Wing Flap

Monthly Newsletter of the EAA Chapter 52
Sacramento, CA - **October 2021**

Experimental Aircraft Association

FROM The Left Seat Gill Wright

FROM The Right Seat *Jim Hefelfinger*

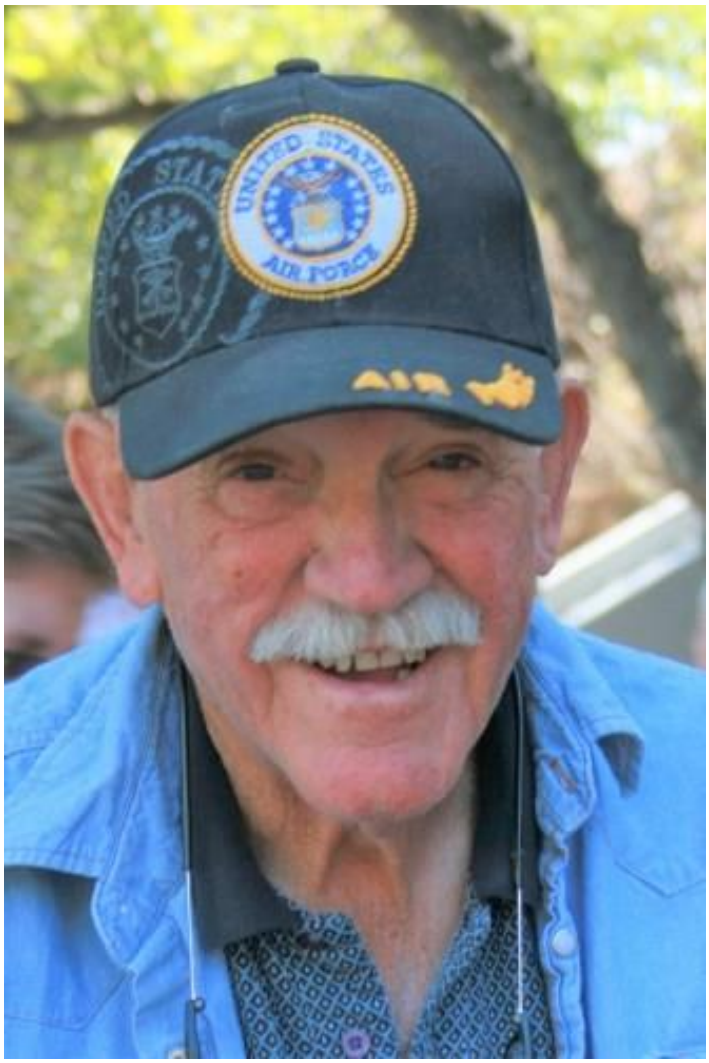
Chapter Outreach **Aviation Club** PGHS after school.
Despite the setback of not being able to be on campus [covid] after starting on campus – relegated now to a classroom zoom meeting - We were able to have a fun meeting learning about aerodynamics through paper airplane folding. Last week's meeting was the classroom portion of the program, this week it was execution of folding a really good design that had the room filled with test flights by the end of the hour.

Objectives for each meeting are to introduce a few aviation careers [selecting unusual ones] , some form of aviation theory, how we measure stuff and terminology, and ending with a hands on project as a topper. I will be able to be on campus shortly through a coaching position once my background check comes back.

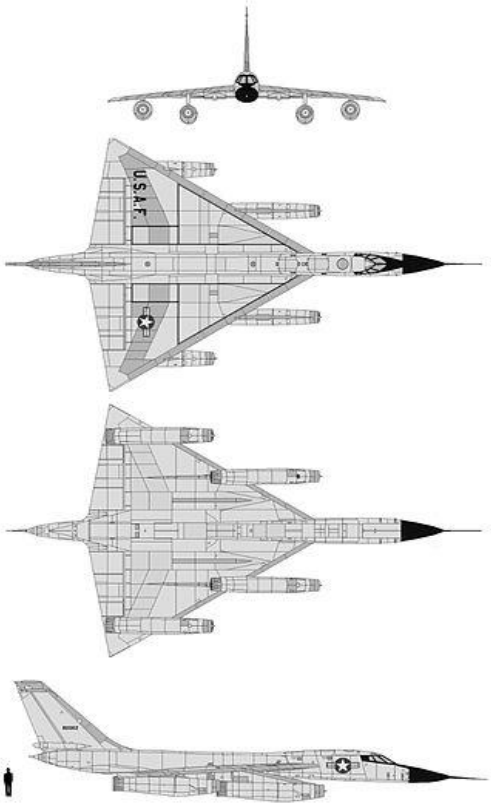
Here is the most excellent introduction to aeronautics I have ever seen and wonderfully produced.
https://www.youtube.com/watch?v=3KqjRPV9_PY
Classroom project - Folding the Phoenix https://www.youtube.com/watch?v=2V55rc58cDg
Folding the world record plane – a bit more sophisticated. https://www.youtube.com/watch?v=B-RUB-qNQ4g

Updates from Owen……

Cecil McLemore Flies West



-We lost chapter member and a good friend to aviation, Cecil McLemore. Cecil's life was a full of aviation, home construction, and friends. Cecil was born July 6, 1936, and raised in the Maryville TN. Taken with aviation at an early age, Cecil escaped rural Tennessee to join the Air Force at the age of 18. Stationed at Travis Air Force Base working on Convair B-58 Hustlers and Boeing B-52 Stratofortresses, Cecil fell in love with California. After leaving the Air Force, he joined the contracting trade and became a prolific custom home and commercial builder throughout the Dixon, Davis, Vacaville, and Woodland communities. But Cecil never lost his love for aviation. Cecil owned and flew a series of airplanes, starting with a Luscombe 8. Cecil loved to share aviation and started a flight school with a few friends and a small stable of rebuilt aircraft. Difficulties with insurance and finding flight instructors kept the fun venture small – but not without its successes. EAA Chapter 52's Cedric Hughes flew Cecil's aircraft to his Private Pilot's License.



