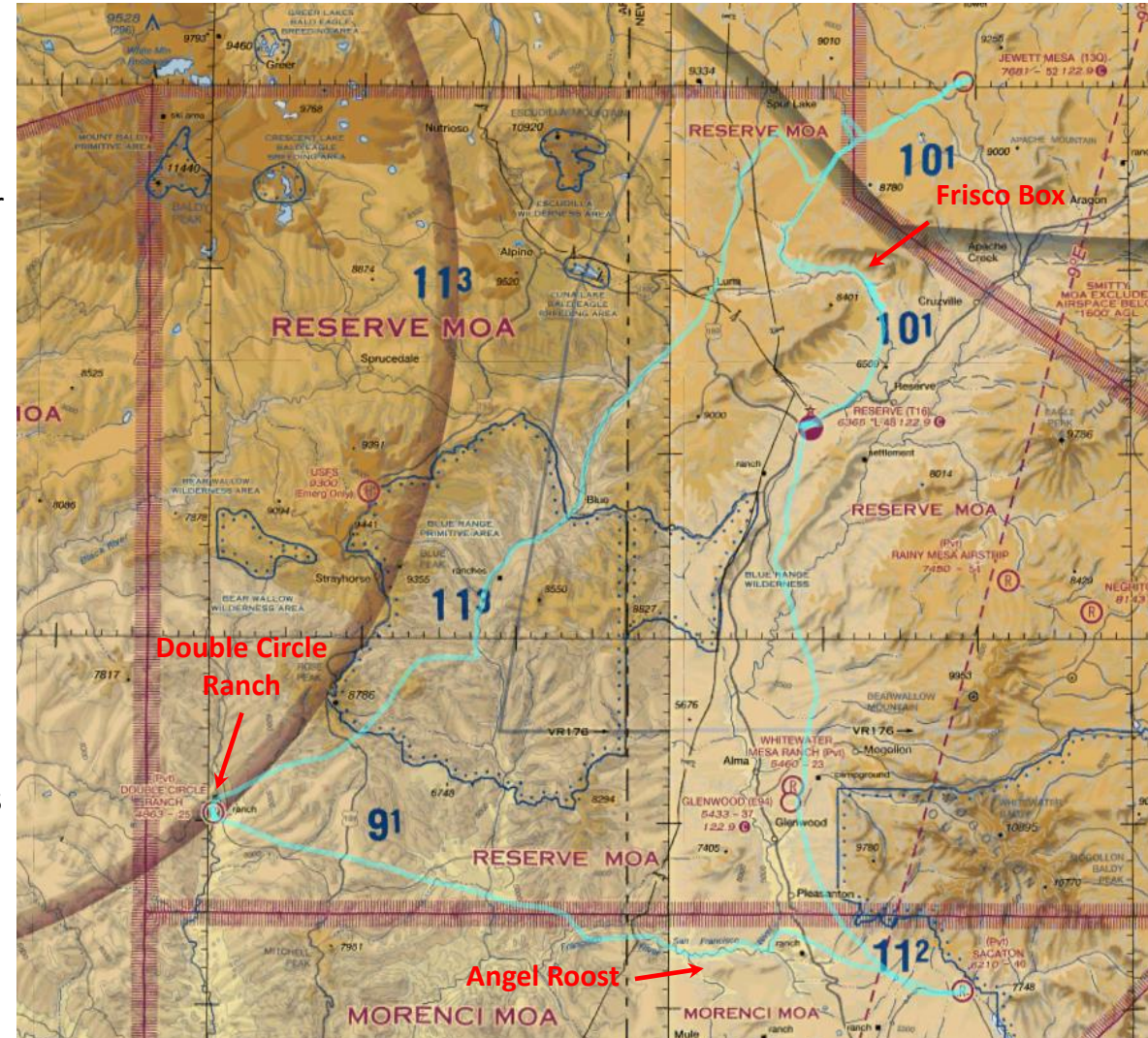
Angel Roost

At this year's Gila Regional Fly-in at Reserve, NM, I was able to do some exploring of the country south and west of Reserve. I made a big loop following the San Francisco River north, over the Frisco Box, and then along its northeast tributary, Centerfire Creek, in the direction of Jewett Mesa. I circled Jewett Mesa and turned southwest towards Double Circle Ranch, following the Blue River through the Blue Range Primitive Area. The southern leg of my trip, from Double Circle to Sacaton, was 45 miles over some of the wildest and most remote country I have ever explored.

