The Denton Flyer

Newsletter of EAA Chapter 661, Denton, TX

August 2024

Volume 3, Issue 10

El Presidente	Janet Patton	janetpatton737@gmail.com
Numero Uno	Mark Cohen	tx.cohen@gmail.com
Minister of Information	Stormy Weathers	flynwx@pobox.com
Minister of Finance	Scott Wiederhold	wiederh@gmail.com
Director of Youthful Enthusiasm	Harper Carr	harpercarr@gmail.com
Membership Czar	Heather Fahle	hfahle13@gmail.com
Cyber Czar	Craig O'Rourke	orourke.craig@gmail.com

Next Meeting:

Our next meeting will be at the regular time and place, the first Saturday of the month, **3 August** at 1200. Please join us in Classroom Bravo in the US Aviation facility at 4850 Spartan Drive, on the field at KDTO.

This meeting will be our annual "After Action Report" from the pilgrimage to AirVenture. There will be pictures and slides and tales galore. Even if you didn't make the trek this year, come out and heckle your chapter fellows as we attempt to explain away our rash purchases of kinetic lawn art from the Fly Market.

Last Meeting:

Our last meeting was on Saturday, 13 July 2024. If you came for the meeting on the first Saturday, 6 July, you found a dark room, no speaker, and no snacks. Sorry, it was in the newsletter. We were trying to give you an opportunity to hang out with friends and family over the holiday weekend. Moreover, if you had any remaining pyrotechnics with nitrates and metal salts, you could ignite those and invite the oo's and ah's that traditionally go with them.

When we met on 13 July, Mike Montefusco talked about the art and science of using the radio to communicate with our friends in ATC. He showed us that good aviation radio technique need not be a great challenge or cause pilot anxiety. It's actually kind of fun, once you get the hang of it. We all learned some things that can help us become better "communicators;" improving safety, competency, and proficiency; thereby increasing our overall flying enjoyment. Perhaps at the top of that list is to practice. Those who practice improve, while those who don't don't.

But, how do you practice? If you go flying for an hour, are you spending even two minutes on the radio? One technique that Mike described is to role play with another pilot. Sit down and plan a virtual mission with whatever tools and devices you would typically use. Then, step through that mission with the other pilot playing the role of ATC. You could do that with a CFI, but you'd need to pay him for his time. Just because the prop isn't spinning doesn't mean he isn't working. However, you could do this with any experienced pilot.

If your wallet is limiting your flying to one hour per month, break that up into two flights of 0.5. You will get twice as much radio practice along with all the other processes that get you up in the air and down again.

Mike also taught us that to sound cool on the radio, you need to think ahead, to anticipate what the controller might ask you or direct you to do. ATC frequencies are assigned to geographical regions and don't change very often. So, you can anticipate being handed off to Fort Worth Departure on 118.1.

In short, be prepared. Have a paper copy of the airport diagram for your departure field and any airports you anticipate landing at. You can use that to make sense of your taxi instructions. You can also use it to picture how you are approaching the airport and make sense of the instructions from the tower controller. If you print the nav log in SkyVector, it automatically prints the airport diagrams for your departure and arrival airports, if they exist. AOPA

has a tool on their website that lets you print airport information in a kneeboard format. That includes all the frequencies associated with that field.

Challenge yourself. Use flight following every time you have the opportunity. It's a good practice, and it's good practice. Plan your flight paths in ways that make sense, but don't avoid controlled airspace just because you would have to talk to a controller.

Here are some other resources that you may find helpful:
Go to AOPA website and search for "Say It Right." There are lots of informative articles there.

Read AC90-66C "Non-Towered Airport Flight Operations"

Go to PilotWorkshops. (https://pilotworkshop.com/)

Read AIM Chapter 4, Section 1, "Services Available to Pilots."

An Opportunity:

Rob Gritta is seeking an A&P mechanic with experience working on those crazy, backward airplanes designed by Burt Rutan. You know the ones. They have the horizontal stab on the front of the fuselage.

Rob has been working an estate for a while and is assisting the new owner of a hangar here at KDTO with clean up and miscellaneous chores. He hopes to find someone who can help reassemble a formerly flying Long-Eze and do some standard maintenance on a Defiant.

If you think you can help, please reach out to Rob at 945-300-7465.

Aircraft Spruce & Specialty is moving to Roanoke.

from Jim Irwin, president of A$&$
Greetings!