Cecil is survived by his wife Ann, and four kids, 10 grandchildren, three great-grandchildren – and three airplanes – a Kitfox that Cecil built, a Cessna 150, and a rare Stinson 10a. Ann is hoping to sell the Kitfox, and is planning on keeping the Cessna or Stinson to fly.

Tailwinds Cecil!

LongEZ Makes Its Debut–

EAA Chapter 52's LongEZ, N81LE, is slowly working its way to first flight. Registration and test flight area modification are still in process with the FAA. Additionally, condition inspection and readiness for flight are proceeding with a thorough inspection and lubrication of all flight controls, inspection of the engine, ceramic coating of the exhaust, installation of a new Lithium Battery, and rebuild of the panel. But even with all this delay, N81LE made its debuted at EAA Chapter 52's last Pancake Breakfast of 2021. Those interested got a chance to get in our new rocket ship. As you can see – we really have something that should inspire a new generation of aviators (as well as some of us old fogies!)

US Navy, Boeing conduct first-ever refueling between unmanned tanker, F-35C

By Megan Eckstein Tuesday, Sep 14

An MQ-25 test asset conducts its first aerial refueling test flight with an F-35C Lightning II on Sept. 13 near the MidAmerica St. Louis Airport in Illinois. (Boeing photo)

WASHINGTON — The U.S. Navy's MQ-25 Stingray unmanned tanker conducted its first aerial refueling with an F-35C Joint Strike Fighter, the third aircraft type to take fuel from the Navy's first unmanned system designed to deploy in a future carrier strike group.

Boeing's T1 test aircraft and an F-35C from the Navy's Air Test Wing and Evaluation Squadron 23 conducted a three-hour mission on Sept. 13, taking off from the MidAmerica St. Louis Airport in Mascoutah, Ill., and then going through a methodical process of linking up and refueling in this test environment. The Navy pilot conducted surveys and evaluations of the unmanned aircraft and the air around it before connecting with its drogue at 225 knots and 10,000 feet altitude. An air vehicle operator at the ground control station then initiated the fuel transfer from T1′s aerial refueling store to the F-35C.

"Every T1 flight with another Type/Model/Series aircraft gets us one step closer to rapidly delivering a fully mission-capable MQ-25 to the fleet," Navy program manager Capt. Chad Reed said in a news release. "Stingray's unmatched refueling capability is going to increase the Navy's power projection and provide operational flexibility to the carrier strike group commanders."

The latest refueling follows a six-hour test flight on Aug. 18, when the MQ-25 refueled an E-2D Advanced Hawkeye for the first time. The E-2D was not originally built to receive fuel in-air but was modified to add the aerial refueling capability in 2019.

"Once operational, the MQ-25 will refuel every receiver-capable platform including E-2," Reed said in a separate news release on the August flight test between T1 and the Navy's Air Test and Evaluation Squadron Two Zero (VX) 20. "This flight keeps us on a fast track to getting the Stingray out to the fleet where its refueling capability will greatly increase the range and operational flexibility of the carrier air wing and strike group."

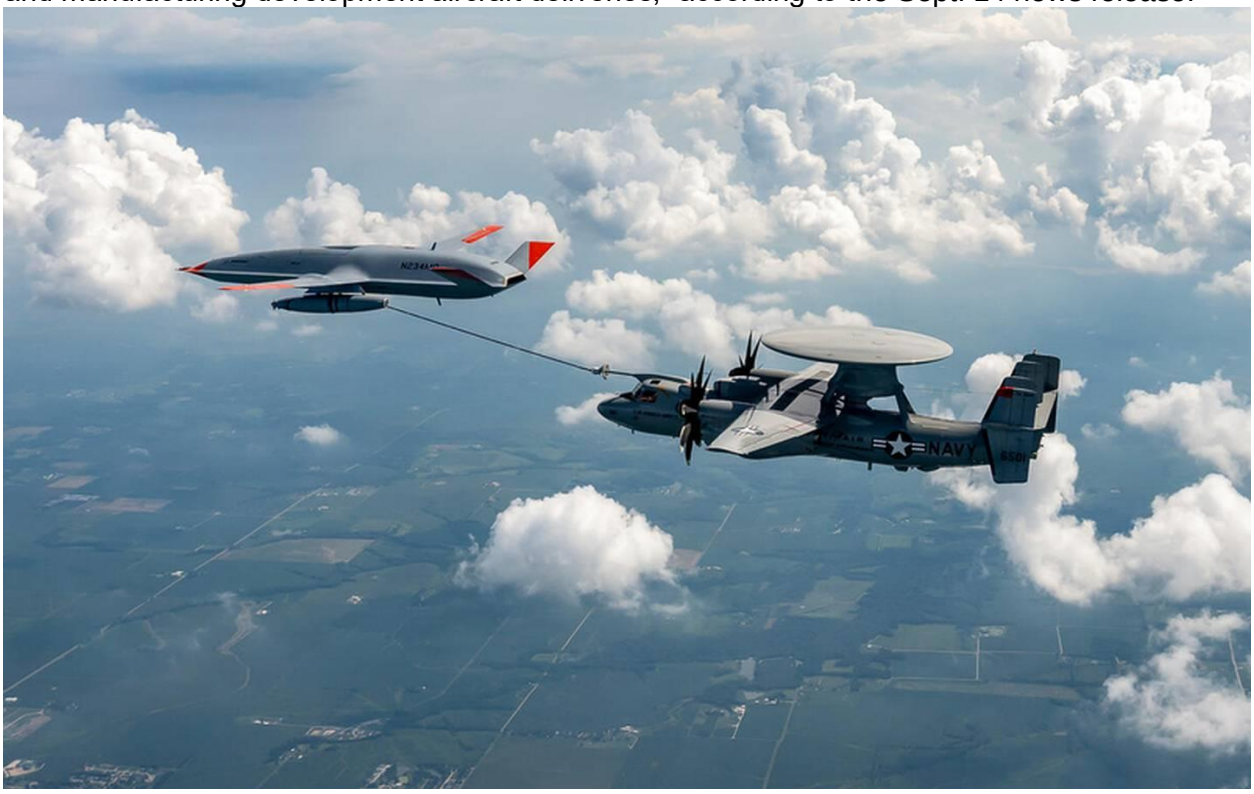
The first aerial refueling test was conducted on June 4, when an F/A-18E-F Super Hornet refueled in air with the unmanned tanker for the first time in naval aviation history. In this first in-air encounter with the drone, a Super Hornet approached to take measurements, made several “dry connects” to practice connecting and detaching from the tanker, and made two actual refuelings, with 300 pounds and then 25 pounds of fuel being passed from the Stingray to the Super Hornet at different altitudes and flying conditions.