On my previous trips out to Double Circle, I stayed on a line between Double Circle and Glenwood. Heading towards Sacaton today caused me to veer about 9 miles to the south, over country largely unfamiliar to me.

At the halfway point on my southern leg, I spotted the a river valley to the south. My GPS / navigation app told me it was the San Francisco River, the same river I had followed through the box canyon north of Reserve nearly two hours earlier.

The San Francisco flows east to west here, capturing the flow of the Blue River and other streams before merging with the Gila River in southern Arizona.



San Francisco River



I had no idea such a deep canyon existed in southwestern New Mexico, or anywhere else in the state for that matter. The canyon bottom was filled with mile after mile of cottonwood trees, 1000 feet below the plateau. Note that the Taos Gorge Bridge is only 656 feet above the Rio Grande, and greatest depth of the Rio Grande Gorge (10 miles downstream) is only 800 feet. *Was this the deepest river canyon in New Mexico?* In the distance, a tall peak rose on the right side of the canyon.

Angel Roost



The high peak on the right is “Angel Roost”, elevation 5958 feet. The river at the base is at 4400 feet, creating over 1500 feet of vertical relief. At this point I left the river canyon for the relative safety of the high plateau on the left side of the canyon. The canyon continued upstream to the east, turning north towards Glenwood and Reserve. Interestingly, the similarly named and more famous “Angel’s Roost” is near the Glenwood Catwalk.

Here are the coordinates to help you find Angel Roost on Google Earth or from in the air.

Latitude = 33.2120

Longitude = -108.9332

It is definitely worth a trip to checkout from the air if you find yourself flying in the southwest corner of the New Mexico.

FLY SAFE

Remember as “Pilot in Command”, you are ultimately responsible for the safety of your passengers and aircraft. Proper planning with respect to the weather, terrain clearance and traffic hazards is critical to having a safe and enjoyable flight.

Angel Roost



As the CFI sees it

by John Lorenz



John Lorenz is a 6000 hour CFII, MEII, glider, and sand-lot acrobatic pilot. He has given over 2000 hours of tailwheel instruction. During the day he is a consulting geologist.

