Racine EAA Chapter 838

Contact

Meetings
Third Thursday's 7:00 pm
Social 6:30 pm

November 2013
Volume XXIV Issue 11
www.Eaa838.Org

AIRCRAFT WAKE TURBULENCE

EVERY AIRCRAFT IN FLIGHT GENERATES A WAKE

Historically, when pilots encountered this wake in flight, the disturbance was attributed to "prop wash." It is known, however, that this disturbance is caused by a pair of counter rotating vortices trailing from the wing tips. The vortices from large aircraft pose problems to encountering aircraft. For instance, the wake of these aircraft can impose rolling moments exceeding the roll control capability of some aircraft. Further, turbulence generated within the vortices, if encountered at close range, can damage aircraft components and equipment and cause personal injuries. The pilot must learn to envision the location of the vortex wake generated by large aircraft and adjust his flight path accordingly.

VORTEX GENERATION

Lift is generated by the creation of a pressure differential over the wing surfaces. The lowest pressure occurs over the upper wing surface and the highest pressure under the wing. This pressure differential triggers the rollup of the airflow aft of the wing resulting in swirling air masses trailing downstream of the wingtips. After the rollup is completed, the wake consists of two counter rotating cylindrical vortices. Most of the energy is within a few feet of the center of each vortex, but pilots should avoid a region within about 100 feet of the vortex core.

VORTEX STRENGTH

The strength of the vortex is governed by the weight, speed, and shape of the wing of the generating aircraft. The vortex characteristics of any given aircraft can also be changed by extension of flaps or other wing configuring devices. However, as the basic factor is weight, the vortex strength increases proportionately with increase in aircraft operating weight. Peak vortex tangential speeds up to almost 300 feet per second have been recorded. The greatest vortex strength occurs when the generating aircraft is heavy-clean-slow.

INDUCED ROLL

1. In rare instances, a wake encounter could cause in-flight structural damage of catastrophic proportions. However, the usual hazard is associated with induced rolling moments which can exceed the rolling capability of the encountering aircraft. In flight experiments, aircraft have been intentionally flown directly up trailing vortex cores of large aircraft. It was shown that the capability of an aircraft to counteract the roll imposed by the wake vortex primarily depends on the wing span and counter-control responsiveness of the encountering aircraft.

2. Counter-control is usually effective and induced roll minimal in cases where the wing span and ailerons of the encountering aircraft extend beyond the rotational flow field of the vortex. It is more difficult for aircraft with short wing span (relative to the generating aircraft) to counter the imposed roll induced by vortex flow. Pilots of short span aircraft, even of the high performance type, must be especially alert to vortex encounters. The wake of larger aircraft requires the respect of all pilots.

VORTEX BEHAVIOR

Trailing vortices have certain behavioral characteristics which can help a pilot visualize the wake location and thereby take avoidance precautions.

a. Vortices are generated from the moment aircraft leave the ground, since trailing vortices are a by-product of wing lift. Prior to takeoff or landing, pilots should note the rotation or touchdown point of the preceding aircraft.

b. The vortex circulation is outward, upward and around the wing tips when viewed from either ahead or behind the aircraft. Tests with large aircraft have shown that the vortices remain spaced a bit less than a wing span apart drifting with the wind, at altitudes greater than a wing span from the ground. In view of this, if persistent vortex turbulence is encountered, a slight change of altitude and lateral position (preferably upwind) will provide a flight path clear of the turbulence.

c. Flight tests have shown that the vortices from larger (transport category) aircraft sink at a rate of several hundred feet per minute, slowing their descent and diminishing in strength with time and distance behind the generating aircraft. Atmospheric turbulence hastens

Racine EAA Chapter 838
Contact
Meetings
Third Thursday's 7:00 pm
Social 6:30 pm
November 2013
Volume XXIV Issue 11
www.Eaa838.Org

breakup. Pilots should fly at or above the preceding aircraft's flight path, altering course as necessary to avoid the area behind and below the generating aircraft. However, vertical separation of 1,000 feet may be considered safe.

d. When the vortices of larger aircraft sink close to the ground (within 100 to 200 feet), they tend to move laterally over the ground at a speed of 2 or 3 knots.

Vortex Movement Near Ground - No Wind

1. A crosswind will decrease the lateral movement of the upwind vortex and increase the movement of the downwind vortex. Thus, a light wind with a cross-runway component of 1 to 5 knots (depending on conditions) could result in the upwind vortex remaining in the touchdown zone for a period of time and hasten the drift of the downwind vortex toward another runway. Similarly, a tailwind condition can move the vortices of the preceding aircraft forward into the touchdown zone. The light quartering tailwind requires maximum caution. Pilots should be alert to large aircraft upwind from their approach and takeoff flightpaths.

Vortex Movement Near Ground - with Cross Wind

OPERATIONAL PROBLEM AREAS. A wake encounter is not necessarily hazardous. It can be one or more jolts with varying severity depending upon the direction of the encounter, weight of the generating aircraft, size of the encountering aircraft, distance from the generating aircraft, and point of vortex encounter. The probability of induced roll increases when the encountering aircraft's heading is generally aligned or parallel with the flightpath of the generating aircraft. Avoid the area below and behind the generating aircraft, especially at low altitude where even a momentary wake encounter could be hazardous. Pilots should be particularly alert in calm wind conditions and situations where the vortices could:

1. Remain in the touchdown area.
2. Drift from aircraft operating on a nearby runway.
3. Sink into takeoff or landing path from a crossing runway.
4. Sink into the traffic patterns from other airport operations.
5. Sink into the flight path of VFR flights operating at the hemispheric altitudes 500 feet below.
6. Pilots of all aircraft should visualize the location of the vortex trail behind large aircraft and use proper vortex avoidance procedures to achieve safe operation. It is equally important that pilots of larger aircraft plan or adjust their flight paths to minimize vortex exposure to other aircraft.

VORTEX AVOIDANCE PROCEDURES. Under certain conditions, airport traffic controllers apply procedures for separating aircraft operating under Instrument Flight Rules. The controllers will also provide to VFR aircraft, with whom they are in communication and which in the tower's opinion may be adversely affected by wake turbulence from a larger aircraft, the position, altitude and direction of flight of larger aircraft followed by the phrase "caution - wake turbulence." Whether or not a warning has been given, however, the pilot is expected to adjust his/her operations and flightpath as necessary to preclude serious wake encounters. The following vortex avoidance procedures are recommended for the situation shown:

1. When landing behind a larger aircraft - same runway, stay at or above the large aircraft's final approach flight path -- note touchdown point -- land beyond it.
2. When landing behind a larger aircraft - when parallel runway is closer than 2,500 feet (figure 11), consider possible vortex drift onto your runway. If you have visual contact with the larger aircraft landing on the parallel runway, whenever possible, stay at or above the large aircraft's final approach flightpath -- note his touchdown point.
3. When landing behind a larger aircraft - crossing runway, cross above the larger aircraft's flightpath.
4. When landing behind a departing larger aircraft - same runway, note larger aircraft's rotation point - land well prior to rotation point.
5. When landing behind a departing larger aircraft crossing runway, note larger aircraft's rotation point -- if past the intersection -- continue the approach -- land prior to the intersection. If larger aircraft rotates prior to the intersection, avoid flight below the larger aircraft's flightpath. Abandon the approach unless a landing is ensured well before reaching the intersection.
6. When departing behind a larger aircraft: Note larger aircraft's rotation point -- rotate prior to larger aircraft's rotation point -- continue climb above the larger aircraft's climb path until turning clear of his wake. Avoid subsequent headings which will cross below and behind aircraft. Be alert for any critical takeoff situation which could lead to a vortex en-

counter.

