Safe Piloting and Double Yellow Lines

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About the Author

Mr. Harrington, along with a dozen, talented, hardworking other pilots, built a small Midwest flight school into one of world's largest, with fifteen offices throughout the United States as well as internationally with offices in

England, Spain, and Mexico. He was also one of the first Internet pioneers having created one of its most expansive sites. He innovated the first live and interactive, on-line classes as well as an FAA approved program to recertify instructors (the most attended in the country).

Mr. Harrington is a Commercial Licensed Pilot with thousands of hours of flying gliders, fixed wing, rotor craft, a P-51 and even the Goodyear blimp, “Stars and Stripes”. He owned the first Cessna 182RG manufactured, a Cessna 310R, two Cessna 340s and a Citation 501. He wrote many manuals, hundreds of newsletters and, as well as teaching pilots, he also created and taught college courses. It was not his favorite trip, but he was well known on 600 Independence Avenue in Washington, DC having traveled to the FAA headquarters dozens of times, as he says, “to kiss their ring”.

At one of his seminars speaking to a couple of hundred wives of the Flying Physician Association husbands on Mackinaw Island in Michigan State, he started his “Pinch Hitter” speech by asking the rhetorical question, “What makes an airplane fly?” Before he could begin a lady in the back of the room shouted, “MONEY!

Table of Contents

Introduction

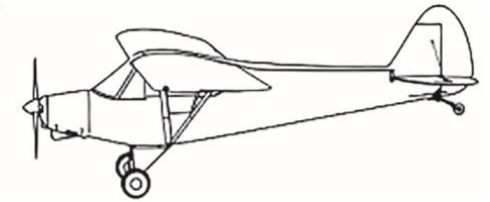
Personal

My church's women's group, who were always creating every imaginable activity, mostly for teenagers, invited a speaker to one of their functions when I was in high school. The guest was a pilot who talked for an hour or so about his career choice. He posted a poem written by a Royal Air Force pilot, partially quoted below. I left that basement committed to become one as well.

Oh! I have slipped the surly bonds of earth

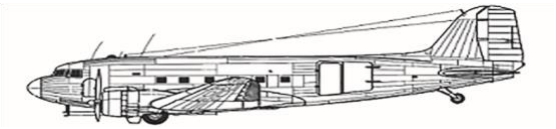
Put out my hand and touched the face of God

"High Flight", John Magee



That was an inspiration for me, but the absolute final confirmation was provided by my college football team's physician. He had a little Piper Cub and would often fly it to our games. I begged him to take me along and he volunteered to pick me up at an airport near my parent's home where I was visiting. As we took off, we drifted toward a barn at the far end of the runway. It was a frightening experience, so much so, that I vowed never to fly in a small aircraft again until I had taken enough lessons to rid my fear and/or assist the pilot, – at the very least learn how to avoid barns.

It is also interesting that my parents named their children after notable people. Roy Rogers, the cowboy singer, George Gilbert, the musician and ironically, Donald Douglas, the founder and principal force of the Douglas Aircraft Company, most famous for developing the DC-3, (C-46, military version) probably the most innovative and versatile transport aircraft ever created. (Some are still flying 80 years later.)



Al Stanek, a magnificent instructor, FAA Designated Examiner, good friend, and the man who taught me the most about flying airplanes, told me that after one of his applicants landed his aircraft in a really, gusty wind, he overheard him say to himself, “Thanks God, I’ll take over now.”

There are a lot of us pilots who can relate to that thank you...

We share the same airspace, so let us not overlook the fact that together we are all relying on the skills of every pilot and expanding their knowledge on how to stay one is in our own selfish interest.

During the summers I cruise the Canadian Boundary waters north of Seattle and the San Juan Islands on the “Eagle”, an old but venerable Grand Banks trawler. Anyone familiar with yachts knows that ‘Captain’ is spelled... ‘m-e-c-h-a-n-i-c’. I motorcoach the winters visiting friends, state, and national parks in my Mountainair RV. I built a desk into both the Eagle boat and the motor home to keep my logs, Pilot Magazines, books, and two computers. It is amazing how many pilots I meet in the harbors and R. V. parks – and of course we do not need any encouragement to ‘hangar talk’, although a good Chardonnay or Pinot Noir helps.

Let me emphasize that I have a commitment to help you become a safer, smarter pilot. Having spent fifty years teaching, coaching, and supporting them, I have the utmost confidence that at least a few of my double yellow lines will resonate with you and if just one of them prevents an accident, then this book will be well worth the effort. One of my football coaches used to tell me, “Don, if you do not have someone coaching you in the right direction, you can get lost in the huddle.” I have learned how true those words were and I do not care what you put your heart and mind to, it’s always better if someone has got your back.

By the way, that coach was my football mentor, and after I was drafted to play professional football four years later, I asked him why he recruited me to play for him. Coach Turner replied, “if you remember, I lined up all the athletes and told them to run toward a tree. The ones that went around it were the basketball and baseball players. The ones that ran into it, like you, were the footballers.”

There is gold down there

One afternoon I was flying between Chicago and Ft Lauderdale when I saw a military jet literally drop from ten thousand feet above me to immediately in front of my Cessna 340 and then climb back up again in an instant. Curious, I contacted flight control and queried, “Was that a UFO or what?” They replied with a chuckle, “you just flew over Fort Knox and got your picture taken as part of their security system.” (“Gold Finger” for you James Bond fans, that is... if you are old enough to remember).

There are two major objectives of this book. First, that experience is equally important as learning in a classroom… maybe even more so. Second, that there are rules, Double Yellow Lines, that no pilot should ever cross over.

Another objective, almost more daunting, was to use as few pilot-speak words as possible. While proofing the book I have tried to eliminate slang and/or technical words and rely on more every day common phraseology. Learning to fly shouldn’t require a new vocabulary. While phrases such as non compos mentis (crazy), nunc pro tunc (now for then) are part of a lawyer’s lingo, they tend to separate themselves from their clients, perhaps even interfere with important exchanges of information. So, words like yaw, pitch, and roll, etc. will be used as sparingly as possible. I was really surprised

when a “Pinch Hitter” student of mine said, “I’ve been flying with my husband for four years wondering how the runways got their names, and you’re telling me it’s just the number from the compass that the runway points to!”

Knowledge: Classroom versus Experience

Formal schooling provided each of us tons of technical information to pass FAA knowledge and flight tests. As necessary as that was, it is not enough to make us into safe pilots. My goal is to enhance your skills with practical information that has been gained by the lessons learned by “been there, done that,” in my case, 50 years of it, and expanded by dozens of other pilots and teachers who have shared their best (or worst) flying experiences with me.

Safe Piloting and Double Yellow Lines is full of anecdotes, admonishments, and flying techniques to make you a smarter, more proficient and safer pilot, but also includes a good bit of history (much of it controversial), criticism of the government, and hopefully some humor. (After so many years of doing this, I’ve probably heard about every pilot joke spoken since the days of the Wright brothers).

Rick, my favorite mechanic, demonstrated why experience is oftentimes more valuable than classroom learning… he showed me how he got more longevity out of the light bulbs in the fleet of one hundred airplanes that he and the fifteen mechanics that he supervised maintained. And believe me, when you learn how much these bulbs cost, you will appreciate what he did even more. Rick was showing some fledgling mechanics how to install them, emphasizing that you must make sure that the filaments are aligned “up and down”, not horizontal to ground level. “Okay,” I said, “but what difference does that make?” “Simple,” Rick responded, “when the aircraft lands there is less stress on the filaments in this preferred position, especially if the landing is abrupt.” (That is experience that makes a good mechanic more than worthwhile).

Another story that involves testifying to experience is that of a retired aviation mechanic... One of the major airlines had just bought a new de-icing truck. It was so high tech and expensive that the top brass of the airline was there to demonstrate to the press and its own employees how it worked. They started it up, but the moan of the company's president was almost as depressing as the new machine's. It did not work. The president called out, "Can anyone help me here?" Someone responded, "Jim, who just retired, is the expert, he could make it work." Jim happened to be in the crowd amongst the reporters and came forward. He looked at the contraption, went over to a work bench and picked up a hammer. Upon his return he gave this praying-mantis-looking monster two huge whacks under it belly. The engine and sprayer came to life, and everyone cheered. The president asked Jim, "How much do I owe you?" Jim replied, "$502.00." The President was a little surprised, and said, "Goodness, you spent less than five minutes... how can you ask for such a huge amount?" The retired mechanic responded, "Well sir, I charged you one dollar for each hammer blow, and five hundred for knowing where to apply them."

Double Yellow Lines

Throughout this book you will encounter "double yellow lines…" with warnings never to cross them. It is well intended.

The double yellow line should be familiar to everyone who drives an automobile because all fifty of the United States paint them on their highways to promote safe driving.

Their meaning is quite simple. Under no circumstances are you to cross them.

I use them for the same purpose to promote pilot safety and hope by the time you finish reading this book you will know where pilots should draw their lines.

And never cross them.

I will also promote a new term, CARE, “Co-ordinated Aileron, Rudder, and Elevator”, an acronym describing the controls surfaces which make it possible for an aircraft to be flown and the best practice exercise, Dutch Rolls, to master how.

Chapter I:

Unique Pilots and aircraft

Sam Walton, Walmart's founder, drove an old Nash Rambler to the airport to take flight instruction.

The Pilot Personality

This is difficult to write, because I am not a psychologist, even though my college professor told me, "Don, I think you could be an excellent psychologist, but most certainly you'd be a great patient." But seriously, I have met thousands of pilots, I've trained an equal amount and let me assure you that they are special people. They are not arrogant. They are confident. They are not reckless. They respect all that is around them and always seem to have a handle on knowing where they are. They are not malcontents, or complainers. Instead, they possess a serenity, a quiet, confident resolve. Like Popeye, they always seem to have a can of spinach when challenged. There are just a few people, who, when you meet them, you're willing to hug. Yes, I agree, and if we meet and I hug you, then you must be a pilot.

Nancy Harkness Love, First of the “Originals”

Nancy Love, born in Houghton, Michigan was the youngest woman in U.S. history to be awarded a pilot license and the youngest to receive a Commercial Pilot Certificate. At 28, she was primarily responsible for the creation and leadership of, the WASPs, (affectionately called the “Originals”,) an all-female military aircraft ferry group, but not actually part of the United States’ military. (Woman were banned from being military pilots at the time. In fact, when she and her all female crew were transporting the four engine, B-17 Super Fortress to England, the flight was canceled enroute, and the order for 100 other deliveries, because of political reasons.)

What are knees for?

Ed Wallace a TWA pilot, (former Chicago Police officer) and one smooth pilot. While he was flying my 310 one night, I noticed that he did not turn the wing lights on to see if there was ice on them, yet, regardless, he was occasionally activating the de-ice system. I wondered how he could know that there was ice? Out of curiosity, I finally asked him, “Ed, are you just randomly hitting the boots, or are you somehow knowing when to do so?” He grinned as he told me that he had his knee touching the trim wheel, and when the autopilot made a nose up adjustment, the trim tab would rotate

against his leg, informing him that our airspeed had declined, and that ice was logically the reason. That is using you head – or knee?

Jonathan Livingston Seagull:

Richard Bach, according to my recollection and or rumor, wrote this terrific little, but powerful book about a Seagull that wanted to soar like an eagle. Mr. Bach was a well-known regular contributor to many east coast newspapers. He was a mature, gray-headed gentlemen when he started taking flying lessons with our school on Long Island. He received some criticism from family and business associates for enrolling in those courses "at his age" and decided to write a book to mitigate their objections. "To be the best that I can be" was Jonathan's, the seagull's goal, and I am confident that that is why Mr. Bach was inspired to write the book. (Thank goodness). It is a wonderful read, a great inspiration. (I'm sure you can find it on Amazon).

Marriage candidate

One of my favorite instructors was hired by United Airlines and at a gathering a couple of years afterward, his wife came up to me with a confession. She was formally Air Wisconsin's chief pilot's secretary who gave him a pile of candidate applications when he needed to hire. She giggled, looked at her new husband across the room, then told me that she only picked 'bachelors'. In other words, her boss hired one of them, and then she married him.

Pilots could not be unique if they did not have aircraft to fly. That is an understatement, of course, and if I have time, I would love to create a book of just some of their biographies – and another dedicated to just the incredibly diverse and unique aircraft that they flew. In the following pages I highlight the different groups of planes by choosing one to represent each. From the tiny Ercoupe to the space shuttle, man's ingenuity and imagination are profoundly revealed. Some of them follow.

The Training Aircraft

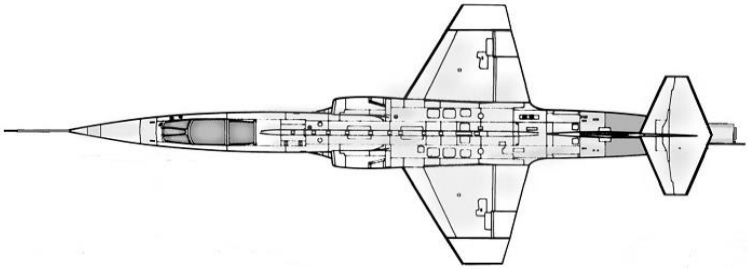
Most of us started out in a small 2 to 4 place, single engine aircraft that is capable of about a hundred miles per hour. Obviously the most manufactured and flown aircraft in the world.

The B-26

The B-26 was a famous, as well as the most produced World War II military bomber (Ford Motor Company built 8,000 of them – one an hour at the peak

of production.) It was however, nicknamed early on, the “widow maker.” Martin was asked by the Army Air Corps, to increase its speed before accepting it for duty. Martin did so by cutting a few feet off its wings. The plane achieved the speed that the Corps wanted, but unfortunately it decreased its lift substantially. It could be devilish on takeoff, especially laden with fuel and armament (later versions added ‘engine boosters’ to increase horsepower on takeoff, but they could only be used for short bursts and decreased the useful life of the engines.)

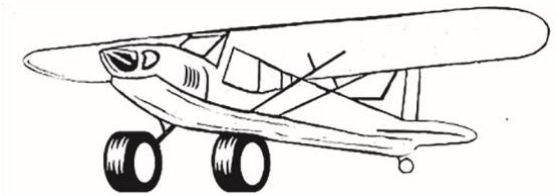
Interesting fact... to overcome the plane’s bad reputation, the Air Force (in 1941 the Army Air Corps was renamed) had a substantial amount of their deliveries made by the WASPs (Women’s Airforce Special Pilots). The top brass figured that if their men saw woman flying the airplanes to their front-line bases, they would be more willing to fly their missions in it. (Was that sexist? Or just a competitive motivation?)



Lockheed F-104

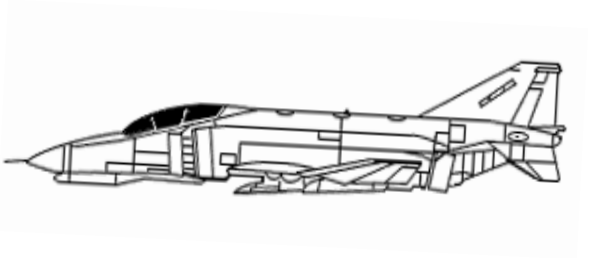
Several other military planes earned the reputation as widow makers. Among them, the F-104, but if you know the inside story you have learned that hundreds of these fighters were retrofitted into bombers, primarily for

Germany, which was banned by treaty to possess offensive weaponry. It was originally designed as a speedy fighter not a bomber.



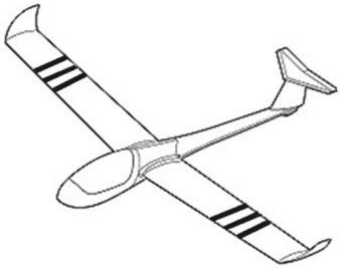
Bush Pilots and Their Mounts

This title uniquely describes the special airplanes and the charter pilots that fly Alaska, and a world where the definition of airport, runway, and even traffic control takes on a slightly different meaning. What is a tundra tire? (Pudgy tire that can land on about any surface, including snow). What is that fifty-gallon barrel of gasoline with a hand pump hanging out of it on the side of the river? (Your fueling station). Even with its idiosyncrasies, there is no more beautiful flying than what Alaskan (and Canadian) aviation companies offer. And if it were not for the bush pilots (whether they are on wheels or floats) there would not be the million people a year visiting our biggest state. When a couple of my friends and I flew from Lake Illyama to the Mulchatna River during the spring Salmon fishing season, the pilot surprised us when we asked him why the manifold gauge (a mandatory and somewhat important engine gauge) was missing from the dashboard… he said, “We do not need it.” When I asked if the FAA would be critical of that, he said, “They are six hundred miles away.”



The Phantom Fighter

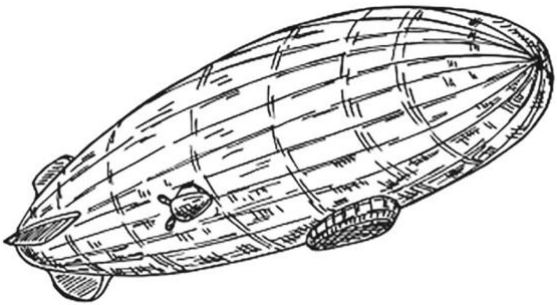
The Phantom fighter was a mainstay in the USAF. Its pilots knew its engine was not out of oil, so long it was leaking it. The SR-71, “Blackbird,” spy plane had the same problem. However, once it was airborne its frame heated up so dramatically (3,000 miles per hour) that the resulting expansion of its titanium tanks sealed the leaks..



Gliders

The first thing that you experience when you fly a glider is – quiet. My brother, George, flew with other glider pilots along the Rocky Mountains and with open hatches were able to talk with one another as they rode on the updrafts prevalent alongside the mountains. Gliders either use that wave of

air forced up along mountain ridges or the hot air rising from the ground (thermals) to stay aloft. (The glider wings develop a tremendous amount of lift so even though the craft is constantly descending, they stay aloft because the rising air draft is greater than their rate of descent). There are a few glider pilots who say they have flown without touching down for a thousand miles along the Allegheny Mountains range. That would be well beyond most pilot's bladder capacity, but... well, use your imagination. For those who are not familiar with the winds along the mountains, or have not been introduced to thermals yet, those hummingbirds that you observe diving down the sides of cliffs, and then soaring back up again, are literally playing in those updrafts of hot, air pocket, thermals, just like the ultimate gliders, the Pelicans, who soar in formation atop the updrafts along our coastlines.

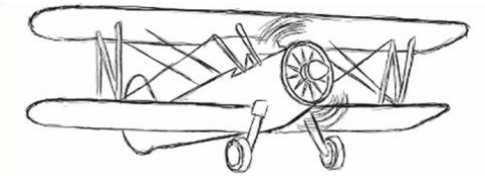


Lighter than air

Pull up your chair, open your window and extend your arm outside. In your hands you have what looks like a wheel from a boat, and next to your chair you have another, almost as big, but facing sideways, not toward you. Hanging outside your left and right windows there are two engines growling, set at a constant twenty-two hundred RPM. There are a bunch of people running alongside of you, appearing to be hanging on ropes, but instead they are hanging onto you. When they let go, you look over at the Captain of the Stars and Stripes blimp, and he tells you to takeoff by turning the wheel next

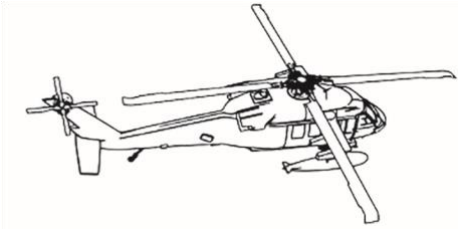
to you toward the rear. Your nose rises and away you go at a blistering 15 mph. This lighter than aircraft is full of helium and is 'buoyant', remaining at the same altitude regardless of its speed, unless you point it up, or down, by turning that wheel alongside your chair (really, a wooden chair just like one at your dinner table). When you turn that wheel, a bag in front or aft embedding within its huge balloon like frame, is squeezed or opened, forcing air out or allowing air into it. The air is heavier than the helium so depending on which bag you are affecting, the nose either heads up or down and your blimp moves likewise.

Blimps are not in great favor or demand, but more and more are used as derricks to lift huge weights. Who knows? If the United States would have sold helium to Germany, avoiding the Hindenburg tragedy, transatlantic flights in luxurious dirigibles might be common today.



The Biplane

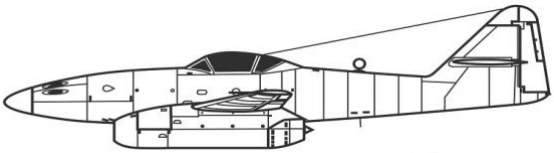
The Biplane had two lifting wings, which made it a very popular design until the 1930s. Its need for struts gave it a high drag ratio and slower performance than the mono-wing, but the mono-wing was not utilized for many years because of its high failure rate. Engineering refinement and innovation, especially in Germany, made the single wing safer, much faster, and more popular soon after the 1930s.



Helicopters

Harry Reasoner, a wonderful (non-political) former anchorman for ABC, did a segment on helicopters one evening. He closed his story by saying, “every good helicopter pilot knows that if it has not gone wrong, it is about to.”

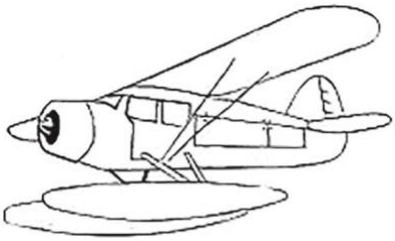
I was fortunate enough to meet Mr. Robertson and have him personally conduct me on a tour of his factory in Torrence, California, which along with his R-22 and R44 whirlybirds, he also designed and engineered the entire factory. A brilliant man indeed and very cordial. He expressed his concern that the FAA was not alert to the unique talents and education that flying a helicopter requires.



The ME-109

Even though the first jet engine was invented by Frank Whittle, an Englishman, it was Germany that first engineered and put them into operation. The ME-262 amazed the English and American Pilots who flew against it, although some P-38 “Lightnings” and P-51 “Mustangs” pilots said they could keep up.

The jet engine has revolutionized the airline industry, obviously by its reliability, power, and efficiency, but maybe more important, its less-recognized ability to take passengers high enough to get them out of turbulent air (every survey indicates that turbulence is second to landings in passenger fear).



Amphibians

There are basically two types of amphibian aircraft, the flying 'boat' and aircraft outfitted with 'pontoons' (some of which have wheels, which can extend, to allow for land as well as water operation. Kenmore Air, based out of Seattle, and its competitors fly thousands of people every year in several types of amphibians. My favorite is the Beaver and if you ever fly one it may be one of yours as well. My first experience flying in a Beaver, well sort of, it was actually an Army National Guard "Camberra", which is just a little bit bigger. Both are extensively (and romantically) used even today.

A shotgun beginning?

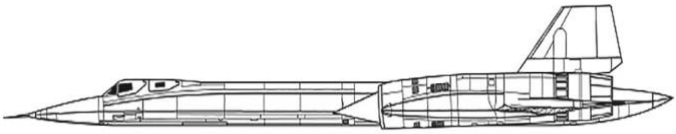
Both the Beaver and Camberra were aircraft that could be started with shotgun shells.... it is a fact, these aircraft were the first choice of pilots in the far northern and southern latitudes, where batteries were practically

useless because of the extreme cold. Imagine sitting in that bird and dropping a 12-gauge shotgun shell into a tube next to your leg, securing its top cover and pulling on a rope to fire it. A noise that defies definition (maybe the groan of a very hungry moose), and then after a second or so, the propeller turns reluctantly and your engine sputters to life. (Most veteran pilots recognize and love the sound made only by a radial engine in flight).

We discuss this later in more detail, but it is important if you are ever fortunate enough to fly an amphibian. Landing on water has a unique problem. What you see as the "surface," the top of the water, is not. What you really see is about three to five feet below it. So beware, "feel" for the surface you intend to land on, use your side window for extra reference, but do not trust your eyes.

Boeing 747

One of the largest airliners – and fastest, ever built. It lost in a competition with Lockheed's C5a "Galaxy" as a heavy military transport. However, Pan Am's Juan Trip, visionary that he was, ordered it as a civilian transport and 1700 planes later, it became the long distance workhorse of commercial airliners. (The Galaxy was arguably a lesser airplane, but politics won out over quality and it went on to be an embarrassment to our military.) Pilots said flying the 747 was like "driving a baby carriage".

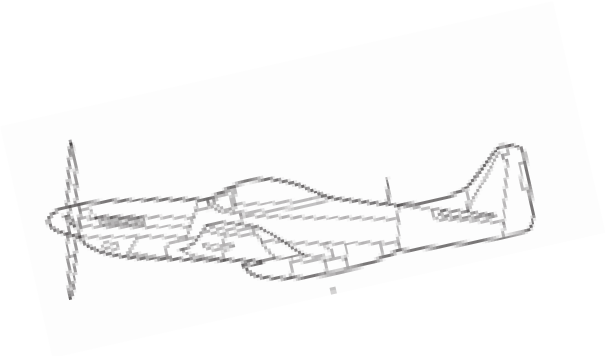


The “Ultimate”

No book for pilots is complete without mentioning the SR-71 “Blackbird” and the “Skunk works” which gave it life. When, Gary Powers U-2 spy plane was shot down over Russia in May of 1960, President Eisenhower, was offered a replacement aircraft which flew 3,000 miles an hour and 100,000 feet above land. In other words, so fast and high that even radar could hardly keep up with it. The Skunk Works was a top-secret Lockheed Martin Aircraft hangar in California. It was run by a brilliant man named Kelly Johnson, who many say must have come from another planet far more advanced than Earth to have the knowledge to build such an extraordinary plane. (Really, nothing like it has been built by anyone since). That same Skunk Works hangar, after Kelly retired, was led and inspired by another brilliant mind, Ben Rich, who built the first stealth airplane in history (radar cannot detect it). Ironically, the titanium metal used to build the SR-71 came from Russia and the extremely intricate mathematical calculations needed to build the stealth aircraft was created by a Russian mathematician.