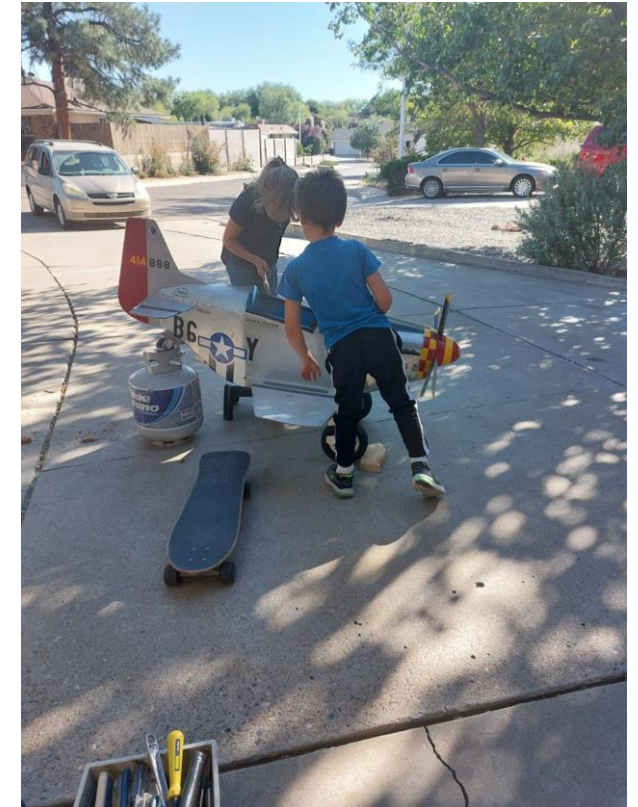
Insurance vs. FAA Requirements

Well done, you have just added a tailwheel endorsement to your logbook, learning the techniques with 10 hours of dual in an Aeronca Champ. The FAA says you're now legal to fly anything from a J-3Cub to any single-engine, land-based tailwheel aircraft up to 12,500 lb. Or maybe you have just earned your complex endorsement in a Piper Arrow and are now legal, per the FAA, to fly the 180-HP Mooney a friend wants to sell you. Your eyes light up as you peruse *Barnstormers* and *Trade-A-Plane*.

But before you buy anything, take a deep breath and call an insurance company to find out what it will cost to insure you in a tailwheel or complex airplane, and what additional make-and-model-specific training requirements they will impose on you. The feds, and most states, do not in fact require insurance on airplanes (see <https://www.gao.gov/assets/gao-15-740.pdf>), but if you want to protect your investment with insurance while you fly it, you will need to satisfy both FAA *and* insurance-company training requirements. The latter are usually more stringent than the former because *money* is involved.

An insurance company may not quote based on a speculative purchase, they prefer to know what specific airplane they will be insuring, but a sympathetic and knowledgeable agent can often give you a ballpark idea of what it might cost before you buy something. When you do get a quote for a specific airplane, the premium will have been set by an adjuster based on:

- The value you have placed on the airframe (the “hull”)
- The record of accident rates for that make and model
- Your age, overall and recent aviation experience, time in type, and accident history
- Whether or not the adjuster has had a morning cup of coffee.



Sure, but can you *insure* it? “Annual time” (note the tools in the foreground): photo by Ken Larson

One company requires an older pilot friend to take annual flight reviews, but it is also possible, particularly for low-time and/or older pilots wanting to insure powerful or exotic airplanes, that a company will flat-out decline to insure you.

An insurance quote will be divided into hull coverage and liability coverage, each comprising about half of the total premium. You can buy a liability-only policy and “self-insure” for the value of your hull, but companies do not sell hull-only coverage.

Insurance rates have climbed recently, some of it being related to inflation in hull values and some of it seeming to be “just because we can,” and yearly premiums these days typically run thousands not hundreds of dollars per year. Side note: aviation policies don’t automatically renew the way auto policies do; you must apply anew each year. Your premium may go down the second year after you get some time in type and maybe an additional rating. However, it will certainly go up if you have made a claim.

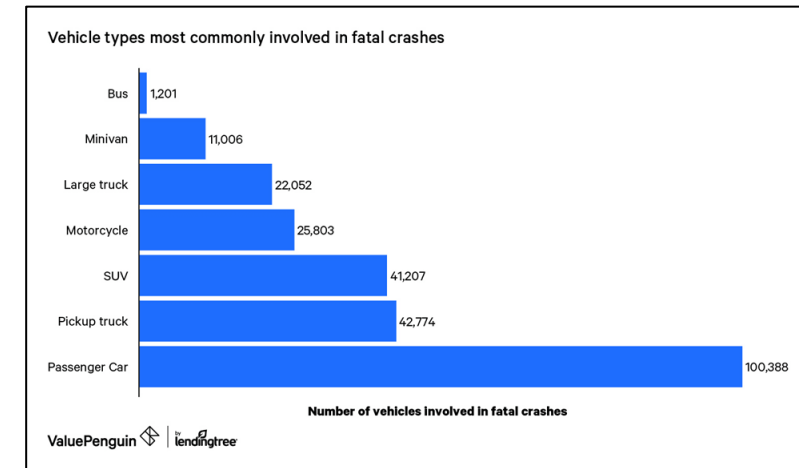
A pilot shopping for insurance doesn’t have much choice. Although there are numerous brokers, they all get quotes from the same few underwriters such as *Tokio Marine* and *AIG*. A broker won’t give you a quote if you’ve already asked for one from another broker because all requests go to the same few underwriters. Moreover, if you have had a reasonable relationship with one broker it rarely pays to drop them and go shopping for another. *Avemco* is about the only company that is their own underwriter: their reputation includes both good service and premiums that run on the high side.