7. Intersection takeoffs - same runway, be alert to adjacent large aircraft operations particularly upwind of your runway. If intersection takeoff clearance is received, avoid subsequent heading which will cross below a larger aircraft's path.

8. Departing or landing after a larger aircraft executing a low missed approach or touch-and-go landing. Because vortices settle and move laterally near the ground, the vortex hazard may exist along the runway and in your flight path after a larger aircraft has executed a low missed approach or a touch-and-go landing, particularly in light quartering wind conditions. You should assure that an interval of at least 2 minutes has elapsed before your takeoff or landing.

9. En route VFR - (1,000-foot altitude plus 500 feet). Avoid flight below and behind a larger aircraft's path. If a larger aircraft is observed above on the same track (meeting or overtaking), adjust your position laterally, preferably upwind.

HELICOPTERS. A hovering helicopter generates a downwash from its main rotor(s) similar to the "prop wash" of a conventional aircraft. However, in forward flight, this energy is transformed into a pair of strong, high-speed trailing vortices similar to wing-tip vortices of larger fixed-wing aircraft. Pilots should avoid helicopter vortices since helicopter forward flight airspeeds are often very low which generate exceptionally strong vortices.

1. JET ENGINE EXHAUST. During ground operations, jet engine blast (thrust stream turbulence) can cause damage and upsets if encountered at close range. Exhaust velocity versus distance studies at various thrust levels have shown a need for light aircraft to maintain an adequate separation during ground operations.

a. Engine exhaust velocities, generated by larger jet aircraft during ground operations and initial takeoff roll, dictate the desirability of lighter aircraft awaiting takeoff to hold well back of the runway edge at the taxiway hold line. Also, it is desirable to align the aircraft to face any possible jet engine blast effects. Additionally, in the course of running up engines and taxiing on the ground, pilots of larger aircraft should consider the effects of their jet blasts on other aircraft, vehicles, and maintenance and servicing equipment. An illustration of exhaust velocities behind a typical "wide-body" or jumbo jet.

JET ENGINE EXHAUST VELOCITY CONTOURS, TAKEOFF POWER

1. The Federal Aviation Administration has established standards for the location of runway hold lines. For example, runway intersection hold short lines are established 250 feet from the runway centerline for precision approach runways served by approach category C and D aircraft. For runways served by aircraft with wingspans over 171 feet, such as the B-747, taxiway hold lines are 280 feet from the centerline of precision approach runways. These hold line distances increases slightly with an increase in field elevation.

2. PILOT RESPONSIBILITY. Government and industry groups are making concerted efforts to minimize or eliminate the hazards of trailing vortices. However, the flight disciplines necessary to ensure vortex avoidance during visual operations must be exercised by the pilot. Vortex visualization and avoidance procedures should be exercised by the pilot using the same degree of concern as in collision avoidance since vortex encounters frequently can be as dangerous as collisions.

3. Pilots are reminded that in operations conducted behind all aircraft, acceptance from Air Traffic Control of traffic information, instructions to follow an aircraft, or the acceptance of a visual approach clearance, is an acknowledgment that the pilot will ensure safe takeoff and landing intervals and accepts the responsibility of providing his own wake turbulence separation.

For VFR departures behind heavy aircraft, air traffic controllers are required to use at least a 2-minute separation interval unless a pilot has initiated a request to deviate from the 2-minute interval and has indicated acceptance of responsibility for maneuvering is aircraft so as to avoid the wake turbulence hazard.

Operational Tips For Light Aircraft How to Avoid Vortex Wake

1. Lift Off Short of Large Aircraft Rotation Point.
2. Land Well Beyond Large Aircraft Touchdown Point.
3. Pass Over Flight Path of Large Aircraft, or At Least 1000' Under.
4. Stay to Windward of Large Aircraft Flight Paths.
5. Keep Alert, Especially on Calm Days When Vortices Persist Longest.

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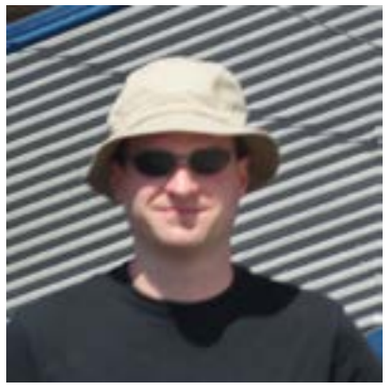
Racine EAA Chapter 838

President's Corner

Meetings
Third Thursday's 7:00 pm
Social 6:30 pm

November 2013
Volume XXIV Issue 11
www.Eaa838.Org



Eric Wolf, EAA Chapter 838 President

This will be the last time you will have to (or will get to, depending on your perspective) read my words in this column. I am done for the second and final time at the end of this year. I certainly didn't plan on being President for the last two years, but after running without one for several months in the middle of 2012, it became apparent that the best solution for the chapter was for me to take the helm again until the end of the term with the caveat that Daryl Lueck take over for the next two years. I'm pleased that Daryl is able to follow through with the deal that we made. Next time you see Daryl, thank him for taking the job with his busy schedule and make sure to give him your full support.

A change in leadership every so often is generally a good thing; it usually sparks change and breaks routine that allows for progress. Earlier this evening, I was meeting with Daryl to discuss the current issues and presidential duties. Off the top of his head, Daryl thought of several good ideas to get the chapter better organized and more energized.

So what am I going to do with my "free time" now? I'm looking forward to starting some large home improvements that I've been holding off on. In addition to that, I have a couple other important non-aviation-related goals to attend to (I'll spare you the boring details). If you see less of me than you are accustomed to, you know why.

Of course I couldn't write my last article without thanking people. I made lots of mistakes along the way, but I think the organization is overall in a better place than it was 4 years ago. As much as I would like to take credit for it, it was mostly the result of the hard work and drive of many people in the chapter. There are many fantastic EAA chapters out there, but we have a unique group with our outstanding youth aviation programs. Thanks to all of those that supported me and the chapter over the last four years.