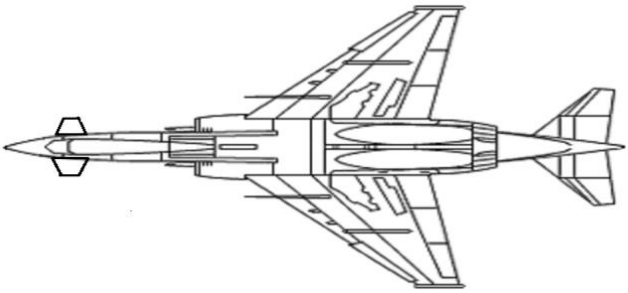
Numerous historians report that Kelly Johnson was given a blank check to build the Blackbird, but that he exceeded it.

Rumor also has it that some sightings of mysterious flying objects might confirm that the “Aurora” spy plane is being built now and far exceeds the capabilities of its Skunk Works predecessors. (I doubt it, because if satellites can read the date off a dime from orbit, there would be no justification other than wasting money or allowing a military ego trip.)



Bob Hoover and the P 51

Who gets shot down in WWII, spends a year in a concentration camp and then steals an enemy airplane to fly home in? Bob Hoover, did, and then went on to make the P-51 one of the most famous airshow attractions. I listened intently when at his 90th birthday celebration in Fredericksburg, Texas Bob certified Chuck Yeager's sound barrier flight as the first. Beforehand, another pilot claimed the achievement, but Bob had crash landed that Super Saber aircraft shortly before thereby discrediting the claim.



Canard winged aircraft

Is there a reason that the design of ninety nine percent of the aircraft in the world do not have canard wings? I'm not an aeronautical engineer but my Uncle Tom was and here's how he answered that question. First he reminded me of a 1965 TV ad which responded to General Motors' introduction of the Corvair car (engine in back). That commercial showed two arrows, one with a weight in front, the second with weight on its tail. After their launch the first flew nicely, the second started out okay but faltered badly. Second, he referred to the fastest land animal in the world, the Cheetah, which has a very, very long tail for stability. Obviously, he used these facts to emphasize how nature and physics affected speed and airborne objects.

Other than their eye appeal, in his opinion, the Canard's advantages were far outweighed by its evils. The wash they created could interrupt flow over the main wings. They could be dangerous in a stall. They were not good gliders. Even the slightest damage or a little ice on their surface could create instability. Its great advantage, that of producing more total lift, especially combined with rear mounted engines, was a nightmare for stalls. (The Boeing 727, without canards, had high speed pumps to move water from the rear of the plane forward when it was certificated because of so much weight in its tail. Stalls demonized its existence). Whether or not the Starship, which cost Beech a billion dollars failed because of its wing design is not a question they, or I, will discuss.

Simulators:

Thanks to Ed Link, circa 1929, who stole parts from his father's piano and organ company, pilots could learn how to fly without an airplane. The cockpit was almost identical to that of an actual airplane, and flew on top of bellows (from his father's company). A compressor underneath provided the air pressure, but was so loud that most users would relocate them outside their buildings. When the Link Trainer lifted off and rode on those bellows it was surrounded by a black fabric nicknamed the skirt. I restored this C-3 Link in 1980 fresh out of box in which It was going to be shipped in to India circa 1945. Missing from this picture are the three lights on top, which activated the outer, inner and zone markers that were being flown over.

The control table, radio tubes and all, was immense, but quite useful for the instructor and student. On the top left you see the “Crab” which crawled on top of glass with maps or approach plates underneath. The crab had a red ink pen which marked the exact flight of the simulator. This was an extraordinary teaching tool because the student could fly the plane and then get out to see -and discuss why it was or wasn’t on course. (The operator could dial in wind with two handles below the table, one for velocity, one for direction). Once the instructor and student had discussed the result of this training flight the trainee could get back in the simulator and repeat it using his new improved knowledge. The best teaching devices for pilots are simulators that Ed Link gave birth to and a man named Rudy Frasca improved.

Rudy, Monty, and P-40 which he flew in the move, Midway

Two of aviation’s modern pioneers: Frasca & Montgomery

Rudy Frasca and Monty Montgomery were farm boys from the middle of the Illinois corn belt drafted into the Army Air Corp in 1940. Their IQ tests were

so high they were both chosen to teach pilots using Links. They did not know one another, but became friends united by their teaching assignment.

Ironically, neither of them was a pilot then!

After the war Rudy approached Monty with an engineering schematic for a much improved simulator based upon the Link. They agreed that simulator movement was contrary to the objective of teaching instrument flying and that a “fixed” simulator without any motion provided a far better learning environment. (I agree with them wholeheartedly. Flying in the clouds without any reliable outside reference requires the pilot to rely totally on the visual reference provided by the planes instrument panel. It seems illogical to believe otherwise.)

Montgomery was thinking about starting a school that concentrated on teaching pilots to get instrument quailed. Flying by reference to Instruments had become more practical and airline as well as civilian pilots needed to learn how. (As I note elsewhere, King Radio had also just introduced phenomenal, inexpensive radios that revolutionized general aviation avionics). Monty wrote one of the first books on Instrument flying, introduced “the 6 T’s”, taught thousands of IFR pilots, including some of the Navy’s submarine pilots. (That’s not a typo, in the 1950’s U.S. subs were literally being “flown” using artificial horizons, needle and ball).

There was a glitch to the purchase. Rudy didn’t have the money to build the trainer, so Monty borrowed money from his in laws and advanced it to him. The FRASCA 101 was delivered to Monty a few months later. (Rudy bragged that instead of Link’s piano wire, he innovated by using fishermen line and leads for control linkages). Today’s Frascas, used throughout the world, are all digital.

Chapter II:

News Versus the Facts

Missing?

It might be interesting for those captivated by conspiracy theories that the missing Malaysia Airliner, MH370, manufactured by Boeing had separate radios to transmit its location and operating data. In fact, they do so in all of the planes they build, even separate transmitters providing information about each engine's performance. Even so, it says it does not know where that airliner ended up because those radios were all turned off... is not

Boeing a big military contractor and did not the military indicate that the airplane flew over one its big bases shortly before everyone lost radar contact? Russian, Chinese and the United States military all know where the aircraft tragically ended up. They don't want anyone to know how sophisticated their electronics are so they play dumb. I am not suggesting there was any clandestine espionage plot, though it is possible, just that the location is known to these competitive nations. Further, radar is not the only electronic observer of aircraft. The other two are radio emissions and satellite video. Most people are not familiar with the fact that every engine emits a distinct radio signal. The military can watch you car drive to the grocery store as well as observe any and all flying objects. Don't forget that our satellites can read the date on a dime laying on a sidewalk…

Evil empire

As you ponder that, you should probably also know more about what happened during the Reagan Administration when a Korean Airliner was shot down by a Russian fighter, (the "evil empire"). In fact, that tragedy was the result of a CIA intelligence gathering flight. The American Air Force EC 135 spy plane was flying (hidden within the airliner's radar blip) just below the 747. It was there to collect information regarding a pending Russian missile launch at their test facilities just west of the route that the Korean Airliner was supposed to be flying (according to the press it "strayed off course" even though it was equipped with more navigation electronics that the Space Shuttle). When the pilots of the EC 135 were told that the missile launch had been canceled, they aborted their mission and returned to base. Not knowing that the spy plane had flown back to Anchorage, the Russian military command assumed that the 'blip' on their radar still included the U.S. spy plane (the Air Force conducted similar missions often). The Russian military ordered their pilot to shoot it down. According to recorded transmissions, before the Russian pilot launched his missiles, he vehemently protested to his commanding officers, "But there is only one aircraft up

here," and "it has commercial lights on." He followed orders and destroyed the 747. (Rumor has it that he committed suicide later that year).

Attack Responses

Another interesting "news" release involves both Russia and the United States who each engage in analyzing the other's military tactics by regularly flying their bombers close to the other's borders. Each incursion is referred to as "provocative" and causes great concern among their respective civilian populations. These flights are nothing more than each military determining what the other's chain of command is. When the flights show up on radar, each country wants to know what the others response will be. Who will radar call, who next, when will the top brass be told, and how? Will fighters be scrambled? How many? From where? How long does their response take? Has the command structure changed since the last test?

Boeing/FAA disaster

To attest to the quality of United States professional pilots, no 'Maxjet' crash ever occurred to a U.S. carrier even though they flew the same aircraft a thousand times more than their foreign counterparts. What is really tragic is the fact that what happened to the Boeing airliner had happened before to a European-built aircraft with the same dire consequences. In order to manufacture a safer airplane the Europeans and Americans both had programmed their aircraft computer software with 'overrides' that took control away from its pilots in order to 'correct' a perceived, dangerous flight configuration. The European pilots did not win their fight to have that option to 'turn off' these computers until after several crashes – and not learning the lessons from those disasters, Boeing and the FAA allowed it to happen to the Maxjet.

But there were still major differences.

The Boeing software forced the nose of the aircraft downward if the “angle of attack indicator” (a tiny little “wing” attached outside of the fuselage) reported that the nose was too high. Sadly, the engineers and computer programmers did not put enough thought into the fact that during takeoff when the aircraft is at its heaviest, a nose up attitude (a high angle of attack of its wings) is necessary to produce lift and that lowering the nose might contribute to a stall. Boeing did however, install a manual off button.

It is also unfortunate that the Boeing Airliner was grounded for as long as it was. The FAA, which protects itself first, and will use retaliation (or the threat of it) to prove themselves the ultimate authority, resented the Maxjet from its inception. Boeing wanted to save the carriers money and built the Maxjet to be “identical” in its flight and control characteristics to its previous 737 models thereby allowing pilots checked out in earlier models, to fly it without need of another checkout and certification.

There is no doubt in my mind that Boeing builds the best aircraft in the world, even though a Russian Aeroflot pilot told me in Moscow once, “Yah, doze Boeings are goooood airplanes, but our Ilyushin’s are just a little bit better.” (He pinched his thumb and forefinger close together to emphasize the slight difference.)

The Challenger Space Shuttle

The news in this country may not be as accurate or factual as that published in the United Kingdom. For instance, were you informed that to reduce weight, six thousand pounds of metal was scraped from the inside of the Challenger’s fuel tank. The U.S. press reported that it “exploded,” but even a cursory look at the video shows it gradually broke into pieces. The central tank, containing liquid fuel and oxygen, was nestled between the two Morton Thiokol solid fuel assist rockets, came apart exactly at the ‘power down point’, which is that time during takeoff that the shuttle experiences its maximum outside pressure….

Flying over water can be deceiving

Most people were told that the Kennedy tragedy was caused by flight into IMC (bad) weather, however, the weather was actually reported as good. He was the victim, as well as too many other pilots who are naive about the danger of flying over water, and not taught about what insidious consequences can occur. As a VFR pilot, Kennedy was using the natural horizon for his primary reference while he was flying over the sound. Okay, that is the primary reference for all pilots flying VFR (by visual reference), including you and I, but what happens if the horizon vanishes?

There are a lot of airports located on the coasts of the United States and every pilot who has ever flown out of one of them will testify that occasionally on takeoff the horizon will disappear. Fortunately, we usually turn right or left soon after takeoff, so that its disappearance is short-lived, but sometimes, especially near dusk it vanishes – period. The old Miggs field, located on Chicago's coast, which was mysteriously destroyed by bulldozers one night by then Mayor, Richard Daley, Jr., is a case in point. Several crashes occurred just after takeoff from this airport that would likely never have happened in the middle of a landlocked one.

This is significant. When conditions are right (most often a little hazy), but still VFR, the water and the sky blend into the same hue. When that happens, you cannot distinguish (see) the horizon. It is usually a gray color, and there have been a lot of pilots, me included, that are momentarily surprised by this phenomenon. Like I said before, usually after departure we turn right or left back to the coast so we regain the horizon quickly (climbing a couple of thousand feet can also make it return, but do not count on it.)

After sunset there is another visual clue that pilots flying VFR use for horizon recognition... lights. Those of us who have flown thousands of hours at night know what it is like to descend and suddenly, those lights around us, disappear. It is like losing sight of the horizon over water, there is that

momentary surprise that – no lights, no horizon. Those of you that are ahead of me can visualize Kennedy's flight now and recognize what really happened.

Remember I said that this loss of the real horizon over water is usually at dusk, which is at about the same time lights are being turned on. Kennedy's flight was easterly over the sound between Long Island and the coast of Connecticut – at dusk. He was using the lights on his right and left for reference as well as the water/skyline in front of him. But what happened to those horizons when he descended? They disappeared.

Chapter III:

Pilot Etiquette

Pilot Speak

I recommend that pilots not overuse pilot speak outside of their community. As much as possible we should communicate with non-pilots by using words that they understand instead of our jargon. I believe that we deserve respect, but it is much easier to earn it by having the outsider understand – and therefore appreciate – what pilots and flying aircraft are all about. There is one language however, common to all pilots regardless of their nationality. If you see a group using their hands in an upward motion, then downward, to the right and then left or in a tight circular movement – sure bet that they are pilots who are really communicating.

Pilot communication must be “two-way”

One of the most important aspects of life, and certainly of piloting, is good communication... and to pilots and controllers, if there is no “acknowledgment” to a first presentation, then there is no communication. The second rule for pilots exchanging information safely is accuracy. Regardless of how you say it, whether you sound like John Wayne or Phyllis Diller, tell it like it is. Be specific. Lastly, try to be brief, but not at the expense of being accurate. Most of the time, the airwaves are open enough for even a politicians’ speech, but during some of the most critical communication, especially around busy terminals, there is not time for chit chat. Although I have a strong opinion against using ‘slang,’ over the years we pilots have created our own language which in my opinion, creates a barrier with non-pilots. I strongly support just using common words to tell our story or transmit our needs.

“Mic Fright”

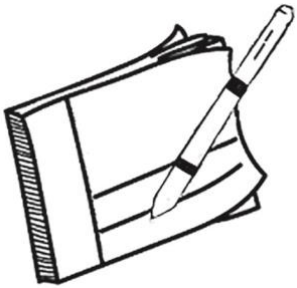
There are many pilots, especially those just starting out, who can deliver the Gettysburg Address over their smart phones, but for some reason they are not comfortable using the two-way radio in an aircraft. Like they think that the whole world is listening, that maybe ABC is searching for another anchor person, so they better sound professional…

Forget it, in addition, forget the pilot lingo. Just communicate... tell the person on the other end what you want or confirm what they instruct you to do. It is simple, but I will offer this piece of advice to make it more so. The guy or gal on the other end is a professional, with years of talking on the radio. They know all the short cuts, the language, and practice their trade five days a week, eight hours a day. Here is the advice. Do not try to compete with their speed. Do this instead. Talk slowly. Really slowly, especially if they are about to give you a complex or lengthy clearance. You can even stutter a little. The faster you talk, the faster they will. So, talk to them with the speed you wish them to talk to you. It works.

For example, I told an IFR graduate of mine who was still a little radio shy to add “first IFR flight” to the comments section when filing his instrument flight plan. A year later he said he did it on every flight because the controllers treated him “like I am Air Force One”.

Most important, fly first, talk after

It is interesting fact that a lot of pilots, especially students, feel obligated to respond to a controller instead of concentrating on their piloting. I was really surprised when a friend of mine started to respond to the tower when on an actual IFR approach while he was way off the ILS centerline. Thankfully, he caught himself, turned back to intercept the right course, and then spoke with the controller. I guess we all want to be polite, but flying your airplane comes first, communicating afterward and when appropriate.



“Hours” are the pilot’s “credentials”

Most professions use degrees like Ph.D., Dr., or MBA to prove and/ or certify their credentials (skill). Some use years of experience, or the horsepower of their motorcycle, but pilots use hours. Funny, if you tell someone you watch a hundred hours of TV a week, they will call you a couch potato, or worse, but not so if you are a flyer. Interesting then, that a pilot with 3,000 hours of flying is presumed to be twice as good as one who only has 1,500. Ironic too, that some of the fastest, most sophisticated, and expensive aircraft in the world are flown by military pilots with barely over one hundred hours. In any event, pilots log their hours in logbooks which are their bibles when it comes to licensing, dealing with the FAA and employment.

In addition, hours are used by insurance companies. They will require that you have so many to be issued a policy on your airplane, especially in type. I make two recommendations regarding insurance companies. First, do not log more hours in your book than you actually have. (If you have an accident, they will deny coverage if they determine that you used any “P 51” time (slang for Parker 51, an ink pen). Second, in many instances the insurance company will exempt you from an hourly requirement if you get a reputable instructor’s recommendation. (They respect quality and an instructor’s word more than what is in your logbook).

What is significant about 300 Hours?

I really do not like writing this, but I feel obligated to warn you that accidents spike when pilots have logged about 300 hours. Why, overconfidence maybe, but I agree with the FAA wholeheartedly that it is likely that the pilot has not really flown with an instructor recently and probably should.

Personal attitude

From my experience, personal attitude (cockiness) is a huge determining factor for those pilots who extend themselves too far – or exceed their skills or reasonable judgment. Self-confidence is one thing, arrogance as a pilot another. On a scale of zero to ten, if you put yourself as a 10, or you believe your friends think so, add that to your processing when making 'go or no go' decisions.

The Tenerife disaster, the world's worst aviation tragedy, was caused more by 'road rage' than a lack of pilot skill.

"Get-there-itis"

The single most frightening influence on judgment is 'Get-there its'. "The kids must be in school tomorrow." "I must be at work." "I have an appointment tomorrow." If you say or hear one of your passengers say something like that, stop. For that reason alone, you are in danger. Most accidents, or frightening experiences, are kindled or caused on the ground before entering the airplane. Nothing is more important than you, your loved ones and your friend's well-being. Let us also interject we would not be pilots in the first place if we were not in a hurry to get somewhere. So, when something seems compelling, or one of your passengers is adamant, please try to back off. It is okay to say, "we'll go later".

Of course, there's always the pilot who boast, "If there's bad weather ahead, I just do a 360".

Who is the Pilot-in-Command?

Believe it or not there are far too many instances when two pilots occupy the two front seats and when something goes wrong, one will say to the other, "I thought you had it!" Please know that there cannot be two pilots in command in an aircraft unless you want to take a preliminary step toward an accident. Make it clear, absolute, who is acting as pilot-in-command. No assumptions. Period. If you are relinquishing that responsibility, make it absolutely clear to the other pilot that he or she is acting as pilot-in-command. At least a quarter of my fights were with another pilot in the other seat. Most of them were pilots who loved to fly, so I would encourage them to take the controls. But I always made sure that both of us understood who had the ultimate decision-making responsibility.

Flying passengers, comfortably

Let us face it, when we are flying solo, we can put our sunglasses on the tip of our nose, wear our baseball caps backwards and fantasize that we are really flying a P-51. Why not, it is pure exhilaration to be on top of the world as a pilot (only about one person in a half million ever becomes one), but we need to remind ourselves that most, if not all, our passengers are frightened to some extent. (As even you and I were on our first flights?)

Tell people in advance what you are doing. You and I might love the sound of the gear going down, or understand the sudden lift generated by lowering the flaps on approach, but your passengers probably do not.

No steep banks or nose up or down movement. Be gentle on your yoke, as well as your throttle.

Ask your controller, and/or plan your approach to your destination airport to include a very gradual descent. Even your ears may appreciate it for it can be painful to drop a few thousand feet during your approach if started too late (for comfort). It can also be embarrassing to be a mile above the airport when you contact the tower... I was on the tower frequency and overheard a former Flying Magazine editor call for landing permission... he was five thousand feet over the top of the airport. (No, he did not write about it in the next issue, but as an old friend, and admirer of his, I did tease him about it at dinner that night. I think I said something like, "You must have really set your altimeter way off?")

Another tip... if you are on a VFR or IFR flight plan and your assigned altitude is taking you through the tops of a cloud bank, request another altitude. I must confess that I never understood why pilots would subject themselves, let alone, their passengers to flying on a 'bumpy' road if there was an alternative. And do not forget that if you are flying in VFR conditions on an IFR plan, you can always cancel it and choose your own altitude. (If your destination is IFR, simply call Flight Service and file a new flight plan, or if you are in a familiar area just call approach (if they are not busy) and ask for an IFR approach (ASR is good) into the airport). Do not underestimate how accommodating controllers can be. Most of them will literally copilot your plane for you if you treat them right (and they have the time to do so).

The wisdom of a captain's briefing

This is where you can eliminate about ninety percent of your passenger's apprehension. Start by giving them the safety rules. Seat belts, no smoking, how to operate the doors (please do not ask me to explain why – just take my advice and do it). In addition, ask them not to touch anything that they should not. Once, when I was flying my father in a Mooney Aircraft, he inadvertently slipped his foot into a tape music player that was located on the floor behind one of the seats. That action turned it on, but it also turned off my communication speakers. It was funny afterwards, but there were a few awkward moments of silence (music).

Once you have completed the safety rules, tell them about the fact that the pressure will be lessened as you climb and that their ears might be affected. (Tell them that yawning is a great equalizer, both up and down.) Then get them interested in the beauty of flight. Tell them about how fast they will arrive at their destination and how amazing the scenery will be. Tell them about some of the highlights of the trip. Cities, airports, geographic features such as rivers and lakes. Turn them on to how that this trip is really going to be an adventure.

Information is the first reason for the captain's briefing, but another benefit which may be equally important, is that this is your opportunity to establish your credibility. This is your time to make them feel that you are in control, and that they are in capable hands.

You cannot imagine how many passengers will thank you for taking the time to conduct a "captain's briefing". You can, – will – allay their anxiety and establish your command presence by briefing them regarding your flight. This is your time to establish authority and confidence. "Welcome, we are going to take off to the west, as soon as the tower determines that there is nobody else in the area, we will be flying to our destination at about six thousand feet. I am expecting a smooth flight, but just as a precaution, keep your seat belt on. Please enjoy the view, especially to our left, as the skyline of Seattle and the waters surrounding it are spectacular.

By the way, a helicopter pilot did not know where he was in that Seattle area last week, and when he saw a skyscraper, he put a sign in his 'copter's window which read, "Where are we?" Responding immediately, the people in the building flashed a sign that read, "You are in a helicopter." The pilot turned the 'copter south and landed at the airport a few short minutes later. Safely on the ground, one of the passengers asked, how did that silly information help you? The pilot answered, "I knew instantly it was Microsoft's office north of the airport because their answer was perfectly accurate, but otherwise totally useless information."

Once you have completed the captain's briefing there are certain piloting rules that will make your flight more enjoyable for your passengers. (I realize that pilots love stalls, steep banks, and maximum climbs, but not your passengers. It is noteworthy to add that some passengers can become more than emotionally upset, so spare yourself the cleanup job.) No steep banks, no maximum climbs and move your throttle(s) and or prop(s) slowly. (Why some pilots 'fire wall' the throttle – or retard it quickly – has always been a mystery to me. Maybe even your engines will be happier if you do not, as well?) In any event, any abrupt maneuver or noise will surely receive unnecessary attention. Climb out straight and level in an attitude that is safe. Descend even more gradually.

Once again, let me emphasize the significance of approaching your destination airport and telling the controller or tower that you would like a long, slow descent. Your passengers will not thank you for sparing their ears, but consideration of your passengers is what being a good captain is all about.

'Need'-to-know versus 'nice'-to-know information

One piece of advice that I always valued as a pilot was to concentrate on need-to-know as opposed to nice-to-know information. A perfect example is found in most FAA publications. You will notice immediately that they have an overwhelming desire for you to know how an engine or a flight

instrument works (as well as other devices' internal engineering... even including your ears). The old saying certainly applies here, "I asked you for the time, not how the watch works." For some reason, perhaps arrogance, some people want you to know that some engines have carburetors and others have fuel injection systems, how a gyroscope senses angular velocity from the Coriolis force applied to a vibrating object, that your ear has hair follicles in it... etc. Good stuff, if you are an engineer or doctor, but is there any application there for safe flying?

Instead of cluttering up your mind with this nice-to-know stuff, I highly recommend concentrating and memorizing the necessary information first.

I will admit that there are a few exceptions to this rule. For instance, it is nice to know that if your gas engine is running hot, you can put the mixture control all the way in to cool it. The added fuel will actually reduce the temperature. (That does not sound right, but on a flight when I was accompanied by a pilot/mechanic, the right engine was just touching the red line when he gave me this advice. By following it the engine returned to a normal operating temperature.)

Ironically, on that same flight, I was puzzled an hour later that even with the autopilot on, the plane was "leaning to the left" though it was still on course. If you guessed that the right tank had less fuel than the left because of the extra gas going to its engine for cooling, you are right... I had previously wondered if those fuel tank, selector options were ever useful. I flipped it over to operate both engines from the left tank which is the only time that I used that selector in fifty years of flying.

One last thought to conclude this chapter on pilot etiquette... what do old pilots do when they still love flying but may not have the physicality or financial capability to do so? I recommend that they consider teaching. You really do not need any major credentials to teach ground school and the cost and effort to get a CFI certificate is not as challenging as you might think. (Anyway, is not teaching the art of telling others what you cannot do yourself?) Several 'retired' airline pilots (and FAA inspectors) were the best classroom teachers I ever had the good luck to employ, as well as one retired

priest, (yes that is not a typo), Father George, who was one great flight instructor as well as a wine expert and connoisseur, a fact that brought us together often.

If you have the passion, and no doubt at an older age, you will possess the experience, knowledge, and pride to teach others, so consider doing so. Could there be a better way to spend your retirement years than flying (or writing a book about it)? And if Social Security gets any worse, maybe a few dollars coming in would be nice as well. Anyway, we need more pilot teachers who have "been there, done that"… and still have the gleam in their eyes.

Procedure versus technique

A procedure is regulatory, a technique is how you go about accomplishing it. A good example is the Procedure Turn that is required on many instrument approaches. The "procedure" which is mandatory, is to go outbound, make a 180-degree turn (right or left) and intercept the inbound course (signal) to line up with the runway. You can follow the approach plate's specific instructions (procedure), or still comply with the regulations using the (technique) of just going outbound, making a course reversal (on the proscribed side), and turning within the prescribed distance and direction (right or left) and head back to the airport.

