

The Mooney Flyer

The Official Online Magazine for the Mooney Community
www.TheMooneyFlyer.com

February 2021



Editors

Phil Corman | Jim Price

Contributors

Bruce Jaeger | Bob Kromer | Tom Rouch | Brian Lloyd | Linda Corman
Ron Blum | Richard Brown

Departments

From the Editor – *Nobody Asked; just our Humble Opinion*

Appraise Your Mooney’s Value – *M20B thru M20R*

Mooney Mail – *Feedback from our Flyer readers.*

Ask the Top Gun – *Tom Rouch answers your questions*

Product Review – *Mooney Speed Shop*

Upcoming Fly-Ins – *Fly somewhere and have fun!*

Have You Heard? – *This month’s Relevant GA news & links*

Mooney CFIs – *The most comprehensive listing in the USA*

Features

[Small Things That Might Save Your Life](#) by Jim Price


[Fuel Mismanagement – Easily Avoidable Accidents](#) by Phil Corman

[Think, Jingle Bells](#) by Jerry Proctor
Keeping sharp by using VORs to navigate

[Why Doesn’t My Tail Trail?](#) By Ron Blum
I always wondered how this worked ... a great read

[Oh, The Places You’ll Go, Part III](#) by Richard Brown
His final installment of flying your Mooney on long trips

[Killing Sacred Cows, Installment XVII](#) by Brian Lloyd
This includes a ton of info to help you understand AoA

 If you love **The Mooney Flyer** and want to keep it healthy, just click on the **“Donate”** button.



Subscribe and we’ll email you when a new issue is published.



Find all the back issues (starting in 2012) or use our powerful search engine to find a past article.



The views expressed in each author’s article are their own.
The Mooney Flyer’s goal is to educate, inform, and entertain Mooniacs.

From the Editor

Phil Corman



FTE

Judgement, Experience, Skill

These are the primary items that we use to expertly fly our Mooneys. You have heard the adage, “Truly superior pilots are those who use their superior judgment to avoid those situations where they might have to use their superior skills.” This is absolutely true.

I was wondering how our judgement, experience and skills change as we age, and how we can harness these changes.



Newly Minted Pilots

As a newly minted pilot, we are clearly short on **experience** and **skill**. At this point, most of our **judgement** is based on who we are and the way that our CFI drilled using judgement into us. Judgement is our primary “decision making asset” and perhaps our most critical “safety of flight” asset. Judgement can be involved in a thorough flight planning, as you avoid the urge to take risks just because you desperately want to fly somewhere. Judgement is dealing with the realities and facts, and then making an objective decision. Another expression worth repeating is, “It’s better to be on the ground wishing you were in the air, than in the air wishing you were on the ground!”

Planning appropriate routes and altitudes can be key, especially when flying over mountains. Choose routes with airports or highways nearby, just in case you have an opportunity to add an emergency landing to your list of aviation experiences. Most good judgement calls are safely made on the ground. Once in the air, as you deviate from a planned route because of weather, headwinds, fuel considerations, etc., you learn to employ good judgement.



Hours Under Their Belts Pilots

As we age, our **experience** level rises and if we are committed to learning, our **skills** will improve. **Judgement** can improve with experience, but it varies by individual. Experience allows us to better evaluate situations during pre-flight planning or when enroute circumstance do not meet our expectations. While young, our skills are elevated by our young brain and hand/eye coordination. As we add hours to the logbook, we become better at making flight planning decisions and dealing with in flight “curve balls”. More experienced pilots have probably honed their personal minimums to detailed conclusions. Judgement and experience team up to facilitate much improved decision making. These are the golden hours of flying, relative to good piloting and safety.

Older Age Pilots



As we become older, our **experience** and **judgement** peaks, but what about our **skills**? Perhaps our eyesight is not as good and/or our night vision has deteriorated. Like a frog in a cool pot that is set to boil, we don't realize what has deteriorated, and that's risky. Another aging issue is oxygen. The FAA says we don't need fulltime oxygen until 14,000'. But metabolically, as we age, the need for oxygen can occur at much lower altitudes. I now put my cannula on at altitudes above 9500". It's pretty cheap as aviation stuff goes, and as we age, it can help us remain sharp, significantly increasing the safety factor. Judgement can help compensate for the loss of skills when we adjust our personal minimums. Another consideration could be the

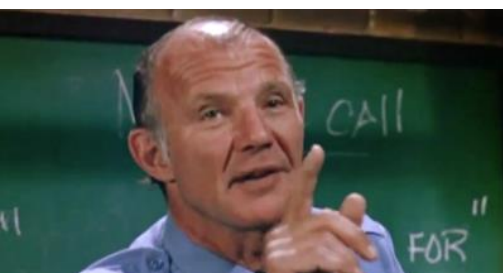
maximum length of a flight segment. As a younger pilot, my flight legs were limited by fuel onboard. I could easily fly 5+ hour legs and remain sharp at the controls. However, as I aged, the length of my flights were limited by my physiological needs. Alas, aging has reduced my flight legs to 3-3 ½ hours.

Final Thoughts

I'm not trying to be preachy here. I just want to give you a chance to inventory your assets. When we are novice aviators, judgement is our best asset, and our mission is to learn from our experiences and increase our skills.

As we gain experience and skill, we become more knowledgeable and aware of risk management. Judgement improves with experience and then, as we grow older, judgement clearly becomes our most valuable asset.

Here's to Mooney pilots... the best GA pilots in the world... flying the best airplanes in the world.



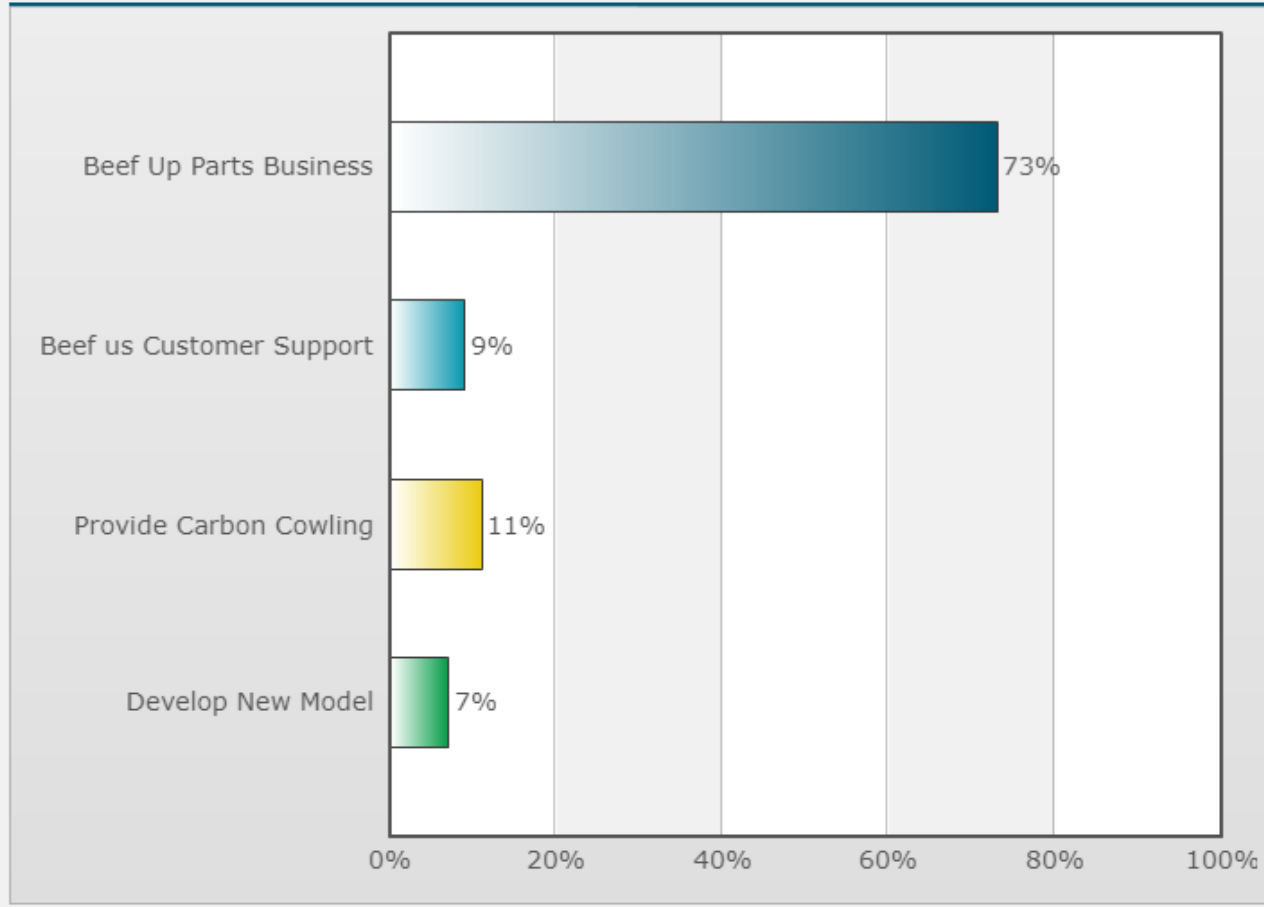
As Hill Street Blues' Phil Esterhaus would say, "Let's be careful out there".



I hope the "new" Mooney Owners

Poll created by [Phil Corman](#) on 11/02/2020

Poll Results



Next month's poll: "Has COVID affected your Flying?" [CLICK HERE](#) to vote.



APPRAISE IT
Check Your Mooney's Value



[M20C](#) [M20E](#) [M20F](#) [M20G](#)
[M20J](#) [M20K](#) [M20R](#) [M20M](#)



CLICK HERE for the most comprehensive list of Mooney instructors in the United States



Letters to the

EDITOR

Editor@themooneyflyer.com

RE: Kindness of Strangers -- I read about the Good Samaritan in Utah in the latest issue. It's a wonderful testament to the fact that fellow aviators will always stop to help out a compatriot. However, I was immediately struck by the fact that the author/pilot knowingly took off (for a night flight, no less!) with a battery that wouldn't charge. I know in my Ovation this is a blatant violation of airworthiness. I'm guessing that the pilot's Mooney is an older one with 14v system, judging by the fact that he was able to jump start with a car, so perhaps the airworthiness issue is different in these planes. But leaving that aside, the battery is the last line of defense if the alternator ever does head south, so taking off at night, over the inhospitable western US terrain, with a knowingly bad battery seems like very risky behavior to me. Curious what others have to say.