Last month, the Navy and Boeing conducted in a virtual environment the first manned-unmanned teaming event between the Stingray and a Super Hornet, where the manned jet bypassed the ground control station and communicated directly with the tanker drone to give directions on where and when to rendezvous for a refueling.

Chief of Naval Operations Adm. Mike Gilday said last week at the Defense News Conference these tests are “really our first foray into the carrier air wing of the future, understanding how we integrate it and how we leverage it, how we’re going to use unmanned and manned together in a way that’s going to be quite effective. "

“We’re learning a lot as we use the MQ-25 off the carrier decks in terms of employing unmanned air into a wing. That’s given us greater insights with respect to the direction we have to move with the air wing of the future,” he added.

In addition to these aerial refueling tests, the MQ-25 has been doing deck handling work and other testing behind the scenes to prepare for fleet introduction. T1 has done 36 flight tests, “providing the program with valuable information on aerodynamics, propulsion, guidance and control in advance of the MQ-25 engineering and manufacturing development aircraft deliveries,” according to the Sept. 14 news release.



The unmanned MQ-25 Stingray test asset conducts its first aerial refueling flight with an E-2D on Aug.18 at MidAmerica Airport in Illinois. (Boeing)

With this third aerial refueling test complete, T1 will enter a modification period to integrate a deck handling system in preparation for a shipboard demonstration this winter, according to the news release.

Because each aircraft type is aerodynamically different and interacts with the MQ-25′s wake differently, these live flights, which feature extensive instrumentation to measure conditions during the refueling, help ensure

Boeing and the Navy understand all the interactions between the manned and unmanned aircraft and can make any needed software adjustments.

The Navy announced last month it would begin standing up a fleet replacement squadron, Unmanned Carrier-Launched Multi Role Squadron (VUQ) 10, later this year, followed by two MQ-25A squadrons, VUQ-11 and 12, that will deploy detachments to the Navy's aircraft carriers.
About Megan Eckstein

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Honeywell Unveils Anthem, the Aviation Industry's First Cloud-Connected Cockpit System
Always-on cloud connectivity provides unprecedented operational efficiency and a clear path to autonomous flight
User experience as intuitive as everyday consumer electronics
Scalable design suits a wide range of aircraft platforms and market segments

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ADS-B On Non-Electric Aircraft? We Answer Your Top Questions ……

NUTS, BOLTS, AND ELECTRONS GA maintenance issues

By Jim Kenney, Paul VonHoene, and Matt Haskin, FAA
The FAA frequently receives questions from pilots and aircraft owners who are curious about ADS-B Out installs on non-electric aircraft, including balloons, gliders, and ultralights. Here are your top questions and answers.

1. My aircraft has a battery to power the radio and transponder. Is that considered an electrical system? No. ⃠

The requirement to install ADS-B Out applies to aircraft certified with an engine-driven electrical system, or one that has it subsequently installed. Simply having batteries or an electric starter would not mean that your aircraft has an electrical system; therefore, it is not required to have ADS-B Out. For example, if you have a generator or alternator attached to the engine to charge a battery, then you have an engine-driven electrical system. If you just have a battery or an electric starter, then you don't.

But what if my aircraft is subsequently installed with a battery? The answer here is also No. See AC 90–114B, Section 3.2.

2. My aircraft has a battery which means I am not required to equip with ADS-B Out, so does that mean I can fly in any airspace I want? No. ⃠

You must remain (1) Outside any Class B or Class C airspace area; and (2) Below the altitude of the ceiling of a Class B or Class C airspace area designated for an airport, or 10,000 feet mean sea level (MSL), whichever is lower. See "Do I Need to Equip" at bit.ly/WhoNeedsADSB, and 14 CFR 91.225 for more.

3. Can I install a battery-powered ADS-B Out system? Yes. 👍

You can install a compliant, battery-powered ADS-B system, but it must be permanently installed. Portable ADS-B Out equipment (also known as "suitcase" units), including system components and antennas, do not comply. See AC 90–114B, Section 4.3.2 for more.

