



August 2023

## ***EAA Chapter 1387 Newsletter***



**President's Corner** | August 2023 | Brett Siefert

Plane bearings or plain bearings?

If you're interested in engine oils, gear oils, wet and dry lubricants, anything having to do with the lubrication of (typically) mechanical wear items then you likely already know that tribology is the science and study associated with these and other types of lubrication. Aviation powerplants and airframes are solidly within the scope of this discipline and it pays to know a thing or two about what you're putting in and on your investment, especially as lubrication-related failures can obviously be catastrophic to both people, machines, and property.



You say tomāto, I say tomāto ... you say motor oil, I say engine oil. I think of motors as electrical, whereas what propels our aircrafts with their reciprocating pistons, fuel combustion, and other features are engines. Many simply interchange these terms, or more commonly use “motor-“ for everything. It really doesn't matter in this context but “engine” is what I'll stick with. Alright, so you may have a preferred engine oil or one you use because it's the only one that's been in a particular engine, or it's what was recommended by a mechanic. Maybe you don't really care, so long as it is available and does its job. That's fine, but it is surely helpful to know what the oil is supposed to do, and why it does eventually break down, and why it's quite important that the chosen oil is up to the task of essentially keeping you alive.

Mineral oil was used in aviation powerplants into the 1950s, even sometimes beyond, but with the advent of higher power densities—which typically means higher heat output, along with tighter tolerances, changing metallurgy, and advances in the lubricants themselves, there became a need for lubricants that could withstand these more extreme conditions. Turbine engines demand even more from oil, especially regarding heat transfer. However, relying on an engine oil in an aviation engine compared to that in an automobile is a whole different risk profile and thus aviation oils really need to be right for the task. Changes in any mass-market engine lubricant do not happen quickly, and perhaps thankfully so. At least, it's a good thing to run only products that have been tested and certified to appropriate and relevant standards. Bringing a new oil to market can take a decade or so, in large part because of the mandated testing. The products available to general aviation pilots and mechanics are fairly well established (heck, some formulations are almost the same now as they were over 50 years ago). But then again, the engines themselves are relics in a way, at least with the typical opposed cylinder, air- and oil-cooled Lycomings and Continentals in many production and experimental aircraft. Why, though? It's in large part because the engine designs are proven and reliable, as are the engine oils made for them. There are market factors at play as well but that is not the scope here.



What has changed, and/or what is changing? Hybrid propulsion systems, for one. Will an all-electric plane still need a lubricant? Yes, it will, even if mainly for cooling a high-output motor. Will it be the same lubricant type we use now? Almost certainly not. In the turbine world, the heat is hotter, and getting hotter still. And can one lubricant serve acceptably in a system that employs a gas engine coupled with an electric motor that then runs to a final drive? Maybe... I think necessity will be the mother of these inventions but will these products be marketable in step with the speed at which the propulsion systems evolve?

What about engines that are not based on older architecture, are not looser-tolerance air- and oil-cooled, with relatively low compression ratios? Rotax has dominated certain markets for awhile but newcomers have joined and they're often really good engines. Liquid cooling, gear reduction, much tighter bearing tolerances, higher specific outputs—what does this require of an engine oil? These manufacturers know their engines and of course recommend what oil should be used. Even the fuel type used affects what the oil must do, whether it's with leaded or unleaded fuel, its octane rating, diesel or jet-A versus gas, etc. Rotax, but they are not alone, supplies engines to motorsports and other markets too, and applies lessons learned across markets. For example, oils suitable for some motorcycle engines (I really want to say enginecycle but oh well) that can perform in a gearbox and/or in a wet clutch system can also perform well in certain aircraft engines and gearboxes because the loads and demands are similar. That, and the limitations are similar too. A synthetic oil can have superior properties with respect to temperatures, oxidation, wear and maintaining viscosity but can be entirely unsuitable for say, rotary engines. Or, in a wet clutch system where some additives can adversely affect performance and lifetime of the lubricant because friction is reduced too much.

If you're into tribology then you've likely already dove down many rabbit holes as you discovered and learned about lubrication. Or you may be the type who isn't very excited about oils and greases but you do want to use the right product in the right way. Wherever you fall on that continuum, the important thing is that it's...well, important. I would argue that anyone operating an aircraft should know a thing or two about the materials and chemicals used in that aircraft, especially if you are the person performing some of the maintenance and specifying what is used in your plane. Oil-related problems and failures are not as common as before, and really should be one of the variables we can control such that virtually all the associated risk is mitigable. But it does require a baseline level of knowledge, and adherence to known best practices. At a minimum, a pilot should know the correct oil type and viscosity that belongs in the engine of the plane being flown—whether it's yours or someone else's--and should be able and actually does check the level and appearance of the oil and knows how to top off the crankcase.