Happy New Year! **Jeff S**

Editor's Note: *As Jeff points out, departing with a mostly discharged battery at night removes the redundancy and safety of the alternator/battery combo.*

RE: UL94: Interesting issue here about UL94: We have had SwiftFuel for a couple of years. Nearly all of our sales of this product are to landscapers and operators of small outboard motors and some motorcycle owners. Currently we have no based aircraft using UL94. Our current pump price is \$7.12 (except for pilots who can buy it for \$5.12). The pump price is listed on AirNav.

Non-ethanol gas is sold by auto supply stores, hardware stores, Home Depot, Wal-Mart, etc., in one- and five-gallon cans (you can Google this) for prices like \$22 for a one gallon can. There is no Mogas available in the vicinity. These customers avoid ethanol like the plague! To them our price is a bargain beyond belief!

Rae W

Editor's Note: *UL94 still has a way to go. It can only be used by smaller bore engines and carries a higher price tag. UL100 will be able to be used by all pistons, but it's years away. Rae's point is taken.*

How do you get cloud tops on Foreflight with Status input? Or do you have Foreflight Pro?
Thanks, **CarolAnn**.

Editor's Note: Cloud Tops is an airborne ADS-B feature. On the ground, it is invisible.

- When you are flying:
 - Touch Aero & VFR (upper left of screen).
 - In the area where you would normally select "Radar" or "Icing", you will find "Cloud Tops"
 - Select it.
- NOTE: According to ForeFlight, you do not need a PRO subscription to display Cloud Tops, Jim

Fuel Mismanagement – Avoidable Accidents

Last winter we wrote several articles on how Gear Up landings occur and a tried-and-true method to reduce the likelihood of a Gear Up happening to you. Every year, about 70 Fuel Mismanagement accidents occur. Sadly, these are caused by the pilot's action, and his or her failure to make a correct decision or take proper action – otherwise known as Pilot Error. Fuel mismanagement is always avoidable if you carefully learn from the mistakes of others. There are two types of fuel mismanagement, Fuel Starvation and Fuel Exhaustion.



Fuel Starvation

This happens when your propeller stops spinning and the engine goes silent, but you still have fuel in your Mooney. As you guessed, it's because you ran out of fuel in one tank, but there is fuel in the other tank(s). This type of mismanagement is remedied by simply knowing your Mooney's fuel system. When I transitioned from a high wing to my first Mooney, I learned to manage each tank, as opposed to the idiot-proof Cessna gravity feed. Early in my transition, I made a rookie mistake when checking my fuel. While standing in front of my Mooney, I subconsciously noted that the tank on my left was lower in fuel. When I got into the cockpit and was looking forward, my simple brain still whispered that the tank on the left (which is now to my right) was lower. As I was descending into Reid-Hillview, the engine sputtered. I realized that I had transposed fuel tanks in my mind. It never happened again. Get into a tank management routine. Some people fly on each tank for 30 minutes. Others fly for 30 minutes and then switch every hour thereafter. Others fly a tank dry, but because this tends to frighten passengers, I don't like this choice.



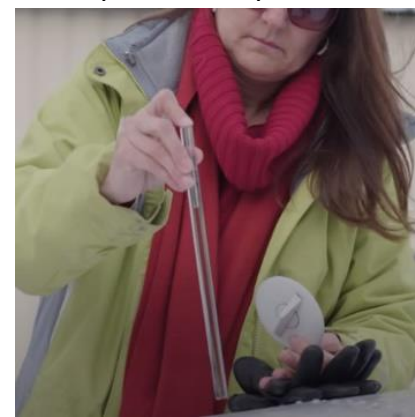
Fuel Exhaustion

This occurs when you exhaust all the usable fuel on board. This is unacceptable. Why does it occur? Here are some reasons:

- Gas is too expensive here, I'm pretty sure I have enough to fly home.
- Headwinds are stronger than forecast or anticipated (An Early Warning Indicator should light up in your head).
- Enroute, you had to divert for some external reason, like weather or ATC vectors, eating into your fuel reserves.
- The worst reason is, you didn't check your fuel and/or your fuel requirements before departing.

All the reasons for fuel exhaustion are avoidable if you just follow these rules:

- Manually check your fuel tanks visually with a calibrated stick. You can make your own if you cannot buy one.
- Know your fuel burn and cross check with your fuel totalizer or your engine monitor to know how much usable fuel you have in each tank. Know your unusable fuel quantity.





Accurate Reading



Inaccurate Reading

➤ Never, never, never rely on your fuel gauges for anything. As you know, the only airworthiness criteria for a fuel gauge is that “it must indicate empty when the tank is empty”. Never rely on your fuel gauge indication. Fuel Gauges are perhaps the most useless instrument on your panel.

60% of Fuel Exhaustion accidents occur because of poor flight planning, so proper preparation can help eliminate the possibility of Fuel Exhaustion. If you use an EFB like ForeFlight or Garmin Pilot, you can enter your aircraft’s performance profiles, which includes the fuel burn rates for takeoff, climb, enroute and descent. Then, allowing for the forecast winds, it will calculate your planned total fuel burn. What an amazing tool!



As with all things in aviation, using the “just in case” criteria, you should inflate the total fuel burn somewhat to give you a buffer. If headwinds or route diversions become significant, then just land and buy some additional fuel. If you plan to land with reserves that are less than 30 minutes in VFR or 45 minutes in IFR, then you are in a higher risk category for fuel exhaustion accidents. I recommend that you always plan to land with at least one hour of fuel reserve.

Summary

According to the NTSB, these are the most common reasons pilots run out of fuel enroute:

- Improper Planning
- Fuel Mismanagement
- Computational Errors
- Poor Decision Making
- Not Declaring an Emergency when Low on Fuel
- Guessing or Assuming
- Distractions

Don’t let this easy stuff put you on the ground prematurely and off airport. Fly Safe!



Al Mooney said, "During my freshman year in high school, I asked my math teacher what I should study so I could design a safe airplane. He laughed, said no airplanes were safe and advised me to wait until I was in college." Realizing his current schooling would give him very slim chance of learning the things he wanted to know, he began spending time at the Denver Public Library, where he read all of the available handbooks for pilots and designers. [Reference The Al Mooney Story.](#)

Small Things that Might Save Your Life

I personalized my aircraft checklist so that it includes everything that is on the Mooney Checklist. Over the years, I learned that I



occasionally overlook some things, so I added more items to the checklist. I try to faithfully use my beloved checklist from preflight to bed down. However, one day, in a moment of weakness, I was unfaithful to my checklist. You can call it laziness. Perhaps it was the know-it-all teenager Jimmy Price that was in charge that day after I landed at MCAS Yuma (KNYL).

When approaching the runway for landing, I always apply full nose up vertical trim. It helps with the flair and is part of the reason that I consistently enjoy beautiful landings. When clear of the runway, I then accomplished the AFTER LANDING checklist. This includes:

- Wing Flaps – **UP**
 - Cowl Flaps – **OPEN**
 - Exterior Lights – **AS REQUIRED**
 - Trim – **SET FOR TAKEOFF**
 - Mixture – **LEAN**
- I accomplished all but one little item – Trim – **SET FOR TAKEOFF**

An hour later, after I had completed my business at the FBO, I returned to my aircraft and started my engine.

- The Before Takeoff checklist includes:
- Nav/Comm – **FLT PLAN: ENTER, FREQ'S: SET, GPS CDI: "GPS" or "VOR"**
 - Transponder – **CODE SET + ALT**
 - Pitot/Prop Heat – **CONSIDERED**
 - Belts & Harnesses – **FASTENED**
 - Trim & Flaps – **SET FOR TAKEOFF**
 - Departure Briefing – **COMPLETE**

On this day, I had set the flaps, but somehow skipped the TRIM setting.

I was cleared for takeoff and around 70 knots, the aircraft leaped into the air with an extremely high angle of attack. The tower controllers must have thought that I was foolishly attempting a loop or an Immelmann.

Right away, I knew I had forgotten to place the trim at the Takeoff Position. I pushed forward on the yoke with all my might, while trimming nose down – wishing it would trim faster.

Why did I miss setting the trim in the TAKEOFF position, not once, but twice? Could it have been a distraction or pilot arrogance? Perhaps both. I do know that I never want something like that to happen again.

We have learned through sad experience, that the faithful use of checklists is vital to aviation safety. In 1935, the U.S. Army Air Corps held a flight competition for airplane manufacturers vying to build the next-generation, long-range bomber. Boeing submitted the Model 299. On October 30, 1935, at Wright Airfield in Dayton, Ohio, a small crowd of Army brass and manufacturing executives watched as the Model 299 taxied onto the runway. It was sleek and impressive with four engines.



The five-man crew was led by Major Ployer (Pete) P. Hill. The co-pilot was Boeing employee Les Tower. The plane roared down the runway, lifted off smoothly and climbed sharply to three hundred feet. It stalled and crashed in a fiery explosion. Three of the crewmembers survived, but Tower and Hill died. Hill AFB near Ogden, Utah is named after Major Ployer P. Hill.



While managing this complex aircraft, Major Hill had forgotten to release a new locking mechanism on the elevator and rudder controls. The Army deemed the Boeing Model 299 as "too much airplane for one man to fly". Boeing knew that Major Hill was the U.S. Army Air Corps' Chief of Flight Testing, so requiring more training for Model 299 pilots wasn't the answer.

In an effort to save the project, Boeing's test pilots created the first pilot's checklist, with step-by-step checks for takeoff, flight, landing, and taxiing. The U S Army Air Corp eventually ordered thousands of the Boeing 299s and designated these as the B-17 "Flying Fortress".

A checklist may seem like a piece of paper, but it's written in the blood of pilots like Les Tower and Pete Hill. Faithfully using it is not a sign of weakness, but a sign of strength and professionalism!