4. What if I have an experimental airworthiness certificate, do I have to install ADS-B Out? No. ⃠

The requirement to have ADS-B Out does not depend on the airworthiness certificate, but it does determine whether or not it needs to be certified. See bit.ly/ADSBOutInstalls (PDF download). Aircraft with a type certificate require certified ADS-B equipment. Experimental aircraft may use non-certified ADS-B equipment. You can install equipment per manufacturer instructions.

5. What are the configuration requirements for the ADS-B Out system, and how do I know it's working? ☑

Your avionics shop and manufacturer can help and advise you on available options and costs associated with any required upgrades. See AC 20–165B. The best way to check your ADS-B is to run a Public ADS-B Performance Report (PAPR) report. It's online, free, with results in 15 minutes: bit.ly/PAPRequest.

6. I am not required to equip with ADS-B Out, but are there any benefits to installing a system anyway? Yes. 👍

See and "B" Seen. ADS-B Out allows other aircraft who have ADS-B In, including those with collision avoidance systems, to see and avoid you, significantly reducing the risk of mid-air collisions. Your chances of a successful search and rescue mission also increases. You are also visible to UAS (drones) operating above 400 feet above ground level.

Situational Awareness. Equipping with both ADS-B Out and ADS-B In gives you traffic information (TIS-B), and flight information (FIS-B), and with 978MHz you get subscription free weather and text-based advisories such as NOTAMs and TFRs. ADS-B In is not required.

Regulatory Roadblock Reduction

#FlySafe GA Safety Enhancement Topic

Jun 11 · 6 min read

An important component of reducing general aviation (GA) accidents is leveraging the rapid growth and evolution of technology in the aviation industry. The General Aviation Joint Steering Committee (GAJSC) believes that the FAA must continue to find ways to help reduce the cost to install safety enhancing technology. Installation of this technology can offer substantial safety benefits, often with minimal risk. The GAJSC also feels that the FAA needs to identify the appropriate level of certification for installation of risk-mitigating avionics. Successful integration of this technology may help the GA fleet reap the potential benefit of reward with a balanced risk approach.

Non-Required Safety Enhancing Equipment (NORSEE) can prevent loss of control.

Breaking Barriers

The high cost of certification has traditionally been a significant barrier for the aviation industry over the years. However, the FAA has made important strides toward removing those roadblocks.
The Sport Pilot/Light-Sport Aircraft (LSA) rules in 2004 marked an important milestone in bringing new aircraft choices to the table. The rule allowed American Society for Testing and Materials (ASTM) consensus standards as a means of certification for LSA. In addition, the safety and technological advances these new designs brought to both airframes and avionics helped drive several more recent developments.
Among these are the simplified design approval requirements for angle of attack (AOA) indicators. This life-saving technology is showing up on new aircraft and is available in a number of more affordable options for retrofit as well. (For more on AOA, see our April 2021 FlySafe topic). The success of this initiative also led the FAA to expand this approach to a broader range of equipment.

Angle of Attack Awareness
#FlySafe GA Safety Enhancement Topic
medium.com

Jetson personal vehicle……

A complete vehicle is $92,000 USD and is delivered to you as a partially (50%) assembled kit for home completion. It contains everything you need, from the aluminum space frame to motor controllers, propellers and motors. You will also receive detailed build instructions.

If you want to have your own Jetson ONE, please contact us for purchase. $22,000 USD deposit to reserve a build slot. We plan to have twelve build slots for autumn 2022, with production starting during the summer of 2022.
https://www.jetsonaero.com/?fbclid=IwAR0U8ATzHG1KhYgIjHboUB1iK2RzvJKE2rqh6nz7Di43egXAljZpGDpp0Uk

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Float planes make their fall migration to the airport from Schwatka Lake on Oct. 12. The lead aircraft is Alpine Aviation's de Havilland DHC-2 Beaver. (Simon Blakesley/Yukon News)

How Does An Attitude Indicator Work?

By Nicolas Shelton 10/09/2021 Boldmethod

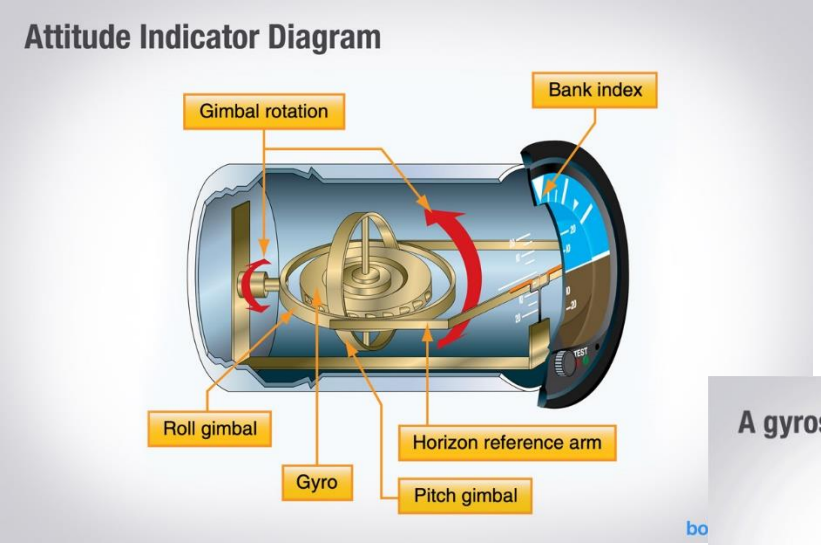
Whether you're flying a Cessna 152 or a Boeing 777, an attitude indicator is one of your most important instruments. But how exactly does it work?

Today we're breaking down how an attitude indicator works, both for round-dial and glass cockpit flight decks.

