The Mooney Flyer

The Official Online Magazine for the Mooney Community

www.TheMooneyFlyer.com

September 2022

Editors

Phil Corman | Jim Price

Contributors

Bruce Jaeger | Tom Rouch | Ron Blum | Richard Brown | Linda Cormar

Departments

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

Mooney Mail – *Feedback from our Flyer readers.*

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

Product Review – Skyryse

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

The Fatal Berm by Jim Price

How to Almost Eliminate Gear Ups by Phil Corman

"Rambo" gets a new Spark (SureFly) by Don Peterson

Take Someone Flying by Richard Brown

Warning! Acronyms Ahead Quiz by Jim Price

Don't Make These Common Mistakes on Crosswind Operations by Phil Corman

How Do You Slow Down? By Jerry Proctor

How I Became a Mooniac? By Terry Carraway

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

Subscribe and we will 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

Personal Minimums

I think it is wise for every Mooney pilot to have a documented set of Personal Minimums. In addition, I believe these Personal Minimums should be written down or logged in your iPhone/iPad and should be reviewed at least annually.
Writing your minimums down, somehow makes them more "real" and more "reviewable" before each flight, especially, those flights that encroach on your minimums. At the least, I review my minimums at home while doing my flight plan and then make a quick review again at the hangar before departure.

If any of my minimums are being approached, then I will question the go/no go decision and be very prepared to abort the flight and return to Earth.

At the very least, Minimums should include Weather. You should consider VFR/MVFR/IFR conditions; what are my options at my destination if the weather is questionable? Do I have strong/viable alternates? How much fuel do I want as a minimum for alternates? Sometimes 30 minutes of VFR fuel reserve is not enough? What is your minimum?

What about your personal health minimums? We all know the IMSAFE acronym, but do you have your health minimums written down? Are you sick? Have you taken medications that may affect your cognitive or hand-eye coordination, such as allergy meds that might make your drowsy?

I'M SAFE Acronymn

- I – Illness
- M – Medication
- S – Stress
- A – Alcohol
- F – Fatigue
- E – Eating

You might want two sets of minimums, or at least consider if you are flying solo or if you have passengers. My minimums are higher when I am taking passengers. I just think I need to be a tad more conservative.

Remember, things change over time and so should your minimums. Are you flying less? Well, you might want to "up" your minimums. Are you ill with a chronic disease such as diabetes, cancer, heart, etc.? These might be a cause to increase your minimums. Getting older might be a reason to increase minimums. So, it is incredibly wise to review your Personal Minimums at least annually, or more as you see fit.

Scope Creep

This one is insidious. Someone may have told you that Mooney gross weights have a fudge factor, so you decided to take off at gross weight or a little over on a warm day. Fortunately, "Voila," nothing bad happened. You rotated pretty close to the takeoff distance that you expected, and your climb rate was just fine. Here is what can happen, and does happen, to some.

You got away with it, so when the next opportunity to take off a little over gross occurs, it's ok with you in your subconscious. However, this is extremely dangerous. You might even push it a little more. I call this "scope creep" and eventually you and your Mooney will be bitten.

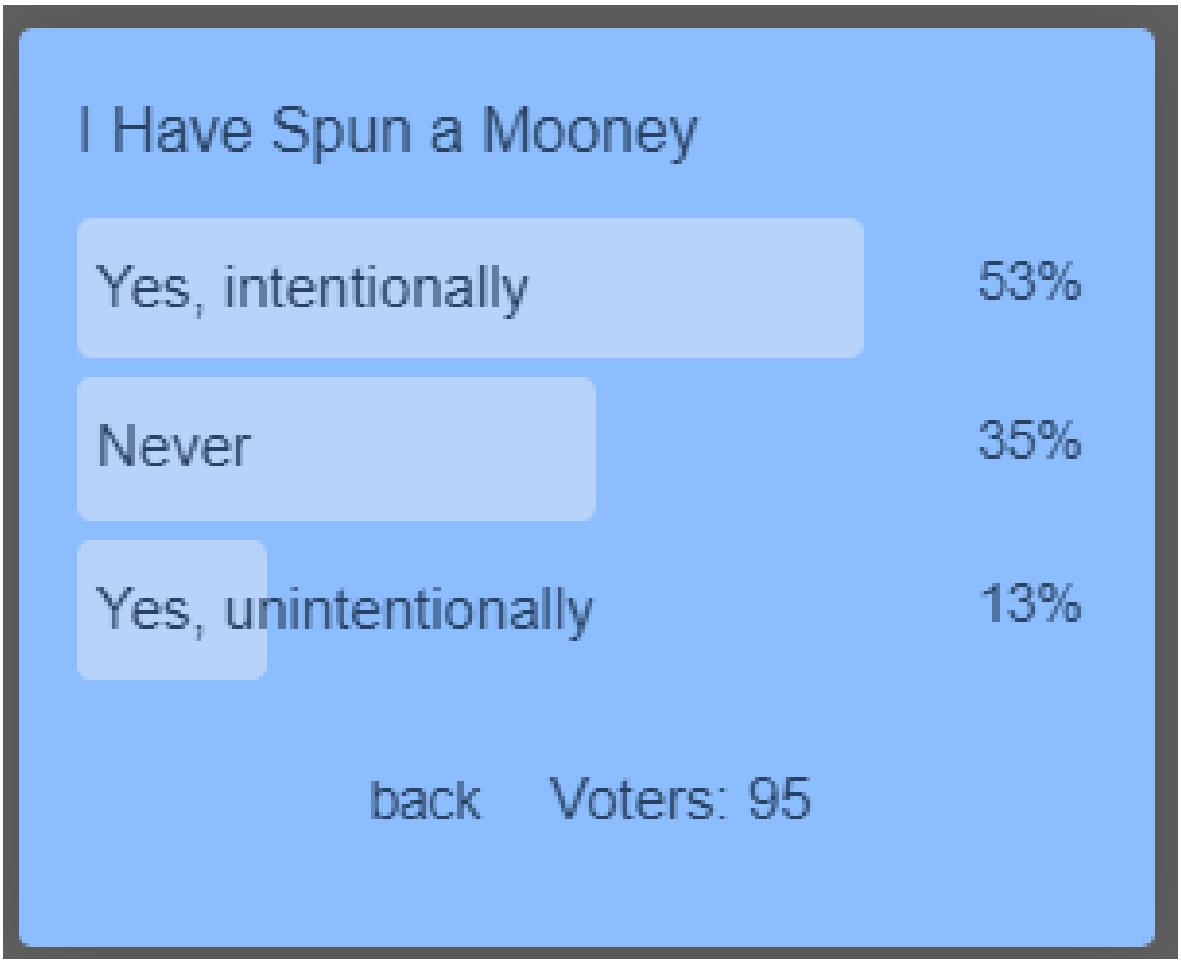
Nasty cross winds can be another creeper. Hey, I landed in a 20kt crosswind last month, and 24kts is almost the same, and so on. It might be but keep referring back to your personal minimum list and don't push those limits.

Personal Minimums Strategies

- **Document and consult**—It's not enough to just document personal minimums—you should consult them before each flight.
- **Anticipate**—Ask yourself what factors might affect your trip.
- **Be honest**—Are you comfortable completing the flight?
- **Don't gamble**—Avoid pressure to decrease your minimums.
- **Carry the document**—Take a copy of your personal minimums contract with you in the cockpit.
- **Proficiency**—Update your personal minimums regularly to reflect your current proficiency level in the aircraft you'll be flying.
- **New rating**—If you've recently earned a new certificate or rating, ask your CFI to help you determine a reasonable baseline to match your new skills.

Once you are on the ground, it is a good idea to spend a few minutes going over the flight in your head. What went right? What went wrong? Were there problems, or potential problems? Could you have anticipated and recognized them sooner? Score yourself. Be as objective as possible, and do not grade on the curve. If you do this consistently, you will soon find yourself catching problems early and dealing with them more effectively.

Be safe, Fly Fast



Next month's poll: "Regarding Oshkosh" **CLICK HERE** to vote.

Your bit on nighttime is oversimplified. Civil Twilight can be as little as 20 minutes after sunset or before sunrise to around 35 minutes.

But the big thing is, while you can log nighttime between the civil twilights, for currency for carrying passengers, the take-offs and landings need to be 1 hour after sunset to 1 hour before sunrise. You need to have log 3 take-offs and landings in that time period in the previous 90 days to carry passengers during that time period.

Also watch out if you take off before 1 hour after sunset, but land after that point. You get to log one night landing, but no night take-offs.
Terry C

Outstanding article comparing portable ADSB receivers in the August 2022 edition of The Mooney Flyer.

Until my retirement last year, I was ForeFlight's Director of Quality and Test Engineering. Device connections, (navigators and receivers), were my primary technical focus.

Your comparison chart and selected testimonials were spot on. Indeed, most Bluetooth and WiFi connectivity issues are resolved with current software or firmware upgrades to any or all the devices in the portable device chain: iPad/iPhone, receiver device or EFB software.

I fly my M20J with a Stratus3 behind the panel and an externally mounted belly antenna. Multiple ADS-B tower reception is the norm. I also flew often with the ForeFlight family of Sentry devices. On occasion, I flew with a GDL-52 as a XM weather back up. The GDL-52 is my go to source for XM music and better resolution XM radar weather. Its ADSB traffic function worked well.

The downside of XM weather is that it may take up to 20-30 min to obtain all the available weather products. Whereas ADS-B weather products can be available within minutes of startup.

The XM music perk in the GDL family is nice to have on cross country flights. The GDL XM music channel selection is only controllable via Garmin Pilot.

There is another portable XM weather and music receiver, (no longer on the market), still in use where ADS-B weather is not available, but XM satellite footprint reception is available - the Sirius XM Aviation Receiver (SXAR1). It has the same XM weather products as GDL-52. Its music channels can be controlled via ForeFlight.

Anyone that has not bought into the safety and convenience provided by portable ADS-B traffic and weather receivers is missing out. (Panel solutions excepted).

Additionally, your explanation for ASD-B ghost traffic was also spot on. The frequency of stealth aircraft suddenly appearing under your wing resulting in swapping paint is near zero. Keep that Mk1 eyeball device in our scan. :-)
Bob W

PRESS RELEASE

SECOND RETIREMENT COMING UP!

Loewen's Mooney Salvage NEEDS A NEW OWNER!

Paul Loewen has enjoyed over 50 years in the Mooney family……first in the Los Angeles area as a Mooney Service Center at Whiteman Airport in Pacoima. He moved to Lakeport in 1973 and began Lake Aero Styling & Repair (LASAR) in 1975. The rest is history, as they say!

Paul sold LASAR in 2017, and he would love to see a "Mooney person" acquire the remaining salvage business that provides Mooney parts from a collection of more than the past 50 years. Paul has enjoyed selling parts from his collection that are no longer available new from the Factory to Mooney owners world-wide.

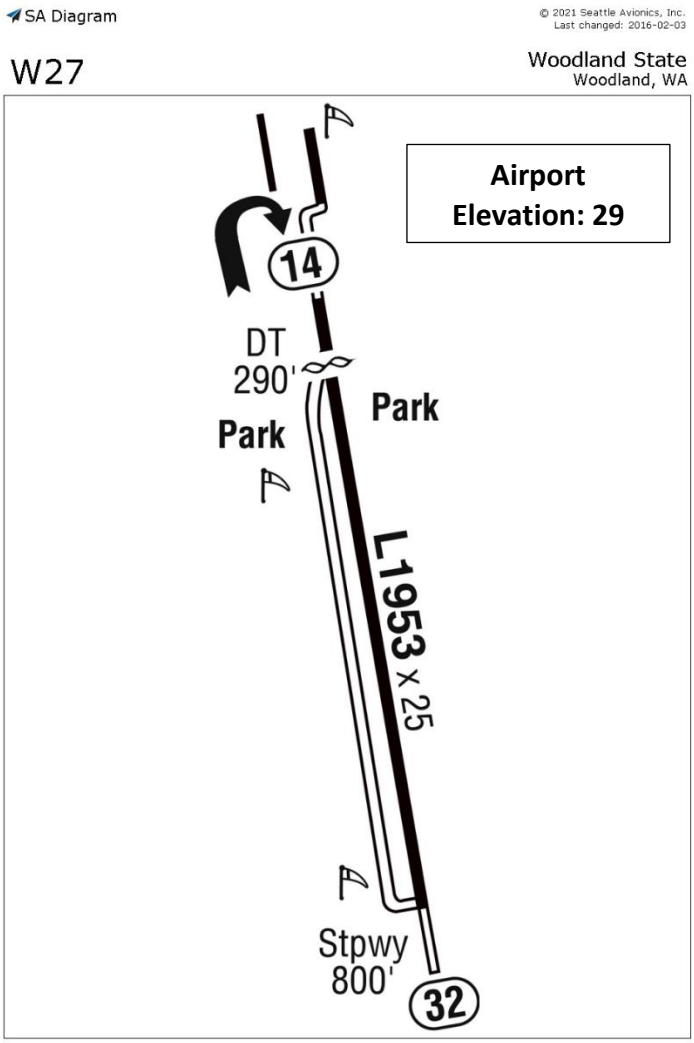
If interested, contact Paul by home phone 707-263-0462, text 707-489-6423 or email PaulL@sonic.net.