"Right increases, left decreases"

Here is a simple fact that will make your piloting much easier. Right increases - left decreases. If your radio is on 118.0 frequency, any instruction from the controller to something greater than that should result in turning the dial to the right. Same rule applies when the controller who tells you to "take a

heading of 300 degrees..." – if your present one is 270 degrees, turning right is correct. Believe me when I say that you would be amazed how many pilots turn the wrong way or spin their dials right and left, back and forth, while resetting their radios. Even more shocking is when your airline pilot turns right and turns back left immediately – or vice versa. Please do not be one of them. If it is a higher number, turn right; if it is a lower number, turn left.

It is a fascinating fact that Russia is just the opposite. They wanted to prevent military invasions from the west Europeans by making their engineering turn left to increase, right to decrease. That way the westerners could not use their machinery and weapons engineering and weapons against them in case of war. Their aircraft engines and propellers revolved opposite of those manufactured in the west. Even their railroad tracks were a narrower gauge to prohibit invaders from using them. (Did you know it was the Romans who established the west's railroad track width "gauge" still used today? Their steel wheels cut ruts in their stone roadways, so everyone using them had to manufacture their wheels that same width. (Two thousand years, that is one heck of a "track" record).

Chapter IV:

Safe Piloting Techniques

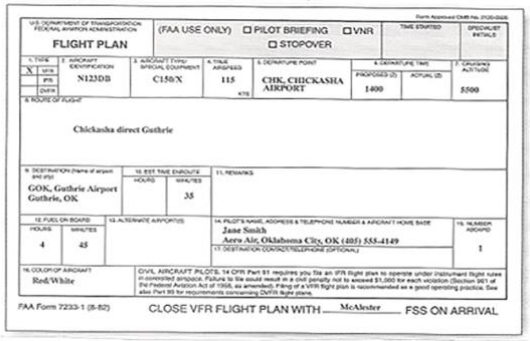
How to stay a safe pilot

First, I suggest that we need to define what kind of pilot you want to be? Do we want to be a daredevil, acrobatic stunt pilot? Are you the crop duster type? Do you want to fly to the moon? Or, are you interested in an airplane to provide you transportation?

If your answer is “transportation”, then this book and the Double Yellow Lines in it is intended to make you a safer pilot starting with your next flight. Most of the people who want to fly an airplane are “type A” personalities, whatever that is. I assume that type A intends to convey that the owner of the title is more successful in life, more in a hurry, and prefers challenges over mundane activity. He or she is certainly not a couch potato.

In any event, no matter what your personality, this book and especially this chapter, is loaded with reminders, admonishments, advice and some real life stories to illustrate and support them. If just one of these tips keeps you out of trouble, then my effort is more worth the while and my life better for it. This book is not written to provide you additional classroom knowledge, help you to pass a written, oral or flight test. Instead, it is a compilation of skills and admonishments that have been acquired from five decades of experience, not only my own, but my pilot friends, associates, and those who I have listened to during a lot of hangar flying.

The goal of every pilot is safe, quick movement from one location to another, but what distinguishes the ‘proficient pilot’ from all the rest? Starting from our first lesson the difference should be obvious… the qualified pilot anticipates that something might go wrong and has been taught and prepared to deal with it. There should be no surprises to a well-prepared pilot. He or she has been trained and is prepared to resolve the unexpected. That is what most of our training prepares us for.



FLIGHT PLAN

(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
X VFR	N123DB	C150/X	115 KTS	CHK, CHICKASHA AIRPORT	1400		5500

8. ROUTE OF FLIGHT: Chickasha direct Guthrie

9. DESTINATION (Name of airport and city)	10. EST TIME ENROUTE HOURS	MINUTES	11. REMARKS
GOK, Guthrie Airport Guthrie, OK		35	

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
4	45		Jane Smith Aero Air, Oklahoma City, OK (405) 555-4149	1

16. COLOR OF AIRCRAFT: Red/White

CIVIL AIRCRAFT PILOTS, 14 CFR Part 91 requires you file an IFR flight plan to operate under instrument flight rules in controlled airspace. Failure to file could result in a civil penalty not to exceed $1,000 for each violation (Section 901 of the Federal Aviation Act of 1958, as amended). Filing of a VFR flight plan is recommended as a good operating practice. See also Part 99 for requirements concerning DVFR flight plans.

FAA Form 7233-1 (8-82) CLOSE VFR FLIGHT PLAN WITH McAlester FSS ON ARRIVAL

Flight Planning, before going to the airport

Many of us have spent a lot of time on the living room floor or, kitchen table, if it is big enough, planning long cross-country flights. If we are so inclined or needed a weather briefing, we would give Flight Service a call asking about the forecast along our intended route, including the winds. (They almost always forecasted head winds, in fact, that is the main reason I planned and flew most of my flights after dark, – no wind, and if there is no wind, it is most likely the ride will not be bumpy as well.)

Oftentimes, we would check our flight bag to update charts, check batteries, and confirm that we still had at least one Snickers candy bar.

Once all was in order, we would pack up and head to the airport, but before leaving we might call Flight Service to file a flight plan especially if the weather was marginal.

Will Artificial Intelligence replace pilots?

“Ladies and Gentlemen, welcome aboard this historic flight to New York City. This is the first airline flight ever to be completely flown by computer and without a pilot or copilot. Yes, every detail of this flight, take off, landing,

navigation, fuel monitoring, bad weather avoidance, and even your air-conditioning will be controlled by one of the most sophisticated computer systems and software programs ever created. So, sit back and relax, enjoy your flight and be assured that there is absolutely nothing that can go wrong... can go wrong... can go wrong... can go wrong".

Flight bags

Most pilots carry a flight bag mainly to have a place to keep their charts and approach plates (GPS is slowly being accepted as an alternative, but until they are perfectly reliable the FAA will continue to insist that you have a paper copy.) One of the comical questions to ask a pilot is, "When did you update your charts?" Almost everyone will say, "Oh, they are up to date, maybe a year or so," but when you look, five years or older is not surprising... amazing 'how fast time flies'. If you carry approach plates (they are nice to have even if are not filing IFR), NOS or Jepp will send you updates which keeps our memory sharper, but updating was certainly not one of my more pleasant memories.

What else should a flight bag have? Everyone has their own list, but certainly a flash flight (including spare batteries,) glasses, if your sight without them is poor, sunglasses, a compass, a cell phone or back up 'hand-held'" transmitter, a spare ELT battery, headset and a couple of bottles of water. They will likely never be needed but it is a small item, so include matches in a small plastic or metal, water-tight container. In addition, a small package of Kleenex to stuff into the door and window openings to stop those annoying hissing sounds.

Some of you may question that these items should be in your glove compartment and I would agree except that experience has taught me two big lessons. First, the glove compartment is not the most secure place in the world as it is likely the first place a thief or vandal will go. Second, even though it may be a little burden, the flight case will most likely be kept up to date, certainly better than the glove compartment.

Please don't squeeze the Charmin

Subconsciously, many pilots squeeze the flight controls, some to the point of getting white knuckles. Nothing inherently wrong with this happening, it will not hurt the plane or injure anyone but, it can create an unplanned (unwanted) movement of the plane right or left, or most commonly, up or down. The remedy can be difficult to achieve and takes practice. Some instructors recommend holding a pencil in the same hand as the controls, so that if it breaks, you will know when your pressure is too great – or run out of pencils. Keep in mind that if you hold the controls lightly in your hand(s) you will be more aware, more conscious and feel any movement that you make to the controls. Another option is trim your airplane so perfectly that you will not need to touch the controls – or install an autopilot.

Practicing safety

The above – and following, safety recommendations are listed here because of one especially important reason. To keep you and those you love safe – and, in addition, help you become a more proficient pilot.

Oftentimes giving advice is like offering someone a large piece of cork for ten dollars... their refusal will likely include a frown, be quick and vehement, "Who needs a big chunk of cork", but if that person is on a sinking boat, they would probably give you a million dollars for it...

All of us are advised to fly with an instructor occasionally or read instructional books to stay sharp – or at least keep current.

Knowledge, experience, and judgment

My goal is not to teach the obvious, that is what you learn in your basic training for the Private, Instrument, Commercial, Instructor and or ATP classes and the dual instruction that was part of it. What I intend is for you to learn that which is acquired by other pilot's experience. Especially my fifty years of flying, as well as the hundreds of intimate pilot friends who have shared their experiences and what they learned from them as well. In addition, the goal is to firm up your ability to use your knowledge, no matter where you got it. In other words, if you have a garage full of tools, this coach wants to help you organize and learn how to use all of them to make the perfect flights.

Judgement is difficult to teach. Most likely it is acquired from experience more so than instruction. If I can share the combined experience of my flying and those of dozens of other pilots with you, perhaps it will help guide your decision making.

At the airport, outside the aircraft

When we arrive at the airport, depending on its facilities, we will usually enter the fuel service (FBO) to request that the line boys top off our airplane, check the weather forecast, and file a flight plan if the weather is marginal. However, even if the weather is forecast to be perfect, there are still many good reasons to file: you'll get excellent flight following, plane and obstruction avoidance, someone watching your back every minute and it is great practice. And, if the weather does go bad, you are already in the driver's seat. Besides, the more you practice anything the luckier you get.

Walk around the airplane

Nobody should assume that an airplane, whether it has been hangared or tied down, is ready to launch. The ‘walk around’ is not only mandatory for safety, but also a time to mentally prepare for your fight. I have heard about a hundred things that have gone wrong because the pilot did not notice the bird’s nest in the engine compartment, the rear tie down was still attached, the ladder was not moved from in front of the plane, the chocks remained under its wheels... oh, maybe the best, the rudder was missing from the tail. Thank goodness, most of these were obvious and/or only resulted in embarrassment, or in the case of the missing rudder, or the concrete block at the end of the tie down rope, the tower noticed each as the pilot taxied out.

Most fuel gauges are accurate, but it is always an excellent idea to confirm that your tanks are full alongside the line boy as he replaces the caps back on the tanks, otherwise that clanking sound could be one of them knocking on your wings, but the noise will go away when the little chain holding it breaks off. (And maybe your fuel will depart as well?)

Another cap that is sometimes overlooked during the pre-flight inspection is the oil cap(s) for the engine(s). This will result in your wind screen covering with oil and may severely limit your forward vision. (And another good reason to take instruction and/or practice landing by looking out your side window).

Aerodynamic braking, when to use it, when not

As the name suggest, pilots learn early on that if they hold their planes in a high nose-up attitude when landing, the slowing effect is dramatic. Very similar to putting your hand out the window of a car moving at sixty miles per hour, when you point your fingers directly into the wind, little backward pressure is encountered, however, put your hand in a upright position, most of us cannot do it because of the aerodynamic breaking effect.

Two things result while landing an airplane abruptly: one good, one bad. First, the good result is the airplane will stop in a shorter distance. But the second can leave your mechanic scratching his head. If your toes are on the top of the rudder pedals applying even slight mechanical braking, you can inadvertently ruin two perfectly good tires by 'sanding' the rubber down to the tread. (But the tire is only flat on one side...)

Be aware that this toe pressure wrongly applied to the brakes can ruin tires at any speed, any configuration and it happens far more often than you can imagine. Just ask your mechanic or Goodyear.

Aerodynamic breaking can have a negative effect when you are taught and/or executing a short field takeoff. Most pilots in their earnest desire to get airborne quickly start pulling the controls back way too early in the takeoff roll thus depressing the aircraft's ability to gain speed. (This is not necessarily true if the runway is sand or mud.) So, the advice for the short field takeoff should be not to bring back the controls until your airplane is well along its roll. (Some might add not to drop the flaps until then as well, but the risk of forgetting to activate them likely overrules the small benefit, if any.)

The Four Horsemen

One of my great fortunes in my life was the invitation to participate in several reunions with WWII pilots. I used to refer to them as the "Four

Horsemen", affectionately of course. They were very successful men after the war, one, Jimmy Maxwell, the Chief Pilot of Ozark Airlines. Along with him was Bob Pearson, Earl something, and for the life of me I cannot remember the fourth. They were the captains of C-46 supply airplanes that flew almost daily for the year following, and including D-day. One of their first reflections was that "There were so many boats on D-Day it looked like you could walk across the English Channel on them".

These remarkable men met annually in Texas for a couple of days of eating, drinking and hanger talk. (They say that whenever you find four pilots you usually find a fifth.) Regardless of the libations, I was the invited, visiting fifth for several years. Their stories would fill another book, but a few of the most interesting follow, some a little difficult to fathom, but these men told it like only those who had "been there, done that" could. The Four Horsemen were based south of London near a large hospital facility. I said, "How nice that you had medical so close." They laughed loudly..., their eyes twinkled, and they said, "Yep, those nurses needed a lot of attention."

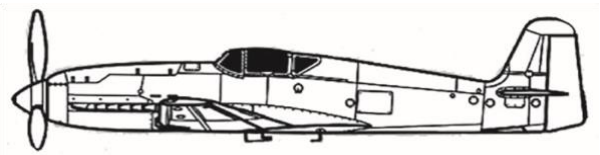
I offer their comments because they are interesting as well as to preserve a some not so well-known historical facts. Most truth about the war has been so exaggerated by Hollywood as to become fictional.

The Reflections of the Four Horsemen

Crew Chiefs: The four horsemen said that the maintenance of their planes was shoddy until "crew chiefs" were added to their cockpit. Crew Chiefs were the actual mechanics that worked on the airplanes. "Once they were added to our flight crews, the maintenance issues almost disappeared".

Side Arms: Immediately after they dropped their paratroopers, the Four Horsemen were obligated to walk back into cabin with their sidearms drawn to invite any soldier still aboard to jump. Upon landing, a Sargent would

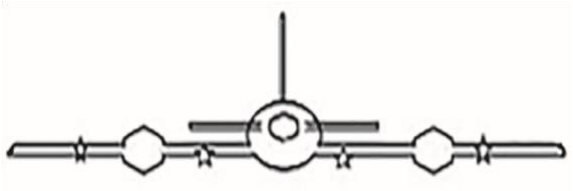
open the door to check for any returned paratroopers. If they found one they would usher him – and the pilot, to the guardhouse. *We do not see that in the theater.*



"There's a ME-109 in our pattern!"

Once landing in Germany, all four were in the landing pattern (they landed sequentially), there was the first C-46, then the second C-46, then an ME-109... "that cannot be right, this is an American operation, where did that German come from?" Turns out he had engine problems and rather than crash land in a field, he chose their US military base instead.

Wouldn't you love to hear a Zero, Spitfire, ME-109 and P-51 pilot debate which of their aircraft was the best? (Sorry the Russian Yak-9, even though 18,000 of them were produced), didn't seem qualified to be compared to the others.



Follow the blue lights

Due to budgetary restrictions, not all their C-46s had a full complement of navigational equipment. Those that did, had blue lights imbedded in the trailing edge of their wings so that only a close following aircraft could see them, but not the enemy ground forces or fighters above. The budget C-46s followed those blue lights and as long as the lead aircraft was on course, so were they.

Car lighted landings

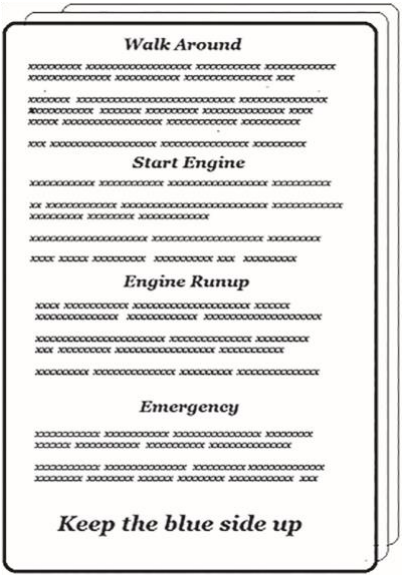
Believe it or not their most frightening experience was when there was an air raid by the Luftwaffe on London so that all the lights were turned off upon their return one night (low on fuel of course.) “No lights, how did you see the runway?” “The airport attendees put their cars along the runway and as each of us lined up with the runway they would turn them on for a few seconds at a time.”

These men and their stories were and are inspirational. They certainly were the last generation of military pilots that really “flew” their aircraft. We owe them and those currently serving our country a debt of gratitude. Thank each and all of you.

Propping an aircraft to start

Please consider propping an aircraft as a last resort. Please. Sometimes the littlest of planes are not that threatening, but for most, propping one to start is like checking a gun's trigger while it is pointed at you. If you must, make absolutely sure that your bird is securely tied down. Do not advance the throttle but by a little, do not wrap your fingers over and behind the propeller, (use just your fingertips instead), kick your leg backward, and even if you do not acknowledge a higher authority, prayer is good. A friend of mine was called before a snowstorm hit Cable, Wisconsin. Libby, the airport's manager, called him to ask, "Do you want me to put your Cessna 310 into the hangar?" He replied, "Please do." The hangar collapsed.

After its repair, a couple of months later my friend was in the process of selling that plane when a young, not so bright pilot, propped his single engine airplane. Through Ed Prosperi's window, the airport owner, famous for shooting his shotgun over the heads of some Illinois state officials there to condemn his land for interstate 80, they watched in astonishment as the little plane jumped into life, climbed up and over the 310's wing and almost cut the fuselage in two.



Aircraft/pilot checklist

A short pencil is better than a long memory

All aircraft have one thing in common. A checklist. This list of items to do, or know, is normally sealed in plastic, and located within easy reach of its pilot(s). It includes recommendations from the manufacture and/or the FAA regarding preflight, startup, run-up, cruise, emergency and shut down procedures. The checklist is informative as well as required, but most importantly, it is an invaluable pilot aid. “Just like a short pencil which is superior to a long memory”, it keeps us from forgetting something that may be critical. I like to suggest that keeping your checklist as brief as possible is important, even though some may think that ninety pages is barely sufficient. My reasoning is that the longer the list, the less likely it will be used in total. Unless you forget your name occasionally, KISS, (keep it simple, stupid) is a good recommendation.

P.S. A good checklist will always include a “red” emergency page, so if you ever need it, it is easy to locate.

The run-up

All checklists, other than gliders’ of course, will have an engine run-up checklist. It is likely the most used, and useful, of all the information available in your aircraft other than your charts (or GPS). Coaching note. Do your run up positioned at the end of the runway of course, but do not do it in the front of other aircraft or buildings if you have the option. And if you are unlucky enough to be in a line for takeoff, spare yourself the coughing by keeping your distance behind the airplane in front of you. His run up might even damage your plane, so it is not just a comfort recommendation. And of course, if you are number one with people behind you, turn a little right or left to keep your exhaust and prop wash from affecting the people and planes behind you.

Preflight in the aircraft

It may seem trite, but move your controls right and left, forward and back to confirm their functionality, and to verify that you have removed the control lock. Make sure that your seat is secure. Many an accident has been the result of either of these two items being ignored with bad result. Another good practice is making sure that your trim wheel is set in the “normal” position to prevent an unwanted nose up or down during takeoff and climb (or if your seat were to suddenly move backward).

One of the important preflight confirmations should be seat belts. If you think that is just for the safety of the occupant, how about a friend of mine who forgot and was terrified by the huge noise of his belt slapping against the fuselage… his $7,000 repair bill was a reminder to double check his belt on future flights.

When to power back after the climb

Too many pilots will power back exactly when they arrive at their assigned or chosen altitude. It is better not to do so until your bird has achieved its cruise speed first, and doing so gradually with throttle and/or the prop will keep your passengers happier.

Taxiing, safest place for airplanes?

You would think so, "What can possibly go wrong while I am slowly 'driving' down a taxi way?" Before I answer that question, did you know that an aircraft carrier catapult can throw a Cadillac a mile straight up? Or did you know that a 747 on the ground can blow a barn down from a mile away? Ah, that gave it away. Do not ever get smug on any airport that has bigger aircraft on it than you because they can, and have often, destroyed aircraft behind them. According to insurance records and FAA statistics, about 300 aircraft a year are severely damaged by the blast of other aircraft (rarely, but some with serious injury to its occupants, including the death of a dear friend of my mine taxiing his Baron on O'Hare Airport, Chicago.) (According to Insurance Company records, property damage is also reported more often than you would imagine.)

It is also a good idea, especially on a hot day, not to taxi close behind another plane waiting for takeoff. First, because their run up could damage your aircraft, but also because the fumes can nauseate you and your passengers. One of the greatest thrills of my life was to fly a P-51 out of Pompano, Florida, but the joy was greatly diminished by the fumes of a turboprop waiting for takeoff in front of me. If you have been stuck behind a diesel bus in the city, you can catch my drift.

It is also good to remember, especially at night, or when you have had a long day, to ask the ground controller for a "progressive taxi". I remember once, although I hate to confess it, that I got lost on Milwaukee Airport and finally

asked ground for where I was and what I needed to do to proceed. He answered, “You are on the runway, all you need to do is turn a little right and call the tower for clearance to take off.” Ouch.

Pets must be secured

There is no exaggerating this admonishment. Too many accidents have been attributed to pets interfering with the pilot’s ability to take off or land his or her airplane. If you take your pet along, especially if he or she is large, make certain that they are secured and in no way can jump into the lap of the pilot in command.

The runway behind you is useless

It may seem an expedient thing to do but do not sneak out onto the runway via some taxi way to take off. Yes, it will take a little more time to get to the end of the runway, but if you have a problem on takeoff, it is sure nice to have half the runway in front of you instead of behind you.

In addition, the DC 10 tragedy years ago at O’Hare Airport illustrates what can happen if you do not know what requirements and/or options you have at predetermined points along your takeoff roll. Seriously, you should make mental notes that if you have not reached a certain speed by a certain point along the runway, you should consider aborting. If you are taking off in a twin-engine aircraft be alert that if you lose an engine your plane will not “turn” right or left, it will “jerk”. Shut down both engines.

And that is a reminder to always keep our hand on the trottle(s) while taking off (and landing).

(Flight 191's left engine came off the wing at 25% down the runway. There are more than a few pilots who think the captain should have aborted then while he had almost a mile and a half of runway to stop.)

In flight point out other aircraft

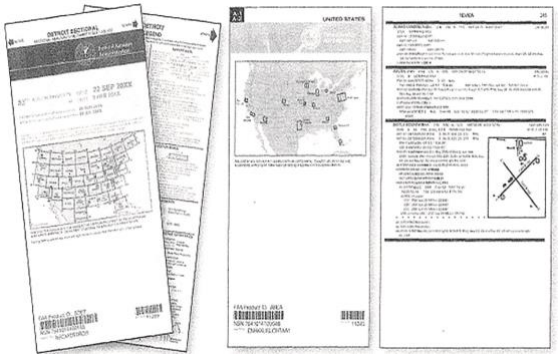
When you fly with an instructor, or another pilot, or just someone concerned about other airplanes in the same airspace, instruct them (you are the pilot in command), "Use your finger to point out other aircraft in the distance, do not tell me about them unless they are a real close." It can be annoying when someone says, "There is an aircraft at one o'clock" and the airplane is twenty miles distant... The finger gesture makes the point to the captain, but is not alarming, especially to your passengers in the back. Tell your right seat occupant to save his or her voice for the aircraft that are immediate concerns.

Can you really read a chart?

Really? If there is one universal shortcoming of pilots it is how to use an aviation chart, whether it is a sectional, WAC, or IFR (and most road maps for

that matter). Okay, I started out on the living room floor just like you, but this technique will not work in the cockpit (as you have already, or will soon learn), so here is the recommended and best way.

To master reading charts, start by realizing that it is not a large piece of paper with a lot of folds... instead, think of it as a book with pages. In fact, the IFR charts have letters denoting the pages on the top left corner, (A, B, C, etc.). Hold the chart in both hands, do not open it wide, instead, thumb through each fold (A, B, C...) until you find the airport that you are looking for. Then open it so only two sections are revealed (A and B; C and D; G and H, etc.). Study it and when you need more information, unfold to the section to the left (west,) or to the right (east). It might take a little practice, but I promise you it is definitely worth it. It is a little tip, but will save you a lot of time.



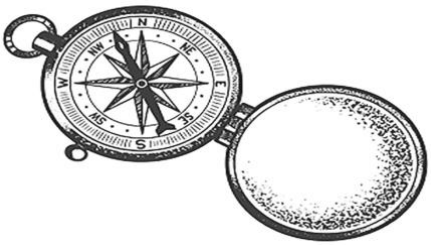
Sectional and WAC charts

If you are flying on a beautiful, VMC day, be careful not to make this mistake. The scale of Sectionals and WACs are different. An otherwise alert pilot estimated that if he only consumed half his fuel flying thirty inches on his sectional chart that he could rely on the other half for thirty inches on his WAC. Oops. The pilot who made this mistake told me that prayer really did

help get him to the airport. He thought nobody would ever know of his of mistake until the fueler pointed out that he took on a half-gallon more gas than he thought the airplane had capacity for...

Practice situational awareness

Flying an airplane is sometimes described as “hours and hours of boredom interrupted occasionally by moments of terror.” Make use of those peaceful hours. Imagine to yourself, if this or that happened to me right now, what would I do? They say that the best athletes in the world imagine themselves in every possible situation before their game, so that when they encounter it, their performance is equal to it. And if you are an IFR qualified pilot, practice an approach as often as you can get clearance to do so (even if it is a perfect VMC day). And by the way, ask approach or the tower for a practice radar approach occasionally. They need to perform a certain amount of them every month anyway, and the exercise will build your confidence as well as be fun.



Navigation

Believe it not the Europeans still have sextant questions in their knowledge examinations. I admire the fact that the Syrians learned how to use the stars to navigate over 2,000 year ago and we've used their knowledge and the sextant ever since, but modern GPS navigation, even in your cell phone, has made it totally obsolete. What I do want to relate to you is how a man named Jeppessen modernized navigation that the world still uses today and likely will for decades to come. Jeppessen was a mail pilot in the early days. He was one of those journal guys who recorded everything. Eventually he had notes regarding most of the rivers, lakes, cities, mountains, power lines and airports in the U.S. The next logical step, promoted by his pilot friends, was to publish this information. So began the world's largest publisher of maps for pilots, including everything in between the city and details of every airport. To this day these "charts" and "plates" are used by the entire world aviation community. When I visited Jeppessen outside of Denver years ago I had the honor of meeting this great man. I was standing in a hallway with Jim Terpstra when he walked up to us. Even though he was in his seventies or eighties at the time, he showed his intellect by asking Jim, "How do I import my pictures and merge them into my word processor?" This was in the computer's infancy (circa 1970-80) which made his question even more profound. During that brief encounter he also alluded to the fact that the earth was expanding by a little over two centimeters a year and it was marvelous that satellites measured and shared that information with their computers.