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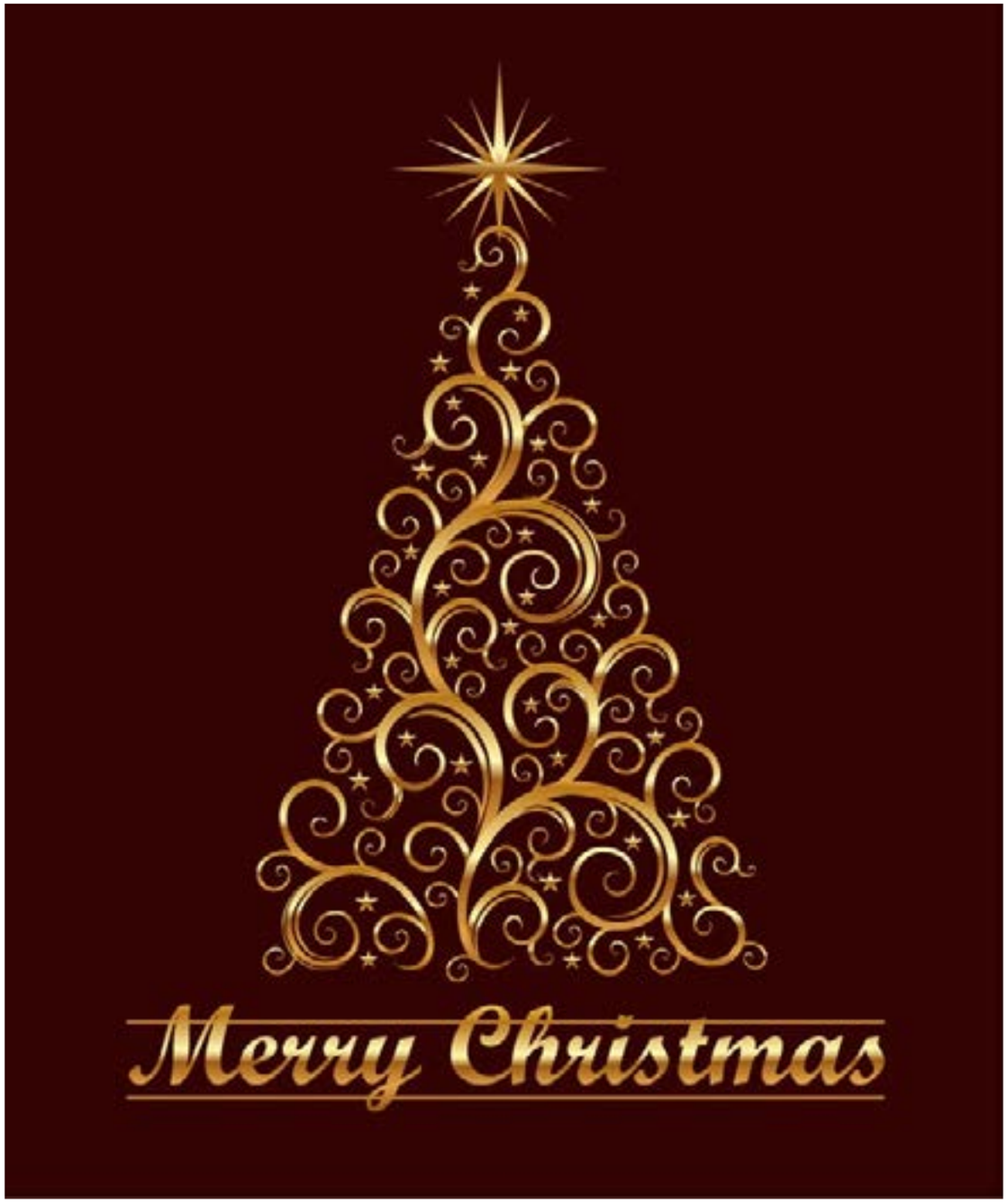


EAA Chapter 838

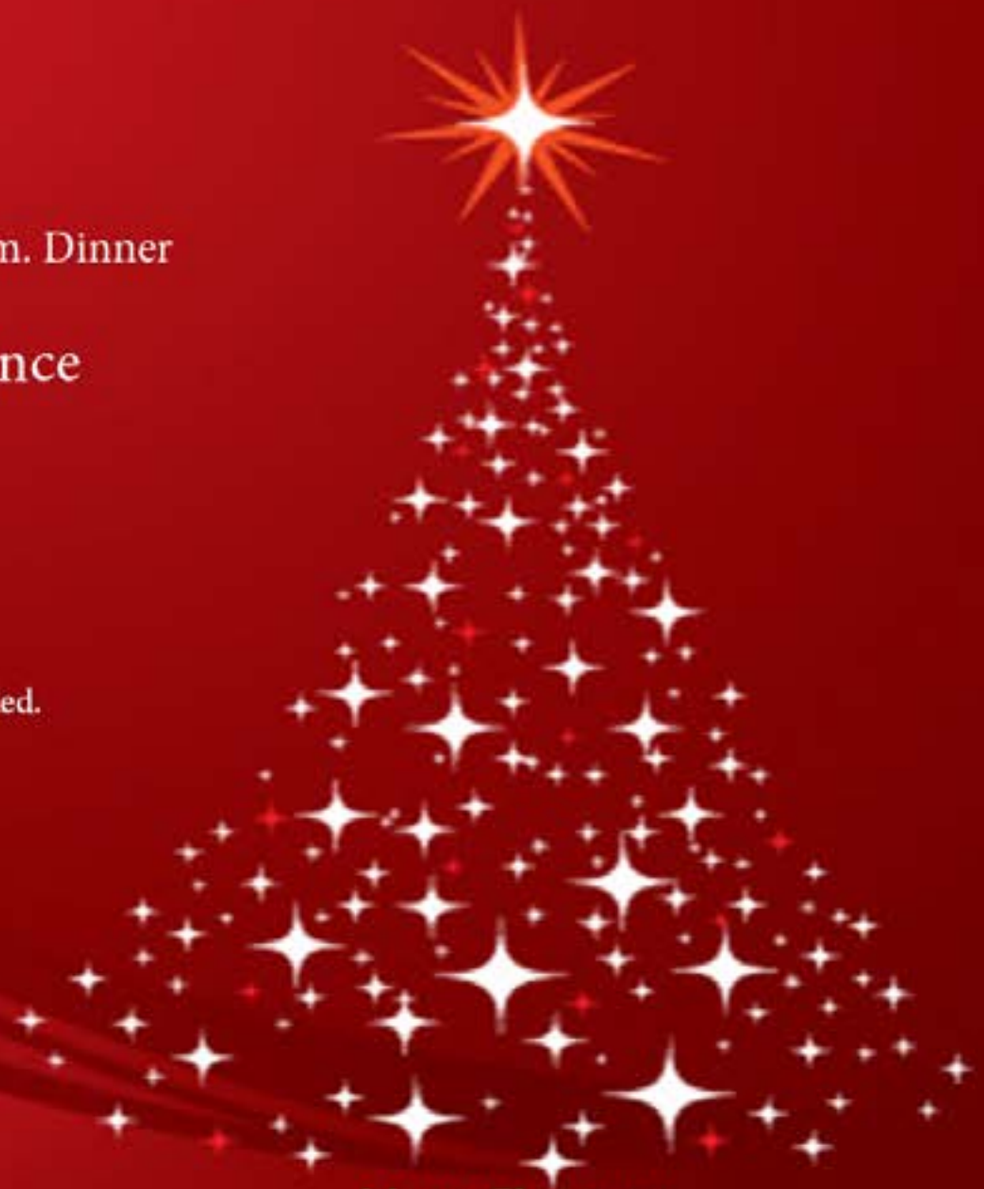
Holiday Party

Friday, December 06 - 6:15 p.m. Cocktails - 7:00 p.m. Dinner

Reservations must be made in advance
by Monday December 02 to
Eric Wolf at 262-989-9653 or
N184EW@Yahoo.Com

Payment accepted at the door. Soda, beer and wine provided.

Dinner catered by Fohrs



Racine EAA Chapter 838

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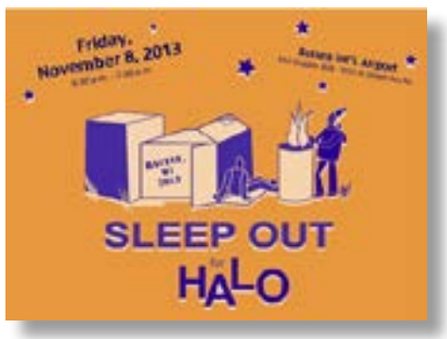
Meetings
Third Thursday's 7:00 pm
Social 6:30 pm

November 2013
Volume XXIV Issue 11
www.Eaa838.Org

HALO

THANK YOU EAA Chapter 838;

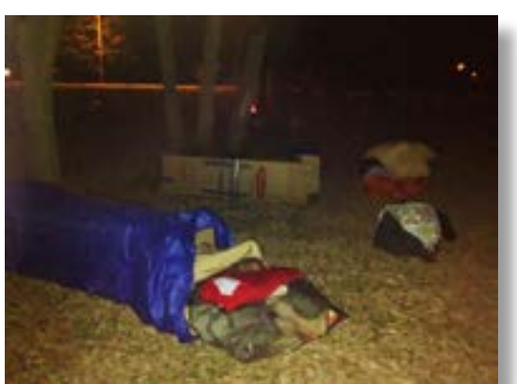


Because of you, our first major event fund raiser, Sleep Out for HALO was a great success and raised over $18,500 in support of HALO's mission to prevent chronic homelessness in Racine.