This has only scratched the surface of all things aviation lubrication (but a good lubricant would prevent that scuffing). Different topics excite different folks, for sure, but if this topic is at all interesting to you, it appears there will be developments and advancements in the field as applied to the newest and forthcoming powerplants that will represent major change from the previous six decades or so, and even the last one.



See you at the August meeting!

Event: EAA 1387 Meeting

Date: 9 August 2023

Time: 7:00 PM

Location: Lincoln County Health Department Community Room

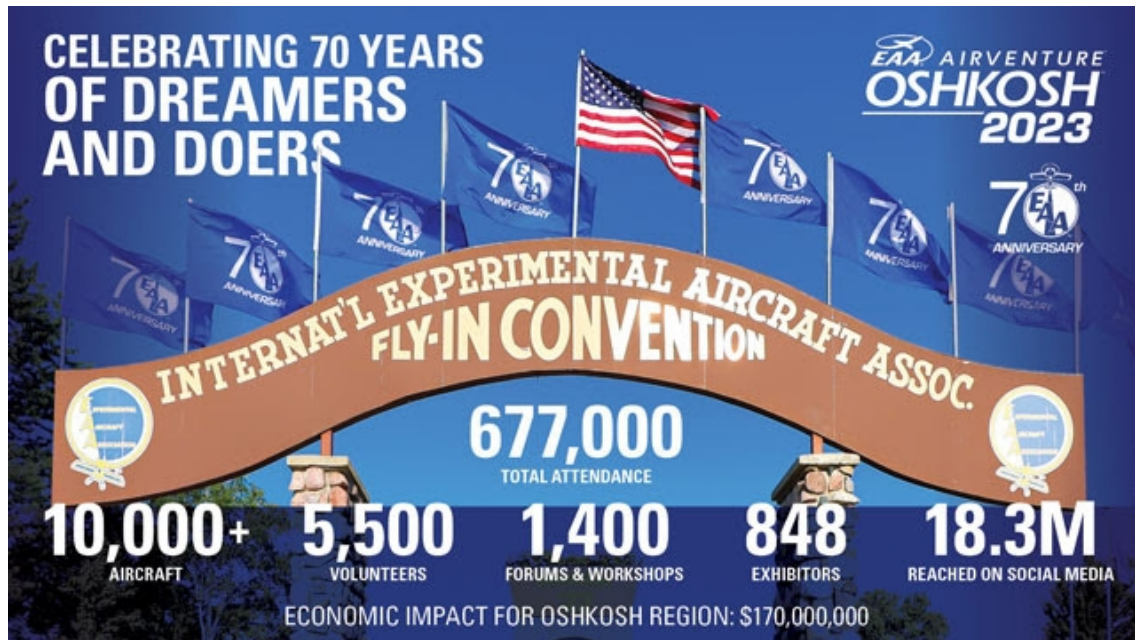
5 Health Department Drive

Troy MO 63379

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## EAA AirVenture Oshkosh 2023 Facts and Figures



This year's annual convention turned out to be another record-setting year.

"There was so much going on during the week that encompassed the entire world of flight, from the presence of the U.S. Air Force Training Command and NASA, to magnificent aircraft restorations and exciting new flying technology," said EAA Chairman and CEO Jack J. Pelton. "Oshkosh was again the place that brought the aviation world together."

This year's attendance was approximately 677,000, up from the previous record of 650,000 last year. But attendance numbers weren't the only record.

"We had record-setting totals of campers, exhibitors, volunteers, and more," said Jack. "It was also a challenging year at times with weather, logistics, and other factors, which makes me even more proud of the efforts by our volunteers and staff to organize an outstanding event."



Here are some additional details from this year's fly-in:

**Total aircraft:** More than 10,000 aircraft arrived at Wittman Regional Airport in Oshkosh and other airports in east-central Wisconsin. At Wittman alone, there were 21,883 aircraft operations in the 11-day period from July 20-30, which is an average of approximately 148 takeoffs/landings per hour when the airport is open.