LOEWEN'S MOONEY SALVAGE (www.loewensmooneysalvage.com)

Number 9 September 2022

The Fatal Berm

On April 20, 2016, the pilot and the front seat passenger flew from Renton, Washington (RNT) to Woodland, Washington (W27). There, they met the next day's rear seat passenger and other friends for a fishing trip. The fishing trip concluded the next day, April 21st, about 1400. The pilot and his two passengers boarded the M20K 231 for a flight to Renton, Washington (RTN), about 100 miles north of W27.



The Pilot

See NTSB Report Event ID: 20160421X94028

At the time of the accident, the Pilot was 52 years old, held a commercial pilot certificate with ratings for airplane single-engine land, airplane single-engine sea, airplane multi-engine land, and instrument airplane. He also held a flight instructor certificate with a single-engine airplane rating. He had 2,915 hours of flight experience, had flown 46 hours in the preceding 6 months and had 100 hours in the Mooney M20K 231.

WASHINGTON 233

WOODLAND STATE (W27) 1 SE UTC–8(–7DT) N45°53.93′ W122°44.24′ SEATTLE
29 NOTAM FILE SEA
RWY 14–32: H1953X25 (ASPH) LIRL
RWY 14: Thld dsplcd 290′. Pole. Rgt tfc.
RWY 32: Trees.
AIRPORT REMARKS: Unattended. Vehicles, pedestrians, and animals on and invof arpt. Ctc WA State Aviation Division 360–709–8015 or 1–800–552–0666 WA area for facility info prior to use. For acft accidents/incidents ctc WA state emergency operations center 800–258–5990. 12′ dike northwest end. Extreme turbulence possible when winds from the east. P–line in apch to Rwy 14. Rwy 32 trees, bridge, low hill at southeast end. 6 ft fence in primary sfc, 105 ft from cntrln, west of rwy and runs entire length.
AIRPORT MANAGER: (360) 618-2477
COMMUNICATIONS: CTAF 122.9
CLEARANCE DELIVERY PHONE: For CD ctc Portland Apch at 503-493-7545.

The Chart Supplement (formerly the A/FD)

The Woodland State Chart Supplement information is very "brief." Note that the Chart Supplement does not include an airport diagram.

The Aircraft See NTSB Report Event ID: 20160421X94028

The 1981 Mooney M20K 231 is powered by a turbocharged, direct-drive, air-cooled, 210-horsepower Continental TSIO-360-LB7 engine, which had 671 flight hours since major overhaul. The annual inspection was current.

Takeoff Weight See NTSB Report Event ID: 20160421X94028

	NTSB Calculations	Pilot's Calculations
Aircraft Empty Weight, last recorded on May 23, 1994	1,945	1,804
Pilot's weight	206	530 (Front seat weight)
Front seat passenger	284	
Rear seat passenger	251	200
Fuel weight	210	210
Baggage weight	83	120
Total weight of aircraft (Max Takeoff Weight: 2,900)	2,978	2,864

Front seat weight: 491

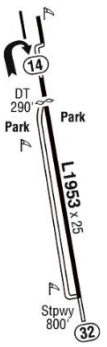
The NTSB occupant weights were derived from hospital reports and personal statements. The NTSB fuel weight was derived from the approximate fuel quantity drained from the airplane's wing tanks. The NTSB weighed the baggage.

When the pilot was asked where he obtained 1,804 lbs. for the Empty Weight (EW), the pilot replied that he retrieved the EW from the internet.

Weather See NTSB Report Event ID: 20160421X94028

The 1440 local weather at Paradise Point State Park, Ridgefield, Washington, which is located about 2.5 nautical miles southeast of W27, included wind from 290° at 2 to 4 knots, temperature 23°C (73.4°F), dewpoint 7°C, and altimeter setting, of 29.67.

The video captured the windsock, indicating a low wind speed. The video also recorded trees and bushes on both sides of the runway, which did not show any visible motion of branches and leaves. These indications confirmed that the wind was calm.



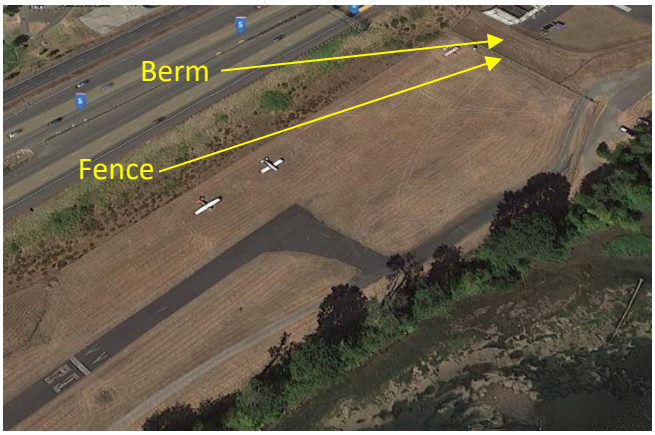
NTSB Reconstructs the Runway Required

See NTSB Report Event ID: 20160421X94028

Assuming an outside air temperature of 23°C, 2,900 lbs. gross weight, 10° flaps, 40 inches of manifold pressure, mixture full rich, and a paved, level runway, **the NTSB determined the takeoff distances required were:**

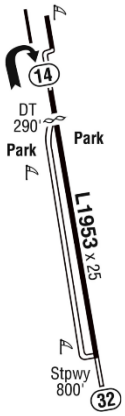
Wind	Ground Roll	Distance W/ 50-ft obstacle
Calm	1,350’	2,300’
4-knot headwind	1,200’	2,200’
6-knot tailwind	1,550’	2,600’

The Berm See NTSB Report Event ID: 20160421X94028



A 9-ft. berm adjacent to a wastewater treatment facility was perpendicular to and about 415 ft beyond the departure end of runway 32.

The Pilot’s Account See NTSB Report Event ID: 20160421X94028



After a normal engine run-up, the pilot began the takeoff roll on runway 32. He said the airplane lifted off after a ground roll of about 1,250 ft., climbed to about 35 ft above ground level, but then stopped accelerating. The pilot then lowered the nose and discovered that the airplane was just above the ground and seconds from impacting a berm. He retarded the throttle and flared the airplane into a nose-high attitude to avoid a "head on" impact with the berm.

The Video

A witness, (a friend of the pilot), was located at the north end of the airport near the berm. He recorded a video of the takeoff, which shows that the airplane became airborne after a ground roll of about 1,933 ft. – about 20 ft. from the end of the runway.

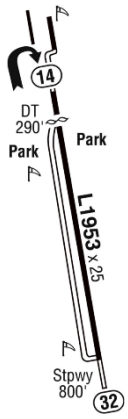
Caution, the shock of the crash caused an expletive which has not been removed.

The video also showed that the airplane attained a maximum altitude of about 4 ft. before it touched down in the grass beyond the runway end. The airplane impacted the airport's perimeter fence, located about 375 ft from the end of the runway and then collided with the 9-ft high berm.

Prop Governor and Magnetos See NTSB Report Event ID: 20160421X94028

A sound spectrum analysis of the video's audio channel showed that the propeller was at about 2,430 RPM during takeoff. Expected maximum RPM is 2,700. The propeller governor had been set to a maximum RPM of about 2,600, which is 100 rpm below the manufacturer's specified setting. The maximum engine RPM was increased 100 RPM, from 2,640 to 2,740, by retiming the magnetos to the manufacturer's specified setting.

The propeller governor would have inhibited the engine from reaching rated power (2,700).



Gross Weight and Ground Run See NTSB Report Event ID: 20160421X94028

Although the pilot's calculations indicated a safe takeoff was possible, the airplane did not perform as expected, likely due to the engine not achieving maximum RPM and the pilot's exceedance of the airplane's maximum gross weight. The pilot should have been sensitive to the short runway length and closely monitored the airplane's performance. If the pilot had recognized promptly that the airplane was not performing as expected, given the distance from the runway end to the fence and the berm that the airplane impacted, adequate distance would likely have been available to safely abort the takeoff. Additionally, if the pilot had designated a go/no-go runway liftoff point, this would have helped him detect the performance deficiency. However, the pilot did not recognize that the airplane was not performing as expected until the airplane was near the runway end and the impact with the berm could not be avoided.

Seatbelts, Shoulder Harnesses See NTSB Report Event ID: 20160421X94028

The head rests had been removed from all seats in the airplane.

The pilot and the right front seat passenger were restrained with lap and shoulder belts and survived with compression fractures of the lumbar spine and extremity injuries. From this, the NTSB determined that this accident was survivable for occupants who were properly restrained.

Rear Seat Passenger See NTSB Report Event ID: 20160421X94028

The NTSB felt that the passenger seated in the left rear seat was likely restrained only by a lap belt and sustained fatal injuries to his brain and spinal cord. However, the Coroner, when deposed, indicated that the rear seat passenger *was* restrained with lap belt and shoulder restraint. The rear passenger received a significant posterior scalp laceration that was consistent with hyperextension of his neck over the low back of his seat. This hyperextension could have been prevented by the presence of a head rest at an appropriate height on his seat. However, the use of a shoulder harness would not have been prevented the hyperextension.

The rear passenger's cervical spine injuries may also have been caused by hyperflexion of his neck over the pilot's seat back and could have been prevented by his use of the available shoulder harness and/or the presence of a head rest on the pilot's seat.

The NTSB felt that the appropriate use of head rests and shoulder restraints would have mitigated the severity of the rear seat passenger's injuries.

NTSB Probable Cause and Findings See NTSB Report Event ID: 20160421X94028

The pilot's delay in recognizing that the airplane was not performing as expected and aborting the takeoff, which resulted in collision with a berm beyond the end of the runway.

Contributing to the accident were:

- The pilot's exceeding the airplane gross weight and
- The underperformance of the engine due to governor setting and magneto timing deficiencies.

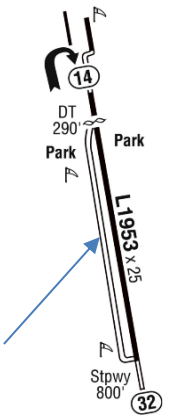
Contributing to the severity of the rear passenger's injuries was:

- The pilot's decision to forego use of his shoulder harness

  and/or

- The absence of head rests.

Calculate a Go/No-Go Point



Use the 50/70 Rule for **all** takeoffs. That is, if you have NOT reached **70% of your takeoff speed** by the time you've reached **50% of the runway length**, you should abort your takeoff.

For instance, if your takeoff/rotation speed is 65 knots, 70% of 65 = 46 knots. Using the 65 knot rotation example, you should reach **46** knots at the runway mid-point. At Woodland, 50% is just 976.5 feet. If not, you should abort.

Takeoff Distance, Fudge Factor – AOPA Safety Institute & TMF

As an added safety measure, AOPA Air Safety Institute (ASI) and The Mooney Flyer, recommend that you add 50 percent to the charted takeoff and landing distances.

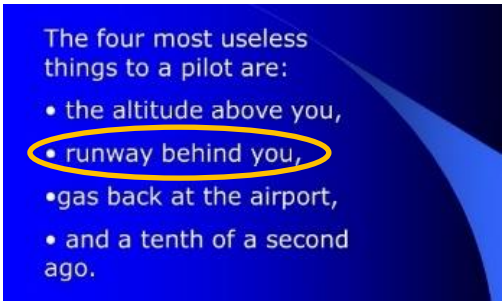
POH Distance	50% Increase	Conservative Takeoff Distance
1,350 feet	**675 feet**	**2,025 feet**

Please remember that the manufacturer numbers were derived when professional test pilots flew a factory-new airplane under carefully controlled conditions. Most general aviation pilots should not expect to match the test pilot numbers. Therefore, give yourself a healthy margin to compensate for the age of the aircraft and your less-than-perfect technique.

Experienced Pilots Recommend 50-foot Obstacle Distance

Consider using the takeoff distance required to clear a 50-foot obstacle as the anticipated ground roll. In this case, it is **2,600 feet.**

Consider a Static Takeoff



When faced with a takeoff on a short runway, do not do a normal, rolling takeoff. It is a good idea to perform a Static Takeoff. That is, taxi to the very end of the runway (providing the maximum amount of runway). **Holding the brakes, apply full takeoff thrust.** Release the brakes and off you go.

Conclusion

When you fly with passengers, you are both Captain and Flight Attendant. Please ensure that your passengers are given a comprehensive passenger briefing. In addition, before engine start, ensure that they are properly restrained with both lap and, if installed, shoulder harness. Shoulder harnesses are required for all seats in small airplanes that were manufactured on or after December 12, 1986. If your aircraft does not have shoulder harnesses, consider having them installed.

When your family and friends fly with you, they trust that you have done everything in your power to ensure that the flight will be safe. Fly professionally because those who fly with you are think you are the best pilot in the entire world!

Join the Wings Program at https://www.faasafety.gov/

You will continue to learn while sharpening your flying skills. Consider a flight with a CFI each quarter and an Instrument Proficiency Check twice a year.

Phil Corman
Co-Editor

How to Almost Eliminate Gear Up Landings

In the Mooney community, we are having too many gear up landings. This hurts, since Mooneys aren't being manufactured anymore. Gear up incidents happen for the following reasons:

1. If the Mooney has a J-Bar – the J-Bar wasn't fully engaged/locked
2. If the Mooney lands hard on the nose gear, this can cause all three landing gear to collapse
3. If the gear is not properly adjusted
4. If the PIC forgets to put the gear down and check that it is "down & locked"

Reason number **one** is easy to deal with if you realize that the receiver wears over time and becomes "oval" shaped, enabling the J-Bar to disengage. You can address this in two ways:

- Check the amount of wear at least during the annual inspection and replace the receiver if it is excessively worn. Paul Loewen designed a receiver that is better and more durable than the one that came with you Mooney.
- After lowering the gear, tug on the J-Bar to ensure that it is securely locked.