I am forever grateful to you, for helping me raise awareness and pledges of support for our 120 bed emergency shelter and self-sufficiency programs. I am especially proud of the 47 brave souls who slept outside, under the stars, on the cold, hard grounds of EAA Chapter 838 at Batten field with just a cardboard box for shelter. Bird shaped fire barrel created by local artist, Bill Reid blazed all night long as chilling winds howled. Overall the event was filled with magical moments and the experience created constant reminder of how much we can take for granted and how truly blessed we are.

Sincerely,

HALO Sleep Out Committee
Dorothy Sack, Chairman



Explorer Post 218

By Jacob Koehler

November 7th - Lt. Colonel Addison Tower guest speaker, retired US Air Force Pilot.

Our Meeting with Addison Tower was very enjoyable and we learned a lot. Addison told us about his life and challenges, and the effect that timing and integrity had on it. He taught us about the importance of having good integrity, and he also taught us how to deal with good and bad timing in life. His presentation also had some great tips for people who want to join the Air Force; he even told us about what it takes to become an astronaut. I would like to thank Addison Tower for his great presentation.

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November 21st meeting. S.C. Johnson Aviation Hangar tour.

By Scott Isaacson

The trip to the S.C. Johnson hangar in Racine was very fun and enjoyable. We did a lot of wonderful and interesting things. We watched one of the company's Falcon 900s taxi into the hangar with the use of a tug. The company's chief pilot gave us a guided tour of the facility, that included a history of the aircraft operations of S.C. Johnson. We also learned the story of the Carnauba plane, which I thought was fascinating. As a part of our tour, we were able to go inside the cabin of the Falcon 900 as well as the company's helicopter. In the hangar the company stores the first airplane that the company ever used. We were told that Sam Johnson had a big impact on the start of Young Eagles which is an amazing program. Overall I really liked this trip, and I think the entire post did as well.

Aviation Explorer Club

Kids between the ages of 8 and 14 years with parents are welcome to come to this monthly event beginning this coming spring.

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Racine EAA Chapter 838

Seán's Corner

Meetings
Third Thursday's 7:00 pm
Social 6:30 pm

November 2013
Volume XXIV Issue 11
www.Eaa838.Org

The Celebi Brothers Vs. Gravity

By Seán G. Dwyer

A Muslim friend once explained to me that nothing happened unless it was the will of God. This is why Muslims often add "insha'Allah", meaning "If it is the will of God," when describing what they plan to do.

"So, your donkey will not run away unless it is the will of Allah that he do so. Of course, it would do no harm to close the barn door," Mehmet added with a smile. His Harvard education was showing through. He offered the opinion that this attitude might be why Muslim nations tend to be less developed technologically. A case in point is the Celebi brothers, Hezarafen Ahmed and Lagari Hasan Celebi, who made the first intercontinental flight and the first manned rocket flight 150 years before the Montgolfier brothers and 270 years before the Wright brothers. Why was there no follow-up to their breakthrough flights?

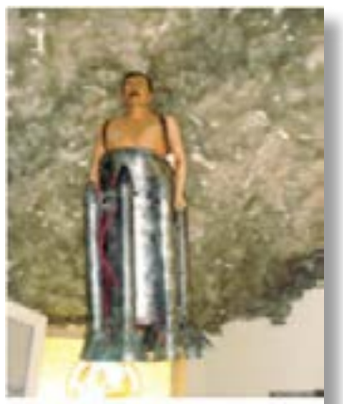


Fig. 1 Lagari Hasan Celebi

I was doing research on Lagari Hasan Celebi who was famous for being the first survivor of a manned rocket flight. That flight occurred in 1633 AD in the city of Constantinople. Watching that day were Sultan Murat IV, his court, and a few of his wives. Fig 1 shows a model of Celebi's rocket in the Topkapi Museum.

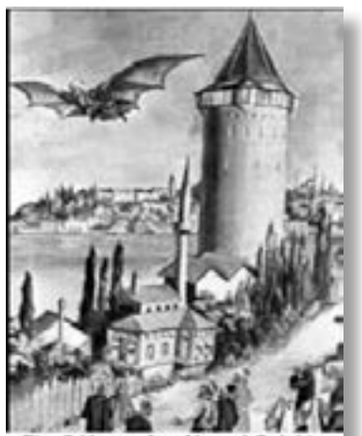
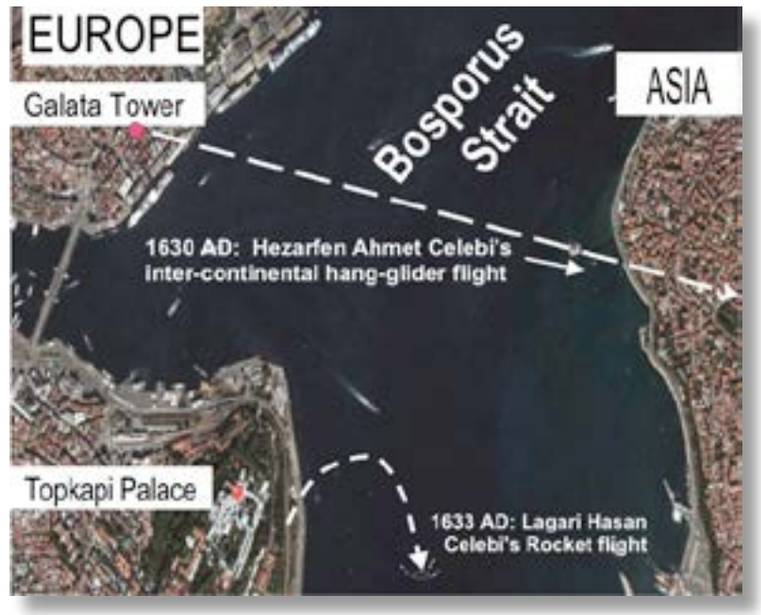


Fig. 2 Hezarafen Ahmad Celebi

The Crash & Burn episode of the TV show Myth Busters attempted to replicate Celebi's rocket flight. A contemporary report said that he attained an altitude of 1,000 feet before descending into the waters of the Bosporus "on the wings of eagles". Were these "wings" a parachute or actual wings as in a wing-suit or a hang-glider? That was what I was trying to find out. Unlike modern day wing-suit flyers, who have to deploy a parachute to land safely, Lagari Hasan Celebi planned to land on water. So he had more options to slow his descent after ejecting from the rocket.