Safety Checks – Double Checks

There is a simple way to double check the important things just before you take off or land. These Safety Checks can put your mind at ease.

Before Takeoff Safety Check (Recommended by Mark Baker, AOPA President)

Fuel –FUEL SELECTOR in proper position, and **BOOST PUMPS** and **MIXTURE** set.

Fire –MAGNETOS and/or electronic ignition completely on.

Flight Controls – **FREEDOM OF MOVEMENT**, and **FLAPS** and **TRIM** set for takeoff.

Before Landing Safety Check (Recommended by Wally Moran, Former Airline Pilot, DPE,

NAFI Flight Instructor Hall of Fame, Pilot Workshops and The Mooney Pilot Contributor) This Safety Check is attached to my instrument panel:

Gear – **DOWN**

Prop and Mixture – **FORWARD/RICH**

Fuel and Flaps – **AS REQUIRED**

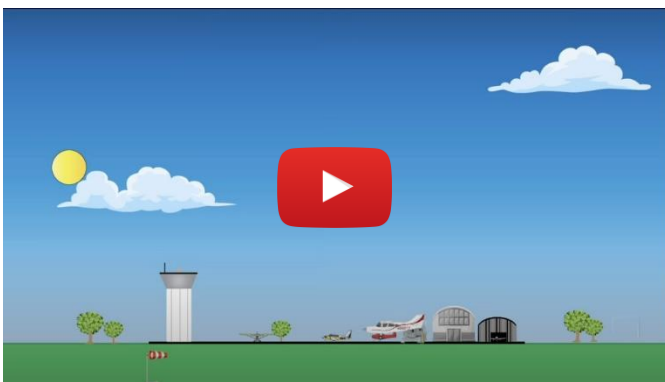
These small and seemingly insignificant additions will not only save your ego, but maybe your aircraft and your life. In fact, you should determine that you will faithfully fly safely so that you can get out of this life without the government naming an Air Force Base after you.

Fly Safe and Often,

Jim



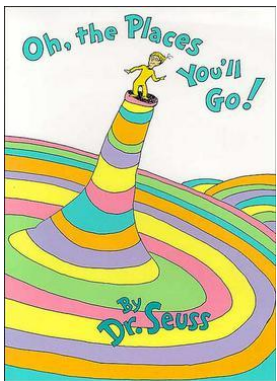
How to Fly the Pattern without making a \$%*%\$ of Yourself



Checkout this YouTube Video

[Click Here](#)

Oh, The Places You'll Go – Part III



Here we are with the third and last installment, the one where we wrap up everything you need to know for a long cross-country. Yes, I'm kidding. I don't think that someone could ever tell you everything you need to know, because there is always something new to learn. Helmuth von Moltke, 19th century leader of the Prussian Army said, "No battle plan ever survives first contact with the enemy." If he was a Mooney pilot he might have said, "No cross-country planning survives unchanged after take-off." The reality is that often your plan will not survive the pre-flight briefing without changes.



by Richard Brown

We aren't flying at Cessna or Cherokee speeds. This greatly increases our chances of flying into a new weather system, especially on long trips. I have two tips for this concern. **First**, having weather available in the plane is not required, but it is really nice. Once you have flown a cross-country trip with it, you will never want to fly without it. If you missed last month's article, go back and read where I wrote about inexpensive options for getting weather on a tablet in the plane. Always remember that the radar images are delayed, and they are only to be used for strategic, and not tactical planning. Nexrad images will help you go around a system, but you don't want to roll the dice and think they will help you pick your way between cells. If you want a good example of how not to use in-cockpit- weather, check out the [Air Safety Institute video](#) about a fatal Piper Cherokee Six crash.

The second part of the weather factor is preparation. For a long trip, I start watching the en-route and destination weather about a week in advance. I do this to get a feel for the way the weather is trending, and it helps me adjust departure times and the route. I'm currently just a VFR pilot, but in the past four years, that hasn't stopped me from flying between 100-140 hours per year. Most of these flights were long cross-country trips. Before I fly, I get a full briefing online from [1800wxbrief.com](#), and if I have any questions, I will call Flight Service and talk to a briefer as well.

The third part is to be flexible. Be flexible with your departure/arrival times, be flexible with your route, and be flexible with your destination. Always leave yourself an out. Never get stuck having to be somewhere and suffering from a case of "get-there-itis". If you absolutely must be somewhere at a certain time, take a commercial flight or drive.

I like to tell stories, so let me tell a few relating these points to my flying experiences. In June of 2017, with about 120 total hours of flight time, we planned a 700 nm trip from Southern California to Rexburg, ID (KRXE). This would be the longest trip I had ever made, and when we made a fuel stop, heading away from home, it felt great! I had been watching the weather, and the only thing of concern was the typical summer thunderstorms that pop up in the mountain west. I got a briefing before leaving Fullerton (KFUL) and it was forecast clear flying all the way to our fuel stop in Delta, UT (KDTA). While on the ground in Delta, I checked the weather again and saw storms north of the UT/ID border. Instead of relying on an online briefing, I called Flight Service for a full briefing, looking for some further insight. The briefer said that there was a small system just north of the UT/ID border, but that it would likely dissipate before we got there.

If it didn't, he said we would probably be able to get around it by diverting west of Pocatello, Idaho, about 40 miles west of our intended route.

After 15-20 minutes with the briefer, we decided to give it a go, but before we did that, I got in touch with my sister in Salt Lake for a back-up plan. If we had to turn around, we would come back to Salt Lake and spend the night with her. Always have a backup diversion plan; a place where you can get a hotel room or stay with friends or family. While small towns are great, keep in mind that you will have more options for transportation and lodging in larger towns/cities, and in the current age of COVID, keep in mind that some airports will not have a courtesy car available.

I spent the next 45 minutes of flying, watching the weather on the tablet and out the window.

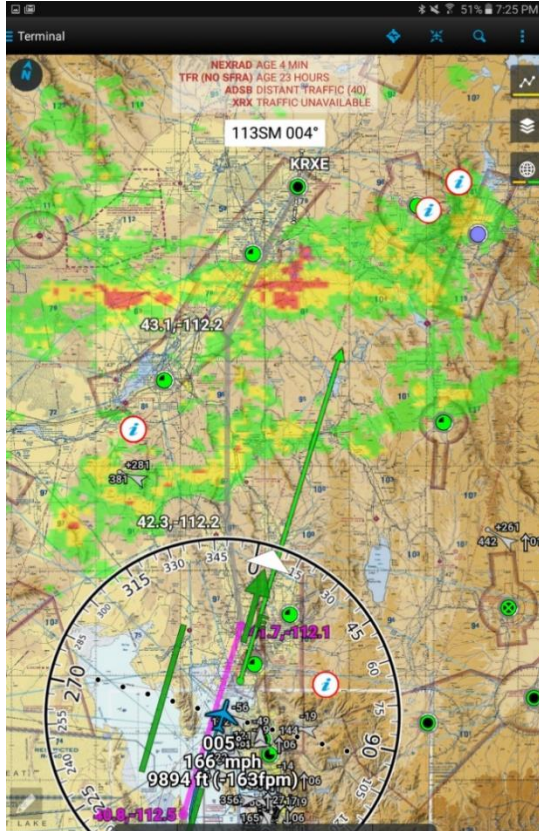


Figure 1 - Storms Ahead

With the weather on the tablet, I could see that the storms were all moving directly to the east. Rexburg was clear, so I knew that if they didn't dissipate, I could at least go around them and reach my destination.

Visibility was excellent, and as I watched one particular storm, both on the tablet and out the windshield, it was obvious that it would be right on us as we reached 9,300' Mount Oxford. So, we made a turn to the west. We would turn north after passing that storm and then make a further diversion westward to get around a storm over Pocatello that just wasn't going anywhere. Once on the north side of those storms, we had a great tailwind and a ground speed of just above 200 mph; not bad for my little old M20D. The diversions cost us some time and had us landing just after dark, but we arrived safely without any excitement. (I like boring trips). Without the weather on the tablet and being able to see the storms in front of us, we would have turned back to Salt Lake. Having the big picture allowed me to make strategic decisions and get around the weather to our destination.

Sometimes you might watch the weather for a week leading up to a trip and decide to drive. You will have times when the forecast is wrong and you could have flown. There will also be times when the actual weather confirms you made the right choice to drive.

A little over a year ago, we had to be in Salt Lake to see my son-in-law receive his master's degree. It was an event not to be missed. The weather looked good for flying, but there was a snowstorm that was supposed to arrive that night and last 2-3 days. The only change in the forecast over the week leading up to the trip was that the storm forecast got worse, not better. I had to be back at work the next Monday and did not want to risk being trapped on the ground, so we made the 10-hour drive. As forecast, the weather was clear on arrival day. I went to bed that night expecting to wake up to snow. I woke up once in the night, looked out the window and despite the snowstorm that was supposed to begin around midnight, I could still see stars in the clear night sky.



The next morning it was a high overcast sky and by mid-morning when we were leaving, the snow was still not falling. We could have flown our Mooney.

Fast forward a year later to the end of December 2020 when we needed to go to Idaho so my son could attend his best friend's wedding. It was a trip made for the Mooney, and I didn't want to drive 13+ hours each way. After a day in Idaho Falls, we were to go back down to Salt Lake for a few nights and then return to California. Again, I watched the forecast for 10 days leading up to the trip. It was supposed to snow the evening after our scheduled arrival and then possibly clear up the next day. For ten days the forecast didn't change, and we finally decided we would drive. We arrived in Idaho Falls an hour before the wedding reception, greeted by snow flurries, and left the reception with a few inches of snow on the roads. The next morning, when we would have been flying to Salt Lake, it was low overcast, freezing, with horrible visibility. I kept an eye on the weather throughout that day and the next. We would have been trapped on the ground in Idaho Falls and missed seeing family in Salt Lake.

I am conservative when it comes to my flying. As I said before, I like boring flights. Never regret those times you could have flown and didn't. As the saying goes, "It is better to be on the ground wishing you were up there, than being up there wishing you were on the ground."