Reason number two: If you land pretty hard on your nose gear and it collapsed, it can take the other two mains with it. The only way to avoid this one is to properly flair and ensure that you nose gear is the last gear to touchdown.

Reason number three is very inexcusable. Your mechanic should check and properly adjust your gear at each annual. The requirement is to check and adjust the gear is in the 100 hour inspection checklist.

Reason number four is the most common reason for a gear up landing because the PIC either does not follow a checklist or a Memory Jogger like GUMPS, or he or she is taken out of their routine by some sort of interruption. The interruption can be of any nature, but the most common include:

- A passenger distracts the PIC
- An issue in the pattern, such as lots of traffic, a close encounter, or something similar
- Challenging airport weather or when landing at a challenging airport

Checklists are a great remedy for this, but a distraction can disrupt the checklist sequence and the PIC may fail to continue.

Here is a tried and true way to almost eliminate inadvertent gear up landings:

- Always try to lower the gear at the same spot in the traffic pattern, such as when you enter the 45.
- Don't rely on the panel annunciator, but also look at the indicator on the floor and confirm the gear is down and locked. At this point, verbally say, "The gear is down and locked."
- When you turn base, check the gear is down and locked and verbally say, "The gear is down and locked."
- On short final, check the gear is down and locked and verbally say, "The gear is down and locked."

Psychologically, this is powerful. You must verbalize (aloud) even if you are alone in the cockpit. After doing this over and over again, your brain will expect the verbal annunciation. If your brain does not hear it, a real response will kick in for you to check before reaching the runway environment.

This is definitely one of the times that talking to yourself can save your ego, plus a lot of anguish, repairs and money.

Take Someone Flying

by Richard Brown

There are many reasons that people fly their own aircraft. For some, it is their job. For others, it is a necessity, given the times and distances that must be travelled. For others, it is just for fun. I don't fly because I must, and I don't fly because I need to. I fly because I want to. I guess I could make the argument that my desire to fly is so great, that I not only need to fly but I must fly. But that is a debate over semantics that we can save for another time.

I love my Mooney Time Machine. It cuts down travel time and enables us to get places and do things that would not otherwise be possible. I love going up for an evening flight to revel in the magic of defying gravity and floating above the earth where once only birds roamed. A few weeks ago, I was texting a friend and sent a picture of my plane in front of my hangar along with the message, "After a busy week closing out the corporation financials it's time for a little therapy session."

All of that said, there have still been times that I planned to fly after work and on the way home, I called my wife and said, "Hey, I'm on my way home."
"What happened, I thought you were going flying?"
"Yeah, just not really feeling it today."

So, what can you do if you are becoming bored with flying? What if it has lost some of the "joy" it once had? I am not saying you are thinking of hanging it up and quitting, but everyone at one time or another has a point where just burning avgas and punching holes in the sky doesn't add up to enough of a purpose to climb in your plane and "slip the surely bonds of earth." We all know that if we don't fly, our skills degrade. Therefore, it is in our best interests to fly regularly, which is why having a purpose to fly is important.

If you are struggling with a purpose, I suggest you take someone flying. Every time I have taken someone it has been a treat. If you want an extra special experience, then take someone who has never been in a small plane, or for bonus points, take someone who has never been flying at all.

I have a good friend whose son is leaving for Cuiabá, Brazil for two years on a mission for our church. My friend had not been in a small plane for years, and his son had never flown in one. I talked about taking them flying for quite a while and a few days before his son left, I finally managed to get a flight in.

I asked if there was any place in particular that they would like to go, and Catalina, (as it often is), was at the top of their list. I told them we would leave Fullerton, fly around downtown Los Angeles, fly past Dodgers Stadium and the Hollywood sign, and then over the top of LAX, using the special flight rules area. After that, we would fly across the channel to Catalina, around the island, and land for lunch. My friend's response to the plan was, "Incredible, I've always wanted to see the west side of the island."

I got to the hangar early, as I always do, whenever I'm taking someone who has never been flying in a small plane. I like to pre-flight the plane before they get there so that there are no distractions. Once they arrive, I explain that I already completed pre-flight inspections, but that I was going to go through the pre-flight again, explaining what I am checking and looking for and encourage them to please ask any questions they might have.

I asked what they know about the physics of flight, which wasn't much. So, in addition to the pre-flight, I also took the time to go over the basics of what makes an airplane fly. I love talking about flying, especially with someone who doesn't know much about the principles of flight. That is so much fun.

One of my favorite analogies, for those that have never been in a small plane, is that while flying in an airliner is like riding on a bus down a highway, sometimes flying in a small plane is like driving a 4-wheel truck down a dirt road. While we cannot see the air moving, it is always moving like the water in a stream, going over and around rocks. A typical 737 might weigh between 130,000 and 180,000 pounds, but we only weigh about 2,500 pounds, so as that air is moving, we will feel it more than the "big boys." However, not to worry, because as long as we have enough air going across the wings, the plane wants to fly and will continue to fly.

Forty-five minutes later, with life jackets on for our trip over the water, we climbed in the plane and started up. The air was a little hazy, but it was a beautiful flight. I have an old sectional and TAC on the wall in the hangar, where I showed them our route of flight and the different airspaces. Just as I was when I first started flying, they were amazed that if you stay out of the different airspace, you could fly wherever you wanted. As we flew around downtown L.A., they were even more amazed.

There was still marine layer covering the water with tops at about 1,000' on the southern half of the island. We could only catch glimpses of Avalon as we flew past, but once on the west side, the clouds had mostly broken up and you could see the coast and east, back down the valley to Avalon.

We had a great lunch and wandered around looking at planes and the island from the vantage point of the airport. I told them that on the way back, we would spend a little time in the Long Beach practice area and let his son fly the plane.

His son responded, “What!? Is it hard?”

“No,” I replied.

I then looked back at my friend in the back seat and asked, “Are you nervous?”

He said, “No, I trust you.”

As we crossed the channel, I dialed in the KFUL ATIS and heard, “The airport is currently closed due to an aircraft incident on the runway.”

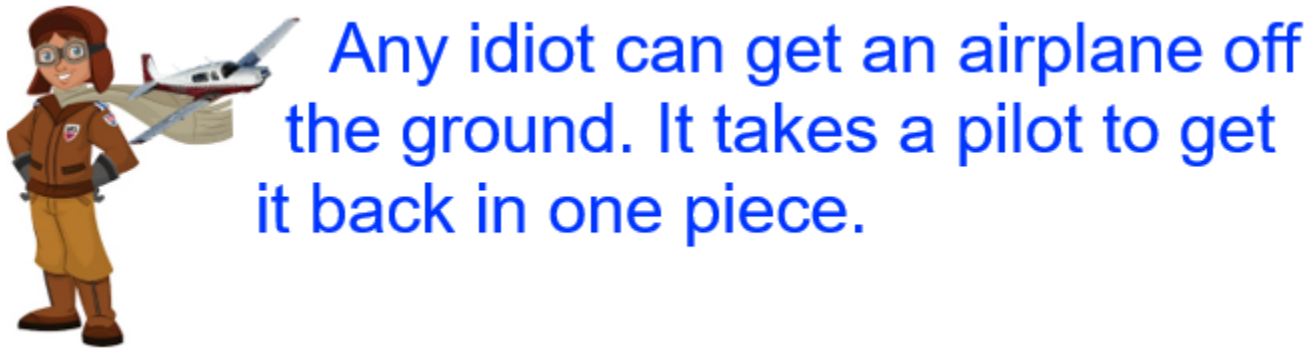
I told them, “Now there is even more reason to spend time with you flying us around. The airport is closed for a bit.” I was not concerned, because other than a meeting that we had to get to in the afternoon, we had plenty of fuel and there were several airport options.

I tuned radio #1 to the practice area frequency and radio #2 to the KFUL tower to listen for them to announce that the airport was open. His son did a fantastic job flying us around and he really enjoyed it. KFUL opened back up and I had him climb us up to 2,000’ so we could transition over Long Beach. I called up KLGB tower and they approved our transition. I gave his son instructions and let him fly until we were past KLGB and ready to descend to KFUL.

My landings at KAVX and KFUL were not the best, but they complimented them saying they were better than almost any they had had on an airliner. Perhaps the landings were that good, and maybe they were just being gracious. Either way, I’ll take the compliment.

It was a fantastic morning of flying and just like every other time I have taken someone flying, it brings back all those memories of the first few times I flew in a small plane. If you want to recapture that feeling of wonder and awe that you had when you first started flying, there is no better way.

As always, thank you for taking the time to read. If there are things you would like me to write about (or not write about), or if you just want to say hello, drop me an email at richard@intothesky.com. If you're ever in Southern California and want to meet up let me know.



Rambo gets a New Spark

By Don Peterson

Good morning cousins. This month marks forty-one years with “Rambo,” my 1964 Mooney M20E. He has been mostly a dependable companion, given his age, and archaic technology. I bought him with 79 total hours in my logbook, and we have never looked back.

Almost a year ago, I had a nagging sense of roughness in the left mag. These things are common and are often caused by a partially fouled spark plug. It usually clears up with leaning and upon reaching operating temperature. He still had the original Bendix magnetos, which are robust, industrial-grade lumps. I’ve had them rebuilt as needed, but they remain a direct evolution of the spark-creating devices that have been used in aviation for over 100 years. Still, the frequency of the roughness registered as slightly out of the ordinary.

Depending upon the condition, a Bendix mag overhaul can run from $500 to $1,000. Sometimes more if things inside have gone scrambled. The left mag on my Mooney was a “Shower of Sparks” version, using a second set of points to provide a timing-retarded spark to aid in starting the sometimes-recalcitrant IO360 engine, particularly when hot. Using the traditional scientific method of research, (asking around the airport for opinions), I jumped in the deep end and ordered a Surefly “SIM” (Surefly Ignition Module), electronic mag replacement unit.

Mooney owners tend to be passionately dedicated to the type, proud of both the speed and economy of design. My E, one among the first batch of 200 HP-powered Mooneys introduced in 1964, was the fastest Mooney until the J was introduced in the late 70's. If you believed the owners' manuals, my E "Super 21" was capable of 193 miles per hour, with the J upping the ante to 201 MPH. (Miles per hour being a more impressive marketing unit than the more commonly used knots). In the real world, both tend to be wrong by about equal amounts. I have learned to expect 148 – 154 KTAS (170 – 177 MPH) at my typical cruise altitudes, whereas J owners claim 155 – 165 KTAS (178 – 190 MPH). I have known a few pilots that claim 170 KTAS (195 MPH). Of course, pilots can always be trusted completely. My bird has a couple of the more common speed mods, but that's not the subject of this report.

For local or short distance flights, I estimate 10 US gallons per hour, block to block. For longer trips at higher altitudes, my fuel flow totalizer will show as low as 8.3 USGPH, but occasional roughness always forces me back to 8.6 or higher. I habitually perform a true air speed calculation after establishing level flight in cruise, as I've learned Rambo's moods so precisely that even a 1 or 2 knot variance indicates something needs attention. Usually, a loss of airspeed will be because I left the manually retractable step extended or the takeoff flaps still deployed. The cowl flap position, or cabin air inlet cracked open will also register as a loss of airspeed. At altitudes up to about 7,500', I can expect 153 – 154 KTAS. From there to 10,500, it should be 151 – 152 KTAS. At 13,500, I have been happy to see 148 – 151 KTAS. Higher altitudes can be reached, but the time to climb and cold argues against it.

Shortly after completing the installation, which included a long-overdue rebuilt starter and a new ignition harness, (to be discussed later), I needed to fly from my home in Carson City, Nevada to Scottsdale, Arizona to participate in the auction sale of an old Alfa Romeo I had restored. The trip also included picking up Maria at the Phoenix Sky Harbor airport, upon her arrival from Colombia. She is now my wife, which I expect will be relevant to future articles.

The flight required close to four hours, with cruise at 13,500 feet. During the post-installation test flights, I had already noted the much-improved smoothness of the engine. To be specific, *massively* improved smoothness, from an engine that had already been dynamically balanced to a rarely achieved standard. Once level at 13,500, I began my routine of dialing in the mixture, RPM, and trim – seeking Rambo's best. To my surprise, the engine remained smooth, even as I went south of 7.3 GPH! However, I sensed a lower power output, although without the roughness that I had learned to expect with lean of peak (LOP) operations. Doing a true airspeed check, I was making 148 KTAS. Right on expectation for 13,500. Being curious, I continued to refine the mixture, settling on 7.4 – 7.5 GPH, which the EGT showed was 25^{o}F rich of peak. Another TAS check found I was zipping along at 151 KTAS! I have never, in forty-one years, seen more than 150 knots at 13,500 in this airplane. I have never been able to operate at less than 8.6 GPH without engine roughness.

The history of aviation has been a series of infinitesimal improvements, with the occasional disruption such as turbines, cantilevered monoplanes, and GPS. The reduction in fuel burn due to the SIM is roughly 12%! By any measure, that is a game changer.

Surefly has been on the market with full FAA certification since October 2019. I did my installation in December of that year, which violated my own inner dictum against buying the dash-Alpha version of anything. In this case, my poor impulse control won out, but thus far I have no regrets.