If you have the endorsement but no time in type for the airplane you are buying, the insurance company, not the FAA, may impose training requirements specific to that make and model. The requirement may include 10-15 hrs of dual in the plane before you are allowed to fly it solo plus 5 hrs of solo before carrying passengers, but this varies widely depending on the factors listed above.

Finding an instructor to give you the dual mandated by the insurance company can also be an issue because the company, not the FAA, may require that the instructor have time in the specific make and model. Instructors with Mooney time are not that hard to find, but finding one with C-195 time can be a challenge. If it is an uncommon type and qualified instructors are hard to find, a broker can sometimes negotiate with the underwriter and get a specific instructor approved based on experience in similar models. However, you could wind up traveling to train with a distant instructor who has time in an uncommon type.

Insurance-company are betting good money that you won’t have an accident, so their training requirements are designed to mitigate that risk and they typically exceed FAA requirements. Investigate the insurance requirements before you buy that 300-H.P. Icarus Plummet you’ve been lusting after.

Never make a distinction between “Fun” and “Serious” flying. Mistakes during either kind can leave you just as dead.



Example of varying accident rates for different types of vehicles. It’s for cars but there are similar tables for airplanes, I just couldn’t find one handy.

<https://www.valuepenguin.com/top-deadliest-vehicles>

Tech Corner

by Will Fox



Turn Back Time

The recent accident that took the lives of Richard McSpadden and Russ Francis was a tragedy. Little is known about the accident at this point, but apparently McSpadden and Francis had taken off in Francis' Cardinal C177 for a photo shoot and shortly after takeoff experienced a problem that caused them to turn back to the airport in Lake Placid, NY. They crashed 400 feet short of the runway. One could chalk this accident up to another failed attempt at the "Impossible Turn", but McSpadden was a very accomplished military pilot. He was also a safety advocate for AOPA in his role as senior vice president of the Air Safety Institute. In that role he had published a video on the "[Impossible Turn](#)" that demonstrated that it was not impossible and depended on the performance characteristics of the plane being flown. The cause of the accident is not known as of yet. Hopefully the NTSB can shed some light on what really happened, but we will have to wait a year or two for them to generate a final report.



Richard McSpadden was a leader in Aviation [Safety](#).

A turnback to the runway is possible, but its success depends on the aircraft you are flying, your piloting skills, and environmental factors like wind and density altitude. It is possible thru calculation or experimentation to determine what conditions allow for a successful turn back to the runway following an engine failure. From that you can use a simple decision process to determine when it is impossible and when it is not. More importantly you can do this on the ground before you ever start the takeoff roll, so the decision can be made ahead of time. Let me tell you about it.

The first thing you need to know is how much altitude you need for the turn back. You can do this a couple of ways. One way is to measure it by climbing to altitude and simulating an engine failure and turn back, and the other way is to calculate it. The formula I use to estimate it is quite simple. The required turn back altitude in feet is equal to the best glide speed in knots squared and then divided by the glide ratio. In formula form it looks like this:

$$TBA = V_{GB}^2 / GR$$

where,

- Turn Back Altitude (TBA) is the approximate height in feet to make a turn back to the runway.
- Best Glide Speed (V_{GB}) is the best glide speed of the aircraft in knots.
- Glide Ratio (GR) – is the glide ratio of the aircraft at the best glide speed.
- The bank angle is 45 degrees.
- The estimate includes a 3 second delay before the start of the turn due to the surprise factor.