The last topic related to the weather, be flexible. When we made the decision to fly coast to coast in 2019, we picked a month and a tentative window. If we found a 10-day forecast that looked favorable, then that was when we would go. I planned for two different fuel stops and destinations, far enough north and south of our route to hopefully have different weather. The next morning when we got up, I would look at the forecast and decide which route we would take. It was a stretch for me because I like to have everything planned out well in advance. However, it led to some great adventures. On the way there, we saw some beautiful country and due to changes in our route, had a last-minute meet-up with a friend in Memphis for what is the best Bar-B-Que I have ever had. We had a great time in North Carolina and the Eastern Shore of Virginia and even landed at First Flight.

For the return trip, I had looked at the weather forecast and planned to take a northern route through Kentucky and Missouri. I had fuel stops and overnight destinations picked out. However, I woke up to find the forecast was all wrong and our route was now blocked by thunderstorms. In a Mooney, if you are making a multi-day trip, changing your route by 200 to 300 miles is not a big deal and it can be fun. We ended up taking a southern route and landed in Augusta, Georgia, with views of the Augusta National on final approach. Next, we stopped in Meridian Mississippi and pulled up on the ramp next to a couple of T-45 Goshawks and a T-38 Talon. We even used the weather on the tablet to steer clear of some scattered storms over Alabama.





The last item is the easiest and concerns maintenance away from your home base. Be sure that you have a credit card with a decent limit on it!

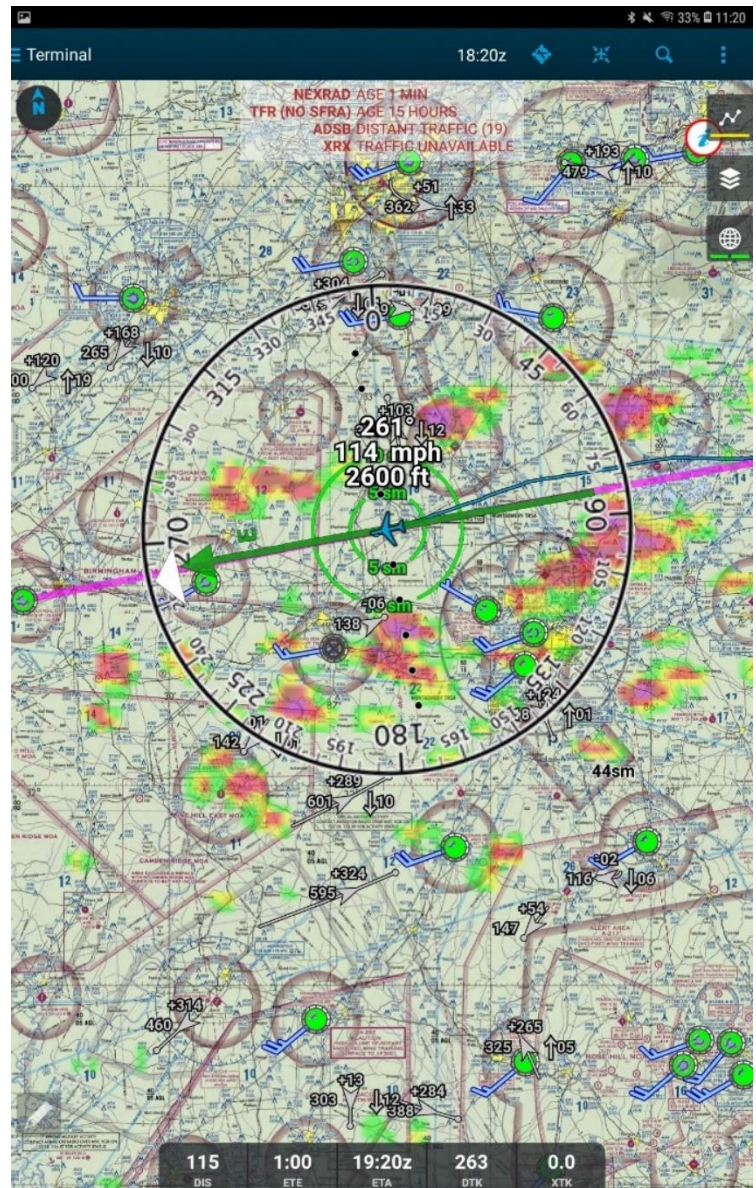


Before you get out the pitchforks to lynch me, I said it was the “easiest” but did not say it would be the “cheapest.” If you are away from your home base and something breaks, there isn’t much that money and time can’t fix. For the first three years and 300+ hours, I carried a small toolbox with quite several things in it. Given the actual simplicity of a Vintage Mooney, I could have disassembled much of the plane with what I had in the baggage compartment.

In all that time, the most I ever did was swap out a spark plug that had shorted out. Now I carry a couple screwdrivers, a set of pliers, a spare spark plug, and the wrenches needed to change a plug along with a couple quarts of oil. I do a lot of the work on my plane under supervision of my AP/IA, but if the problem is more complex than changing a plug, I'm just going to pay someone to fix it.

If you fly long enough, there is a good chance you may be stuck leaving your plane somewhere to get fixed and coming back later for it. It's "just time and money." I'm going to knock on the wooden end table as I type this, but the plane doesn't know if you are 50 miles from your home base or 500 miles away. It is not going to just quit on you because you flew outside of a certain radius.

So, there you have it, a far cry from all-inclusive tips for cross-country flying, but hopefully some thoughts and ideas to get the creative juices flowing and encourage you to head out on some new adventures in the year ahead.



Why Doesn't My Tail Trail?

Ninth in the series
by Ron Blum

Mooney aircraft pilots are, I shall understatedly state, obsessed about speed. Al Mooney's real obsession was not all about speed but rather about efficiency. Yes, the M20 is fast, but the incredible thing is how little fuel it takes to fly that fast. Efficiency is all about reducing drag. A discussion that undoubtably comes up at every Mooney gathering (planned or on the ramp), on Facebook or on MooneySpace is: "In cruise my elevator is not in perfect alignment with the horizontal stabilizer. The airplane would be X knots faster if I knew how to fix it." Let's take the next couple pages to see why this occurs.

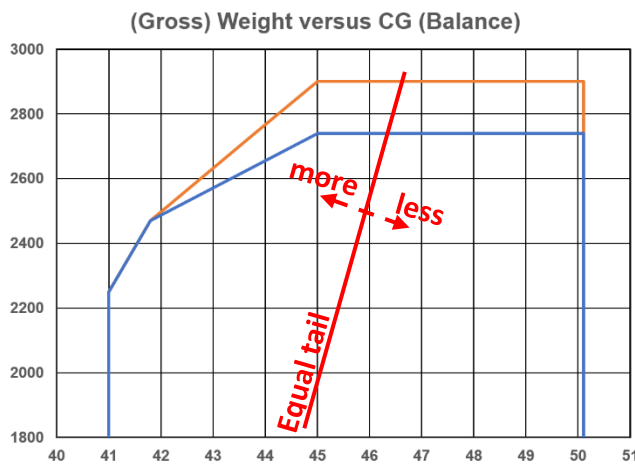


Figure 1 - Weight and Balance

We need to start with a little background information before getting into the de-tails (hint, hint, foreshadowing – look for an Oshkosh 2021 presentation entitled, "It Is All About De-tails :) First, let's take a quick look at weight and balance (Figure 1) - the two M20J envelopes.

What we were all taught in ground school was that due to the lift and pitching moment of the wing, a conventional tail produces a down force. That's a good generalization for what we'll be talking about today. Because of the trimmable stabilizer, (the entire empennage in the case of Mooney airplanes), we have a lot of tail power.

Going back to Figure 1, on the graph, I've placed a guesstimated "equal tail power" line (in red). All along this line, represents the same down force. As weight goes up and/or CG moves forward, more down force is required from the tail. Similarly, as weight decreases and/or CG moves aft, less down force is required. The largest down force required is typically at a point we call the "highest forward regardless point", which in this case is 2250 lbs. at 41". Stall speeds are defined along the forward CG limit (highest speed), in case the tail power is not enough to stall the wing (think Ercoupe). Stall characteristics are worst at aft CG and light weight. We now have all the background we need, so let's look at the tail.



Figure 2 - Tail not in trail

To be in trim (balanced), the tail moment must offset the wing moment. We do this by relaxing force on the yoke and trimming the stabilizer until we are flying "hands off." All is good; right? That is until we look back to see that the elevator is not aligned with the stabilizer (Figure 2). Thanks, Dave Ketcham for the great photograph! OMG!!! What are we doing

wrong? In a word, "Nothing," and I'll explain why.

Like the airplane needing to be in balance to fly hands off, (the aircraft sum of moments is zero), the elevator is also “in balance”, and its sum of the elevator hinge moments **also** needs to be zero. This balance is affected by: static balance of the elevators, aerodynamic load on the stabilizer, aerodynamic symmetry of the elevator itself, (has hangar rash modified the trailing edge?), the flight control system forces, (there’s weight, even if you are not pushing or pulling on them), friction in the system and the big one in this case, the down spring. All three fuselage lengths have different down spring forces and there are small rigging variations within the three lengths. But we’re not done yet.

In the case of Dave’s airplane, Figure 2 indicates that he is flying at a more aft CG. Why does this matter? Because he is flying at a more aft CG, he needs less tail down force. This means that the horizontal stabilizer is more nose up to provide less down force. The down spring geometry is designed to provide more down elevator, trailing edge down - TED force, while at slow airspeeds when the stabilizer is more nose down, and it washes out or lessens as the stabilizer moves nose upward.



Figure 3 - M20M elevator in the static position

For example, Figure 3 is a photograph of a static, (in a hangar), M20M elevator. Without any aerodynamic force on the tail, the down spring is pulling the elevator trailing edge down. It takes a “significant” force to raise the elevator to the streamlined position. The force required to move the elevator to streamlined will

change with the stabilizer position. My educated guess is that this pilot left the stabilizer in the landing position. It’s a rental airplane 😊. If you’re curious, here’s a test for you.

With the airplane setting in a hangar, move the stabilizer to the aircraft full nose up position (slow speed). Walk back to the trailing edge of the elevator and feel how much force it takes to move the elevator to a faired position. Remember that the force will be different with the three body lengths. Now, move the trim a little aircraft nose down, (about 1/3rd of the travel). Check the elevator force again. Repeat until the trim is in the aircraft full nose down position, (high speed). The force to move the elevator to a faired position should decrease each time the stabilizer trim position is moved.