The SIM is designed to be simple, robust, reliable, and maintenance free for 2,400 hours. At present, no overhaul is anticipated at the conclusion of this time. Experience will tell the manufacturer whether an overhaul or outright replacement is deemed the best choice. There are very few moving parts, being primarily a shaft, and two bearings for the four-cylinder version, and a couple more rotating pieces for the six-cylinder. No points, condenser, or other mechanical, and failure-prone, components. Solid-state processors control the timing and spark, with the basic-setup being handled during installation via DIP-switches.

Surefly Partners, Ltd. offer four basic SIM variations; two for four-cylinder and two for six-cylinder engines. The two six-cylinder models are one each for Lycoming and Continental engines, whereas the two four-cylinder models are both for Lycoming; one for direct drive mags and the other for impulse coupled. If the unit is replacing an impulse-driven mag, the impulse coupling is removed entirely, reducing another potential maintenance item.

The four models all include variable timing spark advance, controlled by manifold vacuum and RPM. Although the SIMs can be used on turbocharged engines, the timing advance feature is deactivated. The Approved Model List (AML) is constantly being updated as additional approvals are achieved, as well as updates to the other documents appropriate to Certified Aircraft use.

Holding A&P and IA certificates, I did my own installation, with nothing being out of the ordinary, so long as one is adapted to working in the narrow spaces of a Mooney. After all, there is a reason they are fast.

The SIM is configured by the installer for each engine's specific requirements. DIP switches allow setting the static ignition timing and choosing variable or fixed timing. The IO360A1A data plate in my Mooney specifies a 20^{o} BTDC timing. The same engine is sometimes placarded for a 25^{o} BTDC spark timing, but a Service Bulletin recommends revising this down to the later 20^{o} value. As I understand the history of this SB, it was to prevent cylinder cracking due to detonation. I am content with that recommendation. The static timing for all typical engines is accommodated by DIP-Switch options.

The fixed timing of the SIM to the engine is a brilliant advancement over the traditional timing light, wiggle-the-prop, and repetitively tweak the mag hold-down nuts approach. First, one sets the DIP switches for the specified "static" timing, (for me, it is 20^{o}). Then, set the engine to top dead center on the #1 ignition stroke, stab the SIM into the engine, hook up a set-timing power lead, and rotate it left and right until a small green lamp on the SIM extinguishes. Tighten up the nuts, remove the timing-set power wire, connect the full-time electric power wire, and you are done. Even better, there is no gasket to fiddle with. The SIM is sealed to the case by an O-ring.

Without wanting to bore everyone with all of the installation details, suffice to say you must run a power wire directly to the battery, and if your engine used the Shower of Sparks instead of an impulse coupling, there's some rearranging of the wires on the ignition switch. A small diameter hose must be connected between the SIM and the inlet manifold, so we fabricated a tee in the manifold gauge vacuum line. A placard goes on the panel, prohibiting flight with a sick or dead charging system or battery. As a look-out, you should be aware that there are two different driven gears used on Bendix mags fitted to Lycoming engines. They are clocked a half-tooth apart. Thus, if your SIM cannot be adjusted to suit the TDC timing adjustment – you need the other gear. This was my initial situation. When I rebuilt my engine in 1996, I had to change that gear, but for some reason I kept the old one in my small box of "maybe you'll want this one day" parts. In spite of fourteen years and having moved 2,000 miles west, I knew where the box was. There are miracles.

When I bought my SIM, it was early days, so my cost was $1,250 USD. They are now priced at $1,395 direct from the manufacturer (six-cylinder is a bit more). Long-term aircraft owners will have your own opinion of the real-world costs of living with magnetos, including maintenance, overhauls, and the occasional proof of why our aircraft generally have two of them. I reckon the price is a great deal if the maintenance-free promise is upheld. As there are no points to wear, Surefly predicts the total maintenance at annual-inspection time will be to confirm the built-in timing light still extinguishes at TDC, and nothing is leaking.

And now, for the rest of the story….

Below 400 RPM, the SIM initiates the spark at Top Dead Center (TDC), and with a much higher spark energy than a magneto, which is a benefit of it running on an external power source. Lycoming fuel-infected engines can be quite balky to start when hot or warm. The reasons are long debated, but regardless of the cause, one can spend a lot of time cranking and playing with diverse types of priming techniques. With my SIM, it is somewhere between one and four blades, and we'll be making power. This alone will add years to my life.

The general guidance in the installation instructions is to simply replace the original "starting" magneto with the SIM, in the manner original to the engine. Most, but not all, Lycoming engines have one mag firing the top plugs on one side and the bottom plugs on the other. The alternative mag will power the opposite set of plugs. Given that the SIM is varying the spark event for its plugs, in contrast to the fixed-timing, mag-fired plugs, this struck me as needing a rethink. With the fuel entering my engine at the top of the cylinders, the top-bottom arrangement seemed likely to result in unbalanced firing pulses, left against right once the airplane is up high where the SIM will have a significantly advanced timing. I can also attest that it is the bottom plugs that are more likely to foul, so the additional spark energy could be useful in keeping all four bottom plugs clean, rather than just the two bottom ones on one side. In speaking with Jason Hutchison of Surefly, I learned of Lycoming Service Instruction SI 1294. This factory guidance offers Lycoming users alternative ways to arrange their magneto-plug relationships in ways that might produce the smoothest operation. It does not specifically include the all-top/all-bottom arrangement that I expect would be ideal, but it is a start. To my knowledge, there is no similar latitude currently provided by Continental. It is worth noting that, while in flight at my normal cruising altitude, I have done mag checks. When running on just the original magneto, there is the expected drop in RPM, and some roughness. When selecting just the SIM, there is no decrease in power or smoothness, nor does the EGT reveal a change. In other words, at altitude, the SIM is pulling all of the oars. We are left to wonder about the benefits of dual-SIM operation.

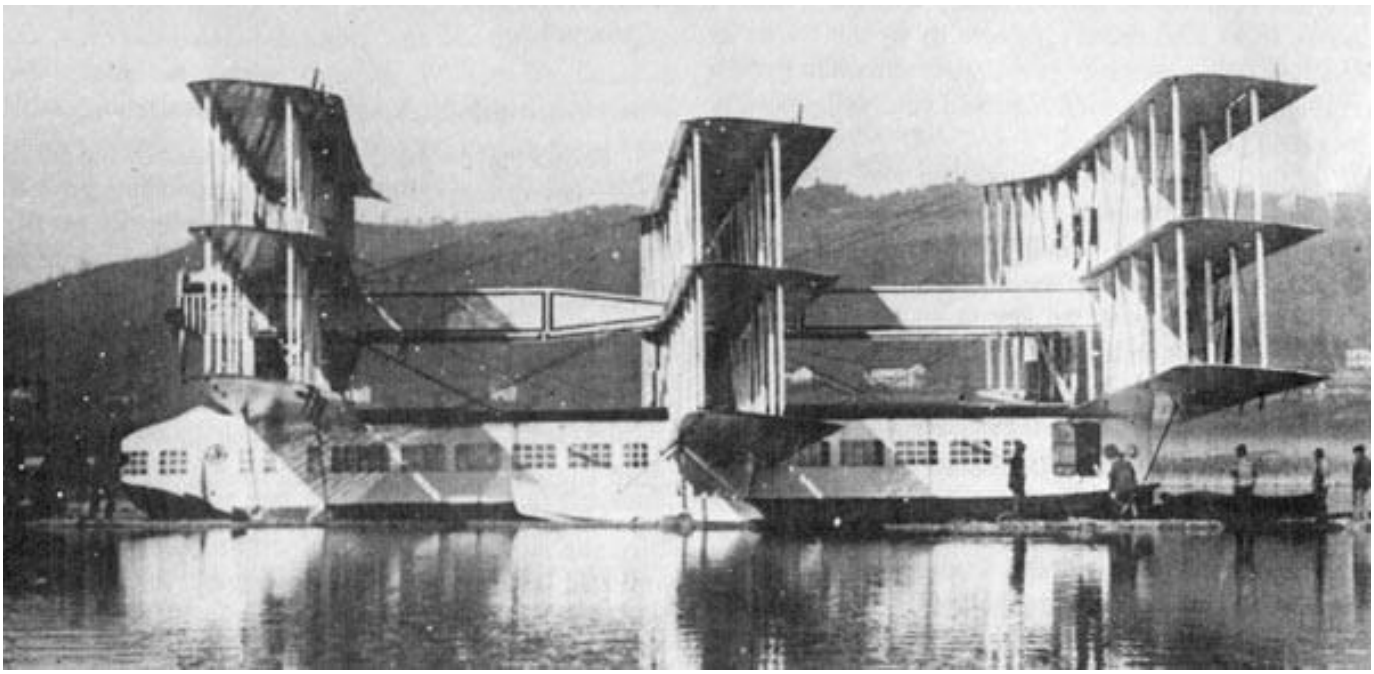
The SIM is designed to use a high-tension wiring set for Slick magnetos. Since I was retaining the Bendix on the right side, I had a custom wire set fabricated to suit both the SIM and the Bendix. The Surefly instructions call out for a new harness AND plugs to ensure full warranty coverage. I chose to install new fine-wire plugs, so between the SIM, wire set, and eight plugs, I am into the kit for about $2,600 USD. I needed the plugs anyway, and the wires had accumulated 1,700 hours on them, so some of the total cost can be attributed to normal use rather than the modification. If you add the SIM during an engine overhaul, your modification cost would mostly be just the SIM, less the cost you would have spent overhauling or replacing that mag. My engine is nearing its recommended TBO, so I expect to transfer the unit to the fresh engine, when that time arrives.

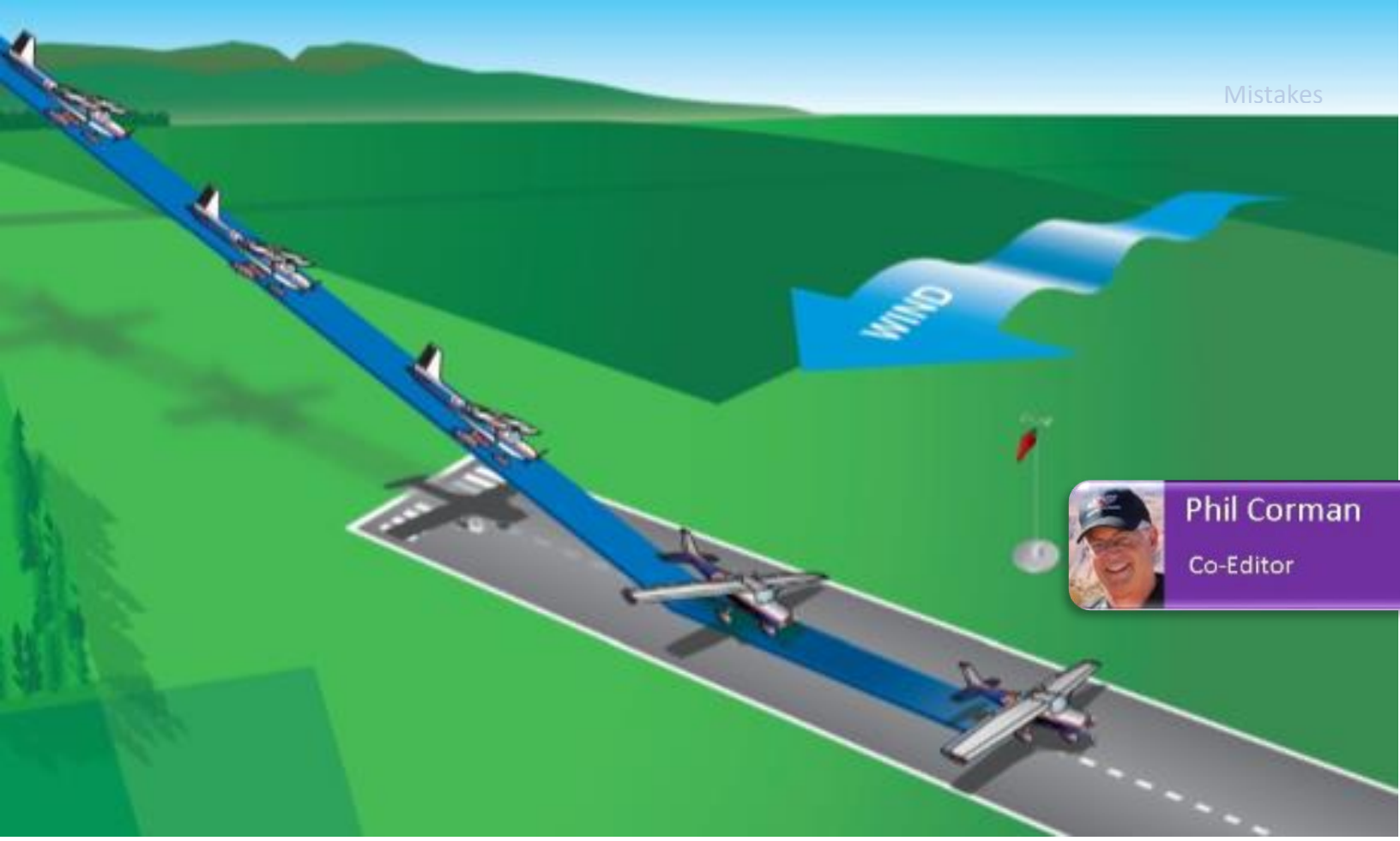
I have picked up about 1 knot of speed at altitude, with at least a 1 GPH reduction in burn. Over 100 hours of use, I used about 100 US gallons less 100LL, for a savings of $600 - $800 USD. That is a three-year payback at our cheap-fuel US prices. Euro/£ costs should improve the payback substantially, and the more you fly, the better.