A snippet (http://www.youtube.com/watch?v=Z48P9VQJIhU) from the movie Istanbul Beneath My Wings shows a cross between a parachute and a wing-suit, but I would not rule out folding hang-glider wings. His brother Hezarafen Ahmed Celebi used a hang-glider three years earlier to make the first inter-continental flight. That was not a grandiose as it sounds, as he merely flew from one side of a city to the other. However, the city was Constantinople and the starting point was the Galata Tower on the European side, and the landing site was the Dogancilar Square in Uskudar on the Asian side of the Bosporus Strait. A quick geography and history lesson is in order before getting into the details of Hezafaren's flight



On the west side of the Sea of Marmara lie the Dardanelles, a narrow strait which leads into the Mediterranean. The Bosporus is the narrow strait at the east end of the Sea of Marmara which connects it to the Black Sea and separates Europe from Asia. The city of Constantinople, which was renamed Istanbul in 1923 after the demise of the Ottoman Empire, lies on both sides of the Bosporus. It was the capital of the Roman Empire in that empire's waning days.

A depiction of Hezafaren's hang-glider is shown in Fig. 2. He was inspired by the 875 AD flight of another Muslim aviator, Abbas Ibn Firnas, for whom the airport in Baghdad is named. He flew a hang-glider off the tower of the Grand Mosque in what is now Cordoba, Spain. However, his flight cannot be considered a success, as he had to be carried away afterwards and never walked without a crutch again. In contrast, Hezafaren made multiple flights before venturing across the Bosporus.

While I have described Hezafaren's aircraft as a hang-glider, it might be more accurate to call it a soaring glider. My reason for saying this is the glide ratio he must have had in his trip across the Bosporus, which I calculate to be 39:1. That is too high for a hang-glider, so some soaring was required. The distance from the Galata Tower to Dogancilar Square is just over two miles, 11,673 feet to be precise. The top of the Galata Tower is 334 feet msl, and the elevation of Dogancilar Square is 39 feet msl, yielding an elevation change of 299 feet. (Thank you Google Earth and various Internet websites) Presumably, he picked up an up-draft after

The Celebi Brothers Vs. Gravity

departing the tower and set out across the strait when he had enough altitude.

Why have the breakthrough flights of the Celebi brothers been lost to history? While both men were rewarded for their accomplishments by the Sultan, both were sent away from Constantinople soon after. One reported reason was "it was dangerous to have such men around". As Galileo found out a century earlier in Rome, it was hazardous to challenge the status quo. Fortunately, western countries got over this hang-up and introduced the Industrial Age and all that followed.

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Question from Seán Dwyer on the subject of "Aviation Firsts"

Who made the first intercontinental flight, and in what year did the flight occur?

(Hint: The pilot's brother also recorded an "Aviation First")

The answer can be found in Sean's article "The Celebi Brothers Vs. Gravity"

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Racine EAA Chapter 838
AOPA
Meetings
Third Thursday's 7:00 pm
Social 6:30 pm
November 2013
Volume XXIV Issue 11
www.Eaa838.Org

Training Tip: 40 degrees of separation

By Dan Namowitz

It's rewarding to pick out the destination airport from miles away as a cross-country flight nears its conclusion. A bonus is using the remaining time to get the wind direction, pick out the correct runway, and visualize the traffic pattern.

Airports with multiple, long runways that present distinct patterns as viewed from above are ideal for spotting. Take South Dakota's Aberdeen Regional Airport: its 6,901-foot Runway 13/31, and 5,500-foot Runway 17/35 form an inverted V as depicted on a sectional chart that is oriented with north at the top, where the two runways intersect.

Your preflight planning also produced a cautionary note about those runways when you reviewed the listing for the airport in the airport/facility directory: "Rwy 13 and Rwy 17 apch ends are closely aligned. Verify correct rwy and compass heading prior to dep."

With approximately 40 degrees separating the two runways' magnetic bearings, that note might strike you as overly cautious. But now, after landing and a quick break, you become momentarily uncertain as you taxi back out over a light surface covering of snow for takeoff on Runway 13.

As usual, your magnetic compass indication sways this way and that during taxi, providing no help, and your directional gyro—ever prone to precession—won't be trustworthy until the system's vacuum pump is fully functional, probably after takeoff.

Remember also that at some airports, runway bearings listed as 40 degrees apart may be oriented somewhat more closely. Runway bearings are approximated in 10-degree increments. And, "for a magnetic azimuth ending in the number 5, such as 185, the runway designation could be either 18 or 19," says Section 4-3-6 of the Aeronautical Information Manual.

You wouldn't want to depart in the wrong direction and pose a collision hazard to area traffic or an aircraft entering a traffic pattern. So stay alert to all airport signs and markings as you taxi out. If your situational awareness is truly top-notch, you will verify preflight research indicating the presence of a visual approach slope indicator (VASI) on the left side of Runway 13. On Runway 17, a precision approach path indicator (PAPI) should be on the right of the runway.

Heed the published cautions about airport hazards and hotspots. Then use all available means to confirm your position for the safest possible departure!

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10 Tips to Avoid Airport Mix-ups

Flying into an airport at night, with several airports nearby that have identical or nearly identical runway headings, requires heightened situational awareness. While landing a Cessna 172 at the wrong airport might not garner the national attention the pilots of the Dreamlifter experienced, landing at the wrong airport is a concern for pilots of any experience level in aircraft of any size. It poses safety concerns such as terrain and man-made obstructions, airport elevation differences, and runway condition and size relative to the aircraft's performance capabilities. AOPA's experts in the Pilot Information Center share tips to avoid airport mix-ups day or night.

1. Before flying to an unfamiliar airport, look at a satellite image of the facility. Because you have already seen what it looks like, it will be easier to spot, at least in the day, and reduce the risk of landing at the wrong airport.
1. Review important airport diagrams, approach lighting, and frequencies during your preflight preparation.
1. Be aware of nearby airports and their proximity to your destination, as well as the runways they have (orientation and number).
1. Know the position of your destination airport relative to any city lights.
1. Use your GPS and an EFB if possible to confirm your location and destination, and to improve situational awareness.
1. When approaching your destination, double check your flight planning and frequencies; confirm that your navigation equipment and GPS are properly configured.
1. If flying on an IFR flight plan, do not cancel until you are certain you have the correct airport in site.
1. Tune in the correct localizer or RNAV final approach course for the correct runway for the correct airport—even if you are on a visual approach—as a back-up to confirm your

approach.

1. On final, verify, verify, verify. Make sure airport layout, runway markings and lighting systems, and heading match what you planned.

1. Make sure you are well rested.

Note: Back in the mid 1960's, when I was a brand new Copilot on a LearJet, I learned about a TWA 707 aircraft on a long final to runway 27 at Columbus Ohio at night. It was a great evening and the pilot could see 50 miles in all directions. The tower asked if TWA had the runway in sight with a response of runway lights in sight the controller cleared the TWA to land.

On the landing rollout the crew realized that they were not at Columbus but at the Ohio State airport northwest of Columbus. After hearing of this event I decided that this sort of thing would never happen to me. I used item six above by tuning to a navigation aid on the airport or a station that pointed me to the airport with DME before every landing, even if I had been to the airport a thousand times. I never assumed that visually orientation was good enough.

Also, before each departure, I always put my compass heading bug in the heading of the active runway which will prevent you from departing on an unintended runway as happened a few years ago in Tennessee. The crew and all passengers did not survive the departure on the short runway.

Phil Fountain

Racine EAA Chapter 838
NOTAMS
Meetings
Third Thursday's 7:00 pm
Social 6:30 pm
November 2013
Volume XXIV Issue 11
www.Eaa838.Org

Cockpit Concepts

Adopting "Best Practices" Part I

Aviation Safety Connection

Go to: http://aviation.org

Cockpit Concepts: January 5, 2013

Systems Knowledge.