Aircraft Spruce is in the process of building a new distribution facility in Roanoke, Texas. This 38,000 sq. ft. warehouse/office will replace our current 10,000 sq. ft. facility in Fort Worth, and we expect to move to the new facility in October 2024. At our branches in CA, GA, and AK, we have vintage airplanes hanging from the ceiling in our will call stores, and we would like to do the same at the new building in Roanoke. Please put the word out to your EAA Chapter members to see if they have an aircraft in storage that they would like to donate or sell that would look good on display in our new store. We would want the aircraft without the engine to reduce the weight, and we will need it fairly soon.
We appreciate all of the support we receive from EAA Chapter members throughout the state of Texas and are looking forward to the opening of our new store. Please have any of your members who might have an aircraft available for us email me directly with the aircraft type, condition, and photos if possible. Thanks for your help, and we will look forward to seeing many of you at AirVenture in a few weeks.

Best Regards,

Jim Irwin
President
Aircraft Spruce

Straighten Up and Fly Right

by Stormy Weathers
A part of learning to be a pilot is figuring out when you are being lied to. You know your magnetic compass lies to you, but you learned how to adjust for that. The airspeed indicator lies, too. It doesn't indicate your groundspeed or even the speed of the air (nitrogen, oxygen, et al) molecules rushing past your airplane in flight. You have to adjust the indicated airspeed for temperature and altitude to get your true airspeed and account for the wind to determine the groundspeed. Well, that's what we had to do before they put that GPS gadget in the panel.

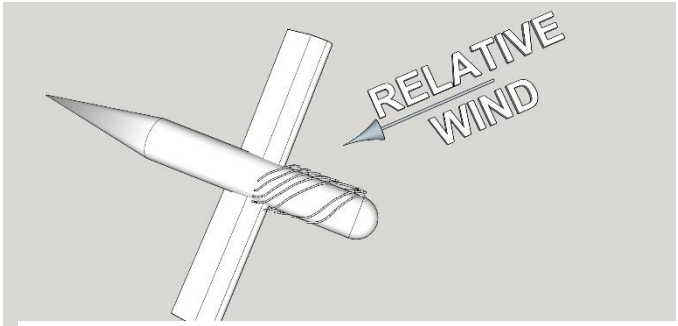
In some cases, the lie has less to do with what happens and more to do with why it happens. I would like to address just such an instance. The mathematicians define "dihedral" as an angle between two planes. Anyone in the aviation community uses the word "dihedral" to refer to the angle at which the wings are tilted up, either at the fuselage or somewhere along the span. As student pilots, we were told that the purpose of that "tilting up" was to give the airplane lateral stability. If the

plane gets perturbed from wings level flight, it will tend to return to wings level – unless your back seater is pushing on the flight controls as he tries to reach his box lunch. All of this is as true as it can be. The lie in this story came when you were told why that happens.

You may argue, "Why do I care? I understand how it behaves. That's all I need to know." If that is you, I can't refute your argument. Stop reading. Really, just stop. No one is watching. There will be no quiz. However, if you would like to further understand the phenomenon known as "dihedral effect," please keep reading.

First, let's bring the myth out into the daylight. Then, we can dispatch it to the underworld and further our understanding of what really happens. The myth goes like this: If the bank angle of the airplane is perturbed from wings level, then the lift vector of the lower wing is acting more vertically than the lift vector of the higher wing, and it rolls the aircraft toward wings level. In 1979, I was naive enough to raise my hand, pull the ring on the side of my neck, and recite the myth to my professor and classmates in my Aerospace Systems Design course at the University of Illinois. The professor looked at me and said, "Sum the moments."

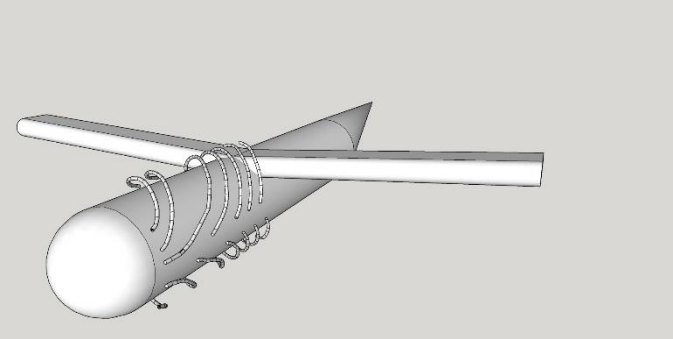
Yes! Of course. The lift of each wing is providing a rolling moment about the longitudinal axis of the airplane. Gravity (or the local vertical) has nothing to do with that. If the lift is the same on both wings, there is nothing that would cause the plane to roll back to wings level. There must be something else going on. Indeed, there is, and it has to do with sideslip. When the plane is perturbed from wings level, gravity starts to pull the aircraft through the air sideways. If you had caused the roll with the ailerons, polished aviator that you are, you would have skillfully manipulated the rudder at the same time to keep the ball in the center and the slipping and skidding to a minimum. However, when nature throws the plane a bit off kilter, she is not so careful. When the plane starts to slip toward the lower wing, it adds a lateral component to the relative wind. Therefore, the wind hitting the lower wing is at a slightly higher angle of attack (AoA) than the other wing. Now, with a difference in AoA there is a difference in lift between the two wings, and the result is a rolling moment that brings the airplane back to wings level flight. We call this "dihedral effect." However, it isn't completely dependent on the dihedral angle of the wings.