Navigating with the VOR made easy

One of, if not the most difficult talents for pilots to learn and apply, is VOR orientation. To really become proficient, and truly understand the VOR, we need to go back to the water. For at least a thousand years, navigators in the seas throughout the world used lighthouses. Oh, you thought that they were just there to warn boat captains to avoid the rocks... which is true of course, but, it has almost been forgotten that there was other, maybe equally important information that was gained by that 'guiding light'. Course and speed... how so?

Picture yourself in New York City, let us say on top of the Marriott which has a fantastic revolving restaurant. Let us pretend for this illustration that the Empire State Building has a rotating light identical to that of any lighthouse revolving to the right. Now let us count the seconds that it takes the light to revolve 360 degrees. Once again for the sake of this illustration, let us say that when the beam of light hits the top of the Chrysler Building, it is pointing exactly 360 degrees or that each time the light beam swings through 360 degrees it activates a red light when it points north. Either way, you and I sitting at dinner in the Marriott know when it points north and that it will do so every 6o seconds.

Now for the fun part... if the light beam hits us in the face 15 seconds after pointing north, where are we in relationship to the Empire State Building? If

you said, 90 degrees from it you now know how ships have navigated for the past thousand years and how a VOR works.

When that light struck us in the face, we were on the 90-degree RADIAL, but rue the English language sometimes. Whereas the strict, original definition of radial was a beam that emitted from a light or radio facility, it has succumbed to be used to mean either "to" or "from". Sadly, this important distinction that a radial emits only from, has been compromised.

Why is this so significant? Because there is only one direction that you could be on if that light hits you in the face, 15 seconds for 90 degrees (east), 30 seconds for 180 degrees (south) and 45 seconds for 270 degrees (west). Only one, but the word radial has been prostituted by improper use to mean either its original direction or unfortunately the opposite as well. If a controller asked you what radial you were on (if the word was still pure), and you answered the 180-degree radio of Detroit VOR, there was not any confusion that you were absolutely south. Period.

So, the early ship captains knew where they were in relationship to one lighthouse – and if they had a second lighthouse also shining in their eyes they would know precisely. (In addition, by using two sets of lighthouses along their course, they could calculate their speed as well). Tomorrow's pilot will rely on GPS, but most small aircraft today still use the VOR for navigation. By now it should be apparent that the VOR station is the same as that lighthouse. Instead of a light beam, our radio equipment tells us what radial we are on. Select 180 degrees on your VOR (using the OBS knob) with a "from" indication and when the needle centers, you know with certainty what radial your aircraft is on, regardless of its heading. (If you know that OBS stands for Omni Bearing Selector, you are witness to its first and worst misuse. Instead of bearing it should have read "radial".) The to/from indicator was added by the engineers to help the pilot navigate, but oftentimes it confuses the pilot, even sometimes making the pilot think that his heading has anything to do with it. If you really want to be proficient using and understanding VOR orientation, center your needle with the OBS with a "from" indication and you know precisely what radial you are on. And

just like the ship captain, select another VOR and get its light in your face and you'll know precisely where you are.

With just a little more mental effort we can also use the VOR to intercept an airway. As we mentioned before, in the western hemisphere, engineers use right to increase, left to decrease. So, if you are on a 360-degree north heading and determine that you are on the 270-degree radial of one of the airways' VORs, you are certainly west of that route. Logical orientation would dictate a heading of 90 degrees for a perpendicular intercept (if the distance is sufficient not to pass north of the omni, use 45 degrees if you want to travel north on the airway, 135 degrees if south.)

Navigation lights

It is interesting to note that the RED and GREEN navigation lights on our aircraft were copied from boating. They were officially required in 1848 for all powered boats, but some attribute their use back to the Phoenicians 2,000 years ago.

Stay off the grass

One sunny day on Santa Monica Airport a brown Rolls Royce parked on a little patch of grass near the front door. Inasmuch as there was a huge parking lot nearby, I was irritated and got up from my desk to demand that the driver move it. As I walked from my desk toward the perpetrator, one of the instructors called out, "Hello Mrs. Astaire, so nice to see you." There she was, on time for her instruction, pink baseball cap, a truly threatening, eighty-pound grandmother who was a pilot not only of a fixed-wing aircraft, but also a Roberson R22 helicopter. I smiled and went back to my desk. (Fred Astaire, her husband, was one of Hollywood's greatest dancers starring with Ginger Rogers and Eleanor Powell in a dozen movies from the 1930s.)

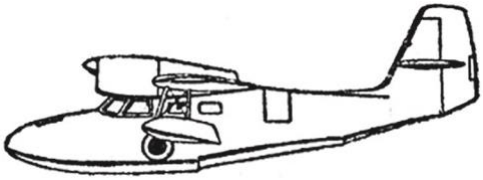
Lost horizon, do not rely on your ears

Joe Kennedy perished in his aircraft primarily because his brain did not know if his plane was flying upward or downward, right or left.... Instead of using his artificial horizon (a gyroscope-driven instrument that duplicates the real horizon) he tried to understand his aircraft's position using his semicircular canal (part of your ear) and the 'seat of his pants' (untrustworthy feelings caused by centrifugal pressures).

The inner ear has three small containers filled with fluid. This ingenious human device is basically a half-full glass of water with hair follicles located throughout its shape. Each hair follicle reports whether it's 'wet' or 'dry' to the brain. So just like holding a glass of water and tipping it forward, backward, right, or left, your semicircular canal gives your brain the identical information so that you know in which direction you are leaning. That is cool, yes, but, (big BUT) when there is a lot of vibration, unusual gravity or centrifugal forces the follicles all get wet and report improperly, resulting in confusion, nausea and "spatial disorientation". (It is no different than motion sickness in a car, but much more severe (and sometimes) fatal in an aircraft. (Yes, our eyes can arbitrate but only if we have a horizon to concentrate on.)

Advice

If you ever 'lose control' of an aircraft, let go of the controls. Your plane is just as interested to stay aloft as you are and has been taught by its designers to fly straight and level on its own.



Depth perception over water, amphibians be alert

If you are eager to get your water wings, be alert to the fact that landing and takeoffs on and/or from water can be deceptive. When viewed from above, especially moving fast, your eyes will tell you that you are much higher above the water than you really are. Unfortunately, to the chagrin of many float plane pilots, a hard landing on water can ruin an otherwise perfect day. Hopefully, all that will be required is a call to the insurance company, but any botched landing can have serious consequences. Fortunately, a Widgeon (nifty little amphibian) pilot escaped serious injury, when he turned (banked) his airplane too close to the water on takeoff in the Keys. His eyes told him that he was higher over the water than he was, so he caught a wing tip in the water and got a little more fishing in than he planned. One of the recommendations for landing on water is use more of your side vision than forward. You are still going to be lower than you think, but the process of doing so may remind you of the compromised perception. Which reminds me to recommend that you use the side window on occasion even for your concrete or asphalt landings. (Windshields in our aircraft fog over occasionally just like our cars).

Compromised forward vision on landing

Not only water landings can be made safer by viewing out the side window, but also a landing impaired by windshield ice, fog, or sunlight. (It may even be mandatory on a rare occasion.) In the case of overwhelming sunlight, good advice is to request another runway. If the windshield is iced over, or

foggy, use your side windows. “Okay... “ you are agreeing, but with a little hesitation... and you are right, unless we have landed a “tail dragger” a lot, we do not have the experience or confidence to know how to use the side window to land (or taxi). That is why on occasion it is a good idea to practice landing without looking through the windshield. Learning this technique early on is prudent, because most aircraft front windows are more vulnerable than your car to visibility loss, however, you might want (need?) a good copilot the first few times.

“Excuse me, I’m not a boat captain”

Jimmy Buffet tells the story of flying around the world in his huge amphibian, the Goose or Albatross, I do not recall which one, but when he landed in Sydney Harbor, Australia he called the Harbor Master and requested taxi instructions but was told to stop. “If you do not have a boat captain on board, you cannot move your boat until you do”.... The Harbor Master must not have been a Parrot Head.

Flying at night in single-engine aircraft

In Europe, flight after sunset requires an instrument rating. In the United States, there is no FAA regulation to require it, but prudence dictates caution. Best advice: stay within gliding range of a good landing spot. Obviously, locating airports along your fight plan would be unreasonable and nearly impossible, so what is a good plan? Fly the interstates. Most interstates connect major cities, are direct and wide enough to land on. Most

do not have obstacles overhead. If the occasion ever presents itself, regardless of the wind conditions, land with the traffic. I never thought it was that funny, but there is a saying for landing at night without an engine, “Just before ground level, turn on your lights and if you do not like what you see, turn them off and recite the Lord’s prayer...”

We all know that there are three flight plans. VFR, IFR and none at all. We have discussed weather considerations that force us to choose filing an IFR flight plan, but what should a VFR plan include? Again, for the sake of brevity, let us simply use common sense when going VFR. If you are single engine, even during daylight hours try to keep you flight within gliding distance of a good landing place in case of trouble or an airport, in the event you need an unplanned pit stop.

What? A Kleenex to stop noise?

Most of us forget that the airflow outside our aircraft is creating a low-pressure area inside out cabin. Literally, the outside is trying to suck the air out of it. Sometimes the doors (or windows) of our smaller aircraft make a screeching or buzzing noise. A simple solution is to carry a box of Kleenex in the glove compartment and put them along the offensive crack (usually the door seals). No glue is necessary, the suction will hold the tissue in place and the noise will be eliminated.

Smoke in the cockpit?

Fortunately, there are very few items in the cockpit that can incinerate, and very rarely anything does, but if you smell smoke, you must act quickly and decisively. Most likely you have an electrical wire that has shorted (the constant rubbing against one another and vibration can cause chaffing.) I recommend that your first course of action be turn off the master (all electrical) which will solve the problem ninety-eight per cent of the time. If this does not eliminate the smoke, make certain that you are breathing only

outside air and not any that is contaminated. If it is not electrical the cause is probably related to the engine, or coming from some place that you cannot reach, so your only option then is getting to the ground as quickly as practical.

Let me repeat that if you smell smoke, it is most likely electrical, so turn it all electrical off and breathe only good air if you need to make an emergency descent.

Landing pattern etiquette: No control tower

Most airports that do not have control towers are just not busy enough to afford one. That should not encourage us to believe there may not be someone taking off or approaching who could conflict with our intentions. Just like the contradiction that low-wing airplanes have fewer conflicts with trees than high wings do, there are more incidents at non-controlled fields than towered ones, so do not let your guard down. First, long before you get there, get the winds from Flight Service, nearby tower or by listening to an open frequency, usually 121.5. It is interesting that here is another instance where boating and flying have common roots and/or procedures. On boats, everyone with a radio is required to listen on channel 16 (universal emergency frequency). But in addition to a mayday call, the captain uses this frequency to make initial contact with other boats, coast guard or harbors. (Only for the time it takes to confirm and switch to a 'talking' frequency.)

For us pilots the emergency frequency 121.5 can (should?) be used for the same purpose at non-controlled fields.

So, within a reasonable distance (ten minutes) monitor 121.5 and announce your arrival and intentions. Include your location in relation to the airport, for example, "1234 Romeo, North, landing Genoa Airport, runway niner." As we have often said, do not worry about talking like a 747 driver, plain English is just fine, and besides there is likely nobody listening who cares anyway.

Although it is not regulatory, a landing pattern is recommended. It's always good procedure not to rush your landing check list, and take a good look at

the airport, especially to confirm that the runway is viable. (I can attest to being surprised by seagulls on the threshold of Danbury, Connecticut's runway, alligators on Marco Island's in Florida, coyotes on Montgomery's in San Diego, turtles on Houston's Hobby and the unforgettable "Libby' crossing Cable, Wisconsin's while mowing the grass.)

Ground effect

When you see a flock of birds gliding close to the top of water, they are taking advantage of what is referred to in aviation as "ground effect". Lift, as we all have been taught is caused by faster air flowing over a curved surface creating a lower pressure area on its top, which is trying to be replaced by the higher-pressure air below it... but that does not explain why sea birds glide just on top of the water's surface. What does? Compression. The air between the bird and the surface is compressed to a point that it creates support. This same phenomenon occurs between the wings of our aircraft and the surface it flies over are close. The nearer to the runway, the more the compression which keeps our bird aloft. Let us admit it, those best, softest landings we make are when we glide on top of ground effect onto to wet (lubricated) runway.

Landing

Another checklist recommendation is to use your trim wheel on approach. There are a lot of pilots who do not possess the arm strength to "flare" their airplanes easily. If you are trimmed for cruise, you will likely need a lot of back pressure to land, unless you retrim your nose up during your approach.

In case you forgot... the perfect way to turn onto the base leg to create a perfect rectangular pattern is to do so at an angle of 45 degrees from the end of runway (or desired touch down spot).

And, if you must land behind a large airplane beware of its wake turbulence.

Only the best can land right on the spot

A dear friend of mine, Fred Abrams, excellent pilot, teacher, and memory bank of ten million jokes, told me that when he was a student pilot he proudly landed right on top of the **X**, which he thought was the spot to be targeted for landing on a small airport in Northern California. He was shocked when the local authorities reprimanded him for landing on a closed runway.

Fred started out with an interesting job in the military. Rather than their pilots needing travel and housing to be taught, upgraded, or refreshed, Fred and his Boeing 707 jet simulator traveled around the country inside a rail car. (Another interesting staying 'on track' story.)

Landing pattern etiquette: With control tower

We have all been taught the landing pattern... we've all 'been there, done that' to a point that not much can be added to our knowledge. However, I will. In doing so I use a tragedy to remind you that situational awareness, knowing where you are, and informing the tower accurately where you are, can be paramount to a safe and uneventful arrival. First, let us emphasize once more who is pilot in command. You are... not the center, not the tower,

not the FAA. They make mistakes and go home to eat dinner, which might not be true of the pilots they give inaccurate instruction to. Second, let us acknowledge that as a pilot we know that if the runway in use is “9” we can report that we are “west of the airport” (even if we are not), and it is likely we can get a “straight in to land” instruction from the tower. Okay, that can eliminate us the downwind and base legs (even if we fudged a little because we were really a bit north or south), but is it safe to do so? Generally, shortcuts are an invitation to trouble in a lot of life’s activities, but if you have been listening on the tower frequency enough to know that there are no others in the pattern, or on an approach, you are fine. But, if there is other traffic I would recommend reporting exactly where you are, and if the tower commands you to enter the pattern, do so. The tragedy that I refer to, and it has happened to many others, not just a friend of mine, involved an aircraft that requested landing instructions from much further out than warranted or was desirable. The tower had someone in the pattern, but thinking that the incoming plane would land quickly, he cleared it to do so. The tower even asked the approaching aircraft how close it was. The plane answered, “I’m peddled as fast as I can.” The tower, realizing that the approaching aircraft had lied about his position, told the pilot in the pattern to extend her downwind, and much too late, “Turn on to base.” Oh, to have those moments back... it is likely that the pattern aircraft obscured the approaching aircraft and the tower never saw the impending conflict.

I mentioned “aircraft on approach” as one of the potential hazards because on rare occasions (some accidents), approach control does not tell the tower that they have an inbound (IFR) aircraft until it is inside the five-mile radius of the tower’s authority.

To further emphasize the desirability of “situational awareness” in the pattern, let me share a personal experience with you from Stapleton Airport, Denver, Colorado. If you ever look out your left window on an approach and see the entire tail of an airliner fill it, you have just experienced a near miss. I was furious, not at the tower for allowing it to happen, but me. How could I be so dumb as not to know that that plane was in such close proximity? Had I listened more closely, I would have realized that the controller did not

calculate my speed properly, assuming in error, that I too was an airliner. She was obviously not a pilot and therefore know that the speed of my Cessna 340 was not equal to that of the jets. So, the airplane that she assumed was behind me, caught up and barely missed me. As my mother often said, "Donald, you should have known better."

Do not bank steeply turning from base to final

Many pilots flying smaller aircraft bank severely to get from their base leg onto final. In fact, most of us have. Whether it was more wind than we anticipated or a miscalculation on our part, we bank abruptly to line up with the runway. In a single-engine plane, we can get away with it. But, let me emphasize that if you are landing in a twin, you are putting your life in peril. A steep bank in a multi-engine aircraft can cause a stall, as it did to a doctor friend of mine, with catastrophic results. This is another double yellow line.... do not bank severely near the ground in any airplane, but absolutely never do it in a twin.

The short leg mystery

Every year, for the first ten of my fifty working in aviation, several aircraft of our fleet of one hundred would experience a landing incident. What was statistically accurate was the fact that ninety per cent of them were women pilots. (At the time, I admit that it wrongly fed my male superiority complex.) But the real explanation came to light when I dug deeper into the "Incident Reports" that had to be filed with our National Safety Board (three of the most senior instructors of the company and the National Maintenance Manager). The male, as well as the female pilots in these landing incident reports, all were short-legged. It really was hammered home when one of our best female instructors told me the reason she slid off an icy runway was, "Don, I ran out of rudder." After further discussion we both realized that her legs were not long enough for her to fully extend the rudder to its

maximum. (Or the dozens of others who had the same embarrassing experience – as well as the thousands of dollars and aircraft downtime lost.) Fortunately, our mechanics were represented on that Safety Board and they contributed to discovering (and fixing) the real problem.

The solution(s) was not as expansive or expensive as you might think. First, I notified the FAA, which did nothing. Second, our mechanics allowed the seats to move forward another inch. Third, we installed "throw over" rudder extensions. (Plastic blocks on ropes, which when, not in use, ride on the top and back of those foot pedals). Lastly, every office stocked back cushions to move the pilot even further forward in his or her seat. It did not eliminate landing incidents, but even our insurance company was impressed by the fact that they had become rare.

Landing etiquette: South of the border

For years I complained about the bribes that were required to get into and out of Mexico, Central America, the Bahamas, and the beautiful, magnificent islands that string all the way to Africa. Then it occurred to me one day on the airport of Mayaguez, Puerto Rico that maybe a $20 bribe was better than waiting for United States Border Patrol to clear me and my friends. How humiliating it is to carry a bunch of suitcases across a hot tarmac into an office of a half-dozen Custom Department agents who are just sitting there doing nothing. "Hurry up and wait" should be their motto. Finally, about the time you are about to have a stroke, one of them, without getting up, waves his arm indicating that you can leave.

So yes, we need to be warned and armed about certain protocols when we fly outside the United States. Your first lesson is that no matter what day you land in most of these countries, their workers are on 'holiday'. In other words, (theirs) if you need fuel, you must pay 'overtime' to get it. Then, you might encounter your next surprise when you want to taxi, "Have you got your weather briefing?" ground control will ask. OOPs. Maybe another $20? Yes, and it can get worse, because without a weather briefing or a tower

clearance, you may not be leaving while your wallet still has any twenties. In Cancun, Mexico a well-dressed gentleman nicknamed the “Expediter” will greet you with a huge smile and with his hand out, ‘volunteer’ to grease everyone for you.

Len Formella, one great human being and extraordinary Sears pilot, often flew the company executives through Mexico and South America. He told me that they could not get cash advances issued from dispatch for bribes, but instead requisitioned decks of cards, which he said were more prized down south than money...

If you fly out of the country piloting your own airplane there is another great secret to getting in and out of airports quickly. Do not wear your monogrammed silk shirt and Pedagora sandals, wear a pilot shirt with epaulets instead. That way the workers will think you are one of them and treat you accordingly. Wow, once I even got addressed as “Captain”.

Why do gear-up landings occur?

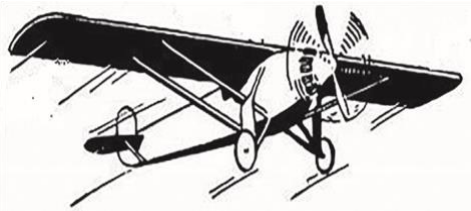
Good Practice Advice (almost a double yellow line): Never do more than three touch-and-go landings at the same airport. For the first twenty years or so of my love affair with aviation, I often heard that, “If you have not had a gear up landing, you are a (likely candidate) or (about to)”. The common assumption was that the pilot in his eagerness to comply with all his landing duties forgets to put it down. So, instructors, safety gurus and the FAA all jumped on the band wagon and admonished everyone, use you check list, and some towers, especially in Texas, added “check gear” when clearing aircraft to land. There is no doubt that many a pilot (and their insurance companies) benefited from this Texas welcome and friendly reminder.

So why did gear-up landings not diminish? Well, my senior instructors, (I created a “Safety Board” for our school, of which four of the most senior instructors and our top mechanic were members). Their job was to investigate every incident, edit all educational materials and set standards for our five hundred instructors, all of whom were required to sign a safety

pledge when they were hired. Their investigation revealed an interesting fact… most of these ill-fated landings occurred on the fourth of fifth landing when either the owner was practicing, or an instructor and student were learning. This fact made my board scratch their heads for a better explanation than was used up to that date. Finally, one of them offered the solution. The problem was not that they were not putting the gear down – it was already down. Yes, important enough to repeat, the gear was already down... So, what was happening? Incidentally, almost everyone interviewed after a gear-up landing swear on the Bible that they had put the gear down, in fact, they were vehement that they remember distinctly, "Having their hand on the gear handle, hearing the gear cycle and saw the lights on the indicator flash" ...and they were right.

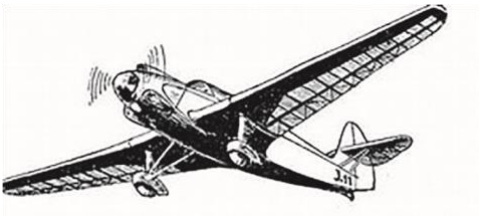
They *were* right, their hand was on the gear handle, they did hear it cycle, and the light did change position. But what was really happening was the gear was retracting. Yes, the cause of these mishaps was not that the pilots forgot to put the gear down, but instead, forgot to bring the gear up after their last touch and go. When they were on final and one of the pilots called for gear down, the other, or PIC, activated the gear handle, heard it cycling, and saw a light, confirmation to both that the gear had just gone down... No, it had just come up...

Incidentally, this information was shared with the FAA and sadly, to my knowledge and disappointment, was never published. To this day there are still gear-up landings that are caused by one-to-many touch and goes. Those retractable aircraft pilots and instructors who abide by "never more than three touch-and-goes at the same airport" are practicing safe flying and saving themselves a big embarrassment (and expense). (Not to minimize the risk of injury, although very infrequent.)



Are high-wing aircraft better than low-wing?

It is amazing how passionate some pilots are when arguing their preference of whether a low- or high-wing airplane is the best. Just like sail boats are preferred more than power. Arabian horses are preferred over Thoroughbreds. Ford is better than Chevrolet. Or, visa versa to each debate. The preference discussions will continue, with no clear-cut winners. When it comes to aircraft, mechanics favor high-wing (because you can walk around the fuselage quicker), instructors favor high-wing (because there are two doors for quick egress), and treetops are more familiar with high-wing as well.... you would think that pilots would be less likely to hit treetops in a high-wing than a low-wing aircraft, (because you can see them better). Ironically, the statistics say otherwise. Why? It is likely that because the low-wing pilot cannot see the treetops, he or she will stay higher – as a safety margin. Line boys dislike high-wing airplanes (because they hate climbing up ladders to fuel them).



Two other ageless debates

A couple of additional debates that have kept ale houses open after hours for years are “Airspeed controls altitude, attitude controls airspeed” and the second, ignited more recently by the FAA’s Pilot Handbook of Aeronautical Knowledge, that stalls are the same as spins. I prefer to go to bed early, so rather than get into the fray (they are sometimes rather heated), I will try to simplify the arguments, and ask the listener, or in our case, the reader to decide.

First, let us tackle the oldest debate. Airspeed controls altitude and attitude controls airspeed. Half the pilots I know, especially if they were military adhere to this concept. Period.

The second group says no, it is a combination of both. They cite as their proof, that you can add airspeed but without attitude (angle of attack) you will not gain altitude. Conversely, that if you have a huge angle of attack without airspeed, you will get the same result.

The other, that stalls and spins are similar contradicts what most instructors would argue defies their very definition, that a stall is when the airfoil ceases to generate enough lift to keep the airplane aloft, and that a spin is a downward tight spiral that increases airspeed.

As I have written before, I think the arguments are purely academic, unless you ordered a full quart of beer for everyone at the table (and/or you are an aerobatics pilot). My belief is that this is one of the most important “double yellow lines” to pilots, never to be crossed. It is like arguing whether the oncoming 70mph Mack truck in the other lane is going to run you over or

knock you off the road. General Aviation pilots should never get into a stall or a spin. Not ever. Period. 999

Chapter V:

CARE to Land

Too much information is spoken and written on how to fly an aircraft and not enough on how to land one. 999

Good landings start with the approach

Before we dissect landings and explore the importance of good technique and using CARE, let's review the recommended approach and pattern that should precede them.

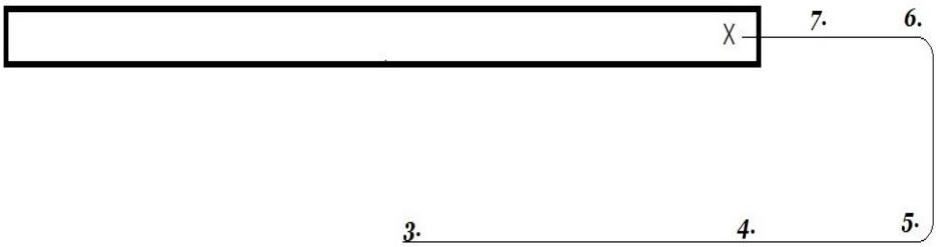
Granted, the best arrival at any airport, especially after a long flight, is a straight in to land, with tower approval of course, but for safety and putting ourselves in the optimum position to make a smooth landing, the pattern is always a good idea and recommended. The 1,000 foot above ground, 45-degree entry provides you with the best view of traffic and prospective of the airport. The downwind segment gives you time to get "organized" (checklist, seat, visor, etc.), and the recommended idle throttle down to achieve the best glide angle (use a little power for twins or personal preference,) at the parallel point adjacent to the desired touch down spot, then turn onto base 45-degrees from that same point. (If there is a lot of wind down the runway, you might initiate your turn onto final sooner or add a little power during final (I recommend turning earlier).