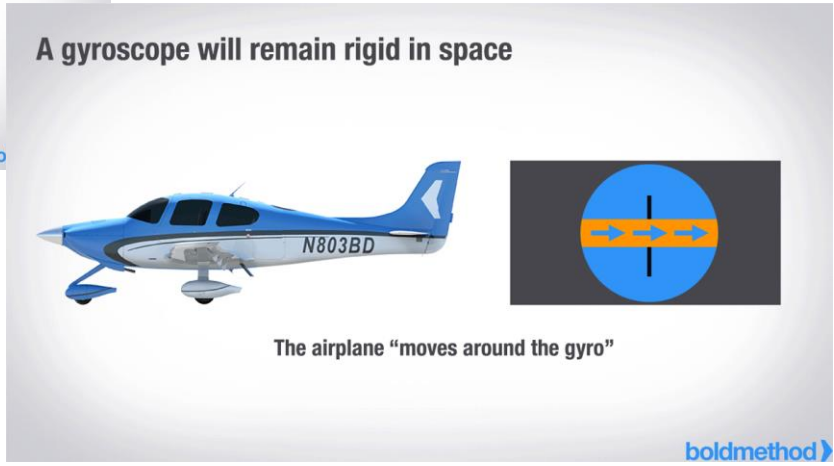
Traditional Attitude Indicators

A typical round-dial attitude indicator has an internal gyroscope that is spun by your plane's vacuum system. Air is pulled through the attitude indicator's scooped rotor, causing the gyroscope to spin.

Mounted horizontally inside your attitude indicator's casing is a gyro that will spin in place. Mounted to the gyro arms is a card with lines depicting degrees of pitch, and on the outside, degrees of bank.



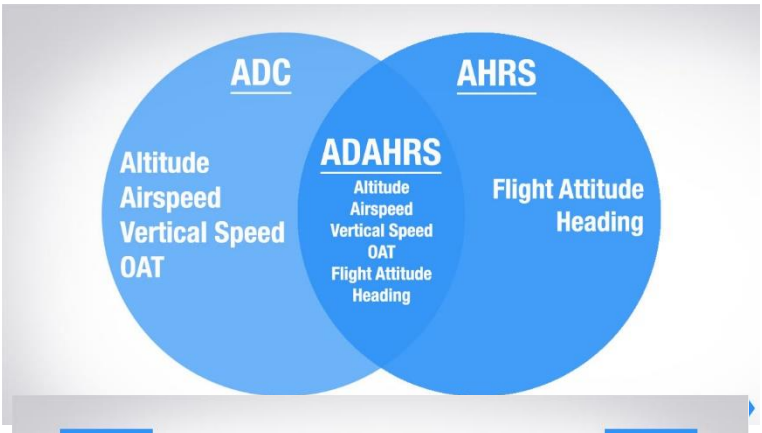
How Does It Determine Pitch?
The simplest way to think about how your flight attitude is determined is to visualize your plane moving around the gyro, rather than the gyro moving.
A traditional attitude indicator measures your aircraft's pitch and bank by the principle of rigidity in space. The gyroscope will remain in the same position as long as it is spinning

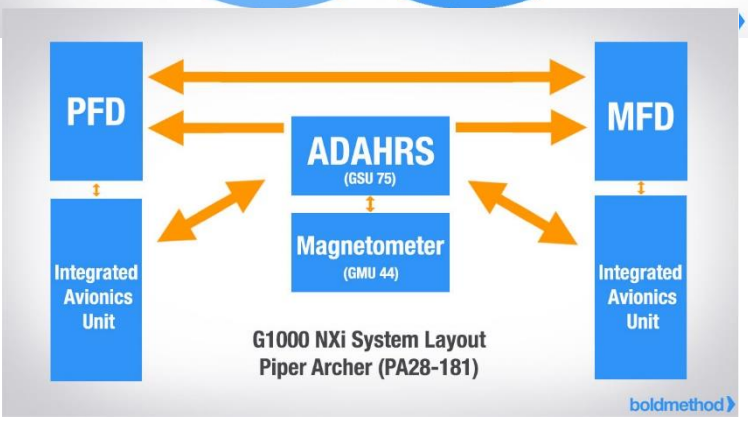


(and abrupt attitude changes do not occur).

Solid-State Attitude Indicators
New solid-state avionics don't have the spinning parts used in round-dial attitude indicators. Instead, they have a version of an AHARS or ADAHRS. AHARS stands for Attitude, Heading Reference System, while ADAHRS stands for Air Data Attitude Reference System.

In some planes, you will find an AHRS and ADC, while others may have a combined ADAHRS. Check your Avionic's Pilot Guide to figure out what your plane has.
System Components
In this explanation, we'll use the G1000 NXi installed in a PA28-181 aircraft. There will likely be small differences between your aircraft and this example, but the principles will likely be the same.
The G1000 NXi system is made up of LRUs (Line Replaceable Units). Think of these as the building blocks of the system. Each box is an LRU.