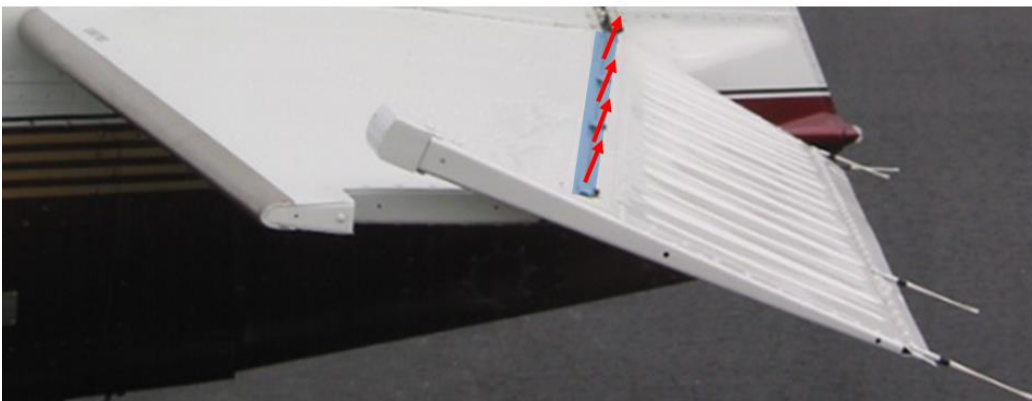


Figure 4 Mooney's great rolling gap seal

Let’s finish up with a short discussion about additional trim drag due to the tail, (elevator) not trailing. This incremental drag is small. Mooney aircraft have a great, aluminum, rolling gap seal design (Figure 4, shown in transparent blue).

The aluminum from both surfaces, (stabilizer, trailing edge, and elevator leading edge), are formed such that they both go through, or very close to, the hinge line. If these surfaces are undamaged, as the elevators move through their entire deflection, the gap will remain very small; zero on some airplanes. The incremental drag is very small, as moving the elevator simply gives the horizontal tail a little camber. In addition, the down spring is there to meet certification regulations for longitudinal (pitch) stability. Happy trails to you!

Santa, a nephew in this case, was good to me this year and bought me a little sports camera (like a GoPro). Next month, if all goes well and I find a willing test airplane in the Wichita area, we will discuss the infamous Mooney tail and its superb aerodynamics.

I appreciate suggestions on where to take these articles and/or answer any questions you may have. Please email me at solutions@blueontop.com. Until next time keep the blue on top.



Ron Blum is an aeronautical/astronautical engineer with a 35+ year career managing general aviation Flight Test and Aerodynamics departments from shore to shore and border to border. He was Chief Engineer of the Mooney M-10 in Chino, CA. He founded Blue on Top LLC, providing engineering and management consulting, Flight Analyst DER services and keynote speaking.



The best pilots fly more than the others; that's why they're the best. Chuck Yeager

Think, Jingle Bells



By Jerry Proctor, MAPA SF

VOR, VOR, VORrr all the way, oh what fun it is to fly the old, old fashioned way, HEY!

Did the tune come into your head? Sorry for my usual weak attempt at opening line humor. I wrote this article two days after Christmas, so I had an endless supply of Christmas tunes running through my head.



My wife and I went for a flight the morning of December 27. For her, it was a beautiful, very clear, smooth flight. For me, it was the same beauty, but I planned to conduct a short flight, relying ONLY on the VOR for navigation. Sounds simple, doesn't it? I have a G1000, so I admit that I put the GPS points in the G1000. However, I promise I did not use it for navigational reference. Ok, maybe I peeked once or twice, but I was mostly using the G1000 to check for the accuracy of the VOR way points.



The flight was from my home base at Ft Huachuca, AZ (KFHU) to New Mexico's first airfield, Lordsburg (KLSB). This small town was a former Butterfield Stagecoach stop, and later became a railroad water stop and stopover city. It has deep roots in the railroads, but the Interstate and loss of steam engines have greatly impacted the town.



My departure plan was to intercept and track Fort Huachuca's Libby VOR (FHU) outbound to the TOMBS intersection. In 1977, I became an Army IFR pilot in both helicopters and twin turboprop airplanes. Thus, VOR radials run deep in my past. I confess that those radials were deeper than I thought, so I didn't pass myself on my flight. My first mistake was not correctly identifying the FHU outbound radial. The previous night, I had written 011 degrees on my Kneeboard instead of **018**. As my climbout proceeded, it was obvious I had made a mistake. It took a second or three, but I came to my senses and changed the radial, but hitting TOMBS exactly wasn't going to happen. Oops number one. I did have the correct cross radial from the Tucson (TUS) VOR, so I came close to hitting TOMBS. I still gave myself an Unsatisfactory grade!

The path from TOMBS required a direction and VOR change. I navigated on the 232-degree radial and flew inbound to the San Simon (SSO) VOR. That happened okay . . . sort of.

The next intersection prior to the SSO VOR is NOCHI. This is where I had set the crossing intersection from Tucson. NOCHI is an intersection I have flown to many, many times, (using my GPS), prior to flying to destinations East of KFHU. It is at the intersection of two Tango routes, T 310 and T 306. I am sure you are chuckling at me now. Mistake #2: NOCHI does not exist in the VOR world. Now on to the San Simon VOR.

I was getting my sea legs back and I could recognize when I was getting close to the VOR by the increased sensitivity and . . . there goes the needle in reverse. On the way to SSO, I turned the autopilot to ON and it tracked a little bit left and right. It flies better when it's tracking a GPS course. I snickered at my autopilot, "You aren't so hot after all!"

I passed the SSO VOR and Lordsburg was dead ahead. My E6B indicated that I would be at KLSB in 10 min. How about that, I still can "Wizz" it. However, I had more tail wind than planned, so I arrived ninety seconds early – exactly overhead the airport. There is no approach at KLSB, so I just landed. The VOR return path went well and I completed the return home with a VOR approach.



My lessons learned are obvious. It is important to remain proficient with VOR navigation, not just VOR approaches. It is especially important when considering the military's training exercises that involve a GPS outage. We have outage exercises at New Mexico's White Sands Range to my East, at my home base, Ft Huachuca, and at Arizona's Yuma Proving Grounds, to my West. It is not unusual to receive military GPS outage NOTAMs. You never know when the GPS is going to be unusable, so wherever you live, go out there and do a full VOR flight, from start to finish.

MESSAGES
 Loss of GPS Navigation
 Use other NAV if available
 ADS-B traffic has failed

Want more, well come get more at a MAPA SF event coming this year to a location near you.

Jerry Proctor, jprocmooney@gmail.com



"I was always afraid of dying. Always. It was my fear that made me learn everything I could about my airplane and my emergency equipment, and kept me flying respectful of my machine and always alert in the cockpit."

Chuck Yeager

Wisconsin Aviation Expands Aircraft Interiors Service with the Acquisition of Jaeger Aviation & Its Spatial Interior



Wisconsin Aviation, Inc., announces the expansion of its aircraft interiors department with the acquisition of Jaeger Aviation, based in Willmar, Minnesota.

With its roots stemming back to 1945, Jaeger Aviation's sixty-four years of specializing in Mooney Aircraft sales and service made a new interior design for the vintage Mooney a natural. The "Spatial Interior," as this new design was labeled, allows for a simpler and better way to increase cabin space and expedite service while giving the Mooney a look it deserves. The Spatial Interior, now 15 years in the making, is recognized worldwide.

For more details, visit: www.WisconsinAviation.com or www.JaegerAviation.com

Wisconsin Aviation's aircraft interiors department, located in Watertown, Wisconsin (RYV), accommodates all types of general aviation aircraft. Its services include minor repairs to complete customized interior replacements. The Jaeger Aviation products and experience will help continue to grow this department.

Wisconsin Aviation offers a complete line of general aviation services including air charter, aircraft maintenance, avionics repair

and installation, flight training and aircraft rental, aircraft management, aircraft brokerage, and fueling services. The corporation has locations in Madison, Watertown, and Juneau, Wisconsin.

For more information about Wisconsin Aviation, send email to Interiors@WisAv.com or call 920-261-4567.



www. ALPHA AVIATION.com

Alpha aviation, inc.

1.800.653.5112

Owatonna MN

SHOULDER HARNESES & LAP BELTS

- 3-pt Diagonal Replacements & Upgrades
- Add Harnesses by Minor Change
- Inertial Reel Equipped or Fixed Strap
- 2-pt Lap Belt Replacements
- Lift Lever or Push Button Release
- Bolt-On or Hook End Fittings
- AmSafe ® OEM Quality
- FAA TSO-C114 & TSO-c22g



THREAD DETECTIVE

- Available in Inch or Metric
- Most Common Sizes - Coarse & Fine
- Easily Identify Nuts & Bolts
- Rugged Steel
- Strung on a Lanyard



NEW ITEM!

HYDRAULIC AIRCRAFT JACKS

Thousands Sold Worldwide Since 1992

- Purpose Built Jack
- Slide Under Fit
- Clears the Gear Doors
- Concave Piston
- Double Action Pump
- Tilt & Go Wheels
- Heavy Gauge Steel
- Laser Cut & Welded
- Powder Coated

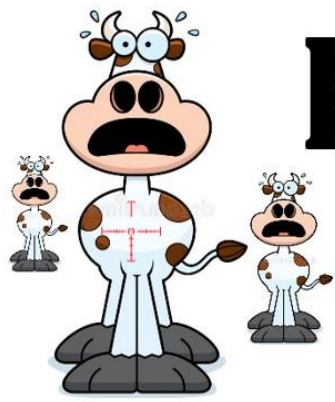
*Ships
Ground*



**100's In Stock
for
Quick Shipment**

**Rules are made for people
who aren't willing to **make up**
their own.**

— *Chuck Yeager*



Killing Sacred Cows

Installation XVII



Brian Lloyd, CSEL/CMEL, CFIA/CFII

Coming up with something new and useful every month is a challenge. Most of the time something suggests itself from what has happened to me while flying over the previous month. And then there is just the ongoing thread of how to fly more safely while still having fun. This month, two of those things came together — Angle of Attack (AoA) and instrument flying. I am going to start by discussing AoA, move into instrument flying, and then pull the two together at the end.