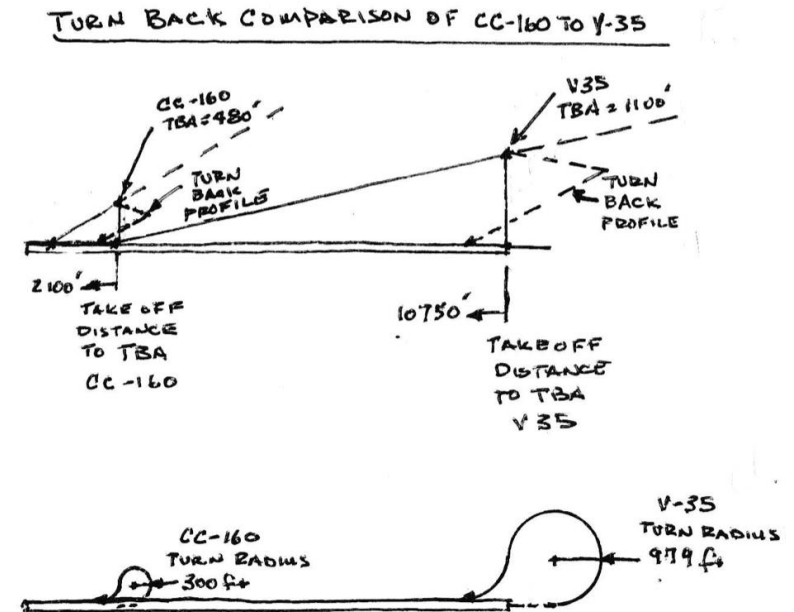
For example, in the case of my Bonanza, where the best glide speed is 105 knots and the glide ratio is 10 to one, the estimated TBA is 1103 feet. See the calculation below:

$$TBA (ft) = \frac{105(knots)^2}{10}$$

$$TBA = 1103 ft$$

No fuss, no muss. If I'm below this altitude I can't complete the turn safely. What's more, this is just the altitude required to complete the turn. It does not allow for any significant glide besides the flare to land after the turn is completed. In other words, unless I'm still over the runway when the failure occurs it doesn't guarantee I'll be able to glide back to the runway. To do that, I need to know two other numbers. One is my climb angle and the other is my glide angle. If my climb angle exceeds my glide angle, and I reach my turnback altitude before the departure end of the runway, then I can make the turnback AND glide back to the runway safely. So I also need to know the length of runway required to reach TBA. Let me show you a couple of examples.

In the Bonanza, the climb angle at sea level is about 6.7 degrees and the glide angle is about 5.7 degrees at gross weight on a standard day. It takes 1700 feet to clear a 50' obstacle plus another 9050 feet at a climb angle of 6.7 degrees to reach 1100 feet AGL. That adds up to a total of about 2 miles to get to TBA. If the runway length is less than that, I won't be able to get to TBA before the end of it. So, if the engine fails, I can't make the turn back, and I will need to land pretty much straight ahead. However, if I reach TBA before the end of the runway and my climb angle is greater than my glide angle, things are golden, because I can turn back at any point after I reach TBA **AND** glide back to the runway. But, it is not very often that I takeoff on a 2 mile long runway, so a turn back in the Bonanza is usually not a viable option. Lets look at another example.



Sketch of profile and plan views comparing a V35 Bonanza to a Carbon Cub LSA during takeoff and turn back to the runway. Note that the numbers shown are based on standard conditions at gross weight in calm conditions. Density altitude, weight, and wind conditions can affect the outcome of a turn back significantly and also need to be considered. For more information about the effect of these factors check out [David Rogers](#) paper.

Let's consider a Carbon Cub LSA. How much runway would it take to reach TBA? With a best glide speed of 59 kts and a glide ratio of 7.2 to one, the TBA is only 483 feet AGL. The takeoff ground roll only takes 290 feet and the climb to 483 feet takes another 1782 feet for a total of about 2072 feet of runway. So a Carbon Cub LSA can make a turn back after a takeoff distance of around 2100 feet. The climb angle of the Carbon Cub is 15 degrees which is considerably better than the glide angle of 7.9 degrees. Once the Carbon Cub climbs past TBA it cannot only turn around, but also easily glide back to the runway. In fact, with that kind of climb rate, one might find themselves quite high following the turnback and need to add flaps and slip aggressively to get down to land before running out of runway, particularly if there is a stiff headwind on takeoff. Ask me how I know this.