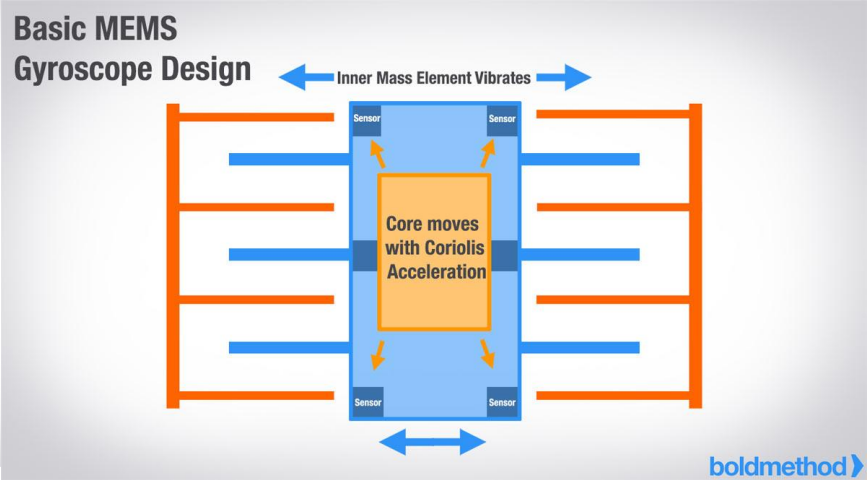




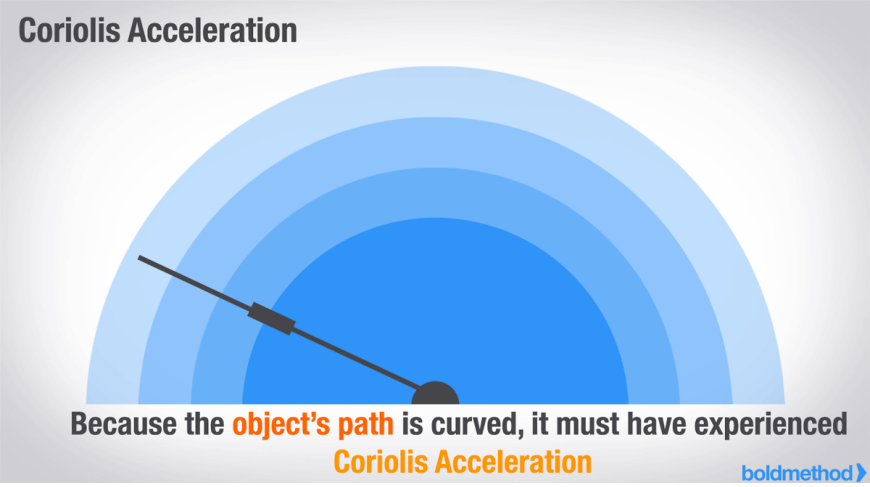
The ADAHRS unit communicates your flight information to the integrated avionics units, as well as the flight displays. You'll also notice that there are multiple linkages to each LRU. This is done for redundancy.
How Does This Determine My Attitude?
The attitude information is processed in the GSU 75 Unit.
Your plane's attitude is calculated using two solid-state gyros. One is set vertically, and the other is set horizontally. Accelerometers within the GSU 75 unit, as well as a magnetometer, help filter out small vibrations and irregularities to make your attitude indicator movements appear smooth.
How Do These Solid-State Gyros Work?

So how do solid-state gyros calculate your attitude information? The answer lies within a component about the size of a quarter, called a Micro ElectroMechanical System, or MEMS for short.

FAA AMT Handbook Volume II fig. 10-98



MEMS gyroscopes have a vibrating element that can determine attitude based on the energy transfer of Coriolis acceleration. (AMT-Airframe Volume II 10-56)



Simply put, the vibration element within the MEMS unit acts as a gyroscope and provides attitude information depending on how the frequency of the vibrations change.

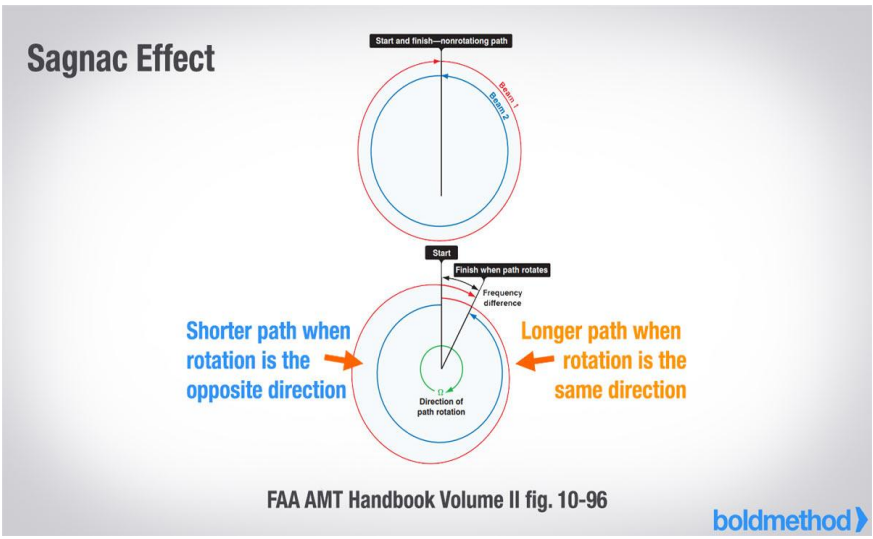
MEMS microchips are often combined with accelerometers, GPS units, and magnetometers to form a complete AHRS unit.

Laser Ring Gyros

Older glass instruments might have a laser ring gyro (LRG). These systems use the Sagnac Effect to determine pitch and bank information.

Sagnac Effect is the principle in which light takes longer to travel around an object that is rotating in the same direction as the light is traveling, and less time if the object is rotating in the opposite direction.

As you change your aircraft's attitude, the LRG is rotated, and the wavelength of the lazer light is changed, allowing the AHRS unit to process the change in attitude. An LRG unit is required for each axis of flight.



FAA AMT Handbook Volume II fig. 10-96

Putting It All Together

If you're flying a round-dial system, your attitude indicator uses a spinning gyro and the principle of rigidity in space to display your attitude information.

If you're flying a modern glass cockpit aircraft, your attitude information is calculated using solid-state accelerometers, often with the help of a magnetometer.
And finally, if you're flying a transport-category aircraft, your attitude information may be calculated using a laser ring gyro.