If you have been reading my missives, you know that as a CFI, I am very oriented toward reducing the incidence of loss-of-control (LOC) accidents. Too many people lose control of their aircraft because they have never been taught to respond correctly to an upset.

One of the first things, and a key to maintaining control of your airplane, is keeping the wing flying so that it may be used to control the flight path of the airplane. The first word in the Upset Recovery Training (UPRT) mantra is “unload”. Unload means to reduce the load (G-factor) on the airplane by reducing the angle of attack (AoA). This does two things:

- If stalled, it gets the wing flying again
- If not stalled, it reduces the rate of change of the flight path and allows more of the lift to be available to roll the airplane upright if it isn't already.

Unless you are flying inverted, which is not likely in your Mooney, unload means to release back pressure on the stick or yoke, and even push forward. When things go wrong, pushing on the yoke, (unload), is almost always the right answer. This needs to be a reflex.

So how do you know you have pushed enough? If the stall warning goes off, you have pushed enough.

Could you have pushed too much? Yes. It sure would be useful to know the AoA. Not only is it useful during an upset, it is useful in a lot of other places as well. For instance, there is a specific AoA for stall (critical AoA), approach (V_{ref} or $1.3V_{s0}$), glide (V_g), etc. We think of V-speeds as speeds, but they are really specific angles-of-attack. As such, the V-speeds vary with wing loading and so must be calculated for the current wing loading. That makes them difficult or impossible to use if the aircraft is maneuvering. When you are pulling on the yoke and you feel heavier than normal, all of your V-speeds have increased. How much? It depends on how many G's you are pulling. That is why an AoA indicator is so useful. The speeds change but the AoA related to those speeds never changes. An AoA indicator is correct no matter how much you are pulling or pushing.

I love AoA indicators. It is one of the most useful safety tools you can have in your airplane. In fact, EVERY airplane should be equipped with a factory installed AoA. Unfortunately, unless you are flying a military aircraft or heavy iron, that isn't case. Fortunately, a lot of aftermarket AoA

indicators are readily available. Some have cool “chevron and donut” indexers that go on the glare-shield and make you feel like your Mooney is an F-18. Some have an indexer-like display but cover a wider range. Some are just gauges with numbers. Some use moving vanes to sense relative wind. Some have special pitot tubes or extra wing ports. Some have no special sensor at all! How does one choose an AoA indicator?

First, how AoA is sensed really doesn’t matter. Both the vane or special pitot tube probe work just fine. The probe-less type can work too. More on this later.

Here is a list of what I look for in an AoA indicator:

1. Must indicate V_{ref} (approach, $1.3V_{s0}$)
2. Must indicate V_s for current configuration
3. Must indicate V_g (or best lift/drag)
4. Must indicate zero AoA (no lift)

Almost no AoA indicators meet all four of these items. Frankly, most don’t meet any of them. You can’t identify V_{ref} unless the AoA indicator knows the flap position and is calibrated for flap position. Item number 2 also requires that the AoA indicator be calibrated for flap position. If the AoA indicator does not have some way of sensing flap position, then it will only be correct for the configuration, i.e., gear and flaps, in which it was calibrated.



Of the instruments out there, I have encountered only two that meet most of the requirements. One is the AOA Pro and AOA Sport systems from Advanced Flight Systems, which is now part of Dynon. The other is from RiteAngle.

The AOA Pro and Sport systems use a differential pressure port, either on the wing or with a special pitot tube. They use a microswitch on the flaps to determine if the flaps are extended or retracted. The only limitation is that it assumes the flaps are extended if not retracted, so it only lets you have calibration for two flap positions. If you are like me and use only two flap positions when on approach in your Mooney, flaps retracted or fully extended, then this system works just fine.

The RiteAngle system uses a vane that measures the relative wind. It also uses continuous flap sensing so it can sense flap position from retracted to fully extended and everything in between.

I have owned and used both of the aforementioned systems. Both work very well.

More and more we are hearing about “probe-less” AoA systems. The two I know of are the Aspen and the new uAvionix AV series (AV20 and AV30). I have the Aspen system in my Mooney 231. (Ok, I sold it, but I still fly it with the new owner.) It works very well. If you have an Aspen Evolution EFIS, AoA is just a software option away. I recommend it.

Before I talk about the uAvionix AV20 and AV30, I want to talk about IFR operation and gyros, because these instruments are mostly primary flight displays with a secondary AoA function. After discussing attitude instrumentation, I will get back to the AoA function of these instruments.

I am a CFI, but I like to teach things that other CFIs don’t. If you want to get a new FAA rating, there are thousands of competent CFIs who can help you do that. If you want Mooney-specific training, the pool of qualified CFIs get much smaller. If you want Upset Prevention and



Recovery Training (UPRT), spin training, or basic aerobatic training, the pool of qualified CFIs gets pretty darned small. I prefer swimming in that smaller pool.

One is not going to teach UPRT and aerobatics in a Mooney. That is why I have two CAP10Bs. It is a side-by-side, low-wing, tail-wheel aerobatic trainer. No, it does not fly much like a Cessna 172 nor does it fly like a Mooney. In the CAP10B, while in a 70 degree bank pulling 3G or rolling upside down, it just feels ... right.

One has to go from one place to another and one has to occasionally fly IFR, even if only occasioned by an un-forecast change in the weather. To that end, I want any airplane I fly to have basic IFR capability. That means a set of gyros and a decent nav-com. I can fly IFR without a big, fancy GPS navigator, but I need gyros and a nav-com.

For safety reasons, my CAP10B has a full set of gyros. Aerobatics are really hard on mechanical gyros, so until the advent of electronic gyros, most aerobatic airplanes had nothing more than a turn-and-slip indicator. Mine came with cageable electric gyros that could be switched off when doing aerobatics. When I acquired my first CAP10B, the attitude gyro was inoperative, so I replaced it with an RC Allen RCA2600 solid-state attitude gyro. It can't tumble and it won't get damaged by aerobatics. It just loses its brains with one roll or one loop, neither of which really caused the mechanical gyro much grief. If I were to get upset, I am not sure it would give me reliable attitude information to get the aircraft back to straight and level. I wanted a replacement.

A couple years back, I met Jeff Bethel of AeroVonics. Jeff designed the attitude system for Aspen and I like his work. Now, he was off on his own, with a new start-up, AeroVonics. As soon as possible, I got one of his gyros, the little AV20. I could do a complete aerobatic routine, roll out straight and level and the AV20 would be dead on. The RCA2600 would be completely off in the weeds. Impressive.



About a year ago, AeroVonics was acquired by uAvionix, and now the AeroVonics AV-30 is the uAvionics AV-30-C, which may be installed in a certified aircraft like a Mooney. I put two of them in the CAP10B and then proceeded to try to confuse them. They refused to be confused. I am VERY impressed. If I had an older Mooney today and wanted to do an upgrade, the first thing I would do would be to pull the old gyros, vacuum system, vacuum pump, and install two AV30s. They even have built-in battery back-up. Everything on them works great except the AoA.

They have a probe-less AoA system which doesn't work. Oh, if you like to fly around mostly straight and level, it will act like it is giving you AoA information; just enough to fool you until you really need it.

To do a probe-less AoA system, you have to use the wing as the probe. Basically it works by solving the coefficient of lift equation backwards. Normally, you solve for lift using AoA and dynamic pressure (CAS) as input. You can rearrange it algebraically, so that you put in lift, CAS, and solve for AoA. The only problem is knowing how much lift the wing is producing. Turns out, that if you know the gross weight of the airplane and the number of Gs you are pulling, you can calculate the lift and, therefore, AoA. Very cool. But you have to know weight.

It is possible to determine the weight when you are flying straight and level. In that case the airplane will be flying at 1G. Now, after calibration, you can compare flight path to deck angle to

get AoA. From that, you can solve the lift equation in the forward direction and figure out lift and therefore weight of the aircraft. Now that you know the weight, you can calculate AoA during accelerated flight. Except they didn't. They try to use the deck-angle and flight path thing all the time. It doesn't work. How do I know? I did a couple of tests.

My first test was a zero-G pushover. When the aircraft is at zero-G, the wing is producing no lift. Therefore, it must be at zero AoA. I pulled the nose of the airplane up to about 45 degrees. The AV30C AoA said I was about to stall, which is correct at that point. I then pushed over at zero-G. I know the AoA is zero, but the AV30 continued to indicate that I was about to stall. It didn't show zero AoA until the nose passed through the horizon. As soon as I pushed over, the AoA indication should have gone directly to zero. It didn't. Not good.

Next test was to bring the airplane to a near stall while pointed at the ground. I did a loop and then, while coming down the back side, I loaded up the airframe, (pulled), until the stall warning came on and then I held it there. I am headed straight for the ground and just about to stall. The AV30 indicated zero AoA. Wrong, again. Not good.

So, with very little effort I can get it to tell me I am approaching a stall when I am not, and to tell me I am as far away from stall as possible, when I am right at the edge of a stall. It doesn't work right. So, the AoA function is not useful in the AV30C

Bottom line, I love the AV30C. It has a whole six-pack in one little 3" instrument for \$2,000. I highly recommend it. It does not lie to you in pitch, roll, or yaw. It will tell you airspeed, altitude, and G-loading. If you get upset in the clouds, you can absolutely count on it to help you get your airplane upright again. However, it doesn't do AoA right at all. If you install an AV30C in your airplane, turn off the AoA function. Don't trust it.

I know, I always sneak in the Sacred Cow at some point. This month it would really be a stretch. Anyway, here goes:

Sometimes the expert or the manufacturer is wrong. Where possible, check it and see.

I like uAvionix. I own several of their products. They seem to be a good, innovative company. They just happened to get the AoA thing wrong.

Ok, it is time to go flying again. Earlier today, I borrowed my neighbor's Bonanza to drop a neighbor off to pick up his plane and then fly to another airport to pick up a new radio. Flying back I was looking at the fuel-flow gauge, which prompted a comment to Faye that I sure do miss the Mooney. Ok, time for some aerobatics. That will take the edge off my Mooney-longing.