Recently I watched a PBS Special on television that covered the role of the engineers on the Titanic as it sank. It was told in story form beginning with a brief trip from the launch to where they loaded passengers, and the head engineer brought his young son with him on that short leg. At the time, his son was attending Engineer school. During the course of that leg, the son raised several intricate questions on the Titanic's systems. One question in particular involved valves that routed the steam, and the father was very impressed with his son's inquisitiveness and what he was learning. As I watched this reenactment, I found myself reflecting back on my learning experiences in both the military and the airlines, and the requirement to learn the systems in some detail when checking out in an aircraft.

Our aircraft today are becoming more and more reliable, reducing in theory the need for extensive systems knowledge. But I have to question if this reduction is really warranted and desirable. In the Titanic presentation, the engineers, due to their extensive systems knowledge, were able to keep a generator running by rerouting steam from the one remaining boiler as other boilers flooded and lost power. There was no procedure for this situation. They had to make it up as they went along and did a remarkable job. Yes, they perished, but in so doing they saved countless lives because of the continuous power they were able to provide. I am reminded of Captain Al Haynes making up his responses to a completely unpredictable situation as the flight of his damaged aircraft progressed.

In this context, what comes to mind is Air France 447. There has already been considerable discussion and conjecture of exactly what happened on that flight, and I do not want to reopen those topics. Rather, I'd like to say that if their checkout was anything like mine in the A320, they were ill-equipped to do any real analysis of what they were confronted with and were simply reacting to a confusing situation. The point I want to make is that passing the check ride to get qualified does not guarantee that you know all you need to know. As a crusty old Major told me, "Your checkout is really only a license to begin to learn all you'll need to know." I think these minimal checkouts are rooted in a statistical hope that you won't need to know more than what is provided. But as a professional pilot, I think that continually seeking additional knowledge is the true mark of professional aviator. The fact that you are reading these articles is indicative of the fact that you are seeking additional knowledge. That is a professional response. There are CDs and DVDs of systems for various aircraft available online. If you have used one of these and found it worthwhile, let us know; if it was a bust, let us know that also.

KNOWLEDGE IS POWER!

--Norm Komich (jnk@aviation.org)

Cockpit Concepts: November 20, 2013

"I'll Fix It!"

We all admire the skillful flying that military flight teams demonstrate. Few of us are required to demonstrate similar levels of precision, but we all can emulate the discipline these teams employ in preparing for each flight and in critiquing each performance. A comprehensive illustration of this pre- and post-flight process is a presentation of the U.S. Navy's Blue Angels that was posted in the Media Center in 2009. Titled "Teamwork: Briefing/Debriefing," it describes the Blue Angels' work ethic complete with a number of imbedded video clips.

Mental preparation is one key to the Blue Angels' success as each pilot visualizes what he expects to see in flight. This routine exercise dramatically improves the pilot's anticipation and situational awareness in flight. Another key is each pilot's performance self-evaluation. The final slide concludes: "Discipline, preparation and self-criticism are some of the attributes displayed in this presentation that has 'lessons learned' for all pilots in all aircraft types flying all variety of missions."

In this video, this Blue Angels team was led by then-Commander Greg Wooldridge. Now retired as a Captain, Greg was the featured speaker this month at the Aero Club of New England's annual Reese Dill Aviation Safety Lectureship Series Celebration. It was an inspiring and entertaining talk, and he did refer to segments of the same video. Greg particularly em-

phasized the importance of the debriefing, one aspect of professional flying that we sometimes tend to neglect. Not a flight goes by where any of us makes a mistake or two, however minor, and to improve we need to learn from these experiences and make corrections.

In their debriefings each Blue Angel speaks to his own performance, tells the others the errors in technique or judgment he made during the flight and what remedial action he will take. At the end he'll state, "I'll fix it!," a personal commitment both to the team and to himself.

If you haven't seen this Media Center presentation, let me encourage you to do so. I think you will enjoy it.

--Bob Jenney (rmj@aviation.org)

NBAA

The following is an example of how the NBAA AirMail system and the group of companies making up the organization support people in need.

[NBAA-sched] Help 2YO patient Orlando-Philly area RT 12/4 & 12/23

On Tue, Nov 26, 2013 at 10:18 AM, Jo Damato <jdamato@nbaa.org> wrote:

Hi all,

Can anyone help with this flight request for Cannon, a two year old boy with Stage 4 Neuroblastoma. He and his mother need to travel from Orlando, FL to Philadelphia, PA on December 4 and return on December 23 for radiation treatment. Cannon's immune system is compromised due to a recent stem cell transplant.

Cannon has a special story and you can learn more about him at Cannonballing Cancer on Facebook.

Nothing from CAN yet and Sky Hope Network has been asked by the family to reach out too. Let me know directly or contact info@sky-hope.org for more info.

Thanks and Happy Thanksgiving!

Jo Damato
NBAA

• • • •

Re: [NBAA-sched] Help 2YO patient Orlando-Philly area RT 12/4 & 12/23

On Tue, Nov 26, 2013 at 3:13 PM, Jo Damato <jdamato@nbaa.org> wrote:

Thanks to all the people who reached out to Sky Hope! Cannon and his mom have secured a flight to Philly next week for his treatement. They still need help for a Philly-Orlando area return flight after his treatment on 12/23 so he and his mom can get home for the holidays to his infant twin brothers!

Cannon has a special story and you can learn more about him at Cannonballing Cancer on Facebook.

Let me know directly or contact info@sky-hope.org for more info.

Jo Damato
NBAA

AirMail System

Topic is from an article in the Wall Street Journal

Here they come. **FAA to Evaluate Obese Pilots for Sleep Disorder**

• • • •

AOPA is all over them:

http://www.aopa.org/News-and-Video/All-News/2013/November/20/aopa-insists-faa-withdraw-sleep-apnea-policy.aspx

• • • •

I don't know what the problem is and where they're coming from. Haven't had a problem since my AF days.

• • • •

With obesity or apnea, or amnesia?

Most of us (crew) are in good fit, with few exceptions as far as the weight goes. If government (White House) is so worried about safety / obesity what about the alarming number of obesity among the TSA's agents?

They aren't doing anything so if they fall over there's no harm.

• • • •

Let's fat check congress.

• • • •

Misguided though it may be, they are not worried about obesity per se. Rather, they want to find pilots and controllers with undiagnosed obstructive sleep apnea, which leads to fatigue, among other things. So, the genesis of this is an NTSB recommendation

Unfortunately, they are, IMO, taking a ready, fire, aim approach.

• • • •

There is a point in it.

• • • •

I think that they are trying to reduce fatigue in the cockpit, which is a good thing.

• • • •

That being so, I believe that the following conditions that can cause fatigue should also be disqualifying conditions:

1. young children in the home
2. elderly parents
3. getting married
4. getting divorced
5. changing jobs
6. moving to a new home
7. having a baby
8. having to work more than an 8 hour shift
9. having to commute more than 1 hour a day to your workplace.

I can probably go forever.

• • • •

This guy has to get real. Professionalism requires us not to fly when unfit for flight and the vast majority of us are professional.

• • • •

What about the guys who have prostate problems that have to get up 4 or 5 times middle of the night to take a leak. Where does it end?

• • • •

Sounds like Bloomberg is running the FAA.

• • • •

When there are no pilots in the cockpit.

• • • •

Contrary to popular opinion we are at the dawn of seeing that day come with many forms of public transportation. It may not be in my lifetime, but it's definitely coming. The technology is there and it has been gradually chipping away at the human element for the last 25 years or more.