Technology….. E Power

Next generation E- Motors.
The science - https://www.youtube.com/watch?v=8EEVPVNJHjM
The application : https://www.youtube.com/watch?v=o-rfAifj6cc

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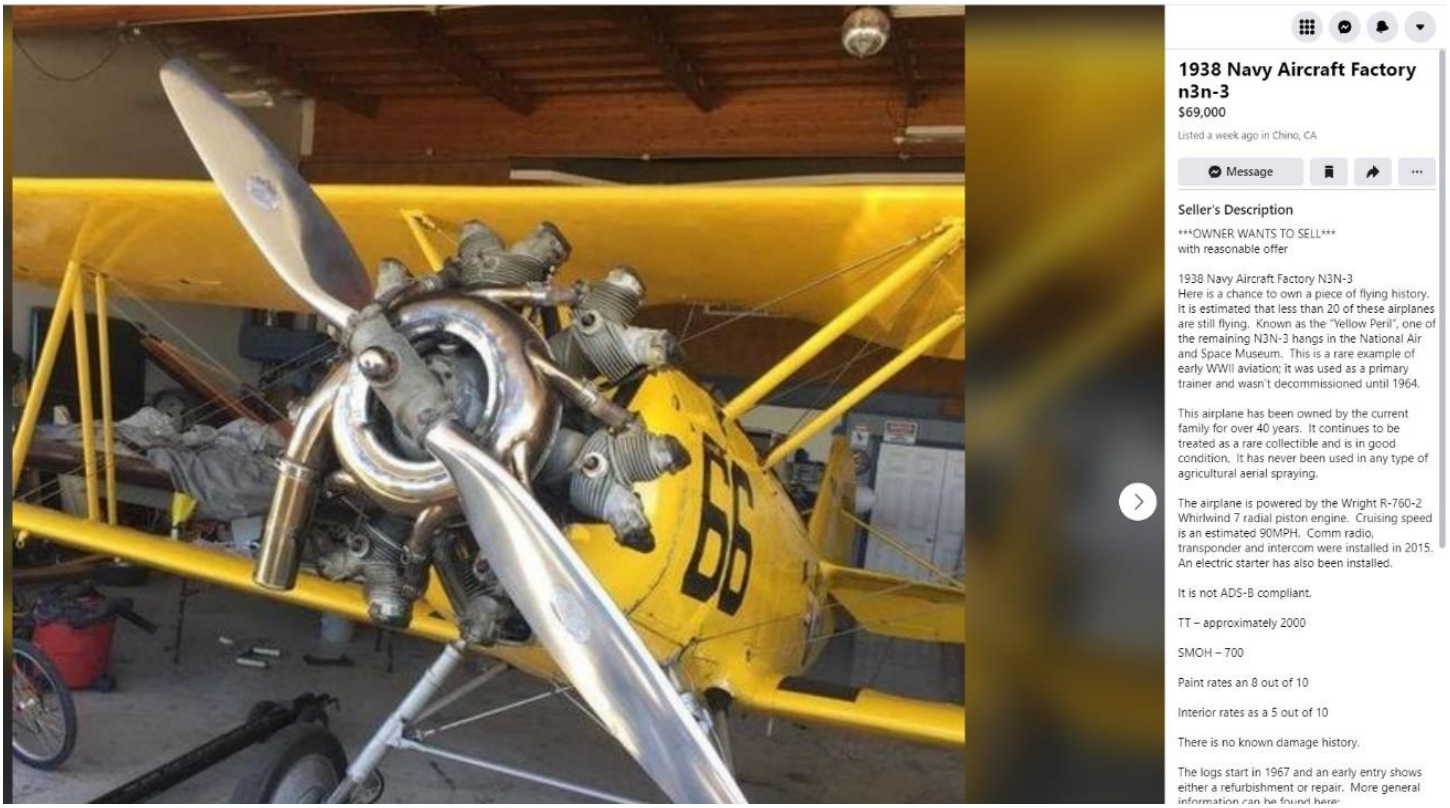
Own a piece of HISTORY…



https://www.trade-a-plane.com/search?make=NAVAL+AIRCRAFT&model_group=NO+MODEL+GROUP&model=N3N-3&listing_id=2385403&s-type=aircraft

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For Sale

Bendix AV8OR GPS - $25 – see jim Heffelfinger
Kuntzleman - DOUBLE DUAL MAGNUM – SYSTEM 12 volt Model with Driver and Two STANDARD STREAMLINE Heads – New - $100. jimheffelfinger@gmail.com
Giving away a mid-tower PC
MB: ASUS 88 GPU on board gpu R7 RAM: 16 GB DDR3 - HD/SSD – none, slots for 4 drives
PS: 400 w , Disc media drive – None – empty bay. Jim Heffelfinger

Remembering Captain John "Wild Bill" Crump (Spokane County, Washington), and "Jeep", the only coyote who flew in combat during WWII.

After graduating from high school, Bill joined the USAAF and prepared to fight for his country. One day, during his pilot training, he found a little coyote, which he named "Jeep", and the pair became inseparable. In a world ravaged by war, Bill couldn't wait to go overseas and confront the forces of tyranny...but not without his four-legged friend, so he smuggled Jeep aboard the RMS Queen Elizabeth and they both went to England.