To take one more step, I added long-range tanks to Rambo in 2012, giving me 88 US gallons usable. With a substantial reserve of one to two hours, I now have over ten hours of range, or a no-wind radius of 1,500 NM. That will carry me non-stop from our home in northern Nevada well into the interior of Mexico or Canada. Given the current and recent entertainment provided by our government and its detractors, that is a reassuring capability.

What's ahead? In talking with Jason, he sketched in the on-going plans for Surefly. It's a relatively new venture, so they are taking only a couple of steps at a time. Next, they are working toward a two-SIM approval for standard category aircraft, making a total break from magneto dependency. Their position is that the entire exercise makes sense due to the 2,400-hour life alone, but I'll admit we spent a fair amount of time comparing the flow rates between Rambo and his experimental RV6, which is equipped with two SIMs. He described his 180 HP O360 happily operating at 6.5 USGPH at full throttle and typical altitudes.

They have already been corresponding with EASA and are anxious to add the entire Euro-zone to their list of customers. N-reg aircraft operating overseas can be modified under our FARs, possibly requiring only an 8130 approval-for-service to satisfy customs and duty collectors. UK reg aircraft are on the target list, but no dates quoted. Experimental / LSA? Sorry – you'll have to ask that question on your own. As for me, I'll be busy filling in the details for our upcoming one-way flight to South America.





Don't Make These Common Mistakes on Crosswind Operations

The Mooney Myth is that they are harder to land than other GA airplanes. We don't think that's true. What we do believe is that Mooneys demand that you fly them at the correct numbers for airspeed and descent. Flare a few knots too fast, and we like to say that you can expect to land in the next county.

At full gross weight, my M20S likes me at 70kts on short final with a stable 3° approach angle. As I land lighter, my approach speed decreases, but I still maintain a 3° angle.

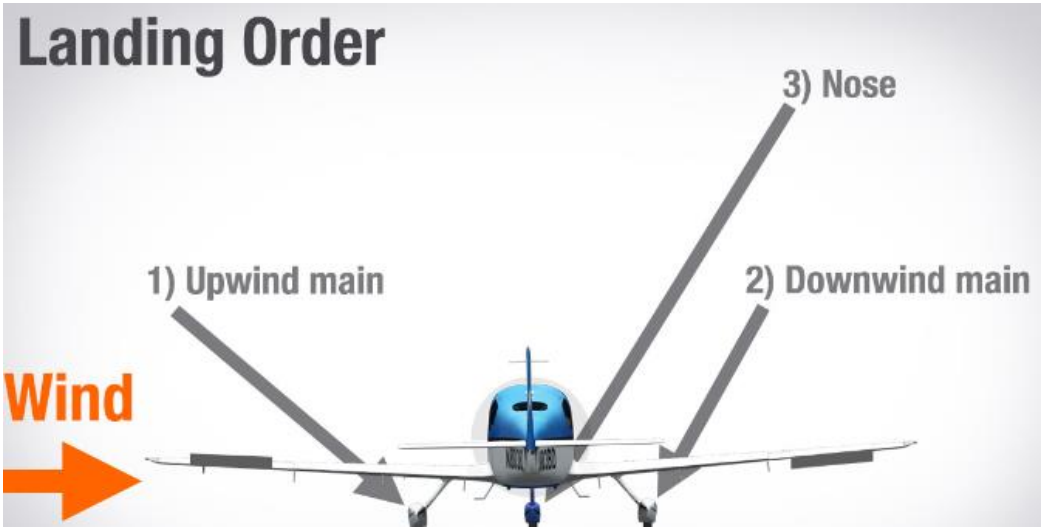
Crosswinds add a few more items to deal with. You have two choices for final in a crosswind. In both choices, setup on final far enough out so you can determine if you can hold the centerline with the existing crosswind. If not, perhaps you should land on another runway. First choice on a crosswind final is the Side Slip. Bank into the wind with your ailerons and then give it opposite rudder to keep you on the extended centerline. The second choice is banking in a coordinated manner into the crosswind. Then, as you flare, you kick the rudder to align with the runway. As you do this, you might consider some aileron into the crosswind. I prefer this "crab and kick" method as it doesn't involve any cross-controls while low and slow on final.

Common Mistakes

Relaxing Aileron Deflection during the Flare

During the flare, it is not unusual for the PIC to reduce the aileron input. But this is the opposite of what you need to do. As your Mooney's airspeed slows, your ailerons have less authority, so if anything, you should add aileron as you flare. This may seem counter to some, but it is an aerodynamic truth. Remember to continue flying while you are taxiing. So, keep those aileron inputs in place.

A clever way to remember which control surfaces to deflect while taxiing, is to hold the ailerons and rudder in a "dive" away from the wind.



Overshooting the Turn to Final

If you have a quartering tailwind on your Base Leg, then you need to compensate by turning to final sooner. The wrong choice is to steepen your Base-to-Final turn. This is asking for trouble.

On Crosswind Takeoffs

Remember to start off with enough ailerons, (usually full deflection in a strong crosswind), and then slowly reduce the deflection as you gain airspeed.

Gusts

Now if you have gusty conditions, you also need to deal with those. The rule of thumb is easy. Simply add ½ of the "gust factor" to your approach. So, if the METAR is 20G30, then add ½ of the 10 kt gust or 5 kts to your approach speed. During takeoff, do the same on your climbout speed.

How do you Slow Down?

by Jerry Proctor

One of the most asked questions about flying a Mooney is, how do I slow down? The MOST asked question by new Mooney flyers is, how do I land it? Neither of these two questions are the subject of this article. So, what am I talking about?

Well, this morning, I was getting ready to take my niece and her nine-year-old daughter for a nickel ride. I was excited about this because it would be their first small plane ride. I had just finished a shower, dressed, and was putting my keys and billfold in my pockets. I heard a voice in my head say, “Hey Bubba, you are rushing. Ya got to slow down.”

Right then, I realized that I was about to put my keys in the wrong pocket!

Now we all LOVE to fly, and even more, we love flying a Mooney, the queen of the GA fleet. So, is it okay to be excited about it? Sure, but we should not hurry. That would not be good! So, I am not going to drone on about why we should slow down, but this will be a discussion, about how you can recognize when you need to slow down and how to make mental changes so you can slow down.

Recognition

It is not a surprise to anyone, that when you are hurrying, your ability to do things, even easy things like tying your shoe, are more difficult. Starting to put my keys in the wrong pocket was my clear signal that I was in a hurry. Other signals are basic fumbling, missing a highway sign, and impatience with the “IDIOT” in front of you. In addition, there are less obvious signs. For example, when you recognize an increased in your heart and breathing rate, sweating, and even less control of the cool man aviator emotions. You should add these to your list of symptoms to recognize. Acknowledge right now, your hurry characteristics and red Flag them in your mind. When I recognize these red flags, it is time to gain control and slow down.

Slowing Down

If you are in a rush, how do you slow down? Far be it from me to be a Behavioral Phycologist, but I do have two degrees in the general area.

FIRST, JUST STOP! Stop doing anything! This morning, I did this. I just stared at my key box and took ten or more seconds to set my mind at a slower pace.

Here is a list of other suggestions to assist you slow down, so that you do things better and faster.

- Don't multi-task. It has been said that the youth can multitask better than mature folks can. That might be true, but are they only just skimming off the top of the waves? Deeper task management calls for focused concentration, not Cliff Notes skimming.
- Don't get distracted. It is harder than it sounds, but it is related to the above. Stay on course so you can do what you need to do.
- Prioritize. Yes, it is connected to the above. My old Army initial instrument training instructor pilot would always say, "Know what you must do next. NOT the second or third next. Just, what do you have to do next? Do it and move to the next and the next."
- He said it with such flair and gruffness, that my stick buddy and I often froze and never got to the first "next."
- Be early. Duh. I will leave this one alone.
- Silence and take deep breaths. It is the little, do-nothing moments. After a particularly hectic boarding process, I have heard of airline captains that have called for a pause, prior to pushing back from the gate.
- Use a checklist and read it aloud. When you go through a checklist silently, you can miss items more that when you say the items aloud.
- If you are behind, catchup, slooooowly. If you rush to catchup, guess what? You are going to sink further.

The moral of this story is that hurrying seldom helps, but often hurts. So, recognize your symptoms, respond with techniques, and then get back to great Mooney flying…FAST! Pun intended.

What good does it do to be afraid? It doesn't help anything. You better try and figure out what's happening and correct it. Chuck Yeager

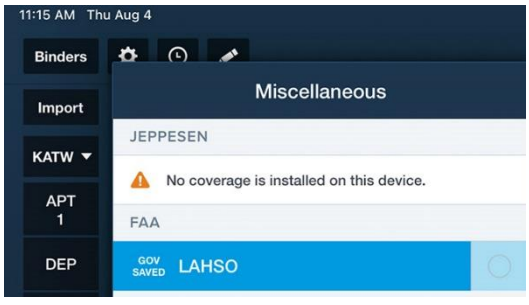
Aviation has always been full of acronyms. They are so fun, especially when you are trying to read a NOTAM. As aviation evolves, so do the acronyms. Let's see if you know these acronyms that are found in ForeFlight, Garmin Pilot and other aviation apps?

1. What is an EFB?

Answer: Electronic Flight Bag

An Electronic Flight Bag, or EFB, is an electronic display system intended primarily for cockpit or cabin use. EFB devices can display a variety of aviation data, such as checklists, navigation charts, and a Pilot's Operating Handbook (POH). EFBs can also perform basic calculations like performance data and fuel calculations. The scope of the EFB system functionality may also include various other hosted databases and applications. Physical EFB displays may be portable (Class 1), attached to a mounting device (Class 2), or built into the aircraft (Class 3).

2. What does LAHSO stand for?



Answer: Land and Hold Short Operations

LAHSO is an acronym for "Land and Hold Short Operations." These operations include landing and holding short of an intersecting runway or an intersecting taxiway, or other predetermined points on the runway other than a runway or taxiway. The available landing distance can be found in the Chart Supplement. (ForeFlight pilots can find the Chart Supplement by clicking on the INFO tab for an airport under A/FD, which is the acronym for Airport Facility Directory – now named the Chart Supplement). Are you confused, yet?

3. What does Advisory Circular 91-78 address?

Answer: The use of Class 1 or Class 2 Electronic Flight Bag (EFB)

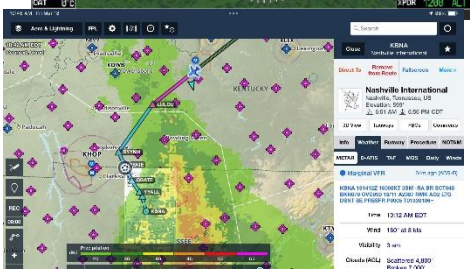
The title of Advisory Circular 91-78 is "Use of Class 1 or Class 2 Electronic Flight Bag (EFB)". This advisory circular (AC) provides aircraft owners, operators, and pilots operating aircraft under Title 14 of the Code of Federal Regulations (14 CFR) part 91, with information for the removal of paper aeronautical charts and other documentation from the cockpit through the use of either portable or installed cockpit displays (electronic flight bags (EFB).

4. What is AHRS?

Answer: Altitude Heading Reference System

An attitude and heading reference system (AHRS) consists of sensors on three axes that provide attitude information for an aircraft, including roll, pitch and yaw. This data can be sent to your iPad from a portable ADS-B receiver like Sentry or Stratus, or from sensors in your panel, like those included with several of Garmin's Flight Stream avionic components.

5. What does ADS-B stand for?

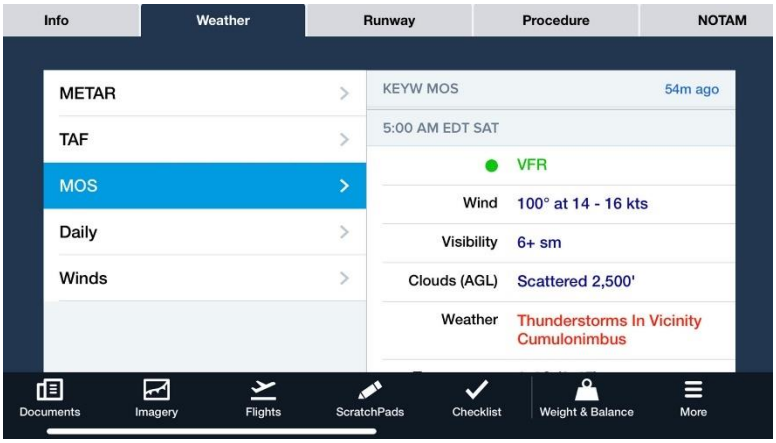


Answer: Automatic Dependent Surveillance-Broadcast

Automatic dependent surveillance-broadcast (ADS–B) is a surveillance technology in which an aircraft determines its position via satellite navigation and periodically broadcasts it, enabling it to be tracked. The information can be received by air traffic control ground stations as a replacement for secondary surveillance radar. No interrogation signal is needed from the ground. It can also be received by other aircraft to provide situational awareness and allow self-separation.

ADS-B also broadcasts a free airborne datalink weather feed, which allows pilots to view updated NEXRAD and textual weather products/reports in the cockpit.

What is MOS?