Double Yellow Line:

If for any reason you pass the point on base at which you should have turned onto final, do not overbank to correct, especially in a twin. (Too many unrecoverable stalls have occurred because of this mistake.)

The Pattern:

“A good approach is the gateway to a good landing”.



1. Twenty minutes from airport, listen to ADIS and twer.
2. At a minumun of five miles out, call the tower, while descending to one thousand feet agl if not already there.
3. Enter the pattern via a forty-five degree angle. Listen to and eyeball others in the pattern.
4. Adjacent to the intended landing spot, trottle to idle, go to best angle of glide. (example: about 70 knots in a Cessna 172).
5. Forty five degrees from the landing spot, turn left onto base.
6. Initiate turn to final so that that you are perpendicular to the runway - at 6.
7. Adjust throttle, if necessary, especially if you encounter high headwind.
8. Add flaps, depending on length of runway and wind. Keep in mind that the more flap that you use may result in a little less control.

Retractable Gear Equipped

I recommend that the gear be extended ten miles out, to help descend. Otherwise, extend it just before entering the pattern, with the double check

point just before base. Insert your preference on the checklist, but two reminders are better than only one.

In addition to the logic of a standardized pattern, give some thought that there may be a better way to practice landings. One of the most consistent complaints that I have heard is how landings were taught (or not). There seemed to be unanimous agreement that they were the most difficult aspect of becoming a pilot, but the most poorly taught and/or remembered. I was intrigued by a group of instructors from Embry Riddle that recommended the following simple, easy methodology, which is also less abusive on tires and brakes. Further, it does not frighten the pilot, interfere with others in the pattern or annoy the tower.

What was the secret technique that they recommended? Simply slow flight 10 to 20 feet above and straight down the centerline of the runway. Obviously, the challenge to do that and benefit of learning how to, is holding your nose straight down the runway and maintaining your altitude by coordinating aileron and rudder (based upon the wind speed and direction) and the proper elevator control. (CARE) It is fun, great for those just learning as well as the veteran. Do one or two at cruise power, then one or two at slow flight. This maneuver requires mostly CARE, but setting or adjusting the throttle for altitude may also play a role. (The best angle for glide during the downwind phase should make it unnecessary).

The recommended setting for the throttle in the pattern is that which results in the best angle of glide starting at the point perpendicular to your intended touch down spot, (usually between a thousand and fifteen hundred rpm) and leave it (them) there. This allows you to concentrate on other matters.)

What about the actual arrival, touching down? Once the pilot is proficient at flying over the runway straight and level at slow flight, he or she can slowly throttle back and miraculously the plane lands. The better you become at using CARE and maintaining your shadow over the runway centerline, the better your landings will become.

Use CARE when landing

Operating an aircraft is very similar to driving an automobile. In both vehicles we mostly “point and go”. Pretty simple. In a car we have three control devices: the steering wheel for direction, the accelerator to move faster and the brake to slow down.

The aircraft’s control devices, and the surfaces that they activate, are significantly different. We move ailerons with the yoke, the rudder with our feet, and the elevator with our hands. These three control surfaces are literally small wings and we should have learned their functions in order to earn our pilot license.

Why do aircraft respond the way they do?

Simply put, when we turn our yoke (or stick) right, the lift on the left wing is increased and the lift on the right wing is decreased, resulting in the plane banking (and moving) to the right. (Vice versa when we turn our yoke to the left).

When we pull back on the yoke, the following edge of the tail (elevator) is forced upward which ‘lifts’ the tail downward and pushes the plane’s nose upward. Vice versa when we push forward on the yoke.

When we apply pressure to the right rudder pedal, the trailing edge of the rudder(s) moves left resulting in the nose of the plane turning right. Vice versa when we apply pressure to the left rudder pedal.

When we apply power, everything else being constant, we generate more speed and therefore, lift. Vice versa when we decrease it. (I will avoid the ageless argument regarding “attitude and throttle” and which controls altitude by simply stating that it depends upon what type aircraft you are flying, but for most of us in general aviation airplanes, it is a matter of coordinating both).

Power settings:

Learning to really use the throttle, which normally controls airspeed, climbs and descents in everyday flying, and is different in every airplane, is not emphasized in most training programs and is seldom addressed by examiners. If you are a “throttle jockey”, (excessive use of the throttle) learn that at specific RPM setting, along with the proper angle of attack, (ideally close to the horizon) the plane with climb or descend at a desirable and constant rate. For example, in the classic training aircraft the Cessna 172, throttle to idle with a neutral horizon (maybe a little back pressure) will give you 70 knots of airspeed at about a 350 foot per minute descent, which is also the best ratio of forward movement to descent. (The best angle of glide).

Is trimming an aircraft important?

I suggest, and profess I learned the hard way, that neutral trim on take off should be mandatory and nose up trim on landing highly desirable. The former for safety, the latter because too many pilots do not have the arm strength to apply a lot of back pressure on the yoke, and at the same time be agile in turning the aircraft.

As much as I enjoy discussing the various techniques of piloting an aircraft, this chapter is dedicated to the skills of landing one. I will argue that maybe the education that we received on how to land an aircraft was flawed. Not that we aren’t good, safe pilots today, but that we can be better, safer, especially if we improve our knowledge of and the skills needed to land safely.

In the following paragraphs I will advocate the best methodology to land an aircraft and, how to easily learn it regardless of your initial education. There are four components to my recommendation.

First, you need to know that there is a big difference between ‘rote” and “cognitive” learning. Second, you need to know the three flight surfaces that

control an aircraft. Third, you need to use “CARE” to operate them effectively. And fourth, you need to know a fun and easy practice maneuver to learn and practice how.

Rote versus Cognitive Memory

To avoid getting too academic, let us premise that there are two main categories of learning: “Rote” and “Cognitive”. Then for the sake of simplicity, let us define rote as repetitious, and cognitive, as conceptual. The weakness of rote memory is it diminishes over time, whereas cognitive memory can remain with us for a lifetime. If we learn something by repetition and refer to it every week, wonderful, no problem, we are on it. However, if we don’t use something learned by repetition, say for six months or more, we may not remember, or should, rely on it.

The psychiatrist explains it this way. If we learn something that has three elements, say, A, B, and C. Six months after rote learning we might retrieve and be able to apply A, B or C, but not likely all of them. If we learned conceptually, chances are we would remember and be able to perform all three. This fact is not a concern for the pilot that flies regularly, but if he or she doesn’t do so for weeks at a time, the lapse of time might be critical.

How did we learn to land an airplane?

Most, if not all of us, were taught to land an aircraft by rote. We “learned” how by repetition. We kept doing those touch and go’s until we could land successfully.

There is nobody that admires or supports Flight Instructors more passionately and respectfully than I, but they “teach it like they learned it”. And they seldom, if ever, go six months or more without flying. But let me not criticize anybody, but instead, let me create and promote a better way. It’s important to note here that most of us writing or reading this book are

general aviation, not professional pilots, so conceptual learning and its superior memory potential is far more important to us, but not as much for the professional pilot. Because the General Aviation pilot's flights are more intermittent, he or she will need to rely on better memory skills. Therefore, we should learn cognitively whenever possible, instead of by rote.

The following pages will introduce you to CARE, and how practicing Dutch Rolls will change your entire perspective on how you should be landing your aircraft. It is easier for most pilots, to "drive", instead of fly, an airplane. Is that rudder or a little slip and ball really that big a deal?

Not normally, but when negotiating a landing it is critical. And if you remember my friend's retort after touching down on a really gusty day… "Thanks God, I'll take over now," you know what I mean. If you and I are to make safe, comfortable landings we must learn to do so cognitively and use CARE.

What is CARE?

CARE is an acronym for **C**O-ORDINATED **A**ILERON, **R**UDDER and **E**LEVATOR. In order to put our aircraft on the runway safely we must understand what control surfaces need to be activated, as well as learn to co-o-ordinate the use our control devices with our hands and feet to do so. It is the difference between driving and piloting. The car accomplishes its movement unilaterally, but the plane requires co-ordination. In a car, we affect control functions individually but, in an airplane, we need to synchronize the control inputs.

If you want to turn your car you do so by rotating the steering wheel one direction or the other. And it turns. If you want to turn your plane, you can use its steering wheel (stick or yoke) similarly, with the same result as in the car, but… two other things will occur: you will lose altitude and bank.

So, singular input directs the car and ***can*** control our plane during cruise, but not effectively for landing. Safe landings require a knowledge of and application of CARE:

Co-ordination of **A**ilerons, **R**udder, and **E**levator.

The best orchestra conductors must co-ordinate the strings, wind and percussion instruments to make great music, the pilot must co-ordinate aileron, rudder and elevator, to make great landings.

What about that airplane that is losing altitude and banked? If it happens during cross country flights it isn't a big deal, but on landing it is critical. We must co-ordinate any bank by applying rudder to keep the wheels lined up to the runway. We must use the elevator to manage our descent. And, to do it right, we must coordinate the inputs.

CARE is the result of cognitive learning, not rote, which was how most of us were taught landings in the beginning. Rote learning losses effectiveness over time, CARE should be with us forever.

What about airspeed? Shouldn't it be a part of CARE? Yes and no, it's not a control surface, so it is not part of CARE, but obviously it is part of operating our plane and for most of us, rather obvious as to when and how to use it. Most of us were taught once in the landing pattern, at the right altitude, to set power to idle and set up our best angle of guide (likely more than that if in a twin) and adjust to the "over the fence" airspeed at a point parallel and adjacent to our desired touch down spot. (using the throttle only if necessary, ie. strong headwind). This pattern procedure, an excellent habit in my opinion, also removes throttle from the CARE formula to land. In addition, it eliminates awkward in and out power adjustments on final. (Please review our illustration to refresh your memory regarding the ideal pattern/landing procedures).

Learning to land an aircraft is the most challenging aspect of becoming a pilot.

But how should we go about learning to perform them proficiently?

Repetition to a certain degree is necessary, but most important it needs to be learned and embedded in our cognitive memory. To do that we must

understand how to co-ordinate the necessary control inputs. Most pilots learn about how aileron, rudder and elevators work, but not enough on how they need to be coordinated to maintain maximum control of the airplane, especially when negotiating a landing.

Hence, our need to learn CARE and Dutch Rolls. (Some old timers will recognize the CARE practice maneuver as a Dutch Roll before its definition was compromised by its more common use today describing an airliner's occasional erratic behavior).

To avoid any confusion regarding these two different definitions, we will use the original one. Most pilots have never heard of a Dutch roll, let alone have ever been taught to perform one. Done in its entirety, this maneuver requires an understanding of the coordination of aileron, rudder, and elevator… the essential, need-to-know, basic control surfaces of an aircraft, and most important, their importance to landing an aircraft.

Practicing the Dutch Roll maneuver should be mandatory for every student, but also us. One of my instructors, Bill Campbell (Billy Swan, the singer in his other profession), insisted that when we flew to a practice area for air work, that we should not waste any time (or money) during our flight, so he insisted that we perform Dutch Rolls on the way.

I cannot emphasize performing Dutch Rolls enough. It should be the mandatory teaching - and an evaluation tool, and even included on flight tests. (Yes, for the fact that if you can perform it on a check ride, the examiner knows for certain that you understand the control elements of an airplane). It is invaluable during dual instruction, but also a fun practice maneuver during any flight. In essence, it demonstrates the pilots understanding of what controls what.

I recommend that regardless of the license you've earned, performing Dutch Rolls is an exercise that will enhance your competence and confidence, and especially, make, and keep you, a Top Gun for landings. Next time out, or especially, next time you fly with an instructor, give them a go. I promise you two surprises. First, you'll really screw up your first attempt. Second, I

guarantee that once you can perform them well, your proficiency, confidence and especially your landings will be miraculously improved.

What is it? Once you have “cleared the area” and have sufficient altitude, start by picking out a prominent landmark on the horizon. A water tower, barn, or other distinct feature thirty or forty miles ahead. Put the nose of your airplane on it and keep it there. Throughout this maneuver your airplane should perform as if it is hanging from a string not deviating right, left, or up, down, just easily rolling to and fro. This can only be accomplished by understanding and the coordination of the controls available in your airplane.

Once we have established that we have no conflicting aircraft and enough altitude, at cruise speed we smoothly, in one continuous motion, bank right 10-degrees and then bank left 10-degrees (from the horizon). Don’t let the nose go right or left, up or down. And do not gain or lose altitude. (Don’t be discouraged, most of us will have the nose swing sharply to the right or left because we are slow using opposite rudder. Start again, knowing this time that as you bank you must apply rudder to keep the nose on your point. And don’t forget elevator to maintain altitude, which will become especially important as you increase bank.

After that first cycle, and in one continuous motion, do the same to 20-degrees right and left. Again, making sure that the nose is glued on your reference point and that your altitude remains constant.

Then 30 degrees.

Finish by doing cycling 20 degrees and 10 degrees back to cruise.

It is a proud moment when you can complete this maneuver smoothly. And, you didn’t have to deviate from your original flight path.

Performing Dutch Rolls to 30-degrees a few times will put you on a 8.5 of 10 scale, 10 being the highest. If you want to increase your proficiency to 9, add two more cycles, preferably with another pilot on board. Do 40-degrees for cycle four, and then slow flight if you think you got the hang of it. (At 30 and

40 degrees, you'll not only have a greater challenge to do them smoothly, but physically, as the rudder pressure needs to be quicker and much greater.

You'll learn very quickly that the nose will not stay on your landmark without appropriate (and quick) rudder, and that your altitude will slip a little without small adjustment to the elevator... But that is what Care is all about – learning the coordination of aileron, elevator and rudder, which is the essential knowledge and skill required to perform landings.

Okay, your first attempt will likely see your nose going back and forth like somebody's head at a tennis match. Next time be ready on the rudder. When you are finally satisfied with the above, you are only half done if you're going for a 9 or 10 rating. Now comes the most challenging albeit, exciting part.

This time, you are going to do the same as before, but gradually reduce the power to slow flight (20 or 30 knots above your plane's stall speed) and then progressively return to cruise all the while doing Dutch Rolls using Care.

If you really want a challenge, do it with flaps, 10%, 20%, and then 30%. (At this extreme you will need to add power to maintain speed and altitude.) This is extremely challenging, even for an expert pilot, but if you can do it smoothly you are truly an ace, not just an airplane driver. (I recommend an instructor or qualified watch pilot on board if you do Dutch Rolls with flaps and/or slow flight).

Most important none of the above can be accomplished smoothly without coordinating the fundamentals of aircraft controls and why I adamantly promote it for every pilot who wants to be at his or her very best.

The person who can perform Dutch Rolls maneuver(s) should never have any problem landing an airplane, especially in extreme cross winds. (Be aware that with less airspeed that quicker and more rudder will be necessary.)

The Dutch Roll is a wonderful and fun exercise to reinforce your ability to co-ordinate your flight controls. They are also a little bit challenging, because very few can do them perfectly. But they are also the best way to maintain your skills for landing, without actually doing them. I recommend that any

time you are in calm air with no traffic, do them to at least to 20 degrees a few times. (Practicing them can also be a test of your present competency. If you aren't "hanging on that string," banking right and left with your fixed point locked in place on your windshield, it could be a message that you need to refresh, either by practicing more on your own, with a watch pilot or recruiting your friendly, local CFI. And don't forget that no time is wasted because they could be a part of every flight without deviating from your flight plan.

Dutch Rolls Made Simple

Begin: straight and level, cruise speed, pick landmark on horizon. Clear area.

Bank 10 degrees right of the horizon, keep nose on landmark, and altitude constant.

Co-ordinate: **A**ileron–right, **R**udder–left, **E**levator back slightly

In a continuous motion, bank left 10 degrees of the horizon, stay on landmark and altitude.

Co-ordinate: **A**ileron–left, **R**udder–right, **E**levator back slightly

In a continuous motion, bank right 20 degrees of the horizon, stay on landmark and altitude

Co-ordinate: **A**ileron–right, **R**udder–left, **E**levator back slightly

In a continuous motion bank left 20 degrees of the horizon, stay on landmark and altitude.

Co-ordinate: **A**ileron–left, **R**udder–right, **E**levator back slightly

In a continuous motion, bank right 30 degrees of the horizon, stay on landmark and altitude

Co-ordinate: **A**ileron–right, **R**udder–left, **E**levator back slightly

In continuous motion bank left 30 degrees left of horizon, stay on landmark and altitude.

Co-ordinate: **A**ileron–left, **R**udder–right, **E**levator back slightly

Finish: Straight and level, cruise speed, landmark and altitude identical to as started.

The ultimate: Do above, but slow flight adding 10 degrees of flap on each frame. You'll need to use throttle.

Kiss

Don't get involved with so much detail that you burden your memory when landing an aircraft. Keep it simple. Landings can be learned and negotiated in a hundred safe and different ways, what's important is to keep your method as simple as possible. Especially if you, like the average General Aviation pilot, only fly 50 to 60 hours a year. Hard to believe, but time flies when you're having fun. (Or, as the toad says, "time's fun when you're having flies).

The following is a simple reminder that you can add to your landing checklist. Add or subtract based upon your need, but don't make it so lengthy that you are hesitant to use it.

ATIS

Tower

Runway

Altitude, 1,000 above ground

Enter pattern, 45 degrees

Landing gear? – great to use it to slow down if you had a rapid descent, but prudent to always add it somewhere on your checklist as a double check.

Clear the area

Abeam of intended landing spot, idle

Best glide angle

45 degrees from intended landing spot, turn base

90 degrees of runway, turn on final

CARE

Add flaps, if needed

Focus

There are dozens of do's and don'ts for landings, but by keeping it simple you can concentrate more on what is essential.

The Alon Ercoupe

There is always the exception, or exceptional.

In the 1930s, a couple of brilliant engineers John Allen and Lee Higdon believed that anyone who drove a car should be able to fly an airplane, so they designed and built one that would. It included no rudder pedals and a unique landing gear that allowed it to take off and land in cross wind environments effortlessly. It was for all intents and purposes stall proof and boasted that pilots could learn in half the time as in a "normal airplane?". This writer and many other caring pilots wonder why their simple ideas did not get adopted by the mainstream manufactures. If their innovations were incorporated in modern airplanes, many pilot candidates might not have quit learning to fly because of the complex and arduous learning curve that exists, not to omit the fact that if it takes twice as many hours to learn, it cost double.

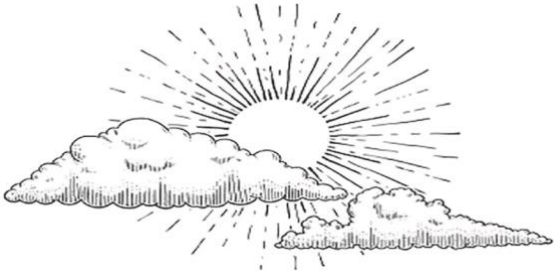
Double Yellow Lines for take offs.

Do not be tempted to takeoff from any point other than from the end of a runway. That runway behind you is worthless.

Don’t ever underestimate hot days and worse, high altitude take off distances.

Chapter VI:

Mother Nature



Weather or not

For thousands of years people who traveled did so at the whim of mother nature, especially sea captains and today, pilots. Most of the time she is our pleasant companion, sometimes even adding speed to propel our boats or planes, but when she becomes our adversary, she can really be unpleasant, oftentimes destructive. Most of the time she is predictable, but you can never count on it.

Pilots need to know two important things about weather. First, we should learn the basics, for instance, that cold fronts move about thirty miles an hour and that that warm fronts move slower, about fifteen miles an hour. Second, it should be mandatory to get a weather briefing prior to every flight.

Volumes have been written about the weather and we all were required to learn a lot about it during our preparation to pass the FAA's knowledge examinations. With all this background, we should have learned enough by now to know how important it is to evaluate its immediate and forecasted behavior as well as respect any warnings.

As I have said often, there is a big difference between book learning and experience. My commitment to you is to share the important lessons that I have acquired over the past five decades of flying back and forth across this great country. In addition, I promised to share the experiences of hundreds of fellow pilots gathered during hangar flying sessions, seminars, casual hallway conversations and of course, wine time.

Always have a window

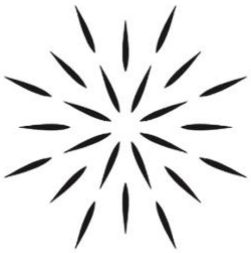
Good pre-flight planning includes seeking the answers to many questions: If there is marginal weather along your planned route, what are your alternatives? If there is ice can I stay above or below it? If there are thunderstorms, can I go around? If the weather really gets bad, are there alternate airports along my route, and/or around, my destination? Even though we should never minimize a severe weather forecast, statistics indicate that ninety per cent of bad weather predictions are inaccurate, but, having that “safe harbor” window available is not only valuable for bad weather flights, but all of them. Even if one of your passengers must make a pit stop, it is a good flight plan that notes or circles the convenient airports along your planned route.

Caught above clouds without an IFR rating

If you find yourself over a cloud bank, please do not attempt to descend without help. The frequency, **125**, is not just for emergencies, it is also used like the boaters, channel **16**, for establishing contact with somebody else. So please use this frequency to connect with an FAA controller for assistance. You will likely end up talking with a center, ARTCC, controller. Do not be shy, you are certainly not the first, and will not be the last, to have the weather go fickle on you.

The controller will likely ask you a few questions, certainly how much fuel you have on board, and inform you of two options.

First, where is there a big hole in the clouds for you to descend through (providing sufficient VMC underneath). This, of course, is your, as well as their preference, and generally available. In the rare instance when it is not, the controller will clear you through the clouds and likely give you vectors to the closest airport. Again, it is important to emphasize that this is not an emergency unless you make it one. The controllers will graciously take care of you, but only if you ask for their help.



Saint Elmo's Fire

One of Mother Nature's most beautiful, but sometime frightening, phenomena is "micro-lightning", Saint Elmo's fire. Seldom seen by anyone but pilots, I've seen a ball of it 'float' down an airline aisle and have even read my charts using its glow off the propeller in my formally-owned Cessna 182 one night. This fireball of light is the result of friction like the sparks generated by combing your hair. Those 'cords' that trail the following edges of most airplanes are there to allow these overly charged bodies to 'jump' off the airplane without damaging it. On rare occasions, St Elmo's departure from an aircraft can do just that. For instance, the hinges on an American Airlines flight into LAX that I was a passenger on one night were so severely scorched that it took an hour to open its doors.

Density altitude and temperature decline

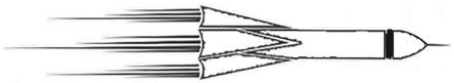
There are two laws of nature that pilots should be aware of. First, that air temperature lessens about 3 1/2 degrees per 1,000 feet of altitude gain. Nothing too exciting about that, but if you also know that clouds start forming at the dew point, you can calculate their bases yourself. If the ground temperature (at sea level) is 70 degrees and the dew point is 60 degrees, the cloud bases would be approximately at 3,000 feet Above Sea Level (ABS).

The more significant and insidious atmospheric phenomena is density altitude, which can ruin an unaware pilot's day. Here are the facts. The air that our wings, propellers, and engine rely on becomes less dense as we go higher. Here is the problem. The wings develop less lift, the propeller less thrust and the engine less power.

Here is the admonishment. When you take your bird over higher ground, especially on takeoff, beware that its performance will be diminished significantly the higher you go. You will need a lot more runway or far less weight.

And here is what can happen. (Has happened.) Too many accidents were the result of pilots who refueled their aircraft "out west" and crashed on take-off. Other victims flew into beautiful canyons or river basins and crashed trying to climb out.

HOT air is also less dense, so do not expect your bird to take off quickly when the temperature is near 100, especially if she is heavy.



Ariba!

Mexico City is an example of a high-altitude airport. Until recently, most of the airlines that flew out of it were JATO equipped. (Jet Assisted Take Off rockets). On one of my cockpit rides in the jump seat there, the pilot, a friend of mine for years who also taught me Spanish, told me that if we were not at a certain airspeed at a predetermined spot down the runway, "I hit the HAATO button over mi cabeza, and *WE GO LIKE HELL*"!

How heavy is a heavy?

A Boeing 747 has its cabin air (one ton of it) included in its weight and balance calculations. It is also interesting to note that the cooler air of an aircraft moves to the rear when it accelerates for takeoff. How about the fact that the airlines intentionally lower the cabin temperature when turbulence is encountered? (That action minimizes air sickness.)

What causes 'bumpy' rides?

When the waves (wake turbulence) that are caused by bigger aircraft are crossed over (like the waves created by a boat), they can cause a bump – wait a second, for there will usually be a second. "Wind shear" that is caused by down drafts can also cause occasional bumps, but most of the lengthy uncomfortable rides in aircraft are caused by different air densities, usually found inside clouds, or in between them. Most of that rough ride is caused by the wings of the aircraft searching for equilibrium in different densities of air. Similar to riding a bike from concrete to grass, to sand repeatedly at a much greater speed and weight, of course. (Wind shear is an odd term. Wind is a fluid like water, but hundreds of times less dense. Have your ever heard anyone talk about water shear? Probably not if it was not in a courtroom while a defense attorney was trying to convince a jury that mother nature caused some accident. Wind and water don't shear, if they are pressed against themselves the force (movement) from their friction point is very gradual, not abrupt.)

The ultimate bumps would be encountered in a thunderstorm, including heavy rain and ice pellets. That is why we avoid them. Would not it be ironic if the FAA required aspiring pilots to fly inside thunderstorms to prove their

skills or learn to avoid them – or is this a “double yellow line” that they understand?