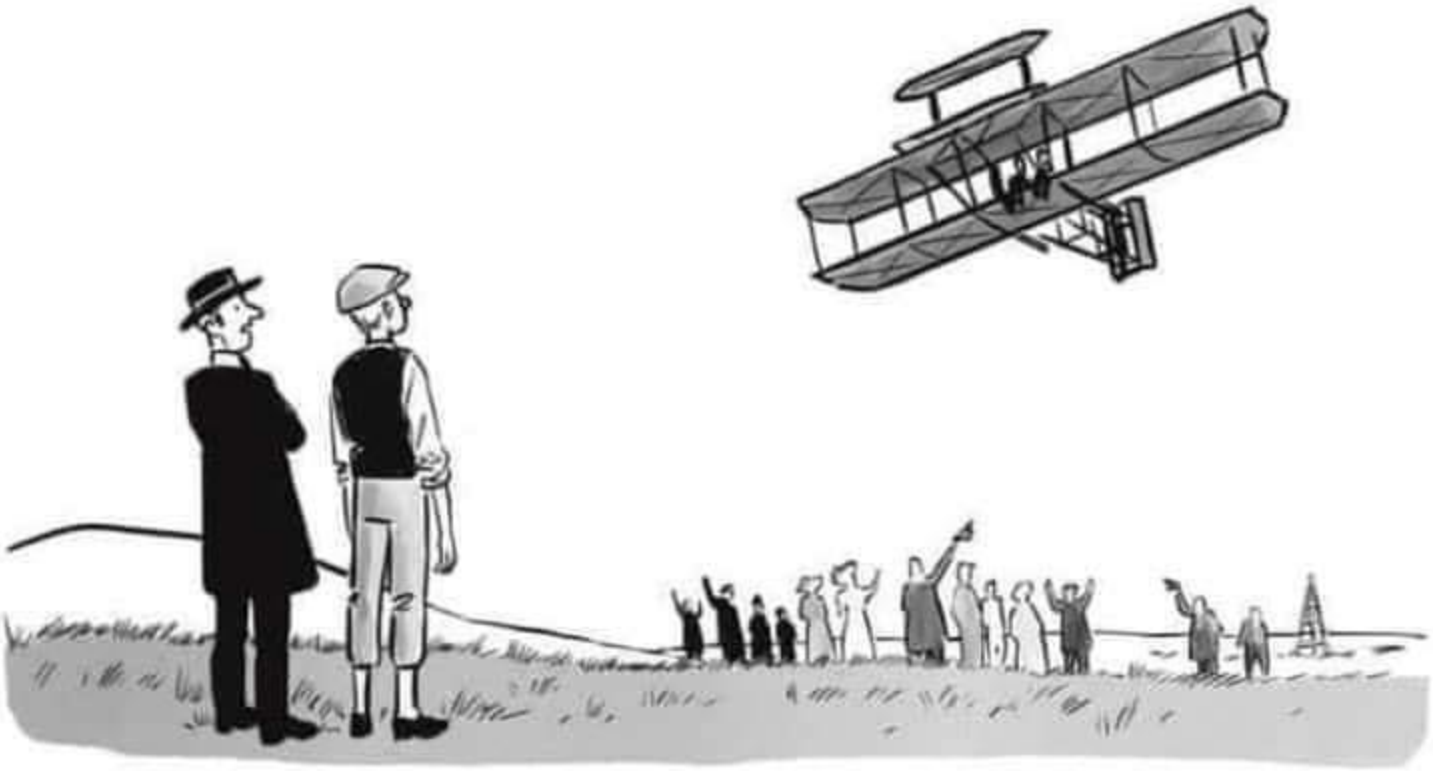
The coyote became a formal member of the 356th Fighter Group, had his own dog tags, and accompanied Bill on five combat missions. Sadly, on October 28, 1944, Jeep was run over by a military vehicle at Playford Hall, Ipswich, and died of his injuries. He was buried with full military honors at Playford Hall, where a plaque marks his resting place.

To honor the memory of his faithful friend, Bill decorated his P-51 Mustang (named Jackie) with a portrait of Jeep. He then flew 77 missions, risked his life to liberate Europe, and managed to survive the rest of the war. In 1992, Bill returned to Playford Hall and spent a moment at Jeep's gravesite. This true American hero passed away in 2008. ✝️
Fallen, yet not forgotten! 🇺🇸🙏🇺🇸
https://fallenyetnotforgotten.com

FAA history
https://medium.com/faa/from-shrimp-boats-to-satellites-5ac78598ff26

Be first to identify October's and September's Mystery Airplane by emailing chapter52.news@gmail.com

Mechanics Corner



"Well, what I see is my bike not getting fixed."

FROM THE EDITOR(s)

We are trying several different formats for the newsletter – feedback would be appreciated. Nick is trying to get his feet under him in a back-in-class environment. Jim H is supporting.

If you would like to contribute a story or news article it would be great. All submissions should be emailed to no later than the 15th of the month. Remember if you submit an article from a publication; please include the name and date of publication so that proper credit can be given. Chapter52.news@gmail.com.

IF YOUR MEMBERSHIP HAS LAPSED let me encourage you to re-engage! We miss you and your involvement in Chapter 52!

If you would prefer to be removed from our mailing list, just drop an email to Chapter52.news@gmail.com requesting to be unsubscribed and we will do so promptly.

BOARD MEETING

2nd Tuesday of each month
7PM-9
Zoom

Meeting ID:

858 9594 7691

Passcode: 63860

(Interested members always welcome!)

CHAPTER 52 MEMBERS MEETING

Last Tuesday of each month
7:00 PM
Zoom
https://us02web.zoom.us/j/86295420288?pwd=ZzFxeXNRU0NZZWRRL0pmbHBFYjJXQT09

Meeting ID: 862 9542 0288
Passcode: EAA52

October Pot-Luck

October 30 – 2:30

Aviators'

Plan for 5-6

December 11 – Holiday Gathering and Installation of the 2022 Board