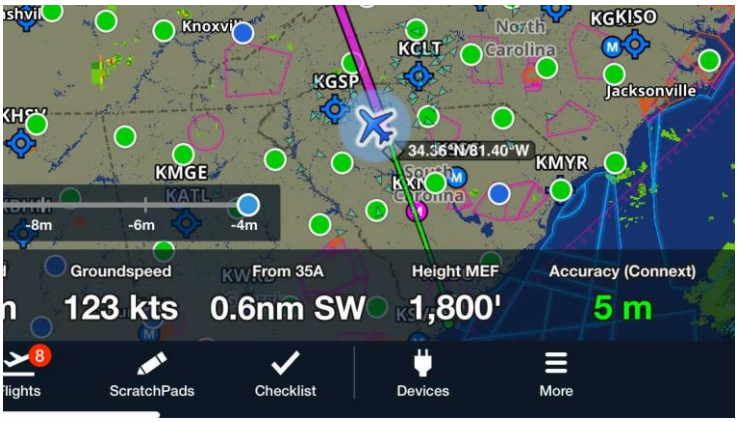


Answer: Model Output Statistics

Model Output Statistics, or MOS, is an objective weather forecasting technique which consists of determining a statistical relationship between a prediction and variables forecast by a numerical model at some projection time(s). It is, in effect, the determination of the "weather-related" statistics of a numerical model.

MOS can be viewed as a textual forecast under the airport data weather tab in ForeFlight, or as a visual depiction in the imagery tab. It is available for most airports in the U.S. and includes a forecast period that extends further out than the TAF.

6. What is MEF?



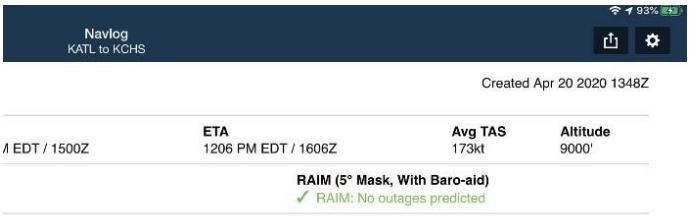
Answer: Maximum Elevation Figure

The maximum elevation figure, or MEF, is a type of VFR altitude which indicates the height of the highest feature within a quadrangle area. It is of interest to pilots if they want to be aware of the highest mountain peaks and tall towers nearby so that they can fly above them to avoid controlled flight into terrain.

MEFs are determined by taking the highest of the following:

- The point of highest *terrain* within a quadrangle, adding 200 ft for obstacles which are not required to be portrayed, and then adding 100 feet for vertical error and then rounding up to the next hundred feet – ***or***
- The height of the highest *man-made obstacle* in the quadrangle, adding 100 feet for vertical error and then rounding up to the next hundred feet.

7. What is RAIM?



Answer: Receiver Autonomous Integrity Monitoring

Receiver autonomous integrity monitoring (RAIM) is a technology developed to assess the integrity of global positioning system (GPS) signals in a GPS receiver system. It is of special importance in safety-critical GPS applications, such as in aviation or marine navigation.

ForeFlight's detailed Navlog on the Flights screen provides RAIM prediction for customers on Performance Plus and Business Performance plans. Receiver autonomous integrity monitoring, or RAIM, provides a measure of GPS integrity along a planned route, and checking for RAIM outages is required before conducting any flight utilizing a non-WAAS GPS for navigation. RAIM prediction is supported for the continental US, Alaska, and Hawaii.

8. What is FIS-B

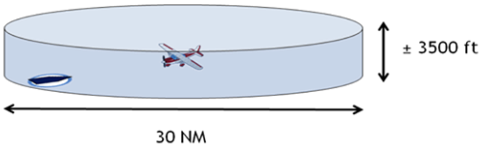
Answer: Flight Information Services-Broadcast

Flight Information Services-Broadcast (FIS-B) is just a fancy name for datalink weather. Only available with a 978 MHz receiver, the end product is remarkably similar to what we're accustomed to seeing with XM Weather. NEXRAD radar, METARs, TAFs, TFRs, AIRMETs and other information is continuously updated in flight, and all this can be displayed on either a panel-mount Multi-functional Display (MFD) or a portable device like an iPad. There is no monthly subscription fee with FIS-B. Well, actually you pay for it with your tax dollars. But unlike XM Weather, ADS-B weather uses the network of ground stations, not satellites. That means coverage, while good in most parts of the US, is not as universal as XM.

9. What is TIS-B

Answer: Traffic Information Services-Broadcast

Traffic Information Services – Broadcast (TIS–B) is an aviation information service that allows pilots to see near real-time positions and ground track of other nearby aircraft as either a "traffic advisory" or "proximate" intruder, for the purposes of collision avoidance. TIS-B is part of the FAA's NextGen air transportation system and is an extension of ADS-B.



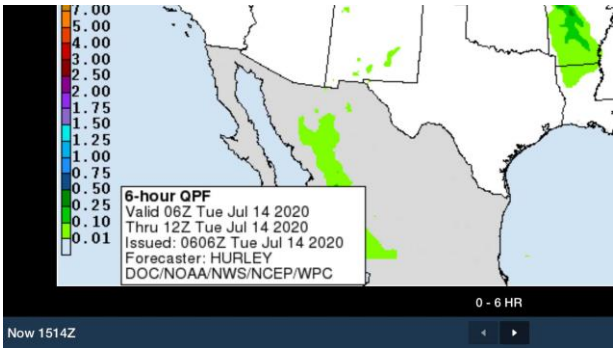
In ForeFlight, to ensure that you only see traffic within 30 nm and + or – 3,500 feet of you, click on “More” at the bottom right of the screen, click on the settings tab at the top of the pop up, scroll down to “TRAFFIC” and slide the “Hide Distant Traffic (ADSB)” button to the right.

Traffic information in ForeFlight is visually depicted on the Maps tab and enabled by selecting the traffic layer in the “Aero & VFR” drop-down menu (located at the upper left portion of the screen).

Unlike ADS-B weather, which is broadcast to anyone in range of the ground stations, ADS-B traffic is a custom report that is only sent to aircraft with ADS-B Out. If you are flying with an ADS-B Out transmitter in your airplane, you will get an excellent picture of all traffic within 30 miles of you.

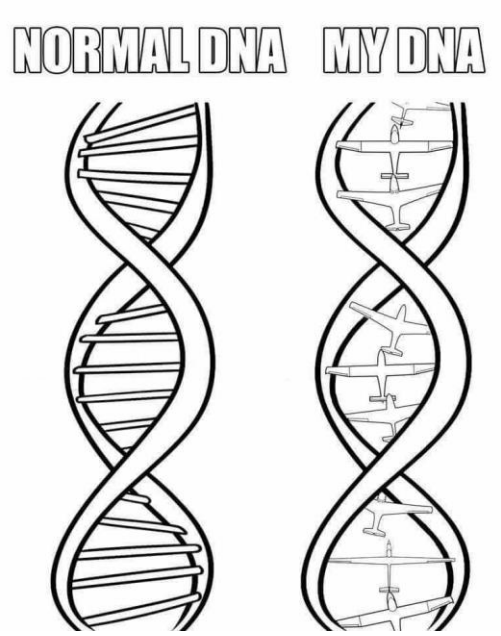
If you're not flying with an ADS-B Out transmitter but only have an ADS-B In receiver like a Stratus, TIS-B is not reliable.

10. What is a QPF?



Answer: Quantitative Precipitation Forecast

The quantitative precipitation forecast (abbreviated QPF) is the expected amount of melted precipitation accumulated over a specified time period over a specified area. This forecast is graphically represented by selecting the appropriate weather product in the imagery tab in ForeFlight.



Thunderbird Aircraft Sales

Specializing in pre-owned Mooney Sales and Brokerage

Hello Mooney Flyer Gang,
My name is Richard Simile, I am the President of ***Thunderbird Aircraft Sales***. We Specialize in the Sale and Brokerage of late Model Mooney Aircraft. If you are considering the purchase of a newer Mooney, or thinking about selling your current Mooney, we hope you would consider using ***Thunderbird Aircraft Sales***.
Our objective is to always provide a very pleasant transactional experience for both the Seller, and the Buyer. We have two offices, Auburn AL and Chandler AZ. Please give us a call or email, we would look forward to the possibility of serving you. Thank you.

THUNDERBIRD AIRCRAFT SALES

602-884-2111

richard@thunderbirdaircraft.com
www.thunderbirdaircraft.com

MOONEY
WE LOVE TO FLY. FAST.

How I got to be a Mooniac

by Terry Carraway

It all started a long time ago. My Dad was a carrier based Naval Aviator, so I grew up around aviation. My first flight in a light aircraft was in his friend's Bonanza. Considering it was in the 1960s, it was super well equipped, with a Narco 12 channel radio and even a VOR.

In middle school, I joined Civil Air Patrol (CAP) and earned my Mitchell Award. I was accepted into the Cadet Solo program but did not complete it.

Fast forward several years when I was a senior in college, I decided that I wanted to fly in the military. I thought it would help if I had some flying experience, so I started flying a Grumman Tiger out of a nearby field. The local Air National Guard (ANG) unit accepted me, and while waiting for a pilot training slot, I earned my Private Pilot Certificate in 1979. In late 1980, I went to USAF Undergraduate Pilot Training (UPT) to fly jets. I attended UPT in Class 82-01 at Laughlin AFB in Del Rio, TX. While in UPT, I also flew a local Grumman TR-2 and gliders. I was also mildly active with the local CAP squadron. I returned home to fly A-10s for the Maryland ANG and continued to fly in general aviation. I eventually got my CFI, CFII and instructed full time for nearly a year. I had a great time and made no money. After several years, I got out of the ANG, stopped flying, and was sidetracked with racing sailboats. We bought a Laser 28 sailboat. Those who know boats will see there is a trend. Before I got out of flying, at nearby Freeway Airport in MD, you could actually go to an aircraft dealer and buy a new airplane "off the lot." I spent over an hour sitting in a 201, thinking how nice it would be to own one.

I got back into flying in the early 90s and jumped back in with both feet. I ran through my PPL, CPL, and CFI in helicopters, added my CFI G, and flew various OPAs (Other People's Airplanes). With some maneuvering by me, a good friend bought a T-34. I ended up taking it to Oshkosh twice and Sun 'n Fun once – without him. With that airplane, I was part of the 63-airplane formation on opening day of Oshkosh 1999 for the 50th anniversary of the T-34. I enjoyed telling people that complimented the airplane that it was not mine but belonged to a good friend. When they would comment that he must be a great friend, I would tell them if he was a GREAT friend, he would have given me his credit card for fuel. Kidding aside, he was a great friend. That airplane, and my friend, were lost on the way home from Sun 'n Fun in 2001. I was in the backseat when the plane crashed. I did get back to some GA flying afterwards, then, for the second time, I stepped away from flying.

At that point, I got back into cars, both road racing and track days with my BMW M3. The trend continues.

About a year ago, I decided to return to flying. I went to the local airport – the same one where I earned my PPL and also instructed. There, I booked a lesson. I told the instructor that I was looking to get a Flight Review but was under no expectations on how long it might take. 1.3 flying hours later, plus the ground time, I had a current flight review. A month or so later, I had an Instrument Proficiency Check (IPC), partly in an approved sim and partly in a C-172. I also rediscovered Civil Air Patrol and realized that it was not the same CAP of my youth. I joined and got checked out in the C-182 aircraft, both steam gauge instruments and G-1000. I am working towards being a mission pilot, but currently, I fly for proficiency, repositioning aircraft, and Cadet Orientation flights. Other than my CAP check ride, the flying has been free.

Last spring, I came into some funds, and decided it was time to buy an airplane. It was a totally spur of the moment decision. After some thinking, I came up with three candidates. A Tiger, a Mooney, or an Aerostar. If you haven't noticed the trend by now, I like fast things.

Due to current gas and overhaul prices, the Aerostar was stricken from the list and I started shopping for Tigers and Mooneys. There were few Tigers for sale, so I started learning more about Mooney M20s. I knew a bit about the early ones and the 201s and 231s. That is because I had read about them in the magazines back in the day. I did not follow the others. I found and started reading The Mooney Flyer and joined Mooney Space. I started looking at past magazine articles about Mooney models. The Internet is great to look at back issues of online magazines.

I also found a Mooney A&P who is also a Mooney owner. He helped me through the process, discussing the different models, their strengths and weaknesses.

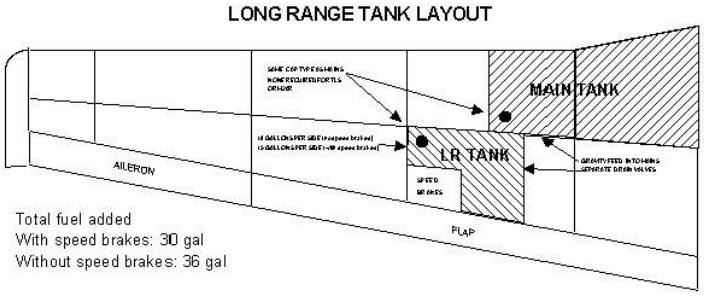
While I like speed, I am also "frugal." So, I rejected the big engine models and decided on the best of the small engine models. That lead me to the M20K 252 which met my "frugal" and fast criteria. Next, I started the quest to buy. I know myself and once I read about the 252, I knew that was the plane for me. I could buy a different model or aircraft make, but eventually, I would end up with a 252, so why not just skip ahead and get it now.

I found out that the 252 was a model that is desired by others, but not many were built – only 231. There were few choices, but some of them seemed reasonable in equipment and price. I also quickly found out that buying an airplane is not like buying a car or boat.