Seashore winds, day in, night out

Most airports adjacent to large bodies of water have their runways perpendicular to the shoreline. The reason is that the wind along shorelines is almost always either directly in, or directly out, because of “convection”. During daylight, the sun heats the land more than the water (which absorbs most of its energy). This causes the air to rise much more ashore than at sea and the air from over the water displaces the rising air over the land causes the wind to flow inland. At night, the water, which absorbed the heat, is warmer than the land causing its updrafts to be replaced by air from the land.

Advection fog

If you live in San Diego, or along the coast, you already know about advection fog. If you are flying to an airport that is located adjacent to any large body of water, be aware that in the early mornings there will be fog so thick you can almost swim in it. It is known as advection fog because it is caused by warm, moist air off a body of water in contact with cooler land or air, most often before the sun can dissipate it. It is usually not very tall and is gone before the morning rush hour is over.

Ice can be insidious

Unfortunately, too many accidents are caused by ice. Most of them were avoidable if the pilot had responded better to the weather briefing or knew how to deal with icing conditions that were not in the forecast.

But the forecast is just that. It is a weather person's best guess, you know, the meteorologists who predicted a dozen hurricanes last year and not one materialized. During your weather analysis pay special attention to the freezing level and moisture potential. If the freezing level is 6,000 feet and the cloud level is 4,000 to 7,000 feet, then filing for a cruise altitude within those altitudes would not be prudent. Regardless of the forecast, if you are flying near, or in the clouds, and the temperature is near freezing, icing may be a consideration.

And regardless of the forecast if you get into icing conditions there are certain prudent things to do and not.

First, if you are equipped, activate your anti-icing. (Only use de-icing when there is visual ice on your wings).

Second, and almost simultaneously, get out of it. Call center and request a lower altitude where it is likely warmer, or higher altitude which may be free of precipitation. If in doubt, the controller may have pilot reports that could be helpful.

Third, if you think that you are in icing conditions turn off your autopilot and exercise your controls. I emphasize this for good reason. One of the most dangerous icing formations, if not the worst, is getting frozen water inside

your control hinges, preventing their functionality. Hopefully, you have enough de-icing equipment to deal with airfoil accumulation, as well as the propellers, (do not be shocked when you hear and feel ice sliding off your props and hitting the fuselage, it can be loud), but few, if any, aircraft have anything to combat ice inside their hinges – and if they freeze you lose control of your plane.

At least two airline crashes, one in Indiana and the other more recently on the east coast, were the tragic result of not turning the autopilot off and manually moving the controls. (These were professional pilots who should have known better.) I also lost one of my favorite pilot friends who climbed out of Midway Airport in his turbo Baron through ice with his autopilot engaged.

Please keep in mind that if you are flying through warmer air which has moisture or rain in it that icing can still be a problem. If you have descended from a higher altitude where the outside temperature was below 32 degrees, that water could freeze because the surface of your airplane is still at the lower temperature (below 32 degrees). This is not as uncommon as you might think.

"I didn't know that was coming"

Lastly, if you are carrying a lot of ice when you land, do not be surprised when your airplane leaps back into the air when the wheels touch the runway. That accumulation of ice will likely break away, maybe several hundred pounds of it off the fuselage and wings, which will result in a lot less weight, more lift, and you being launched back into the air. It was quite a surprise when it happened to me while landing at Cable Airport, Wisconsin. (Even Libby, the airport manager, was shocked to see the airplane nose up so dramatically. She came out to meet me with a bottle of whisky in one hand and a glass in the other. My passenger grabbed the bottle and drank from it instead of the glass.) This incident illustrates why descending early during a procedure turn may not be a good idea in certain conditions. For instance, if

you think that ice is in the clouds, and their tops are just below you, but higher that the initial approach altitude, do not descend until you are on the inbound leg. IFR approaches at most smaller airports will entail a procedure turn that will likely instruct you to a lower altitude during it, but you should delay that descent as long as possible to stay out of the ice.

Thunder isn't the only thing that follows thunderstorms

The following story illustrates how thunderstorms can be dangerous even if you do not fly into one. It also illustrates why it is important to captain your airplane and be forceful when a controller might be wrong.

I was flying to Aurora, Colorado to visit friends at Jeppesen. I was on an instrument flight plan flying a pressurized airplane. The weather and vista were gorgeous, as those of us who have flown the eastern slopes of the Rocky Mountains in the afternoon can testify to. There were the scattered thunderstorms, mostly caused by the updrafts, and they were illuminated by the sun giving them the stature and status they have earned. Awesome, but beautiful.

I contacted my controller and indicated that I wanted a deviation to avoid what looked like white stripes following one of the big monsters eighty miles in front of me. The controller declined my request, which was really a surprise considering that I had not heard a voice on the frequency for the last twenty minutes.

If I may, let me divert for a moment. I learned later that that controller was one of the 'Post Office Specials' that Congress forced the FAA to hire resulting in hundreds of mail carriers being transferred to controller jobs. Conceptually the program had great intent, but it failed miserably. Controllers are a special breed of people, born with a mental speed that nobody can be taught. You either have it, or you do not, and even an act of Congress could not make it otherwise.

Back to that thunderstorm. Those white lines following that monster, as you have probably already guessed, were hail. Big pellets of ice formed by the updrafts within the storm and literally being thrown out of its top and backside. I made another request to deviate, but once again was rebuked, so I told the controller that I was going to descend and once I reached a lower altitude, I would cancel my flight plan.

Unfortunately, it was too late. Even though I was in magnificently beautiful air my plane was being pummeled by golf ball sized hail... sounded like a baseball bat being slammed against the wings and the windshield. The glass-heating element on the windshield in front of me disintegrated, the light and its plastic cover on the left-wing tip tore off and the aircraft slowed dramatically. It all happened in the span of just a few seconds, but they were attention getters.

I was still on the controller frequency and asked to be vectored to Centennial airport. I may have told the controller that my aircraft was damaged due to the ice, but in any event, I was extended a lot of courtesy from there to landing.

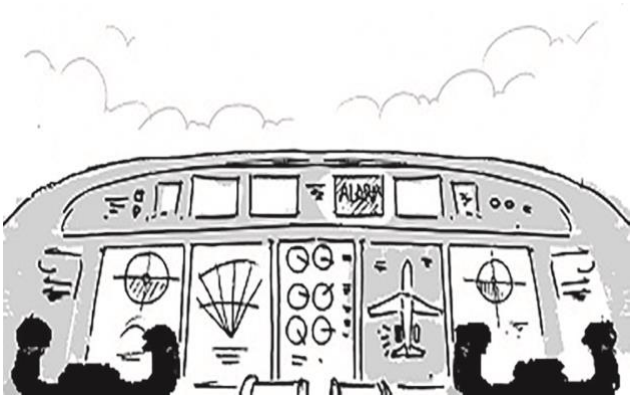
I do not want to dramatize this incident. I use it to warn pilots that going around the rear of a thunderstorm may not be your best course of action. Not all thunderstorms throw garbage out their back doors, but keeping your distance is a still a good idea.

When I landed the plane and saw dozens of dents that the hail had caused my demeanor changed dramatically. Wow, maybe I should have been more concerned than I had been, but other than the plane slowing down I did not think I was in an emergency.

Last thought. The mechanic who repaired the wings was a genius. Instead of installing new leading edges at great expense, Rick Friedinger, who I have applauded before, chiseled out wooden forms that matched the curvature of the wings. He then used a mallet to hammer out the dents.

Chapter VII:

I R Safe



The ultimate goal of being IFR qualified

Do not forget that the reason for, and most important goal of, an Instrument Rating is to get you and your airplane out of the clouds into the good weather (VMC). Similarly, the primary goal of an instrument approach is to get you into visual flight conditions to see the airport or the at least its runway “threshold”. There is a reason for pilots who remark that after they got their Instrument Rating “the weather got better.” Even if you don’t think that you will need or want the IFR license, it, along with working toward a Commercial license will make you a better pilot, safer, and maybe even earn you a discount from your insurance company.

Only about thirty per cent of Private pilots go on to become IFR-certificated. About seventy per cent of them ever file a flight plan. I certainly recommend that every private pilot take some instrument training each year for four additional reasons. Obviously, you will be better equipped to know how

handle an emergency (most of which are weather related,) you will be a more proficient VFR pilot. You will be more expert at navigating, and you will learn how to better understand and work with the nation's controllers, who, when you are more comfortable with their communications can be your best friend up there.

Who invented IFR capabilities?

There are many conflicting stories about who created the instrumentation that allowed for safe flight in adverse weather conditions (IMC). I subscribe to this, the "Kettering" version because it is first-hand information from the pilot who flew this remarkable inventor around in his AreoCommander Aircraft.

The following are notes from my journals of sixty years ago when I first met Monty Montgomery, Founder of Aviation Training Enterprises (ATE), later known as American Flyers.

DH journal entry: July 9th, 1967...

Today I learned how a concrete mixer, a mail carrier and a parrot contributed to the history of flying, especially that of flying by sole reference to instruments. Every great invention is preceded by a problem and the biggest one for pilots fifty years ago was how to keep an airplane airborne when there was no outside reference, just the gray insides of a cloud. Pilots had learned early on that if the horizon was parallel to their wings they were most likely flying in a straight line, and, depending upon how much of it was in their windshield they would know that they were in a descent or climb. But, absent these visual references for keeping their aircraft straight and level, let alone how to navigate from point A to point B, was more up to chance than discipline.

Early mail carriers, like the man named Jeppesen, (Yep, you are likely using his Jeppcharts today) flew by the 'seat of their pants', following road,

railroad tracks, rivers and one outstanding land feature to the next. Most of the time the mail got through, but there was always adverse weather that forced the pilot into 'scud running'. It was risky and often resulted in serious consequences.

There was a cash reward for the first pilot to navigate a triangular course without any outside references. As I learned the story from Monty Montgomery, Kettering's Areo Commander Pilot for a many years before he founded Aviation Training Enterprises, two pilots approached the inventor with the challenge and asked how they might control and navigate their plane using only information from inside the cockpit. Kettering (who invented the concrete mixer, which is pretty much the same today as when he first designed it decades ago. He was also the chief engineer for General Motors and invented most of the electrical devices for them, as well as most other automobiles,) took them to his workshop and within a couple of hours attached a needle to a gyroscope and explained to the mystified pilots how the aircraft would "revolve around it" allowing them to make timed turns to remain on a specific course. The "Needle and Ball" was invented with two "dog houses" right and left of the needle, to indicate the "rate of turn" (eventually two minutes for civilian, four minutes for the military). Kettering went on to use another gyroscope to create the artificial horizon using the same principals in order for the pilot to discern the attitude and bank of the plane.

The two pilots flew the mandatory course safely and were awarded the prize money, but most important, all pilots now had reliable instruments to fly through the clouds.

What if the engine became a gyro?

Ironically, French engine manufacturers learned the hard way that a spinning gyroscope was not always useful in an aircraft. Contrary to reciprocal engine design now, their earliest engines had the block rotate around the crankshaft. Unfortunately, when their engines became heavier and revolved fast enough, the engine would continue in a straight line separating from the

airframe if the aircraft turned abruptly. (Mechanically, gyroscopes obey two laws of physics: Rigidity in space and precession. Its first trait is its vehement personality to resist change in its position. The second is to react to any outside input by 90-degrees).

Back to instrument flying... so along with using radios (ADF, same as your old AM car radio) that could (point) providing guidance from one station to another, instrument flying was born. Pilots could now fly and maneuver in instrument conditions, but precise navigation was still limited until the VOR was introduced in the 1930s, the same decade that the CAB was created and began issuing "Instrument Ratings" to pilots.

Prayer Wheel

Owing to high cost of the radio and navigational equipment needed for the airplane to fly instruments, about the only 'legal' IFR was done by the airlines and for all intents and purposes they acted as their own 'controllers'. The FAA was created in 1957 and the Air Traffic Control system began operation in 1958. Its controllers used "vector wheels" (they looked and operated like round E6Bs) to calculate the time and distance of the aircraft that they were responsible for keeping separated. The controllers nicknamed them "prayer wheels".

There are two other critical innovations that contributed to IFR flight. First, in the 1960s Narco invented a reliable, and affordable, General Aviation radio. In many ways, it was better than the airline equipment in that they were "one and a half systems". They not only could be used for communication, but also navigation, and you could even use the NAV side to listen to the controllers if necessary. Most models even had glide slope capabilities. These Narco radios made IFR more affordable for the General Aviation aircraft owner.

The second innovation that really promoted IFR flying was the transponder. Back in the late 1930s England had just invented radar (the Germans as well) and to determine who was 'friend or foe' the allied aircraft were equipped

with “transponders”, a radio that reflected radar signals with unique codes attached to them. They were formally named “Precision Airborne Radar Recognition of Targets” or “Parrots” and if you did not “squawk” the right code over the English Channel you might get a Spitfire on your tail.

Silly me

It may seem silly, but there are a lot of really qualified pilots that find themselves digging through their approach plates just before they get to their destination airport.

Always know your minimum safe altitude

All charts, maps and approach plates publish minimum safe altitudes. A safety-conscious pilot will reference them and keep them in the back of his or her head, especially in mountainous regions. There have been instances where a controller instructed a pilot to fly below those minimums, or the pilot who unwittingly did…

Inside the marker

Sometimes because the approach or tower operator is busy, or the winds are relatively strong, you may be turned on to final inside the marker. This can really upset your timing, especially for descending, and is a great reason to have your ADF tuned into the locator at the outer marker (if the marker as well as you have ADF). Let me emphasize having your ADF tuned to the locator at the outer marker can be a great reference point. Whatever electronics are available, knowing where the controller is intersecting you with the ILS (or VOR) can be critical to making a successful approach.

Flying the glide slope safely and easily

Modern electronics are making instrument approaches a lot easier today than only a few years before, but the glide slope is still one of the more difficult items to negotiate on an approach. (No doubt it is the last consideration for more than a few pilots). There is a wonderful simple technique to flying an ILS Approach and nailing the descent safety and easily. When you cross the outer marker, descend to the minimum descent altitude prescribed on the approach plate for a non-precision approach (MDA) as rapidly as is safe (and keeping your needle centered on the ILS). Maintain this altitude until the glide slope needle centers, then descend to the prescribed Decision Height (DH).

This technique has several advantages. First, it is easier. Second, even the FAA writes that you cannot do two things at once, so you won't need to make heading AND altitude adjustments both at the same time. Lastly, and maybe the single biggest advantage is, when you arrive at the MDA altitude, you are likely to have reached VMC conditions, if they exist. And if you do not see an airport environment (runway threshold), before taking that last 75 feet or so, look for it (that is usually all the benefit that the glide slope provides below the MDA), you now have a little extra time to review the missed approach procedure.

A sage old pilot reinforced this technique by telling me that most pilots can remember two things a lot better than remembering any more, especially if you are a long way from your education. Good point.

If you ever do an ADF approach again, here is how

That same gentlemen, Jim Burton, who was my best golf buddy and close friend, recommended the same technique for ADF approaches. His argument again was simplicity. Fly to the ADF, do a procedure turn, take up the prescribed heading from the approach plate to the airport, descend to the MDA as rapidly as is safe, and if you find visual conditions, you are a "Private Pilot looking for an airport". If not, start thinking about the missed approach

procedure, during which you will have more time to think about and execute. Jim added this refinement: If you know the wind is from your right, add 10 degrees to your inbound heading, if the wind is from your left subtract 10 degrees. Incredibly simple.

We use our VOR so often to navigate that it makes executing a VOR approach easy, and it is much more precise than an ADF approach, but there are a few pilots who will use this same technique for a VOR approach. 999

Alternate airports

When you file an IFR flight plan you should include an alternate airport even if it is not required. You should also confirm that you have an approach plate for it (take it out of the bag) and check to make sure that you have the electronics to navigate the approach and that the airport (especially its elevation and runway) are acceptable to your aircraft.

Next to good weather, an instructor next to you is great

Now that I am no longer my school's most vocal salesman, nobody can second guess why I say it is a good idea to practice your instrument flying skills as often as possible. First, it is fun. Second, it can be easy. For instance, if you have a watch pilot in the cockpit with you, ask them to look out for other aircraft and put the 'hood' on for a few minutes. And, instead of making a VFR approach and landing when the weather is great, ask the tower if you can do the VOR, Localizer or ILS approach. Or, if you have not done one, ask the tower for a PAR or ASR approach. They usually have the radar and they are supposed to perform and log a certain amount of them every month anyway.

The 'at home' simulators of today are really sophisticated. If you have the discipline to use one, go for it. They can really back up your mental skills, if not so much the motor ones.

Your best option for staying IFR proficient is your local instructor. Either ask him or her to join you in the airplane and your next flight, or if he has a simulator available, use it. Next to good weather, a flight instructor next to you is your best flying friend.

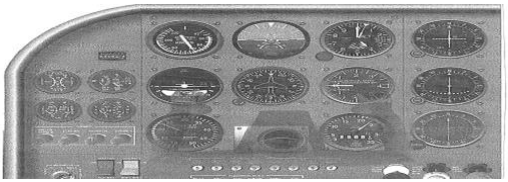
Special clearances

Remember we said that the benefit (and true objective) of being IFR qualified is to get to VMC and enjoy the good weather – as well as know how to use the controllers to your advantage? Here are a few examples that prove that last part is true...

First, you can request the tower to give you a special VFR clearance when the weather at your take off airport is marginal, but clear onto your goal. He or she can guide you through marginal weather, with heading and altitude instructions, which will (within their jurisdiction of five miles) allow you to get to VMC and onto to your destination without filing a full IFR flight plan and having the hassle of dealing with clearances, etc.

The second is to ask the tower again for a special clearance to "VFR on Top." Again, the controller will guide you through the inclement weather, but this time escort you and your plane to the good weather on top and on to your destination.

Third, sometimes you can even request the tower for a special clearance to a neighboring airport. Remember, each airport has jurisdiction that includes a five-mile radius, so if two airport zones overlap one another, the two towers, or approach controllers, can coordinate, vector you from one to the other, and save you a lot of hassle.



“Vision” through instruments

Most general aviation aircraft are equipped with what is affectionately known as a “six pack”. These panels have served pilots well for almost a hundred years, but are being replaced by digital panels which are far more sophisticated (and expensive). There is always resistance to change, and the newer electronic panels are no exception. The argument against them, other than cost, is what can the pilot rely on if there is an electrical problem or equipment failure? And if you spend the extra money for backup, why buy the electronic panel in the first place?

We have heard, and for the most part have overcome, the same complaints about telephones as they were replaced by smart ones. I doubt many people would argue any more that the new world of communication is a vast improvement over the past.

It would be a difficult, if not impossible to argue that the utility of GPS does not blow the socks off maps and I think that most pilots love them. The electronic representation of the six pack may be a different matter.

If we step back a second and review how the old panel gave us the vision to fly in IMC, their reliability was outstanding. Half of their dials were vacuum-powered and the other half electrically so. This was not a failsafe of course, but some would argue superior to an electronic panel which is reliant exclusively on electricity.

Those of us who still fly aircraft that use vacuum driven systems should be aware that we were taught to fly on partial panel, but maybe we did not learn how to recognize the symptoms that required it in the first place. Your instructor probably reached across in front of you and covered the pressure-

driven instruments to simulate the failure, thereby alerting you. If you fly a plane that features a vacuum system, study what those symptoms would be, especially if they are not obvious 'red flags' in your aircraft to alert you. Even better, discuss it with your instructor on your bi-annual flight.

The FAA is aware of this vulnerability and has been proactive with the manufacturers to ensure reliability and backup. In summary, the electronic panels are certainly superior to the six pack and their dependability is excellent. This fact should not make us complacent, and every pilot should understand and practice using the information projected regardless of what type of panel is presenting it.

To fly by reference to instruments, we need to know bank, pitch, airspeed, and altitude regardless of whether we get that information from a six pack or digital display.

Put that map or plate down

Which brings up an important skill that an IFR pilot should learn to be more proficient at cockpit management. Visualization. This is not an inherent talent of pilots and needs to be learned through practice. The pilot who has his map or plate in front of eyes one hundred per cent of the time is not visualizing. The pilot that looks periodically to visualize where he or she is at, and what needs to be done, is.

Let us take the approach plate as example (holding patterns are also important for pilots to visualize, but are so rare, we will use the approach plate and instrument landing system for illustration instead).

Start by thinking about what the most important information that you will need for this approach. Then, where is it located on your approach plate? You should have already dialed in your VOR or ILS as chosen or given. (Also, I highly recommend the ADF located on the localizer if it is an ILS.)

Now, what is your final approach fix or locator?

Visualize it.

Next, what heading is prescribed by the VOR radial or localizer?

Visualize it.

The altitudes: glide slope intercept, MDA and/or DH?

Visualize it.

What is your expectation when you arrive at the missed approach point (or runway observation)?

Visualize it.

And lastly, if you do not see what is necessary to land safely, what is the heading and altitude for the missed approach?

Visualize it.

Holding patterns

When I was learning to fly instruments, my instructor jerked my IFR chart out of my hands and said, “Don, this holding pattern is exactly like being told to park your car in your churches’ parking lot... visualize it and stop staring at your map.” That rallied my feeble brain to see St. Paul’s Church on the northwest corner of the intersection of Main Street and Dole Avenue in Crystal Lake, Illinois. That did make it easy.

My instructor also knew that I was still mentally juggling with what ‘entry’ to make when he said, “Do not worry about how you are going to get into that parking lot. Just get in it.” He was right. The controller could care less if you enter turning right, left, or even backing in. What he expects of you and me is to be in that parking lot, and no other place.

An air traffic controller once warned me that I might get a holding pattern later in my IFR flight, but it did not happen... and in 50 years of flying I never got a single one. Even so, they are a great exercise and educational tool so I passionately believe we should keep them in our training programs.

Chapter VIII:

Twin-engine Safety Techniques

How to grease your twin landing

We are all taught when landing a complex airplane to advance the propeller(s) on final. It is on the check list and it is good operating procedure and highly recommended for short runways. The reason that it is so is simple. Just in case you need to “go around” the prop(s) are already in position to do so. Great. But how many times does something interfere with a landing? Exceedingly rare indeed, and some would argue that it would be second nature to advance the prop(s) at the same time as the throttle(s) for a go around anyway, so why do it?

Before I explain how to grease the landing in a twin, let me recommend that when you do advance the prop(s), please do so slowly. There are two times when your passengers are most frightened, takeoff and landing. And from my experience, landing is the most feared, so go slow on your props so it does not cause unnecessary concern for them. As I have recommended before, abrupt control movement – or noise, is a rude disregard of your passenger’s comfort. There is no need to ‘firewall’ the throttle, just as there is no need to change the prop(s) quickly, except of course, in an emergency.

With that said, let us make that smooth landing. Do not forget, you should have plenty of runway and be competent in the plane you are flying. In

addition, keep your hands on the throttles (and props?), not only for these landings, but all takeoffs as well. So, to grease your twin onto that runway, do not advance the props during your approach. Instead, slowly move them forward upon touching down. Rather than 'hitting the runway', your bird is going to flair... just like the single engine planes you first learned to fly in. Enjoy. (Bear in mind that when the props are advanced, they are like speed brakes, when the blades flatten, along with the engines' lower RPM , significant drag is created. Very similar to down shifting in a gear stick automobile to slow down without touching the brakes).

Taking off in a twin

Just after taking off do not climb and turn at the same time.... climb, comfortably, always above the blue line (that speed on your airspeed dial put there by the engineers for your safety). Bank separately, to the degree you and your passengers are comfortable, but never severely. The reason for not doing both simultaneously (climb and turn) is the remote possibility of an engine failure on your low wing, which will flip you over abruptly. In addition, having the wings a little lower provides better visibility. And remember, speed (above stall) and altitude (maximum glide) are always your good friends.

Engine Failure

The failure of one of today's modern engines is extremely unlikely, but every pilot must be prepared to deal with it. In a single, I recommend always knowing where there is an emergency landing spot, as well a knowing the wind direction on the ground, especially for night flights. A really simple way of adding safety to single engine night flying is to flight plan your trips above interstate highways and pencil circle all airports on your trip map. Most of

these roads connect our major cities and are almost as safe to land on as runways (excepting traffic considerations but landing with the flow is highly recommended if possible).

Fortunately, with the reliability of today's engines, failure is rare, but every pilot, especially those operating twins, must be prepared to react competently.

Engine out on the takeoff roll in a twin

An engine failure on the runway in a twin is not something that you ever want to experience, but if you do, don't be shocked when your plane jerks severely into the faulty engine. Two things to remember. One, keep your hand on the throttles for every take off. Two, keep both of your feet on the rudders. These two critical bits of advice provide for immediate power off to both engines as well as maintaining directional control down the runway using your feet.

Engine out just after takeoff

This is our worst case, engine failure scenario and most dangerous because instinctively we want to turn around and go back to the airport. Even though we really want to do so, statistically it is best to shut down both engines and land straight ahead. Obviously, that's a bold move, but scary as it is, your best alternative. It is also another good reason to begin every takeoff with all of the runway in front of us.

An engine-out during cruise

Be aware that if you experience an engine malfunction while cruising, even though you might have plenty of altitude and airspeed (which is good, of course), you will need to consider "vibration" caused by the bad engine as an urgent item to deal with. Let us acknowledge that engine loss is an

exceedingly rare emergency, but when an engine does falter it will do so with considerable side effects, most notable is that you'll think that Godzilla is shaking you by your wing tips. Good advice... be ready to shut it down, turn the fuel off and feather the propeller quickly.

Speaking of shutdowns... many an expensive maintenance bill could (can)

be avoided by running your engine a few minutes longer after landing, especially anything equipped with turbo chargers. Heat is one of the biggest enemies of metal, because when it is hot, it expands, and when it is cold, it contracts. The transition from hot to cold causes metal fatigue and cracks, especially if the cooling is rapid.

Speaking of heat… if you notice that your engine, or one of them, is running hot, advance your mixture control to add more fuel. Contrary to logic, the more gas, the cooler the burn.

And it is always a good idea to wait awhile after a "heavy" has departed in front of you.