(SIDESLIP ANGLE EXAGGERATED FOR CLARITY)

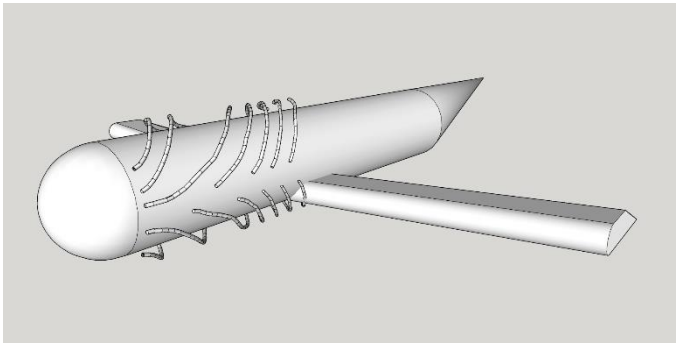
There are, after all, some planes with no built-in dihedral angle that still exhibit some stability due to the dihedral affect. It still has to do with sideslip and the effect on the angle of attack of each wing. Consider the OV-10 Bronco. That airplane looks like they used a giant yardstick for the spar. It's as straight as it can be. Nevertheless, it has some lateral stability baked into the design. Let's look at what makes this happen. With no sideslip, the air flows

down the sides of the fuselage. The flow on both sides is the same. However, when we introduce a bit of sideslip, the airflow must go around the fuselage to get from the upwind side to the downwind side, some over the top and some under the bottom. If the wing is connected to the fuselage in the middle, not the top or the bottom, there is no effect on the AoA of either wing. On the other hand, if the wing is attached to the top of the fuselage as it is on the OV-10 and the Cessna 172, then there is an effect on AoA. The air going up and over the fuselage hits the upwind wing, increasing the AoA near the fuselage. It has the opposite effect on the downwind wing,



slightly decreasing the AoA in the region near the fuselage.

For airplanes with low wings, like the Cherokees and Mooneys of the world, the flow around the fuselage has the opposite effect. For this reason, the dihedral of the wing must be large enough to compensate for the destabilizing effect and still offer a positive dihedral effect. Have you ever noticed that low wing airplanes seem to have a lot more dihedral angle? Now you know why that is the case.



It is important, or at least interesting, to note that not all airplanes are designed and built with all that stability in mind. We want our training aircraft to be well behaved and forgiving to our ham-fisted students. On the other hand, we want fighter aircraft to be agile and responsive. When you are trying to roll the lift vector toward the surface to air missile that is screaming up toward you, you don't want to have to overcome a lot of lateral stability before the aircraft starts to roll. A lot of fighter aircraft are a bit unstable in one or more axes. With modern fly-by-wire airplanes, we can put some of that stability back in the form of software in the flight control computers. Let's look at a plane that predates all that fly-by-wire technology, the F-4 Phantom II. Despite the lack of automated flight controls, it was equipped with a Pitch Stability Augmentation System. There was no such system for lateral stability. In fact, the original design had no dihedral angle on the wings, even though the wings attach to the fuselage at the lowest possible position. What happened next, it's hard to say. The rumor that floated around the F-4 community said that a fight broke out between the aero guys and the structures team. It might have gone something like this.

Aero team: "We need two degrees of dihedral."

Structures: "Well, you should have thought of that before we designed the wing carry through box."

Aero: "But, it will be unstable! What good will your wing box be if the plane is uncontrollable?"

Structures: "OK. The Navy insisted that it have folding wings. You can have your precious dihedral at the pivot station."

Aero: "Fine! Give us four degrees."

The next time you have a chance to look at an F-4 up close, check out the dihedral angle at the wing fold and tell me you can't hear the slide rules hitting the table and imagine guys with crewcuts, white shirts, and skinny black ties glaring at one another. In the end, the dihedral effect on the F-4 was adequate. In fact, due to some other quirks that got baked into the design, the plane could not be rolled with the ailerons if there was any load on the wings. Nevertheless, pushing on the rudder provided sufficient roll authority. That is all due to dihedral effect.