Have a great month everyone. Remember to be safe, fly better, and have fun.



In the 1920s, spins and over-loads on structures often killed test pilots. Al knew that in a dive a 9G force would be enough to break up an airplane designed for only 8Gs. Al wrote, "I decided then that limitations to the pilot, written and repeated, would be the only answer. In later years I crusaded for this approach in my meetings with government regulatory people. The idea took years to be accepted but finally was, and airplanes were placarded with maneuvering speed." [Reference The Al Mooney Story.](#)

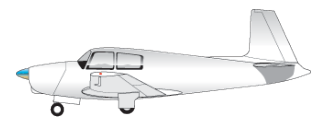


LOEWEN'S MOONEY SALVAGE
Paul Loewen **LMS**
 ...Healthy Donor Parts From Broken Mooneys...
LAMPSON AIRPORT
 400 Lakeview Road
 Lakeport, CA. 95453
 Call: 707 263-0462 Cell: 707 272-8638
www.loewensmooneysalvage.com paulloewen98@gmail.com

There is a big inventory of serviceable airframe parts, including wings for M20C, E, F, G, J, K & R models, empennage assemblies, fuselages, rebuilt controls, rudders, elevators, ailerons, flaps, cowls, engine mounts, landing gear and small parts.

Paul Loewen is offering them online, or by phone. The website is www.LoewensMooneySalvage.com, and he can be contacted in Lakeport, California at **707 263-0462** or by cell at **707 272-8638**. Email is PaulLoewen98@gmail.com. The used inventory is also still available through LASAR Parts at 707. 263-0581

Mooney Maintenance



Visit our Website for all kinds of maintenance resources

The Mooney Flyer
 Magazine for the Mooney Community

Click here

Click here

Download Mooney's 100 Hour Inspection Guide

Search Mooney's new website for Service Bulletins (SBs) and Service Instructions applicable to your Mooney

Click here

Download and search LASAR's Airworthiness Directive (AD) Log – all models

Click here



Ask the Top Gun

TG

Tom Rouch

Founder of Top Gun Aviation, Stockton, California



Send your questions for Tom to TheMooneyFlyer@gmail.com

Dear Tom,

Question: I'm a new Mooney owner and I am curious as to the process of adjusting the gear. Could you walk me through the step-by-step process and explain a few things?

Answer: To answer how to adjust Mooney landing gear, with over fifty years of production and so many models, year after year, it is almost impossible.

We go from the early years, with the simple manual gear, then to the mid years with the early electric gear, and then to the later advanced electric gear models. The actual adjustments are many and not all that simple.

My answer is, if you really want to know how, you need to purchase the Maintenance manuals for your year model and read all the adjustment steps. The gear only needs adjustment when you need to replace parts, during the Annual Inspection if something does not pass the inspection tests, or even on inspection, if a simple item like a gear door is hanging open. Besides the electric actuators, there are numerous adjustable switches, relays, many actuation rods, rod ends, etc. The parts that require changing the most are rod ends. There are at least 20 rod ends and they wear constantly. Most of the problem is lack of lubricant at the rod ends, caused by many Annual Inspections without any lube. We have replaced rod ends that were frozen because they were leaking lubrication. Some broke and caused gear failure. It is mandatory for an A & P mechanic to have the maintenance manual readily available at the aircraft while working on the gear. No one else should even attempt to adjust landing gear. Most of the adjustments are at the rod ends of actuating rods, but once adjusted and lubed every year, they should be trouble free for many years.



Through the years I have repaired many Mooneys that had landed gear up. I even had one of my mechanics drop a plane in the hanger, so am experienced with landing gear. Most Gear-up landings were simply caused by the pilot forgetting to put the gear down, although, most would not admit it. On the early manual gear models, wear at the gear handle unlock would cause the handle to flip down and the gear to retract on the rollout. On the electric models, I have seen occasional electric problems stop the gear from extending, but with an operational emergency system, the gear could be lowered. I have seen double failures, where both systems did not work, usually because there was a lack of proper maintenance.

I am highly in favor of an owner learning how things work. With this greater knowledge, he or she can make better emergency decisions. Maybe you could ask your mechanic to let you observe some of the Annual when the plane is on jacks and opened for inspection. I will admit we prefer no one around while working, but for an owner I would make an exception.

Top Gun Aviation



Specializing in Mooney and Cirrus

(209) 983-8082

For Service and Maintenance, ask for Mark or Tom

FAX: (209) 983-8084

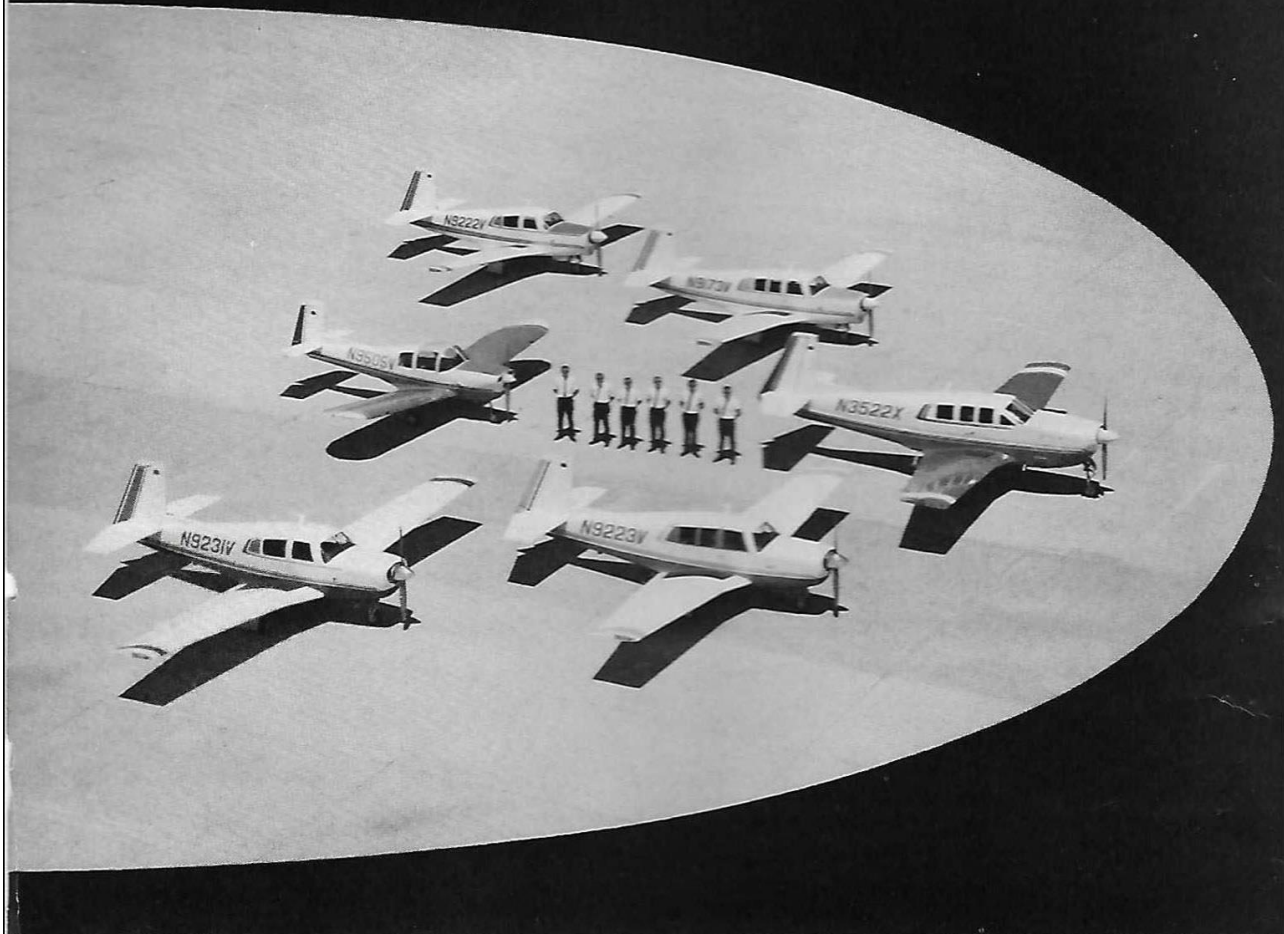
6100 S. Lindbergh St., Stockton, CA 95206

or visit our website at www.topgunaviation.net



Avionics Repair and Installation Services now available on site thru J&R Electronics

Step up to speed in '70.



See the Newest in Modern Flying

Value Engineered Features for 1970

- Pedestal Power Console
- PC Flight Stability
- Electric Gear & Flaps
- Tubular Steel Cabin
- Full Trim Tail
- Integral Wing Tanks

It is a fact—Mooney's modern new line of high performance aircraft are unmatched by other planes in their class. These advanced state-of-the-art aircraft incorporate advantages in structural qualities, ease of handling, outstanding performance, and flight efficiency unequalled by competitive models.

Isn't it time for you to step up to modern flying? Why not discover what real performance is all about. After all, speed is the only real reason for flying and Mooney puts you a step ahead of your slow-flying friends. Join the revolt against the wheel-draggers. Discover cross-country speed at its best! Step up to speed in 'Seventy—fly Mooney.

See them at your dealer's today. For free folder describing the Mooney Cadet, Ranger, Statesman, Chaparral, Executive, and pressurized Mark 22, write Mooney Aircraft Corporation, Department FIF, Kerrville, Texas.



MOONEY

A SUBSIDIARY OF AEL, INC.

MOONEY AIRCRAFT CORPORATION • KERRVILLE, TEXAS

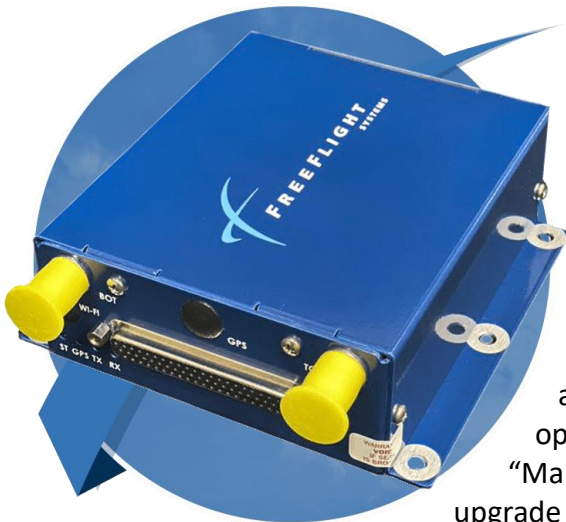
Have you
HEARD?