Chapter IX:

Medical

Why alcohol is so dangerous to pilots

If you have a glass of wine and drive your car, most likely you are still in full control. Unfortunately, the same is not true if you go flying. If you climb to 5,000 feet, that one drink can become three times more potent and compromise your performance dramatically. It is a wise pilot that does not drink twenty-four hours before any flight. (Or is it as the wise guy says... twenty-four 'feet' from the airplane.

What is hypoxia?

Oxygen is the mandatory catalyst that 'fires' all engines, including the human machine. At sea level, each of us breathes enough of it to maintain normal functions, but as we move upward, there is proportionally less of it resulting in compromised performance. In fact, at 10,000 feet, you and I are only inhaling fifty per cent of the oxygen that we would at sea level. Even though I tend to be skeptical, the medical world says that your eyesight will be impaired the most. In any event, that is why supplemental oxygen is mandatory if you exceed that altitude, 6,000 feet if it is after dark.

Instead of just referring to this lack of oxygen as just that, somebody wanted to impress us by naming this condition, "hypoxia". What is the difference between hypoxia and anoxia? Hypoxia is the lack of oxygen; anoxia is the substitution of it with a different molecule so that oxygen cannot attach to

the red blood cells in your lungs. (Alcohol and carbon dioxide attach to the red cells and block oxygen as well).

Pressure differentials in air (pilots) and water (divers)

Not only does oxygen become less as we climb in our airplanes, but also its pressure against our bodies. At sea level we experience about 15 pounds per square inch, but only about half of that at ten thousand feet of altitude. That pressure differential is relatively harmless and painless unless it changes quickly. The ear drum is a membrane that normally has the same pressure on both sides of it. When the pressure changes abruptly on either side, most of us will suffer some, or a lot, of pain. The airlines attempt to maintain about seven pounds throughout their flights and most of them will start gradually changing it as soon as the doors are closed before takeoff and well ahead of landing during the descent.

Pilots can avoid this pain (especially their passengers) by not climbing too fast (which in most aircraft is not a problem) and not descending too rapidly, (which can be). As we mention later, a really good pilot will start descending far out from his destination airport or ask his controller to provide a gradual descent starting way out. Sometimes, a little exaggeration is helpful, such as "I have a little congestion and would appreciate a low angle approach."

It is quite common for ear pain to be part of the flying experience no matter how diligently we try to prevent it. Advice varies but understanding what is happening is critical. The unequal pressure on the drum causes the pain, so equalizing is its only remedy. You can accomplish this in a few ways. First, swallow deeply and often. Second, a good yawn is helpful. Third (which if you are diver is a must), hold your nostrils closed and blow gently, but firmly. This procedure is especially helpful when the descent has been too rapid and the pressure outside the ear drum is much greater than inside.

I mention water pressure and divers because scuba diving and then flying without adequate time in between can be dangerous – not so much because of the eardrums, but what is referred to the "bends". To understand why, it

is pressure again. Unlike the half pressure change of flying from sea level to 10,000 feet, descending into water only 30 feet doubles the pressure. And you can add another two atmospheres if you go down to 100 feet. Most divers will learn to equalize their ears by holding their nostrils and blowing, but if that does not do it for you, try swimming up a few feet, then down, then up – repeatedly.

If you need to fly in an airplane after diving, be aware that your ear diaphragm can repair itself if damaged, but the "bends" can result in a lifelong painful condition (Ironically, not everyone is suspectable). The "bends" are caused by expanded gas bubbles forming in your blood. In water, a one-inch diameter balloon with air in it at a depth of one hundred feet will expand to three inches at the surface. This has serious consequences if it occurs to the oxygen in your blood in the wrong place of your circulatory system.

When assessing your vulnerability and planning prevention, the deeper you and longer that you dive, the slower you should ascend, and in timed steps if your "tables" say so.

Medical exemptions

Pilots may request an exemption if they do not pass the physical. If the failure to pass is due to a physical limitation it most often can be reversed after demonstrating your ability to operate the controls or by having the aircraft modified. Prescription drugs are the most disqualifying otherwise.

I had the distinct honor of personally instructing a marvelous person who had lost both hands. He later designed and manufactured prosthetic devices. He could control an airplane with no problems, but he had trouble with his curricular flight calculator which he would squeeze with so much pressure it would shatter. We were fortunate to find a manufacturer who had just started marketing an E6B with a sliding 'button' which replaced the grommet and allowed him to set his heading with his metal finger.

Aviation Medical Examiners (AMEs)

These are doctors (most of them pilots), independent of the government, who are approved to give medical examinations. As of this writing, medical examiners were also authorized to issue student pilot licenses. As I say, “as of this writing”, because there is a movement that champions giving this authority back to the introductory flight instructor or school. I firmly believe that no doctor should be authorized to issue these student permits for many reasons, the foremost of which is ‘professional recognition’. Flight Instructors are professionals. They are the ones promoting aviation, piloting and are on the front line every day. They deserve, and have earned the right, to issue that first recognition (honor) to our newest fliers. They should proudly hand each new generation their beginners’ license and with that unique sparkle in their eyes, inspire them back for their next fight.

Let doctors examine and issue medical certifications, let instructors be the ones who control the teaching and certification of pilots. Can you imagine how the medical professionals would react if teachers started prescribing pills?

Another reason doctors should not be issuing student pilot permits is the ‘professional student’. There are some pilots who fly hundreds of hours, (most of whom own their aircraft, most carry passengers illegally) just to avoid taking the written and/or private flight test. Shamefully, they accomplish this by repeatedly getting their AME to reissue another student permit.

Eyesited

My medical examiner, (seriously, his name was Dr. Butcher,) became frustrated when I had difficulty reading the letters off his eye chart during my last visit. He finally lost his patience and blurted out, “Okay Don, how about I read the letters and you respond, “true or false”.

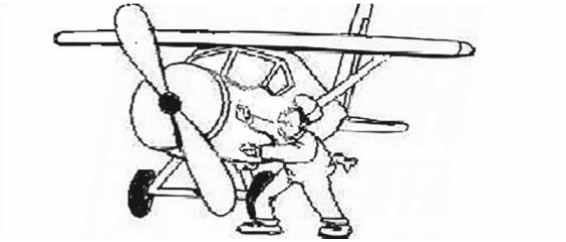
Chapter X:

Aircraft Ownership

Buying:

If you are considering owning an airplane, it may be prudent to start by purchasing a used one. There are many perfectly good, used, one twenty knot, single engine aircraft to choose from. You can get a year of experience and most likely will sell it for what you paid. If you do fall in love with, and purchase, that romantic speedster, it would be advisable to take an instructor along for the first dozen flights. It is also good advice to hire a broker to search for it. He or she should not be obligated to a manufacturer, anybody's inventory, or have loyalty to anyone other than you. In addition, it is a good idea to ask an insurance broker what airplanes are difficult to insure, which might be an indication that the plane has a bad track record.

Maintenance:



A&P mechanics, AIs, the FAA, and logbooks

Airplane mechanics (A&Ps), Airplane Inspectors (AIs), and the FAA are the people who are responsible for keeping your aircraft air-worthy. The documentation that each of them uses, including the pilot, are known as the engine and airframe logbooks.

For a mechanic to legally work on an aircraft he must be certified by the FAA. (Usually, two years of schooling are required or apprenticing under the supervision of an AI, as well as passing several knowledge tests.) For a mechanic to endorse logbooks for “Annuals” or major repairs he must be authorized by the FAA as an AI, Airplane Inspector, (usually after a few years of experience as an A&P and satisfactorily completing several additional knowledge examinations.)

Owners are permitted to work on their own aircraft but limited in scope.

The FAA has its inspectors who occasionally will review aircraft and their logs to determine that they are “air-worthy”. Most aircraft must undergo an “annual” inspection, and planes used for hire must have an inspection every 100 hours, or be enrolled in an FAA approved maintenance program.

There are two different logbooks for each aircraft. One for the airframe and the other(s) for the engine(s).

Cars get “recalled,” aircraft get “AD’ed”

The FAA occasionally issues Administrative Directives (ADs) to the aircraft owners directing them to inspect and/or repair certain issues that have been experienced by similar planes or equipment. The AD will normally specify a length of time for this to be done, but if it is serious, the airplane will be grounded until the work has been completed and the logbook endorsed appropriately. For instance, if the battery installed in a certain group of planes was found leaking, all owners who had similar batteries would be notified to repair or replace theirs. The owner’s mechanic would do so and make an entry into the logbook specifying the repair, date, hours on the airplane and attach his signature as certification that the plane was in compliance – and once again “air-worthy”.

Mechanic, owner, operator liability

It is important to mention that even though you may reasonably assume that it is your mechanic’s legal responsibility to maintain your airplane, the pilot – and you personally as the owner, are ultimately responsible for compliance. The regulations are interpreted by the FAA to mean that any aircraft that a pilot flies must be in an air-worthy condition and that he or she is liable in case of any mechanical infraction. In other words, if you fly an aircraft in an unairworthy condition, you are the violator – and liable – not the mechanic. (This is bothersome, because to know if the airplane is airworthy, the pilot would need to supervise the work, as well as be responsible for the logs. Most pilots find this a curious interpretation and I agree. It seems logical that the mechanic should be held responsible - or the manufacturer) not the operator.

When you find a good mechanic, buy him the best beer and pizza on the airport. (After hours of course.)

Aircraft owners should be aware that 'midnight' requisition is common on airports. Do not assume that the battery in your plane today is the same one that was in it yesterday.

Further, be aware that birds will build nests in your plane, most often in the spring, in a matter of hours, so inspect it, even after a brief pit stop. Use a light and inspect deep back in the engine nacelle(s).

Also, be alert for any weather condition that may require you to move your plane to another location. It is better to move it than repair it.

Brokers, sales, and other advisors?

When and if you want to purchase an aircraft, here is some advice from someone who has bought over 500 of them, five for personal use. First, I recommend enlisting the help of a broker instead of a salesperson. The latter has an obligation to his company and/or his boss to sell what is in their inventory or what is on the assembly line. A broker should not have such an alliance, if any. Further, he or she will likely be a more aggressive negotiator than yourself, especially if you pay him a fixed commission. In addition, he or she will likely know a trustworthy mechanic, or if the aircraft is used, know the mechanic who has worked on it. A broker can ask questions about the history of that aircraft far better than you.

If you already have an insurance broker who is airplane savvy, call and ask him which airplanes the carriers are hesitant to insure. If the carriers are reluctant to insure it may be valid warning that that airplane is not right for you, especially if it is your first purchase. Be aware that some insurers may want you to have a certain amount of flying time in the airplane that you buy. If so, you can accomplish this by taking an instructor along with on your first dozen flights, or most insurance companies will honor a written endorsement that you are qualified to operate the aircraft by a respected instructor regardless of your logbook hours.

Premium and renewal discounts are often available from your insurance carrier if you take annual instruction from respected flight-training

organizations, instructor, or an organization such as the AOPA Safety Foundation.

If you know an experienced instructor, ask him or her for their recommendation about which airplane to purchase. They likely have flown in a lot of different aircraft and can offer some good advice – and warnings.

The first warning you will get is to avoid a high-performance plane as your first purchase. Too many millionaires buy airplanes that are beyond their experience to fly and pay a price they were not prepared for... go simple, buy a used, medium-sized, single-engine plane such as a Cessna 182, which is maybe the best first owner aircraft in the world, not just for its safety reputation, comfort, low operating cost, but also its quick and excellent resale value. (Gary Comer, founder of Land's End, started with a 182 and last I heard he was flying a Citation X – personally.)

Taxes can be enormous, so I recommend working with your accountant to determine what state and county to buy your aircraft in, or not. You can often save at least 1% by not paying a state sales tax directly on closing, but rather, volunteer to do so with the state later. Most state sales taxes include a percentage for the county and/or the city. (Chicago and New York can be as high as 2% of the state's sales tax.) If you buy the airplane "out of state" and volunteer to pay a state a tax due, they will charge a "use tax." (They really are not that concerned about the county and city taxes, just what is due to them and besides how would they calculate it?)

In addition, be aware that many states not only have sales, but also county property taxes. (Most of them have the "April 1st rule". If it's parked in their county on that calendar day you will owe them a tax, but if it is parked somewhere else, not so).

It is worth repeating that your accountant should be able to advise you in what location is best to take delivery of your plane and additionally, whether it is prudent to buy it personally or through a company, or one that you create just for that purpose. As with all tax-related matters, good initial advice and fastidious records are better than clever arguments after the fact.

What extras should your airplane have?

Your personal preferences come first of course, but here are some recommendations.

Sunglasses

I realize that I have already recommended them for your glove compartment, flight bag and jacket pocket, but I cannot over emphasize the need for a pair when you land on runway 27 with a setting sun. I believe that one of the most difficult landings is into blinding sunlight.

Spare microphone

If you don't carry one in your flight bag it's a great idea to have one in your planes' glove compartment.

Strobe lights

A green light on the right wing informing those to the right of you they have the right a way, red, on the left wing, informing those on your left that you have the right of way and white on your tail. (Same as the boating world.) Those are regulatory, but if you really want to be seen, and add another level of safety and purchase a strobe, flashing light, and install it, preferably on your tail. One is enough, because believe me, you can really get tired of having your cabin constantly bright, dim, bright, dim, etc. It is annoying.

Tinted plastic or see-through fabric windshield visor

The sun can be ruthless (and dangerous), especially if it is sitting on the other end of the runway that you are landing on.

Stormscope

Even if your aircraft has radar, the Stormscope is an excellent bad weather detector. It reads thunderstorms from the energy (radio beams) that they produce and bounce off the ionosphere. In that way the Stormscope is superior to radar in as much as it can see behind those storms that lie in front.

Glass inspection plates

Your mechanic will appreciate not having to remove the inspection plates each time he inspects your aircraft. In fact, it is not a bad idea to look inside yourself occasionally.

First Aid Kit

Add a pair or two of ear plugs. Sunglasses are nice.

Flares

A few of the 'oldies, but goodies, aircraft' had flares installed adjacent to the doors or windows and could be ignited, dispatched, and followed downward in a circle for night landings.

Gear mirror and handle warning

A lot of retractable aircraft owners have heard and respect the old pilot adage, that "there are two groups of pilots, those who have landed gear up and those that will".

Purchasing a mirror that facilitates a visual confirmation of the position of your retractable gear is prudent. Some of the more ingenious aircraft owners

hang a reminder warning flag over, or on the gear knob. Some tape a piece of red plastic or cardboard above and over the lever, which must be lifted before the gear can be activated.

Regardless, it is forever good advice to look out the window and confirm your gear's position when landing.

Inflatable raft

If you plan a lot of over-water flights, purchase an inflatable, or, they can be rented at most near-water FBOs. If you fly single engine over water be advised that your engine, like mine, and most others will, sound just a little different once you cross *either shoreline*... (If in the very unlikely event you ever need to ditch your plane into water (or the top of a forest), perform an exaggerated "Maple Leaf", basically a rudder-controlled emergency stall. That maneuver will reduce the plane's forward speed dramatically, and especially if you have a fixed gear, is your best landing configuration. (Be aware, it is certainly not recommended for every-day use and do not attempt it unless you have learned to do it from a qualified instructor.) Do not inflate the raft until you get out of your airplane.

Admonishments:

(1) If you rent your aircraft to a school, FBO or flying club beware that a few of them may install a switch that can deactivate the tachometer or

hobbs meter, limiting the information from which you must rely on for your income.

(2) It is also almost an accepted industry standard that if your plane is used for charter, your rental payment will almost always have a maintenance expense deducted from it. The solution is to have maintenance done by a different company than the one renting it, but this will likely decrease your income for obvious reasons.

Chapter XI:

Regulatory Rigor Mortis?

After a United and TWA airliner collided over the Grand Canyon in 1957, Congress completely revamped the old Civil Aeronautics Board and in 1958, created in its stead the Federal Aviation Administration (FAA) along with the Air Traffic Control network (ARTCC). (There are twenty-two of them located at least 35 miles from any major body of water. (I asked the boss of the Chicago Center in Aurora, Illinois why was his facility was so far from Chicago. His answer, "The Russians would never try to bomb Chicago, instead they would drop the bomb nearby in Lake Michigan so that everything for twenty miles inland would be destroyed by a tidal wave). Prior to the creation of these systems of enroute 'centers', air carriers were, for all intent and purposes, allowed to fly intercity without notifying, approval or coordination by any government entity. Instead, separation and control was accomplished by the airlines and the pilots themselves.

The FAA has responsibility for approximately 600 airports which accommodate air carriers and almost 20,000 airports and landing strips (some of which you would not want to taxi a Sherman Tank on).

In the Beginning

You are not going to believe this, but in the early days, circa 1910s, the military certified its pilots by having soldiers take an airplane apart and then put it back together. If you could do so properly, you were licensed and became an aviator ready to take flight. (From my research this was a continuation of the military's marksmanship programs. If you could take a gun apart and put it back together - and it worked, you were awarded the "Marksman" certificate and medallion). *Go figure...*

Astronauts and monkeys

At the pinnacle of aviation's pilots are the Space Shuttle astronauts, arguably the "Top Guns" of all time. Early in NASA's program, monkeys were sent into orbit instead of humans primarily to test physical limitations, but also to prevent loss of human life. The NASA pilots complained. They were embarrassed that those early flights did not include them at the controls. The pilots finally convinced NASA to put them in command on the Mercury flights. That series' first launch included an astronaut sitting next to the monkey. On the cockpit's panel there were red lights in front of both, and next to which looked like a fax machine built into the dashboard. When the red bulb flashed in front of the monkey, he tore off a printed instruction sheet, read it and followed its instructions by pushing and pulling a few knobs. This was repeated several times and the pilot became irritated... NASA had promised the astronauts that they were going to fly this ship, not the monkey. Finally, the light in front of the pilot blinked and he tore off his instructions which read, "feed the monkey."

Every pilot is governed by the Federal Aviation Administration (FAA): its regulations, controllers, certification, …and bureaucracy. Joseph Schumpeter, maybe one of the most prescient political authors, predicted that all governments, regardless of their ideology would eventually be run by their bureaucracies. The politicians will come and go, but the bureaucrats would be entrenched and mandate policy.

Three facts make Regulatory Agencies, like the FAA, almost more powerful than the legislative body that created them. First, nobody can operate without their approval, whether it's a license to fly or run an aviation business. Unfortunately, if Congress intended it or not, they can demand that you do whatever they want – or they won't permit, or renew, your certification to operate. Secondly, there is no challenging their decisions. All appeals are handled basically, "in house". Lastly, if you irritate them in any way, they will retaliate (or threaten to).

One of the arguments that a lot of people make against the FAA is that they should not be involved in educating pilots, instead concentrate on testing and certifying them exclusively. I agree. In my experience nobody in the FAA bureaucracy should be teaching anything to anyone. Why is it that millions of people every year learn how to drive automobiles from their parents, schools and the internet and are licensed quite adequately by state appointed examiners?

The most important tool, other than the radio, that center controllers use to monitor and direct aircraft is radar and the most important electronic device that pilots use to identify themselves is the transponder. A radar scope in the centers and towers shows all aircraft flying above certain altitudes within its circular range. When a controller needs to distinguish your airplane from others, he or she will ask that you tune your transponder to a unique four-digit frequency. (The pilot can also choose other frequencies to communicate to the controller, for example, an emergency, 7700, or a hijacking, 7600.)

If the controller really wants to know exactly who and where you are on his screen, he will ask you to “ident”. By doing so the double blip (those aircraft squawking the designated codes for that controller) will fill in and become much brighter. Why is this frequency request referred to as “squawk”? During the Great War the British radar monitoring all aircraft coming over the British Channel was named Precision Airborne Radio Recognition of Target, “PARROT”, and what do parrots do? They squawk when they need to be recognized.

Every air-carrier flight must be approved and monitored by the FAA ARTCC system, as well as any military or civilian flight using its airspace. Interestingly, Boeing, which already has an elaborate system to monitor each of the aircraft they manufacture (even their engines have transmitters constantly broadcasting their operating data) offered to replace the ARTCC with a computer/satellite control system. That would save the taxpayer millions of dollars and the flying population would never again be vulnerable to a strike, which tragically occurred in 1980 and shut down air transportation for weeks. Of course, lobbying was stronger than reason, so we continue to use a system that even most of its controllers say is inefficient and outdated.

Why are American pilots the best in the world?

The United States emphasizes practical knowledge and experience to train and certificate its pilots, whereas the rest of the world believes that classroom is just as educationally viable. (Europeans are required to receive at least a year of it, compared to next to none in the United States).

No airliner in the United States is flown by a captain that does not possess at least 1,500 hours of flight experience (in the rest of the world as few as 400 hours is sometimes all that is required).

It is interesting to note that in the United States, more young people are attracted to become pilots than the rest of the world. Some Arab and Asian airlines pay premium dollars to attract American Pilots to fly for them or help with training and certification because piloting is not as an attractive career option to its young.

The FAA is a bureaucracy

First and foremost, log this in your mental flight bag. The FAA (accepting tower, flight service, and ARTCC personnel) is a government bureaucracy. It is not a warm, friendly organization and the primary goal of its employees is job security, seniority and self-promotion. Not that there are not exceptional people to be found there, but they are rare and usually are hired away by private industry quickly. The best advice to you and anyone that must deal with their supervision (authority) is... stay as far away as you can, never challenge their (its) authority, do not threaten to hire a lawyer, and 'get it in writing' whenever possible.

Most government regulators, and especially FAA inspectors, do not want their opinions in writing to be reviewed by anyone, so tell them that your boss or mechanic is fussy and insists that if they come up with a "finding" that you want them to stipulate what it is – in writing. (FAA inspectors refer to their accusation that you violated a regulation as a "finding").

Arbitrary, and sometimes at odds with itself

The FAA can be awkward and confusing when it attempts to reprimand or violate the pilots it oversees. Each Region (nine of them), GADO (General Aviation District Offices, 90 of them) and oftentimes inspectors seem to have

their own agenda and/or own interpretation of the regulations. In addition, enforcement in one area of the United States can be completely different than another. The best advice for pilots is to keep your nose clean, but if you stray, do not be confrontational. Do not hire a lawyer, do get it in writing, and talk friendly to the FAA inspector who wrote you up. (The more the better.)

The FAA retirement treadmill

If you spend twenty years serving our country in the military and discover that if you had a combined 25 years of government service that you could retire with most of your last salary, would you be interested in learning how? Simple, visit the FAA at 800 Independence Avenue in Washington and look on the right-hand bottom corner of that office's computer and you will likely see a number like 133... What is the relevance of that you ask? You will not like the answer if you care about integrity and the people in Washington that affect your life and taxes. It is how many days are left until the occupant of this office will retire. Some call it shameful that many of the top positions in our bureaucracies are filled with men and woman whose main goal is retiring with the maximum government paycheck, but it is a fact. Let me add, that during my nearly 100 visits to Washington to 'kiss the ring' I met many talented and dedicated people. I wish I could say, most were, but that would not be true.

Add to that the fact that Washington's FAA responsibilities are shared by two other almost redundant offices in Oklahoma City and Atlanta, so the taxpayer pays more than they should to have its aviation regulated. The Oklahoma office was the result of the Senator, Mike Moroney, who had enough power in Washington to create this additional burden on the taxpayer (7,000 employees). Oh, and do not make the mistake of visiting one office and being told that you need to go to another, that is if you can get in. These offices are so security-oriented that the head of the FBI could not gain access without an appointment. (So much for "of, by and for the people".)

It is not a good idea to argue with the FAA

If you do not agree or do what they say, the FAA can refuse to renew or even suspend your pilot license or operating permit. (Guess who you can appeal their decisions to? That is right... them.) That threat gives them the ultimate power because you cannot operate an aircraft, a school, a maintenance shop, or air transport without their "FAA Approved Certificate or License". You will do as they say. Believe me, the FAA's greatest power is retaliation, or the threat that they will use it. If you refuse to do what they want, they will simply threaten to not approve your application or next renewal... yes, that means even if you are in full compliance of the regulations.

The FAA can be very defensive

It protects itself (and its employees) at all costs. Here is one example. An aircraft crashed in Illinois due to "icing conditions". Within a day of that tragedy, the FAA 'violated' every aircraft flying in the same vicinity and time frame of that accident. By doing so, they were protecting themselves from any culpability because they could truly argue that that plane and others were in violation because they flew into known icing conditions.

And can you imagine the chagrin of the United captain who smarted off to an O'Hare airport controller and received the following clearance: "United 123, take up a heading of three, six, zero and maintain an altitude of three-thousand feet until further notice," even though the flight was going to Denver, Colorado (270 degrees, due west) at three thousand feet that airliner would have consumed a lot of its fuel very quickly. (Commercial jets must fly at high altitudes to get any fuel economy.) The Captain responded contritely (and apologized) before he received the appropriate clearance.

Or from my own experience, after a controller near Atlanta was radar vectoring me toward a radio tower, I joked, "Do you want me to run over that radio tower in front of me?" His reply was, your "transponder is

inoperative". Well, my transponder was working properly, but this was his knee-jerk response intended to protect himself from any complaint that I might have reported. Even though my transponder worked fine everywhere else in the country, on all my future flights over Atlanta for at least a year I received the same comment, "your transponder is inop."

Double yellow lines

One of the biggest criticisms of the FAA (as well as so many government regulatory agencies and bureaucracies as a whole) is their obstinacy toward modernizing their regulations, training, and testing criteria. (Of course, the Europeans are worse as they still cling to the sextant as a useful navigational tool.) My argument, as well as a preponderance of instructors' and examiners', deals primarily with stall speeds and VMC (defined as that speed when a twin engine airplane is no longer controllable).

When airplanes were first invented their stall speed and cruise speed were often only a few knots apart, so knowledge of, and testing, of them was appropriate. Today however, in almost every general aviation airplane being flown, those speeds are far apart from one another and the chances of entering a stall is nearly impossible unless some very wrongful control movement(s) precede it (or total loss of control). The last words printed on far too many accident reports indicate that the "airplane stalled and

crashed". Unfortunately, those stalls were the result of a loss of control, which caused the aircraft to stall just before the crash. But if you read these reports that implied the stall caused it, you'd likely agree and demand, "We need more training to avoid these demonic stalls."