The first one I decided to buy looked great, had a nice panel, and reasonable hours on the engine and prop. A review of the logs showed a questionable overhaul and engine reliability issues. So, I decided not to pursue that one. I found another, that was not so great in a few ways, but was listed at a good price. However, they insisted that the pre-buy be done at their hangar. I could bring the A&P to it, but they would not bring the plane to him. So, I put that one on the back burner.

I went through a couple more, and then found a great candidate. We came to an agreement on price and the pre-buy arrangment. I placed a deposit but did not do a written sales contract. The day the plane was supposed to be delivered to the shop for the pre-buy, the owner called and said he had changed his mind about selling.

Then another one popped up that would work. It had Monroy tanks and had been "upgraded" to the Encore specs with a -SB engine and the airframe parts. This allowed a 230 pound increase in gross weight to go with the Monroy tanks.



An agreement was reached, the aircraft had a pre-buy, the bank was happy, and I suddenly became an aircraft owner. This took less than 10 days. WOW!

Due to some work and personal travel, I did not get to see my "new" Mooney for about a month. The pre-buy was done in Texas, so I flew there, one way, to get some Mooney transition training, after which I would fly my plane home. MY plane. That sounded great.

I contacted a few Mooney instructors from the list on the Mooney Flyer site. A couple were too busy when I was available, but I was able to coordinate time and schedules with Matt Weitzel. We met Friday night and did some ground school and also got to know each other over an adult beverage. Yes, it was plenty of time before flying.

Due to my schedule, on Saturday we were going to try to complete the five hours of dual required by my insurance company. We flew some patterns to get me started. After the pre-buy, we wanted to stay close to a runway, just in case. Then we did a cross country for a nice lunch at the Dreamliner Diner at Benham, TX (11R). We tried to get some fuel, but the self-service system would not read any of our credit cards. Strangely, there were no phone numbers posted for assistance, and none were listed in the airport information. We had plenty of fuel, so we flew to Stinson Airport (KSSF) near San Antonio. It has a very historic terminal building with some great pictures from across the years. We got fuel and headed back to the starting point. After landing, we had flown 5.5 hours, and Matt was OK with my performance.

Back at the hotel, we had more ground time and Matt signed me off for a Flight Review and entered the paperwork in my logbook.

The next day, I took off in MY PLANE. I just like saying that.

I flew two hours to the Baton Rouge area to visit a friend. Being a frugal Mooney owner, I landed at Louisiana Regional (KREG) because of their $5.29 per gallon fuel. They are very nice people. The line guy actually filled the tanks and then towed the plane to a parking place and helped tie it down.

I was going to try to get home the next day, but the weather was looking uncertain in the Mid Atlantic area. So, I planned a stop in eastern Tennesse for gas and to see how things were going with the weather. I planned a flight to Monroe County airport (KMNV), again for the fuel price of $5.59. I flew this leg VFR with Flight Following. I started at 7,500 MSL, but due to the clouds, I moved up to 9,500 MSL. Getting close to my destination, the clouds were getting less scattered below, so I asked for a pop-up IFR clearance for the descent to ensure I could maintain the cloud clearance requirements. The bases were about 4,000, so after getting below the clouds, I cancelled IFR about 10 miles from the airport. After fueling, I checked the weather and decided I would wait until the next day to head home. Luckily, the airport has a crew vehicle, that they were happy to let me have overnight. The only space to park had no tiedowns and my new tiedowns were at home. When I mentioned this, one the mechanics found some tiedowns and tied it down for me. Again, great service and hospitality. The flight was 3.4 hours and used 44 gallons of fuel. Most of the time I averaged 165 KIAS and just over 13 GPH Rich of Peak (ROP). The number 6 Cylinder Head Temperature (CHT) runs a bit higher than the others, but my mechanic now tells me that this might be due the different sensor, as the factory gauge is normally on the cylinder. I figure that a bit of fuel is cheaper than having a cylinder overhaul.

I drove over to the nearby interstate exit and got a room at the Holiday Inn Express, figuring that would make me smarter for the next day. Right down the street was an incredibly good BBQ place. I had a nice dinner, a wonderful night's rest, with breakfast included.

I filed IFR for the last leg, requesting 9,000 MSL. After takeoff, I knew that filing IFR was the right choice, as there were clouds at around 3,000.

After climbing to 9,000 MSL, I was above the clouds and able to see any major buildups and deviate around them. After a while, I requested and climbed to 11,000 MSL as the clouds were getting higher. My plane has an oxygen system and I had purchased a Mountain High O2D2 EPS device. If you are not familiar, this unit senses when you inhale and only delivers the right about of oxygen when you inhale. I had used it the day before at 9,500 to try it out. After two days, the oxygen pressure in the cylinder had hardly changed. It is an amazing device.

After a while, I stepped up to 13,000 MSL. Once level, I saw 173 KTAS on 13.5 GPH. The clouds continued to move up, but there were no buildups, so I stayed at 13,000 MSL and logged some actual instrument time.

As I traveled to the north, I noticed a drop in the OAT to 3ºC. There were AIRMETs for icing in the clouds above the freezing level. About that time, I hear a Cirrus a bit further north asking for a descent from 13,000 to 11,000. The controller was busy, so the Cirrus kept calling. Finally, he stated that he needed to go lower because he was picking up light rime icing. As soon as the controller cleared him lower, I also requested 11,000 MSL. I saw no need to prove that I too, could pick up some ice.

Around Martinsburg, WV, I received a descent clearance to 9,000 MSL and then popped out into a serious VFR day. There was a layer of scattered small clouds at about 5,000 with great visibility. After I got under those, I cancelled IFR and continued VFR to my home field, Harford County Airport Churchville, Maryland (0W3). After an uneventful landing, I stopped by the FBO to get the key to my temporary hangar. I will be in this hangar for a month or two, then move to MY hangar.

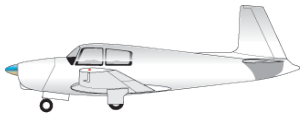
I checked with my friends that are about one to two hours flying time away. They are all busy this weekend, but I am determined to find somewhere to fly MY airplane.

DM

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



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

LASAR

Fanatically Mooney. Exceptionally Fast.

Ask the Top Gun

TG

Tom Rouch

Founder of Top Gun Aviation, Stockton, California

Send your questions for Tom to TheMooneyFlyer@gmail.com

My friend's M20E experience a gear collapse on landing. I thought that Mooney gear rarely collapsed. Was there something possibly wrong that would allow the gear to collapse?

Tom's Answer

It is the most common problem Mooney's have. I think there are more manual gear collapses versus the electric gear. If you search FAA records, you will find that in one month earlier this year, there were four gear collapses or gear up landings.

With the manual gear, usually the problem is that the gear handle didn't lock with the gear down. On landing, the handle comes loose and the gear folds. As the planes age, the uplock mechanism located on the instrument panel becomes worn and problems increase. Through the years, the top of the handle wears a grove in the uplock casting until it is so worn that the handle fails to lock. Just ask pilots with the manual gear how many times they test the lock by pulling on the handle before landing. **Cause:** Very few of these models are getting a thorough Annual Inspection to check for wear.

NOTE: When the manual lever comes unlocked, it slams so down hard that if your arm is in the way, it will break your arm.

The electric gear models have very few collapses but have the most gear up landings. That's because the pilot forgets to lower the gear. However, (now don't get mad at me), to save the pilot's ego, these gear up landings are reported as collapses. It is easily proven because a gear up landing will have grooves worn straight down the main gear doors, while a collapsed gear will tear the doors up.

I have repaired lots of electric gear-ups, but very few "collapses". To fix these, we would just test the crank shaft to see if it is bent, then put a new prop on. However, now you will have to perform a very costly engine tear down. In all my years, I only had one Mooney that had a left gear collapse. This was caused by a retract rod that had bent. The pilot was landing in a crosswind and the left gear hit first.

I have actually seen a couple of Mooneys with about two inches shaved/ground off the prop. The pilot realized the gear not down and he or she was able to take off again, lower the gear and land.

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


Mooney
SERIES 18
the most practical personal aircraft built
N3199K

Have you HEARD?

BREAKING AVIATION NEWS HYH

Aircraft equipped with Aspen Evolution primary flight displays will no longer be required to carry mechanical gyro (Announced at EAA AirVenture)

Shown are, from left, the Aspen Evolution 1000 Pro MAX primary flight display, Evolution MFD500 MAX multifunction display, and Evolution MFD1000 MAX MFD. Photo courtesy Aspen Avionics.

Aspen Avionics CEO John Uczekaj said July 26 that the FAA allowed the change after years of data showed the digital equipment is far more reliable than mechanical attitude indicators and turn coordinators that have long been required as backup instruments.

Aspen also announced a software upgrade that will allow its PFDs to interface with Garmin GFC 600 autopilots. Garmin and Aspen are working together to obtain regulatory approval to make the change.

Uczekaj said a **merger** with the AIRO Group, an international amalgamation of six aerospace firms, will give Aspen the capital it needs to bring ambitious new avionics products to market. Uczekaj is chief operating officer of AIRO, a firm based in Washington, D.C.

Nav Canada Announced Delay of Deadline for 1090ES ADS-B Out Antennas Capable of Broadcasting Toward Space-based ADS-B Receivers

Over the past few months, AOPA and a coalition of industry leaders from Canada and the United States submitted comments to Transport Canada, citing supply chain issues, as well as **concerns** that the upcoming mandate would cause financial hardship to aircraft owners who recently equipped their aircraft to meet U.S. ADS-B requirements.

The first phase of the mandate, for Canadian Class A and B airspace, was originally set to take effect February 23, 2023, requiring aircraft to be equipped with an appropriate 1090ES ADS-B Out transponder as well as antennas capable of broadcasting toward space-based ADS-B receivers. Technical requirements can be found **here**. In a letter to stakeholders, Ben Girard, Nav Canada vice president and chief of operations, said, "We recognize that supply chain issues may be impacting some of our customers in terms of their ability to acquire and install an appropriate ADS-B Out equipment in a timely fashion. In recognition of the challenges that these customers are facing, the Canadian equipage mandate will be delayed, to provide additional time to install an appropriate transponder."

The new mandate effective dates are August 10, 2023, for Class A airspace and May 16, 2024, for Class B airspace.

Girard wrote, "At this time, NAV CANADA remains focused on preparations for the Class A and B mandates. However, we recognize that some customers who do not operate in these classes of airspace and are not impacted by the Class A/B mandate are apprehensive of future requirements in additional classes (C, D and E) of airspace."

Implementation of potential changes to transponder requirements in Classes C, D and E airspace remains to be defined and will occur no sooner than 2026.

New Pilot Minute Video Covers How to Check the Status of Your Medical

You can now check your current medical application status in MedXPress. In the latest ***Pilot Minute*** video found here, FAA Federal Air Surgeon Dr. Susan Northrup demonstrates how to do. The video highlights the new “Application Status” tab in MedXPress that shows information to about 95% of users on their issued medical certificates. If your application was deferred to the FAA for a decision, MedXPress will give you details about the status of your case. If the FAA needs more information, MedXPress will display an Action Required icon. Check the Help tab on the site for more details. Be sure to check out the complete list of ***Pilot Minute*** videos here.

The Federal Aviation Administration (FAA) has issued the following SAIB: 2022-16

This **Special Airworthiness Information Bulletin** advises manufacturers and operators of an airworthiness concern about lack of traffic conflict alerting or collision detection functionality for their Automatic Dependent Surveillance -Broadcast (ADS-B) In Systems. At this time, the FAA has determined that the airworthiness concern is not an unsafe condition that would warrant Airworthiness Directive (AD) action under Title 14 of the Code of Federal Regulations (14 CFR) part 39.

Background: On May 13, 2019 in Ketchikan, AK, a float-equipped de Havilland DHC-2 (Beaver) airplane, N952DB, and a float-equipped de Havilland DHC-3 (Otter) airplane, N959PA, collided midair. The DHC-2 pilot, and four passengers sustained fatal injuries. The DHC-3 pilot sustained minor injuries, nine passengers sustained serious injuries, and one passenger sustained fatal injuries. The DHC-2 was destroyed, and the DHC-3 sustained substantial damage. Both aircraft were equipped with ADS-B Out and In. The FAA Safety Issue Action Team reviewed the investigation findings documented in National Transportation Safety Board (NTSB) Accident No. CEN19MA141 as well as information from other recent midair collisions. NTSB Accident No. CEN19MA141 findings revealed that one aircraft had a Technical Standard Order (TSO)-C195a ADS-B In system installed, but that aircraft's ADS-B In unit did not have collision alerting or collision detection functionality because TSO-C195a had no requirements or standards for such functionality. As a result of the lack of conflict alerting functionality, the ADS-B In system had no means of providing an aural alert to the pilot to warn of the impending conflict. The Minimum Operational Performance Standards (MOPS) in the current ADS-B In TSO-C195b, RTCA document DO-317B, and the subsequent MOPS revision, RTCA DO-317C, now provide standards for an ADS-B In conflict alerting application called **ADS-B Traffic Advisory System (ATAS)** in TSO-C195b. In addition to visual conflict alerting, **ATAS** provides voice aural alerts of impending conflicts consisting of the word "Traffic" along with information on relative bearing (expressed as a "clock position") and usually relative altitude ("high", "low" etc.), range, and vertical tendency (e.g. "descending"). **ATAS** may also be implemented without a traffic display. However, **ATAS** is an optional application for a TSO-C195b system, and is also currently an optional application in DO-317C. A report related to NTSB Accident No. CEN19MA141 analyzed the performance of the ADS-B In systems on the two aircraft and concluded, **"... the circumstances of this accident indicate that pilots might not always use Cockpit Display of Traffic Information consistently to supplement their visual scan for traffic, and that aural alerts that draw the pilot's attention to imminent traffic threats can significantly improve the effectiveness of these systems."** NTSB studies of several recent midair collisions, including Accident No. CEN19MA141, have further concluded that had the accident aircraft been equipped with ADS-B Out and a TSO-C195b system with **ATAS**, the ADS-B In system would have provided significant advance warning of the collision. In most cases, this warning would be between 20 and 39 seconds in advance.