So, in the case of the Bonanza, a successful turn back requires a two mile long runway whereas in the case of the Carbon Cub it needs less than a half mile of runway. Why is there such a big difference between the two when comparing the required runway length? It is the fact that the best glide speed and climb speed are so much lower for the Carbon Cub, not to mention the higher power loading of the Cub. You can see now that it is important to consider the airplane's characteristics to know whether a turn back to the runway is possible or not. Pilot experience and proficiency are also extremely important factors. The turnback maneuver is a fairly aggressive maneuver done close to the ground and is not suited for the average pilot (I know, we all think we are above average, but unfortunately, half of us are not). So if you want to put this maneuver in your tool box, become an above average pilot. Also, find a CFI and practice it at altitude first.

I think the data on the dangers of the turn back maneuver is misleading. We know when it doesn't work, because there is an accident report, but we don't know how often it does work. I have made a turn back to the runway following an engine failure on three occasions. In two of the cases, I was flying a high performance STOL aircraft and knew ahead of time that once I reached TBA, I could make the turn back based on the criteria I just showed you. The other time I was flying a two place training aircraft and the engine began slowly losing power about a mile after the end of the runway. I and the other CFI with me agreed to turn back for the runway. The engine continued to lose power and it became questionable whether we would make it or not. Plan B was to land in an emergency field in the canyon below the airport if we had to. In the end we made it back to the runway. The turn back was a judgement call and we were lucky, but we did have a plan B just in case.

In summary, determine the TBA for the aircraft you fly either by experimentation or calculation or a combination of both, and then use it in concert with your climb and glide angle to make a decision of whether you can turn back to the runway or not. Why guess in the middle of an emergency, when you can know the answer ahead of time.



A turn back to the runway after an engine failure on takeoff will require aggressive maneuvering near the ground.

CFI Resource List: A Member Benefit for Students and CFI's

NMPA Certificated Flight Instructor Resource List updated 3-28-2020
NMPA members who are CFI's and who would like to be listed here, or who need to modify their information, please contact John Lorenz at johnlorenz@geoflight.net



Instructor: Suzanne Azar

Contact: email suzanneschmeckazar@gmail.com

Primary areas of instruction: *Private, Commercial, Instrument, Multi-engine Instrument*

Airports you instruct at or will travel to: *El Paso, TX, Santa Teresa, NM, and Las Cruces, NM*

Do you have access to an airplane for instruction and if so what kind: *Cessna 172 and Cessna 182*

General summary of experience: *I have been a pilot since 1980 and a flight instructor since 1984. Among my many students I taught both of my daughters to fly. I have flown numerous air races through the US, Bahamas, Hawaii, and Canada. I hold a commercial pilot's license and am rated in single engine, multi-engine, glider, and seaplane, with an instrument rating. I fly a Lancair IVP a pressurized, retractable, high-performance composite experimental as my personal aircraft, and instruct in Piper and Cessna singles. As a Multi-engine Instructor, I have flown many aircraft from the 1956 Apache to a 690B Rockwell Commander turboprop. I also hold licenses as basic and advanced Ground Instructor and have earned the FAA's "Gold Seal" flight instructor license.*

Instructor: Mike Dellas

Contacts: (505) 699-7297, captrellas@aol.com

Located at Santa Fe (KSAF)

General summary of experience: *Currently flying for AAL, experience in Aeronca Champ to a Twin Beech D18/Douglas DC-3 and aerobatic planes such as Citabria and Decathlon, owned and operated a Luscombe, C-180, and C-310 including instruction over 45 year flying career.*

Instructor: Scott Burnett.

Contact: email ssburnettnm@gmail.com

Single and multi-engine CFI teaching in the student's aircraft. Specializes in tailwheel and Maule check-outs, private instruction, and ferry flights. Located at Mid Valley (E98)

Instructor: Peter D Murphy, contacts peterdenismurphy@gmail.com, 505-946-7777. CFII MEII LSP. Flight Design CT

Instructor: Diane de Souza - Taos - contact info is dyeingtoweave@gmail.com

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