One of my instructors introduced me to the "double yellow line" warning early on. He asked rhetorically, "Don, if we were in a car driving at 70 mph and I told you to cross over the double yellow line painted on the road, what would you do, especially if you knew that there were a Mack truck coming from the other direction?"

"Ridiculous, no way I would cross over those lines," I responded. He then queried, "So, do I need to demonstrate that to you?"

"Of course, not."

The obvious goal of this instructor was telling me that there are double yellow lines when flying an aircraft and no one should need to demonstrate crossing them to make their point. Besides, how can any amount of training on the other side of the double yellow line make driving a car safer or make you a better pilot? Bottom line… if it is a double yellow line, do not cross it. Ever. Period.

It is my opinion and that of most of my respected colleagues that to intentionally perform a stall is illogical, if not outright dangerous. (Just as ludicrous is demonstrating VMC in twins, which is defined as that speed at which the aircraft is uncontrollable? Apparently, if you don't crash, you didn't do it right.)

"There are too many accidents caused by instructors who want to teach someone about a dangerous situation and put themselves and their student into one". George Moore, NTSB

Why perform stalls – ever?

I have met hundreds of people who regrettably gave up taking flight training and my innate curiosity forced me to ask them the question, why? Their first answer was perfunctory. (Money, time, too busy, etc.) But I learned long ago that most people do not really give you their most honest response until you ask them a question at least three times. And when I did that, the answer was revealing. “My last flight was with an instructor who showed me a stall.” (They did not have to say, “it scared the hell out of me”. The look on their face confirmed that as fact, as well as the tone of their voice. Okay, I have no problem performing a stall and I’ve never met an instructor who did either, but when you ask me or one of those instructors to sit in the back seat while someone else stalls the plane, the grimace on our faces is profound and very revealing. So, stalls are not that nifty…

In the early days of flight, the stall speed and cruise speed of aircraft was really close, sometimes only a few knots apart, so requiring exact knowledge of, demonstration, and how to “recover” from one, was maybe warranted. Today, however, the stall speed of most airplanes is only about fifteen per cent of its cruise speed, so the likelihood of getting into one is minimal, thereby eliminating any rational to perform one. In fact, I would say that they are ridiculous. Many FAA inspectors today will not ask their applicants to demonstrate one, especially departure stalls, (which is a great way to test the integrity of our older fleet of training aircraft). Instead, the smart examiner might request a flying to a point which a stall could occur – a recognition of an ‘imminent stall’ to confirm that the applicant is aware of its danger, knows how to prevent it from happening and if it did, what corrective action would be appropriate to recover. The important lesson is to avoid stalling in the first place.

This should be another Double Yellow Line which should never be crossed. Don’t stall. The proficient, safe pilot will not get into a one in the first place. (And if you do, let go of the controls – I don’t know of a general aviation aircraft which won’t recover on its own).

Aircraft are designed by engineers to fly straight and level without someone at the controls. Like cars which are engineered to go straight if you let go of the steering wheel. Our aircraft are engineered to 'right themselves' and fly relatively straight and level on their own (assuming that they are not way out of trim, which is a good reminder and reason for doing so). That is one of the reasons why one wing is bent slightly different than the other (dihedral) to offset the propellers tendency to 'tip' the aircraft.

Demonstration or recognition?

Instead of "demonstrating" an unsafe airplane configuration, let's know the point at which it might occur and avoid it. The first rule for every pilot is to never allow their airplane to get into a stall or their airspeed to get too low for control. The second is to understand the danger as the incentive to do so. (Mack truck). Last, you need to assure your instructor or examiner that you know the consequences of crossing these Double Yellow Lines. What are the critical speeds, what are their entry points - and how to avoid them. As with the Double Yellow Line, don't ever cross them.

If your aircraft does approach its stalling speed, lower your nose or add power, or both. (In extreme cases, let go of the controls altogether. It is a good bet your aircraft will go it alone better than what you did, or did not do, to get it into this situation.) But, it is a proficient pilot who avoids this situation all together by remembering never to cross the Double Yellow Line in the first place. (An ounce of prevention is worth a thousand unusual recoveries.)

Controllers are the best of the FAA

Thank goodness there is a huge difference between the FAA administrators, its inspectors and the men and woman who communicate with you and I in our airplanes daily. These are the professional guys and gals on the ground

(tower, approach, dispatch, flight service and ARTCC) who tell you what and when to do whatever. (God bless them!) I used to 'tip a few' with them in the Cracker Barrel (a peanut-covered-floor bar, down on the banks along the Fox River in Aurora, Illinois. That Aurora Center was of one of the busiest centers in the United States and in the trade, it was known as the home of the "Choir Boys" (The PATCO Union at the time was led by a group of blond headed men).

These people are special. They work their tails off for us pilots. Many are themselves aviators as well, but do not tread on their radar scopes. Most of them are former military and sharp as razor blades. If you believe you can think fast, these people will leave you in their wakes. There is no better friend than one in need, and if you are piloting an aircraft in the middle of some thunderstorms, these people are more than your best friends. They are sharp, you can (and will) trust them with your lives. Still, you are pilot in command, so it is your education, experience and mental resources that must make the ultimate decisions, not them.

Radar, the controller's eyesight

If you were a controller say working in the Kansas City Center, you would instruct the airplanes that you were responsible for to select a specific code to transmit on their transponder, "6400", for instance. Your radar scope would then distinguish those aircraft as double blips instead of the single blip of all the others. If you needed to recognize a specific aircraft, you would

request the pilot to push the “Ident” button on his transponder, which would result in that double blip on your screen expanding into a much larger image. Most radar scopes today, unlike in the movies, are installed horizontally and have computer-generated information attached to the blips (Identification, FL (flight level), altitude, destination).

Formerly, the controllers would write this information on a piece of clear plastic (they referred to them affectionately as “shrimp boats”) which they slid over their scope alongside the respective aircraft blip (for example: United 817, FL 28, ORD).

The pilot can also use the transponder to discreetly communicate unusual situations to the controller as well. In an emergency, 7700 can be transmitted and if the aircraft is hijacked, he or she can squawk 7600.

Controllers save a pilot

Speaking of appreciating a controller... a good friend of mine, Bob Otto, was flying his Beech Travelaire back from the Caribbean one winter’s night and both of his engines quit during a snowstorm just short of his intended landing at Palwaukee Airport, near Chicago O’Hare. He was flying on an Instrument Flight Plan and called his controller. Obviously, he said in a panic, “My engines have quit and I need help.” The controller responded, almost nonchalantly, “Roger, maintain your present heading for radar vectors to Palwaukee, what is your descent rate?” He reported that the Vertical Speed needle was buried. “Roger that, you are three miles from runway niner, turn right to one hundred degrees.” The controller continued to call out his altitude, distance and heading until the runway threshold, where even though he was in the heavy falling snow the runway lights and its big 9 became apparent. He landed safely, and then a funny thing happened... forgetting that his engines were dead, he pushed his throttles forward thinking that that he could taxi over to his hangar...

A friend in need, a friend indeed!

You are where?

Some pilots learn to 'work the system' and take advantage of it on occasion. Although I do not recommend the following cutting-in-line technique there may be a legitimate time in which you might want to know about it. Let us call the pilot Doc. He was late to pick up his boss who was landing at DFW airport between the cities of Dallas and Ft. Worth, Texas. He was flying a Cessna 310 and approached the airport from the North at high speed, halfway between two of the parallel runways. Both runways had a "string of pearls" in line for landing. Less than ten miles out Doc announced his N number and his wish to land. The tower was stunned. He has got airliners – on the right and on the left and Doc's plane is only a minute from penetrating his five-mile control zone... what other option did he have but to say, "Oookay... squeeze yourself in between United and Frontier, maintain 150 knots, and cleared to land."

He joked later that the controller got revenge by setting off his 310's ELT on touch down, if true, poetic, if not, sometimes higher authorities work in mysterious ways....

National Transportation Safety Board, (NTSB)

The other organization that Congress authorizes to monitor pilots and aircraft safety is the National Transportation Safety Board. Specifically, it is assigned to investigate accidents and return its unbiased opinion of what happened and to recommend new procedures and/or rules to prevent its recurrence. There was excellent intent when Congress enacted this legislation directing the FAA to stand aside because of the potential for self-interest, but to this day the FAA and NTSB, contrary to their public announcements to the contrary, conduct their own separate investigations.

What is pathetic is that even after these investigative reports by the FAA and NTSB are published, they are often ignored by our courts. Their reports can take years and cost the taxpayers hundreds of thousands of dollars and are

compiled by some of the best aviation minds and pilots in the world. Even so lawyers are persuading juries to adjudicate contrary than their findings on a regular basis. Some judges even prohibit the FAA and NTSB reports to be used in court, indicating that they “might unduly bias the jury”. (Greed always seems to prevail over facts...?

Chapter XII:

The Double Yellow Lines

Do not volunteer to perform stalls.

No spins.

No intersection takeoffs.

No flight into known icing conditions.

Do not fly behind thunderstorms.

Never overbank, especially at lower altitudes.

Never overbank transitioning from base to final.

Never descend below the MDA or other published minimum altitude.

Never fly a twin below blue line.

Never prop start an aircraft.

Never fly if drinking or taking drugs.

No aerobatics or unusual flight at lower altitudes.

Do not take off or land behind heavies.

Never leave your autopilot on in icing conditions.

Never take off over gross.

Always secure pets.

If two pilots in the front, establish who is pic.

Do not overestimate your skill or underestimate bad wx.

Do not go without checking the weather.

Do not allow anyone to show you something dangerous, that becomes so.

Glossary

This glossary is devoted to the language used by pilots. I list only those words that are used often, some humorously, some as slang, some just unique in meaning to those of us who fly airplanes. All of them are instructive.

Please forgive me if you are sensitive, but this joke has been around since the Wright Brothers... boyfriend accuses girlfriend of fooling around with a pilot, and she says, “negative”.

ACE:

Originally used to describe a fighter pilot with 20 victories to his credit, but contemporarily used as a reference to a really good pilot.

Actual:

Controllers, briefers, weathermen, and pilots refer to adverse weather conditions which require filing an Instrument flight plan as actual – or “IMC” (Instrument Meteorological Conditions). The antonym, or good weather conditions for flying, is “VMC,” (Visual Meteorological Conditions). Most pilots use IMC and IFR, as well as VMC and VFR interchangeably. Bad weather, good weather.

ADs:

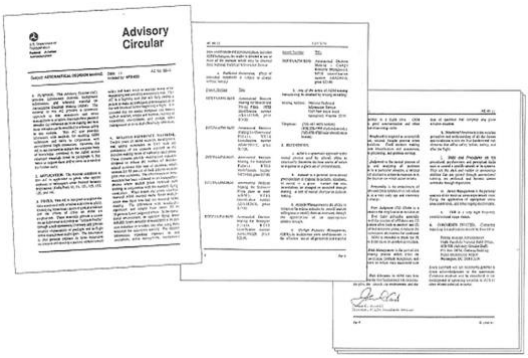
Aircraft Discrepancy, like an auto maker’s recall, the FAA issues ADs when there is a mechanical issue found on similar models or equipment. There is usually a time limit assigned for compliance, either immediate, hours of use, or calendar days.

ADF:

A low-frequency radio transmitter or receiver. Because it is not “line of sight”, such as the VOR or VORTAC, it has a tremendous range. (It bounces electrons off the ionosphere.) It is rarely used in the United States anymore except as the outer or middle marker’s “locator” on instrument approaches.

ADIZ:

Air Defense Identification Zone, a “do not cross without permission”. A military boundary around the United States.

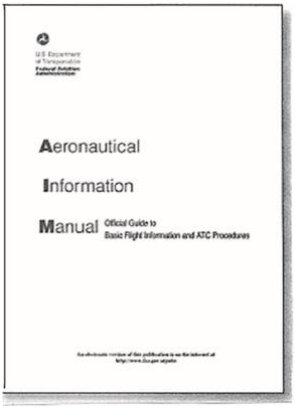


Advisory Circular:

One of the numerous ways the FAA communicates with pilots.

AGL:

Above Ground Level.



AIM:

Airman's Information Manual. A very useful book written by the FAA, but experienced pilots may find it a bit trite.

Aircraft Logbooks:

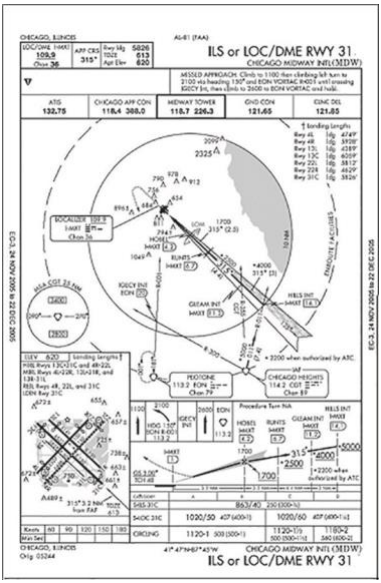
Journals in which detailed maintenance and engine (separate) records are kept. These entries must be endorsed by a qualified FAA approved mechanic (A&P or AI).

Angle of Attack:

The wing's angle to the relative wind. Most often, the greater it is, the more lift is created.

Approach (Controller):

At most busy airports you will be transferred from ARTCC to Approach Control. Approach is the intermediary that will set you up and hand you over to the Tower.



Approach Plate:

A detailed diagram of the approach, airport and runway used by pilots for landing purposes, mostly IFR.

ARTCC:

Aircraft Regional Traffic Control Center, there are nine of these ‘centers’ manned by a group of professional controllers who direct the nation’s aircraft traffic. They handle thousands of flights every day, with

approximately 2,500 aircraft on their screens every day (the military ones are not published).

ASR:

An instrument radar approach that pilots can request of approach control or the tower.

Back Course Approach:

Rare, but some approaches can use the localizer of the opposite end of the runway.

Base:

Either referring to the lowest level of clouds or the perpendicular leg when landing.

Blip:

The single slash of an aircraft caught on radar.

Broken:

Refers to a sky with about 50% cloud formations.

Cat:

Clear air turbulence.

Call Sign:

The identity of your aircraft, "N" number for most general aviation aircraft. Example: 1234R.

CAVU:

Weather term, "Ceiling And Visibility Unlimited"

Ceiling:

Weather term, vertical distance from the ground to the bottom of broken or overcast clouds.

Center:

Short for ARTCC.

Chart:

Aviation maps.

Co-pilot:

The pilot in the right seat of an aircraft, unless he or she is an instructor.

Controller:

A reference to most of the people when you are in radio communication with an FAA tower, Approach Control or ARTCC (center). Operator is used more frequently to identify Ground and Flight Service stations personnel.

Cross (X) country:

The distance describing a course from one airport to another. Must be at least twenty-five miles to be used in your logbook. (The FAA exempted B 52 pilots from any cross-country requirements for currency or testing purposes because even though they flew thousands of miles on most of their flights, they took off and landed at the same airport.)

Deadhead:

An airline employee getting a free ride or a log in the water hazardous to boats.

Dihedral:

An engineered wing design to 'balance' aircraft lift.

DME:

Distance Measuring Equipment, electronic device.

Double Yellow Lines:

The phrase used by this author to emphasize never cross it (do not do it), just like the hazard of crossing the double yellow lines painted on the highways.

Engine Cowls:

Small doors located on the nacelle(s) that you can open on the ground to help keep your engine cool.

ETA:

Estimated Time of Arrival.

ETD:

Estimated Time of Departure.

FAA:

Federal Aviation Administration, the pilot and aircraft governing authority. (They are here to help you.)

FAR:

Federal Aviation Regulations

FBO:

Fixed Based Operator. I've tried in vain to determine the origin of this odd reference to the airport's gas and service station.

Five by Five:

When Marconi invented and introduced the radio, (some argue that Tesla beat him to it, certainly the electrical concept). In any case, Marconi transmitted the first message as follows: "Five, Four, Three, Two, One, One, Two, Three, Four, Five, how do you read?" The response he received was, "Five by Five," which is still used today, worldwide, in communications to acknowledge, "I hear you loud and clear."

FLIB:

A term used by controllers, usually in ARTCC, to refer to "Friendly Little Itinerant Bastards. (Some controllers might not use "friendly", but instead a little more colorful metaphor.)

Flight Level:

The altitude assigned by ARTCC to high-flying aircraft, mostly airline and military. Example: FL 28 would be 28,000 feet.

Flight Service Station(s):

Nationwide pilot services, weather briefings, flight following, and the place you call (phone or radio) to file a flight plan – and sometimes to get it in the form of a clearance (usually while airborne). (Do not forget that the faster your request your clearance on the radio, the faster the controller will give it to you.) Advice: talk slowly if you want them to do so.

Flight Plan:

The VFR pilot who wants to be "followed" by ARTCC or have an IFR "approved flight plan" filed with ARTCC to fly from one airport to another. If you request flight following, be aware that when the controller responds, "maintain VFR" it not only means for you to stay in VMC, but also terrain clearance and separation is still your responsibility.

Flight Test:

Usually conducted by the FAA or someone designated by them to evaluate your in-flight skills, even so you will be expected to answer "oral" questions germane to the certificate that you are trying to qualify for.

Greased:

A good landing is referred to as a "greased" one. Most landings are just "arrivals", but every pilot works quite diligently to make them perfect (greased), especially if we have an audience. (Pilots refer jokingly to the opposite of a good landing as a "controlled crash" but will add "that any landing your walk away from is a good one".)

Gyro(s):

Almost all aircraft have at least two gyroscopes, one to show horizontal and bank, the other a turn coordinator which indicates the rate of the aircraft turning.

Ident:

Controllers will ask you to Ident when they want to distinguish your airplane from the other blips on their radar scopes. Your blip will expand and get brighter.

IAS:

Indicated Air speed, the speed at which the airplane is moving through the air without correction for altitude. And not to be confused with the speed at which you are traveling over the ground, (if your IAS is 100 knots, and your headwind is 25 knots, your ground speed is 75 knots.)

IFR:

Instrument Flight Rules, the term used to describe the regulations and procedures governing flight in which outside reference by the pilot would be unsafe or impossible. You must be Instrument Certified to fly in IMC or file an IFR flight plan.

ILS:

Instrument Landing System, a very sophisticated directional control electronic device, usually including a glide slope. About 4 times more sensitive that a VOR signal.

IMC:

Instrument Meteorological Conditions. Bad weather.

Instrument(s):

Term used to refer to the gyros and other informational gauges on the panel of an airplane. Newer airplanes are optionally equipped with computer systems which the pilot can switch to view different “screens” either for operational and navigational information.

Localizer:

That part of an ILS instrument approach which provide heading (azimuth) information.

Locator:

A low frequency transmitter (ADF) strategically located at the beginning and middle of an ILS approach.

Logbook(s):

Journals which pilots and mechanics use to save and certify detailed records. Your logbook has legal weight, far beyond what you would expect. (Do you know the difference between a journal and a ledger? Historically, journals (books with removable pages) were written in pencil, ledgers (non-removable pages) in ink.)

Knowledge test, formerly, sometimes now, "written":

These FAA examinations are designed to evaluate your book knowledge.

Markers:

Usually referring to low-frequency beams located strategically on instrument approaches. Like a flashlight pointed upward, they call only be "seen" electronically (usually by a flickering light) by the pilot when their airplane is immediately over them.

MEA:

Minimum En route Altitude. (That altitude that prescribes above land and obstacle clearance for en route and approach navigation).

METAR: Weather
reports.

Mode C:

That function of a transponder that reports altitude.

MSL:

Mean Sea Level.

Navaids:

Navigation Aids, as the name implies, these are usually radio beams that pilots use to navigate.

Notams:

Notices to Airman, issued by the FAA, usually as a warning or prohibition. For example, “No fly zone, Chicago airspace, January 10, 1500 – 1800 zulu. (President Obama visiting.)

OBS:

Omni Bearing Selector, the dial on the pilot’s navigation radio to choose a radial or bearing. Radials are what make up the highways in the sky.

Outer Marker:

One of the most important components of an ILS instrument landing system. Usually located at the entry gate about 5 to 7 miles from the end of the runway, and either at, or near where the glide slope intercepts the localizer. It is a radio beacon that is like a light beam that can only be seen from directly above. There used to be more, and still should be at all, ADF “locators” at the outer marker to provide a reliable reference point.

PAR:

Precision Radar Approach, which can be requested by pilots of the tower or approach control as an instrument landing facilitator.

Phonic Vocabulary:

Instead of saying letters, per se, the pilot language uses common words to make communicating easier. To see the list, scroll down to the bottom.

Pilot-in-Command:

Sole manipulator of the controls of an aircraft.

Pink Slip:

Unfortunately, a failed flight test results in the issuance of a pink slip by the examiner.

Procedure Turn:

Part of an instrument approach whereby the pilot goes outbound a predetermined distance before turning back toward the airport.

SIDS:

Printed, to save time in communicating, Standard Instrument Departures, given by controllers as part of a departing aircraft's clearance.

Squawk:

Controllers will instruct you to squawk a certain frequency so that they can distinguish your aircraft blip from the others on their radar scopes.

Regs:

Federal Aviation Regulations. Yes, pilots refer to them so often that we have truncated the word. Note of advice – there are a lot of people who quote the "regs" who may not be totally accurate. I learned the hard way not to trust even FAA personnel. If you are ever in a situation that involves an FAR, get the book, or go onto the Internet, and read it with whomever you are discussing it with. Believe me there are so many 'if, ands, and buts' to these Regs that anybody who says they know them all is likely exaggerating.

Rime:

Usually referring to ice that forms on the wings of the aircraft when the temperature and humidity are conducive.

SID:

Standard Instrument Departure, a published chart (map) showing the pilot how to depart an airport in IFR conditions, issued by the tower or departure control.

Sigmet:

A serious weather warning to pilots.

Stick:

Older aircraft did not have “steering wheels” like modern aircraft. Instead, they possessed wood or metal pipes connected by wire to the control surfaces of the aircraft. (Gliders, acrobatic and many military aircraft have sticks, in fact most fighters have just a control that fits into their hand.) (A good “stickman” used to be a term that referred to a good pilot.)

STOL:

Short Takeoff or Landing – an aircraft that needs very little runway to take off or land.

Tail Dragger:

An aircraft with its third wheel (or skid) on the bottom of its tail instead of in its nose. (They do take a little longer to learn how to land and taxi.)

TACAS:

An electronic device that can warn of another aircraft that might be too close for comfort.

Terminals:

The buildings where aircraft and passengers mix.

Top(s):

The top(s) of the clouds.

Tower:

A distinctly tall structure (most look like golf tees) that house controllers, usually government, FAA people, but occasionally manned by private companies. The tower normally houses a tower operator and a ground controller. At most larger airports the building will also be occupied by the approach controllers who are the intermediaries between ARTCC (the centers) and the tower.

Transponder:

An electronic device in the cockpit of most aircraft that provides ground controllers detailed information about the aircraft that are on their radar scopes.

Tricycle Gear:

An aircraft equipped with a nose wheel instead of one mounted on its tail.

TVOR:

A VOR located on an airport.

WAC:

World Aeronautical Chart – much preferred for flight planning because it covers far more territory than a sectional.

Way point:

Intermediate designations used to divide a flight plan into segments.

UFO:

Unidentified Flying Object, an aircraft from another planet. Nobody has ever explained why these visitors do not use radios. There are no unknown frequencies and if aliens were here from another planet it would be logical to assume that they would communicate with their home base, – and just as certain, someone on Earth would pick up their signal. Maybe they transmit using their fingers like the movie, ET?

VASI:

Visual Approach Slope Indicator, this light system aids pilots in staying on a good glide path for landing. Simply put, the redder the lower, the whiter the higher. Half white, half red, you are on the glide path.

VFR:

Visual Flight Rules. The rules and procedures that pilots use when the weather is “VMC” as opposed to “IMC” the latter of which would require that the pilot be IFR qualified.

VMC:

Visual Meteorological Conditions, the term used to describe good VFR weather conditions, not IMC, which would require the pilot to be Instrument Rated.

VHF:

Very High Frequency, radios designated for communication and navigation by the aviation community.

VIP:

Very Important Pilot.

Visibility:

Weather term, horizontal distance to distinguish an object.

VOT:

An electronic VOR accuracy testing device. Most airports also have designated location where you can test your VORs as well.

VOR (VORTAC):

Very High Frequency Omni Range. As you drive along a lot of our interstate highways you will notice an unusual-looking building (usually a round circular one with what looks like a pointed smoke stack). These are radio transmitters that create the highways in the sky for airplanes to transit with.

WX:

Short for weather

ZULU:

Universal Coordinated Time (UCT), formerly, Greenwich Mean Time, (most often used currently), is based upon the longitudinal line (prime meridian) which runs through Greenwich, England (near London,) separating one day from the next as well as East and West. Zulu time is used by pilots internationally so that every pilot in the air is ‘on the same page’.

Phonic Alphabet:

A	**–**	Alpha	**N**	**–**	November
B	–	Bravo	**O**	–	Oscar
C	**–**	Charlie	**P**	**–**	Papa
D	**–**	Delta	**Q**	**–**	Quebec
E	**–**	Echo	**R**	**–**	Romeo
F	**–**	Foxtrot/Fox	**S**	**–**	Sierra
G	**–**	Golf	**T**	**–**	Tango
H	**–**	Hotel	**U**	**–**	Uniform
I	**–**	India	**V**	**–**	Victor
J	**–**	Juliet	**W**	**–**	Whisky
K	**–**	Kilo	**X**	**–**	X-Ray
L	**–**	Lima	**Y**	**–**	Yankee
M	**–**	Mike	**Z**	**–**	Zulu

Index

Humor, history, safety rules, controversy,

(Don@SafePilot.coach), or, participate on our Pilot Forum on www.PilotOwl.com. Please
de your questions, suggestions, and most important, include your own thoughts on safe flying
ether maybe we can build a “Wikipedia” for Pilot Safely informing other pilots about how to sta
of trouble.