FreeFlight ADS-B Transceiver

[FreeFlight Systems'](#) Datalink ADS-B Solution has received Approved Model List Supplemental Type Certificate (AML-STC) approval covering more than 400 FAA Part 23 aircraft airframes.

The Datalink ADS-B system, available in both receiver and transceiver options, has received five certifications for ADS-B: Transmission on the 978 UAT frequency, receiving flight information broadcast services (FIS-B), receiving and processing aircraft surveillance application systems, receiving traffic information systems broadcasting (TIS-B), and global positioning systems.



The unit interfaces with Traffic Alert System (TAS) and Traffic Collision Avoidance System (TCAS), and supports Ethernet, RS-232, and ARINC 429 data interfaces.

It is designed to interface with a broad range of aircraft avionics and tablet applications, and also provides a flexible option for upgrading technologies and displays.

"Many of our customers already flying with our RANGR series can upgrade to the new Datalink ADS-B transceiver to improve their situational awareness," said Ashley Ring, vice president of sales and marketing.

For customers using the RANGR series, FreeFlight Systems is currently offering a \$2,500 trade-in to upgrade to the new Datalink Transceiver.

Reno Air Races to return in 2021

The [National Championship Air Races](#) are scheduled to return to Reno for the 57th year Sept. 15-19, 2021 — pending COVID-19 restrictions.

"After canceling the 2020 event we found ourselves with a significant financial loss that we knew would be a tremendous challenge to overcome," officials said. "To make up for this, we launched a fundraiser campaign to 'Save the Races.' Thanks to the support and generosity of the air racing community, we raised over \$460,000 of our \$500,000 goal."



“The amount raised allows us to move forward with planning for our 2021 event,” officials continued. “The safety of our pilots, volunteers, fans and community is our top priority and with the evolving health situation, we’re optimistic that by September we’ll be able to put on a safe and spectacular event for all our race fans.” Those interested should check the website for upcoming announcements about ticket sales, performers, and other news about the 2021 races.

Bigger oxygen bottles

[Aithre](#) has released a 152L oxygen bottle as part of its new portable oxygen bottle line.

The larger size follows on the release of a 47L bottle, which is available at [Aircraft Spruce](#). Measuring 4.5 inches x 13 inches, and 3 pounds full, the bottles boast six hours of use time at 2,000 PSI with a fixed flow of 0.5LPM regulator.

The bottles are 1.12L liquid volume 152L gas volume at 2000 PSI and are self-fill using a custom Aithre-MH Aviation Oxygen Systems transfilling hose and another aviation tank, according to company officials.

They can also be used with the optional MH regulator for use with MH pulse demand and cannula equipment.

Price: \$495, which includes the bottle, combined regulator/valve, custom neoprene sport carrying bag, and a Uni-flo2 cannula.



Garmin adds new elearning courses

Garmin has added an eLearning training course for the G1000 NXi, the [G1000 NXi Essentials eLearning Course](#) is focused on systems installed in high-performance piston and turbine engine aircraft. The G1000 NXi Fundamentals eLearning course is available for \$94.95, while the G1000 NXi Essentials eLearning Course is \$145.95.

[LEARN MORE HERE](#)



Mooney

Events

AROUND THE WORLD



Contact Dave at daveanruth@aol.com or (352) 343-3196, before coming to the restaurant, to have an accurate count. Events begin at 11:30

CANCELLED



MAPA Safety Foundation Pilot Proficiency Program

2021

April 23-25: Santa Fe, NM
June 18-20: Fort Worth, TX

Sep 10-12: Chicopee, MA
Oct 15-17: Wichita, KS

Sign Up at <https://www.mooneysafety.com/ppp-registration/>



MOONEYSUMMIT

[CLICK HERE](#) for details

Australian
Mooney
Pilots Association

March [25-30, 2021](#) - AGM 2021 at Annuka Resort, Coffs Harbour



[CLICK HERE](#) for details

Other Mooney Events

May 21-23: *The Mooney Flyer* is planning a Fly-In to Paso Robles, CA ([KPRB](#)). Dinner on Friday.. Saturday Ramp Arrivals, Wine Tasting, Seminars for Pilots and Passengers at Estrella Warbird Museum (Tours available) Sport competitions, Horseback Rides and SPA Treatments, Wine & Food Party on Saturday night



Mooney Speed Shop

Many of you may not be aware of the Mooney Speed Shop. It's a one-stop online shop for Mooney logo stuff.

A screenshot of the Mooney Speed Shop website. At the top center is the Mooney logo, which consists of a red bird-like shape above the word 'MOONEY'. Below the logo, the website is organized into several product categories, each with a representative image and a 'SHOP NOW' button. The categories and their items are: Apparel-Men (dark blue t-shirt), Apparel-Women (dark blue long-sleeved shirt), Apparel-Youth (white t-shirt with sunglasses), Business Accessories (black laptop sleeve and wallet), Decals / Signage / Skins (oval Mooney decal), Gifts, Food & Accessories (white star-shaped gift), Golf Products (golf club headcover), Headwear (black beanie), Outdoor / Leisure (black blanket), and Promotional Products (two white promotional pens). At the bottom of the page, there are links for 'FAQ | Contact Us', 'Privacy Policy | Terms of Use', and a copyright notice: '© 2021 - Advanced-Online, A Follett Company'.

As you can see, there are men's and women's clothing, even kids clothing, as well as hats, gifts, and accessories. The prices seem reasonable. We have ordered shirts, jackets, decals, etc. This is not Amazon Prime, so it may take 10-14 days to arrive.

Go to <https://mooneyspeedshopm.merchorders.com/> to check it out.



Parts for Sale



This Cowling was removed from a M20E and replaced with a M20J (201) cowling. The cowling is located at Fullerton Airport (KFUL) and is in excellent condition. Offers accepted

Contact: Bernard Lee – leebern@msn.com (562-865-2547)



P/N 310309-501
P/N 310309-502

These fairings are new and priced @ \$280.00 each or \$525.00 for both. Priced elsewhere @ \$362.69 each.

Contact: Bernard Lee – leebern@msn.com (562-865-2547)



Bushing P/N 914007-003 - 2- Bushings in the original package @ \$35.00 each. Priced elsewhere @ \$45.00 each.

Bushing P/N 914007-005
1-Bushing in the original package @ \$59.00
1-Bushing loose @ \$50.00
Priced elsewhere @ \$69.00 each

Contact: Bernard Lee – leebern@msn.com (562-865-2547)



Access Covers P/N 3000-901 (2-available) - 1-without nuts attached.

Make offer. Contact: Bernard Lee – leebern@msn.com (562-865-2547)

1/3 SHARE FOR SALE

Two partners are offering the final 1/3 co-ownership share in this excellent, incredibly unique and well-equipped aircraft. Over \$50,000 spent over the last two years, upgrading and sorting it out. The share price is \$45,000. TTAF is about 3160, engine SMOH About 1320 (Mattituck Red/Gold). We have Calculated that 1/3 of the fixed expenses will be around \$5,250 per year. Reserves TBD. Photos and all records can be provided. The plane is hangered at KCCR Concord, CA.

- Garmin GNS 430 WAAS
- King KX 155 N/C/LOC/GS
- Castleberry electric back AI
- King KFC 150 FD/AP alt hold, climb/descend, simulated GPSS
- King KCS 55A HIS
- Garmin GTX 330 ES TXP with traffic, ADS-B out
- Newly Overhauled KX 256 AI (\$1,730)
- King KN 64 DME
- New Garmin GMA 345 Audio Panel
- New JPI 830 with *all* options
- ADS-B in including traffic, weather, Sirius XM, etc. via a new certified Garmin GDL 52R hard wired to a panel mounted Garmin Aera 660. A new yoke mounted Aera 760 will be hard wired to provide IFR charts and Additional features, More Bluetooth connections for portables and iPad available from the GDL 52R
- Newly Overhauled BFG WX 1000+ stormscope, display and processor (\$1,890)
- 28-volt electrical system
- Astrotech LC-2 clock
- Electric trim with CWS
- Yoke mounted AP disconnect and ident.
- Electric Back-up vacuum
- New STC'd gear and stall audio alarm (\$1,100)
- Built-in CO2 detector
- Speed brakes completely overhauled January 2020 (\$2,800)
- Four place intercom
- 2900 GW STC
- Two built-in David Clark 20-10X ANR headset jacks with headsets
- CYA 100 AOA with custom housing, (not yet wired) (\$1,690)
- Useful load 992 lbs.
- Air/Oil Separator
- Reiff Preheater, 2 sides
- Removable back seats
- Articulating seats
- Inflatable lumbar support
- Indirect interior lighting
- Kool scoop
- Wing mounted fuel gauges
- Two place Sky Ox oxygen tank with custom rack
- Sidewinder electric power tug
- B-Cool ice cooler with remote switch
- Annual completed February 2020 by Top Gun Stockton MSC.
- Tan leather interior redone 2012, good condition, front sheepskins coming soon
- Custom black front floor mats, custom cover, cowl plugs
- Original paint. Pleasing colors. Looks very good at 8'.
- The plane starts right up hot or cold, good compressions, does not use much oil, good oil analysis, runs very smoothly, flies great.
- Recent avionics fan, fuel pump, starter, battery, airstop tubes on mains
- New shock discs 2 1/2 years
- No back clutch spring was installed 2 1/2 years ago



Give me a call anytime at 510 377 0129 or email bradinc@astound.net. Thanks! Steve

Rusty Pilot or Old Pro



INSTRUMENT PROFICIENCY CHECK
Study Guide
J D Price, CFII, MEI, ATP

FLIGHT REVIEW
Study Guide
J D Price, CFII, MEI, ATP

Prepare online **FREE** JDPriceCFI.com