We won't be able to hold it back and neither will the alphabet groups, labor unions or politicians. The public will embrace it because safety is being underwritten or promoted more and more today by advancements in technology as opposed to the benefits derived from the human element.

Today it is all about flying the box, or managing the systems that fly the aircraft, as opposed to actually flying the aircraft. This has been going on now for more than 15 years and in the last 7 years or so it has escalated dramatically.

As time goes on technology will continue to improve and we will progress to less and less hands on flying and more managing of the systems that actually fly the aircraft.

The day will come when the two pilot cockpit will go the way of the dinosaur. Advancements with UAV technology will reach a point where the influence of the human element will be invited out of the cockpit and placed firmly on the ground.

It's been an interesting journey for me as a pilot and a businessman and it will be a sad day when pilots are invited, or pushed, out of the cockpit by technology.

• • • •

Racine EAA Chapter 838
NOTAMS
Meetings
Third Thursday's 7:00 pm
Social 6:30 pm
November 2013
Volume XXIV Issue 11
www.Eaa838.Org

Many years ago, Albert Einstein remarked: "I fear the day that technology will surpass our human interaction. The world will have a generation of idiots."

• • • •

The FAA is not concerned about pilot prostate problems.

• • • •

The Government has been giving the entire aviation industry a thorough prostate examination for the last several years.

Thank you sir may I have another.

• • • •

This is very concerning. Our fellow aviators may be losing their jobs because of some arbitrary ruling from the heavy hand of government. I for one will call on NBAA to start working to overturn (or prevent it from being enacted) this. I hope that each and every one of us gets shoulder to shoulder and stands up to this and any other ruling that may endanger any one's ability to make a living.

• • • •

Nobody will lose their job due to sleep apnea. If diagnosed, your medical would be suspended until you get it under control with surgery or ventilated with a C-Pap.....I'm guessing 6 weeks max.

• • • •

Know a delta pilot who had the surgery and was out for 6 months until the FAA med would approve the medical after much testing after the surgery. Painful expensive and if their numbers of over 140000 pilots that could be targeted can you say shut down airlines and corporate aviation.

• • • •

I second your post with personal experience. The Feds are very fussy about apnea.

In 2004 I had a sleep study done for snoring. It was negative for apnea. (I weight 175 and am 6' tall). In 2005 a flatbed truck ran a stop sign, hit me and I ended up with a fractured neck, among other injuries.

After wearing a hard "aspen" collar for 13 weeks, an additional sleep study found severe apnea due to anatomical changes from the collar.

I had the UPPP surgery, which removes your tonsils, uvula, tightens your palate and straightens your septum. It was a very painful recovery and I reported it on my next medical application.

Let the fun begin. The next medical required another sleep study and reports submitted to the region. The application was reviewed and it took nearly 6 months total to get a medical certificate. Each subsequent medical was issued conditionally (mailed by the regional doc) with hard expiration dates. An annual sleep study was required with regular reports submitted by my ENT doctor.

It took 3 years and 6 follow up reports, to get the "conditional" aspect of my medical issuance removed from my certificate.

• • • •

The first thing to happen is that you will not be issued a medical until you satisfy the bureaucracy. This is a problem for the contract pilot. And in this economy there are a lot of us.

• • • •

I question the Federal Air Surgeons legal authority to change the medical requirements of Part 67 without first issuing an NPRM.

• • • •

I was in the Air Force for several years and it sounds like this guy is trying to create a civilian version of the "Fat Boy" program!!!

• • • •

From Aviation International News

FAA Targets Pilots for Sleep Apnea

The U.S. federal air surgeon, Dr. Fred Tilton, plans to demand specific sleep apnea testing for airmen who fit a particular profile. Untreated sleep apnea can be disqualifying to anyone with an FAA-issued medical certificate. In his editorial in the Federal Air Surgeon's Medical Bulletin published last week, Tilton stated that, "OSA [obstructive sleep apnea] is almost universal in obese individuals who have a body mass index (BMI) over 40 and a neck circumference of 17 inches or more, but up to 30 percent of individuals with a BMI less than 30 have OSA." The BMI calculator for the Center for Disease Control indicates a person 5 feet 10 inches tall with a BMI of 40 would weigh 280 pounds. Tilton said that once the policy becomes effective, all airmen medical examiners will be expected to calculate a BMI for everyone who applies for a medical certificate. Anyone found to have a BMI of 40 or more will be required to be evaluated by a board-certified sleep specialist. Specific details about the evaluation were not made clear. Tilton said that once an initial examination of the affected airmen is complete, the FAA plans to gradually reduce the BMI index floor to continue the search for more people potentially suffering from OSA. Industry reaction has

been vociferous about why the new BMI policy was not channeled through the usual process that invites comment from stakeholders. Dr. Tilton said the new policy will be "released shortly." The FAA Federal Air Surgeon's plan to adopt a new policy to monitor overweight pilots at risk of obstructive sleep apnea has the aviation industry complaining of intrusive and unwanted attention. Is the FAA overstepping its mandate, which could cost some pilots their jobs, or does the air surgeon's policy make safety sense? AIN will address this issue in the January 2014 issue and wants to hear what you think. Please contact senior editor Matt Thurber at mthurber@ainonline.com or (310) 306-4039. We will not reveal your name or any other identifying information.

• • • •

House Addresses FAA Sleep Apnea Policy

The U.S. House of Representatives has created a bill that would require the FAA to open a public comment period and apply normal rulemaking procedures before imposing new policy regarding pilot girth, medical testing, and sleep apnea. AOPA and EAA reacted to the announced policy with strongly worded letters "demanding" that it be suspended. They argued that the policy addresses a problem that exceeds the Federal Flight Surgeon's mandate, could add a financial burden to the pilot community, and hasn't been proven to exist. AOPA Thursday expressed its support for the House's legislation and added some choice words.

AOPA president Mark Baker said, "The policy change is arbitrary and capricious and doesn't make sense given the data." AOPA says that a review of ten years worth of general aviation accident data "found no cases in which sleep apnea was a causal or contributing factor." The policy itself specifies that pilots or controllers with a body mass index of 40 or greater be automatically referred to a medical specialist. AOPA argues that the policy will add to a 55,000-case backlog of special issuance medicals and collectively cost pilots anywhere from $99 million to $347 million in new medical fees. As written, the House legislation ensures that any new or revised requirement be adopted "pursuant to rulemaking proceeding." Each sponsoring member of the House is a member of the General Aviation Caucus.

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Publisher Comments

And it goes on, as a profession you can see, from above, how concerning a person's health is to their career in aviation. A lot can be avoided by taking care of one's self with exercise and good eating habits but as a person gets older, the pressure gets greater and pilots have to deal with situations that they have no control over.

For the young people with high aspirations of an aviation career where health may affect the longevity of a career, you must keep a number of things in mind. First you should consider complementing your aviation career with a secondary education that you thoroughly get excited about. Next, there are plenty of quality companies to fly for but unfortunately there are more that you will have to avoid. An employer digs into your character and history to find thinks that may raise a red flag, well the same goes for the person looking for a job, do your homework.

Right now the airlines are a difficult part of the industry to work for, but in the not too distant future, the airlines will have to change for the better if they want people to come into their segment of the industry.