Note: Since June 17, 2014, new models of ADS-B ASA systems must meet the MPS qualification and documentation requirements.

Recommendations:

- The FAA recommends that manufacturers of ADS-B In systems ensure their systems meet the performance requirements of TSO-C195b or later revision and include the **ATAS** application or equivalent traffic conflict alerting capability.
- The FAA recommends that operators performing an initial installation of an ADS-B In system in their aircraft install a system that meets the performance requirements of TSO-C195b or later revision, that incorporates **ATAS** or equivalent traffic conflict alerting capability.
- The FAA recommends that operators with existing ADS-B In equipment installations prior to TSO-C195b, or with an existing TSO-C195b installation without **ATAS**, upgrade to a system meeting the performance requirements of TSO-C195b or later revision, that incorporates **ATAS** or equivalent traffic conflict alerting capability.

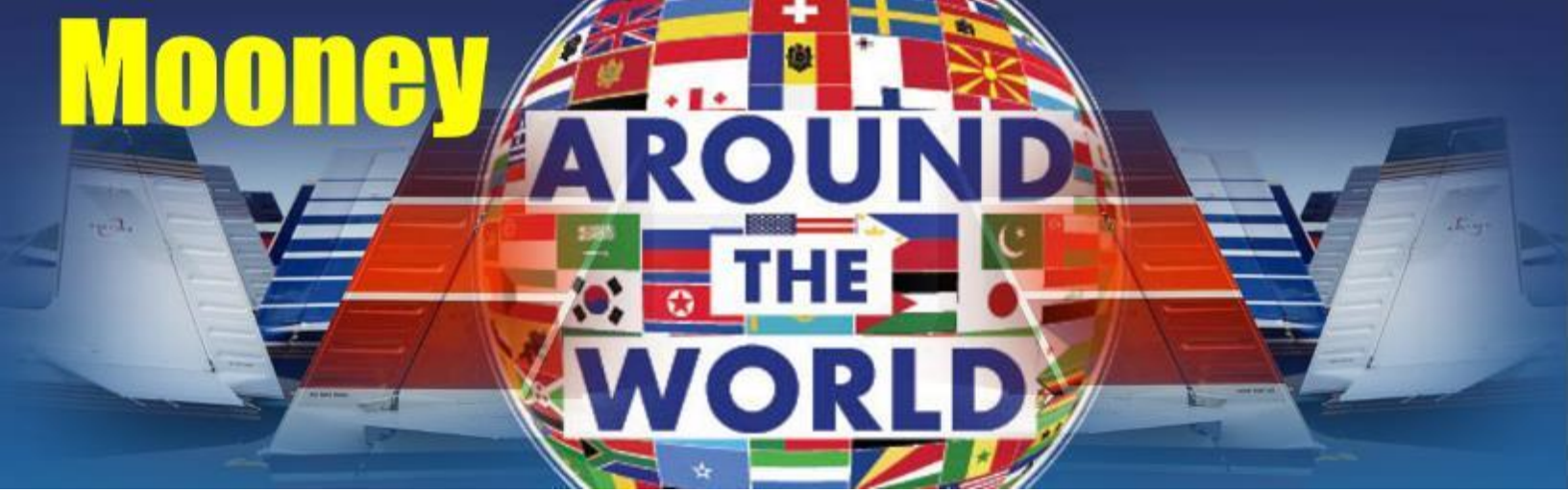
For Further Information, Contact Ray Mei, Aviation Safety Engineer, Aircraft Information Systems Section, FAA, 2200 South 216thStreet, Des Moines, WA 98198; phone: (206) 231-3541; email: raymont.mei@faa.gov

AOPA Companion Copilot Video Series Released

The Aircraft Owners and Pilots Association Air Safety Institute (ASI) has released its new Companion Copilot video series.

The videos help non-pilot passengers learn how they can assist with the preflight, route planning, navigation, and radio communications, including how to work with ATC.

The **Preflight, Aviate, Navigate, Communicate, and Emergency videos** cover preflight tasks, simple aerodynamics concepts, navigation and communication considerations, checklist use, and emergency procedures. You can find all five episodes by going to https://www.youtube.com/ and searching for **AOPA Companion Copilot Aviate** or, just click on this link: https://www.youtube.com/results?search_query=AOPA+Companion+Copilot+%7C+Aviate



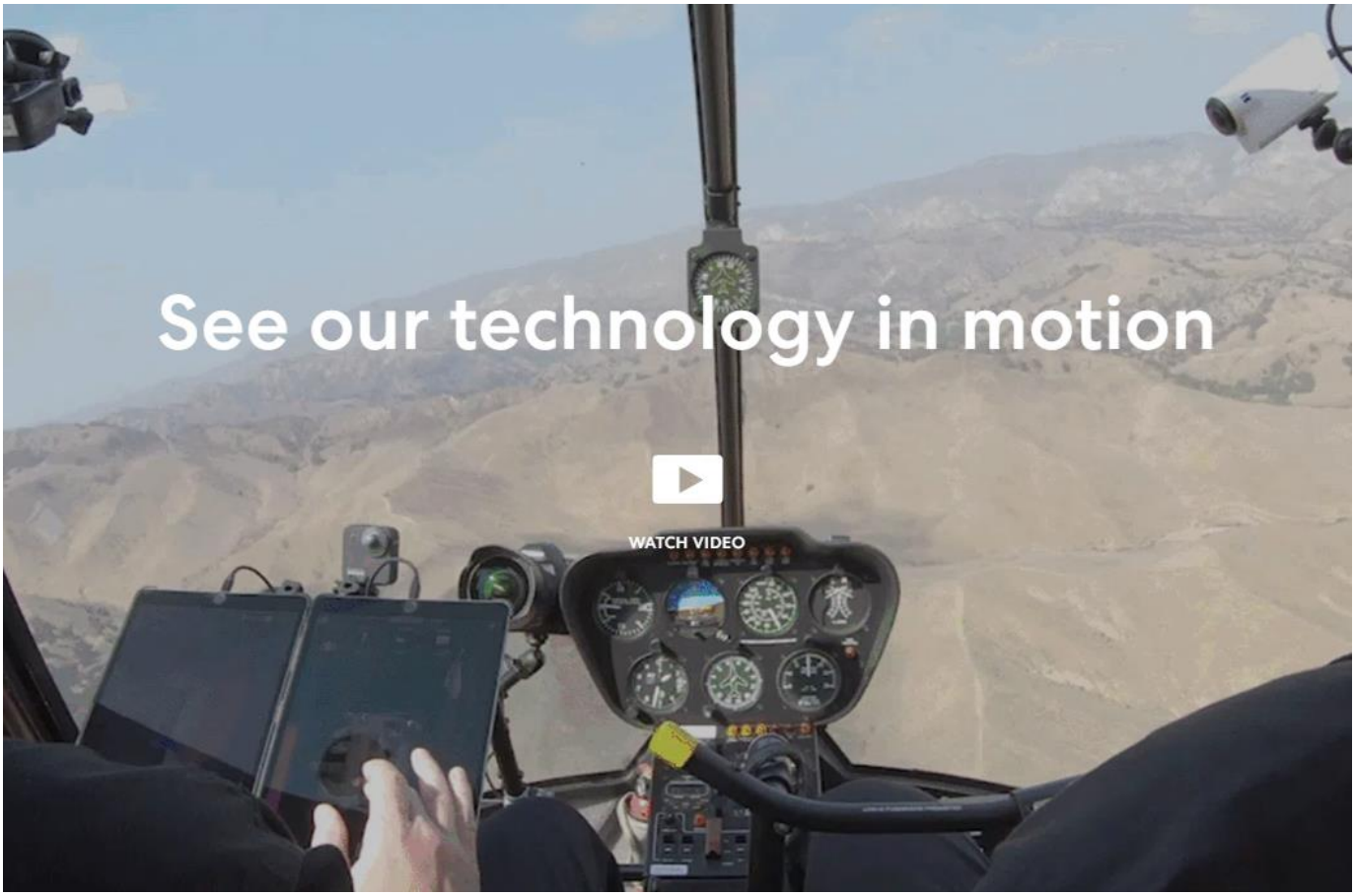
Florida Mooney Lunch Group	*Contact Dave at daveanruth@aol.com or (352) 343-3196, before coming to the restaurant, to have an accurate count. Events begin at 11:30* Sep 10: Vero Beach (KVRB) Oct 8: Flagler (KFIN)
MOONEY SAFETY.com	**2022 Events** Sep 16-18: Oshkosh, WI (OSH) Oct 21-23: Redding, PA Sign Up at https://www.mooneysafety.com/ppp-registration/
MOONEYSUMMIT	**Learn more at** https://www.mooneysummit.com/
Australian Mooney Pilots Association	September 9-12: Spring Fly-In to Merimbula – More details later **Learn more at** https://www.mooney.org.au/
EMPOA	**Learn more at** https://www.empoa.eu/index.php/en/
Other Mooney Events	

Skyryse

This is not a product that you can buy yet, but it might be a glimpse into the future of flying. In the future, it also might be a possible training scenario.

In the video, a non-pilot flew a helicopter after only ½ hour in a simulator.

Enjoy



CLICK HERE to view their video!

CLICK HERE to go to their website

Parts for Sale

Item for Sale

Call Tom 303-332-9822

New Hartzell Propeller Hub HC-C2Y (K, R)-1 Serial CH41782B
This hub will comply with AD2006-18-15 and superseded by AD2009-22-03
This AD affects many IO-360 aircraft.
Current Hartzell price is $4,275.

Price $3,999

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.

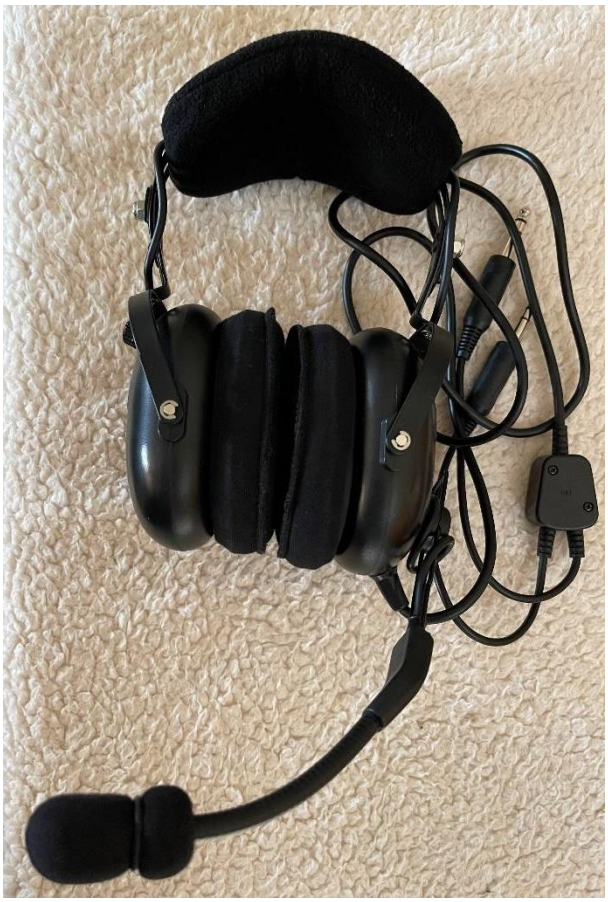
Contact: Bernard Lee – leebern@msn.com (562-865-2547)

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)



FLIGHTCOM Classic 5DX Headset

$70.00 **(Includes shipping – US Shipping only)**

(Available new - $175)

Contact Jim Price:
jaspriceaz@gmail.com
480-772-1527

Stratus 3 ADS-B Receiver

$310 **(Includes shipping – US shipping only)**

(Available new - $749)

Comes with:

- Charging cable and 110V wall plug. (Charging cable also works with all 2.0 amp cigarette lighter plugs).
- Suction cup window mount

Contact Jim Price:
jaspriceaz@gmail.com
480-772-1527

Lightspeed Tango Headset $575

(Includes shipping – US shipping only)

(New Price - $1,000)

The Tango is a wireless / Bluetooth headset.

It Comes with:

- Bag
- Charging cables
- Manual

Contact Jim Price:

jaspriceaz@gmail.com

480-772-1527

X-Naut iPad Cooling Case for the iPad Air2, 7th Generation (9.7”) with Ram Claw Yoke Mount – Both for $110 **(Includes shipping – US shipping only)** (The X-Naut is available new at $200). (The Ram Claw Mount is available new at $56).

Contact Jim Price:

jaspriceaz@gmail.com

480-772-1527

RAM EZ-ROLL iPad Mount for the iPad Air2, 7th Generation (9.7")

$10 **(Includes Shipping – US shipping only)**

(Available new at $25)

Contact Jim Price:
jaspriceaz@gmail.com
480-772-1527