• • • •

Wikipedia

Coffin corner (aviation)

From Wikipedia, the free encyclopedia

The coffin corner (or Q corner) is the altitude at or near which a fast fixed-wing aircraft's stall speed is equal to the critical Mach number, at a given gross weight and G-force loading. At this altitude it is very difficult to keep the airplane in stable flight. Since the stall speed is the minimum speed required to maintain level flight, any reduction in speed will cause the airplane to stall and lose altitude. Since the critical Mach number is the maximum speed at which air can travel over the wings without losing lift due to flow separation and shock waves, any increase in speed will cause the airplane to lose lift, or to pitch heavily nose-down, and lose altitude. The "corner" refers to the triangular shape at the top right of a flight envelope chart where the stall speed and critical Mach number lines come together.

Aerodynamic basis

Consideration of statics shows that when a fixed-wing aircraft is in straight, level, flight at constant-airspeed the lift on the main wing is equal to the aircraft's weight plus the downward force on the horizontal stabilizer; and its thrust is equal to its drag. In most circumstances this equilibrium can occur at a range of airspeeds. The minimum such speed is the stall speed, or VSO. The indicated airspeed at which a fixed-wing aircraft stalls varies with the weight of the aircraft but does not vary significantly with altitude. At speeds close to the stall speed the aircraft's wings are at a high angle of attack.

At higher altitudes, the air density is lower than at sea level. Because of the progressive reduction in air density, as the aircraft's altitude increases its true airspeed is progressively greater than its indicated airspeed. For example, the indicated airspeed at which an aircraft stalls can be considered

constant, but the true airspeed at which it stalls increases with altitude.

Air conducts sound at a certain speed, the "speed of sound". This becomes slower as the air becomes cooler. Since the temperature of the atmosphere generally decreases with altitude (until the tropopause), the speed of sound also decreases with altitude. (See the International Standard Atmosphere for more on temperature as a function of altitude.)

A given airspeed, divided by the speed of sound in that air, gives a ratio known as the Mach number. A Mach number of 1.0 indicates an airspeed equal to the speed of sound in that air. Since the speed of sound increases with air temperature, and air temperature generally decreases with altitude, the true airspeed for a given Mach number generally decreases with altitude.[1]

As an airplane moves through the air faster, the airflow over parts of the wing will reach speeds that approach Mach 1.0. At such speeds, shock waves form in the air passing over the wings, drastically increasing the drag due to drag divergence, causing Mach buffet, or drastically changing the center of pressure, resulting in a nose-down moment called "mach tuck". The aircraft Mach number at which these effects appear is known as its critical Mach number, or Mach CRIT. The true airspeed corresponding to the critical Mach number generally decreases with altitude.

The flight envelope is a plot of various curves representing the limits of the aircraft's true airspeed and altitude. Generally, the top-left boundary of the envelope is the curve representing stall speed, which increases as altitude increases. The top-right boundary of the envelope is the curve representing critical Mach number in true airspeed terms, which decreases as altitude increases. These curves typically intersect at some altitude. This intersection is the coffin corner, or more formally the Q corner.[2]

The above explanation is based on level, constant speed, flight with a given gross weight and load factor of 1.0 G. The specific altitudes and speeds of the coffin corner will differ depending on weight, and the load factor increases caused by banking and pitching maneuvers. Similarly, the specific altitudes at which the stall speed meets the critical Mach number will differ depending on the actual atmospheric temperature.

Consequences

When an aircraft slows to below its stall speed, it is unable to generate enough lift in order to cancel out the forces that act on the aircraft (such as weight and centripetal force). This will cause the aircraft to drop in altitude. The drop in altitude may cause the pilot to increase the angle of attack (the pilot pulls on the stick), because normally increasing the angle of attack (pulling up) puts the aircraft in a climb. When the wing however exceeds its critical angle of attack, an increase in angle of attack (pulling up) will lead to a loss of lift and a further loss of airspeed (the wing "stalls"). The reason why the wing "stalls" when it exceeds its critical angle of attack is that the airflow over the top of the wing separates.

When the airplane exceeds its critical Mach number (such as during stall prevention or recovery), then drag increases or Mach tuck occurs, which can cause the aircraft to upset, lose control, and lose altitude. In either case, as the airplane falls, it could gain speed and then structural failure could occur, typically due to excessive g forces during the pullout phase of the recovery.

As an airplane approaches its coffin corner, the margin between stall speed and critical Mach number becomes smaller and smaller. Small changes could put one wing or the other above or below the limits. For instance, a turn causes the inner wing to have a lower airspeed, and the outer wing, a higher airspeed. The aircraft could exceed both limits at once. Or, turbulence could cause the airspeed to change suddenly, to beyond the limits. Some aircraft, such as the Lockheed U-2, routinely operate in the "coffin corner". In the case of the U-2, the aircraft is required to be flown on autopilot at such conditions.[3] The U-2's speed margin, at high altitude, between 1-G stall and Mach buffet can be as small as 5 knots.[4]

Aircraft capable of flying close to their critical Mach number usually carry a machmeter, an instrument which indicates speed in Mach number terms. As part of certifying aircraft in the United States of America, the Federal Aviation Administration (FAA) certifies a Mach number for maximum operation, or MMO.

Following a series of crashes of high performance aircraft operating at high altitudes to which no definite cause could be attributed, as the aircraft involved suffered near total destruction, the FAA published an Advisory Circular establishing guidelines for improved aircrew training in high altitude operations in high performance aircraft. The circular includes a comprehensive explanation of aerodynamic effects of, and operations near Coffin corner.[2]

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Racine EAA Chapter 838

The People

Meetings
Third Thursday's 7:00 pm
Social 6:30 pm

November 2013
Volume XXIV Issue 11
www.Eaa838.Org

Welcome

New Chapter Members

Rebecca Schmitt	September 2013
Bill Myers	June 2013
Bill Schalk	June 2013
Michael Ratchford	May 2013
Merritt Adams	Feb 2013
Michael Arts	Feb 2013

EAA Chapter Distribution

Chapter 18	Milwaukee
Chapter 217	Kenosha
Chapter 414	Waukegan
Explorer Post 218	Racine
Steve Hedges	AOPA

Sean's Answer

Early boats that were pulled ashore at night through surf did not have a rudder at the stern. The "steering board" (or 'starboard' with the right accent) was near the stern on the right side. However, when docked alongside a pier, the steering board would always be on the side away from the pier. Hence the left side was known as the "Port" side.

Monthly Meetings

Boards Meetings	Second Thursdays	7:00 pm
Chapter Meetings	Third Thursdays	
	Social	6:30 pm
	Meeting	7:00 pm
Shop Night	Every Monday	7:00 pm
Explorer Post 218	Second Thursdays	7:00 pm
	Fourth Thursdays	7:00 pm
Young Eagles	Second Saturday (March - November)	9:00 am

Upcoming Meetings & Speakers

Dec	6th	Christmas Party
Jan	16th	Harold Mester — History of Mitchell Airport
Feb	20st	
Mar	21st	
Apr	17th	
May	15th	
Jun	19th	
Jul	17th	
Aug	14th	
Sep	18th	
Oct	16th	
Nov	20th	

Officers

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Vice President	Daryl Lueck	414-333-4228
Secretary	Tracy Miller	847-420-5098
Treasurer	Steve Jenkins	262-681-2491
Foundation	Steve Myers	262-681-2528

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Roy Stuart	262-884-0371
Jim Senft	262-758-2189
Tony LoCurto	262-412-0019

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Newsletter Publisher	Phil Fountain	M 414-803-5357
Young Eagles	Tracy Miller	847-420-5098
	Chapter Building	262-634-7575