**Total showplanes:** 3,365 including a record 1,497 registered in vintage aircraft parking, plus 1,067 homebuilt aircraft, 380 warbirds (up 3 percent from 2022), 194 ultralights, 134 seaplanes and amphibians, 52 aerobatic aircraft, and 41 rotorcraft.

**Camping:** More than 13,000 sites in aircraft and drive-in camping accounted for an estimated 40,000 visitors.

**Volunteers:** More than 5,500 contributing in excess of 250,000 hours.

**Commercial exhibitors:** 848 (another record number).

**Forums, Workshops, and Presentations:** More than 1,400 sessions hosted throughout the week.

**Social media, internet, and mobile:** More than 18.3 million people were reached by EAA's social media channels during AirVenture (up 78 percent over 2022), with engagement of 1.9 million; More than 189,000 hours of viewing EAA video clips online also occurred during the event (more than double the 2022 total).

**International guests:** International visitors returned in a big way in 2023, with 2,372 attendees registering the International Visitors Tent from a record-tying 93 countries outside the U.S. Adding a significant number of international visitors who do not register at the tent when they arrive, the actual total is much higher.

**The Gathering:** The EAA Aviation Foundation's annual event to support its aviation education programs attracted more than 1,000 people and raised more than \$2 million dollars that will be focused on EAA's mission of growing participation in aviation.

**Media:** 863 media representatives on-site, from six continents.

**Estimated economic impact\*:** \$170 million for the five counties in the Oshkosh region (Winnebago, Outagamie, Fond du Lac, Calumet, and Brown).

\* - based on 2017 University of Wisconsin Oshkosh economic impact study

By the time you read this, planning for EAA AirVenture Oshkosh 2024 has begun in earnest. "We are already looking at a number of big activities, including the 100th anniversary of the Royal Canadian Air Force," said Jack. "Plenty of ideas have also been forwarded to us from EAA members and others that will be part of the planning for 2024."

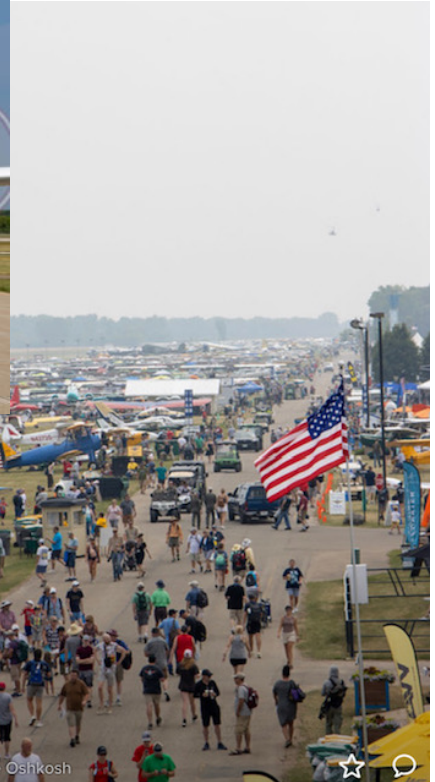


## Chapter 1387 at AirVenture

23-27 July 2023

Many thanks to those who made the trek to Oshkosh. It's been called Slosh-kosh in the past and this year was no exception. There's always a little rain in ones aviation life!











## NEWS FROM HQ

In this month's Chapter Video Magazine, Jack Pelton gets you up to date on EAA happenings: (No August video out yet, this is from July...)



Chapter 1387 Events for 2023. Always looking for membership inputs on what everyone is working on or what you'd like to share with the Chapter. Building projects, Items of Interest, etc. would be ideal. Please review and send me your input to share! Thanks, Joe V.

### Chapter 1387 Calendar of Events - 2023

#### Aug

- YE Update and AirVenture in Review

#### September

- 2 Sept, Sat - YE Rally at Mexico ( Moved to Oct due to the Holiday)
- Jeff Schans – Lycoming Engine Tech Rep Presentation – 13 Sept
- Chapter Poker Run Fly Out (Tentative)

#### October

- 7 Oct – YE event for Trail Life (Venue TBD)
- Member Input - Volunteer Needed

#### November

- Officer Elections – President and Vice President
- Member Input - Volunteer Needed

#### December

- Chapter Christmas Social
- Election Results
- Chapter Renewal by 31 Dec for HQ



## VMC Question of the Month

**Question:** When planning a VFR departure, particularly at night in higher terrain or when obstacles are present, what is the standard climb gradient that an aircraft is expected to be able to meet to clear obstacles?



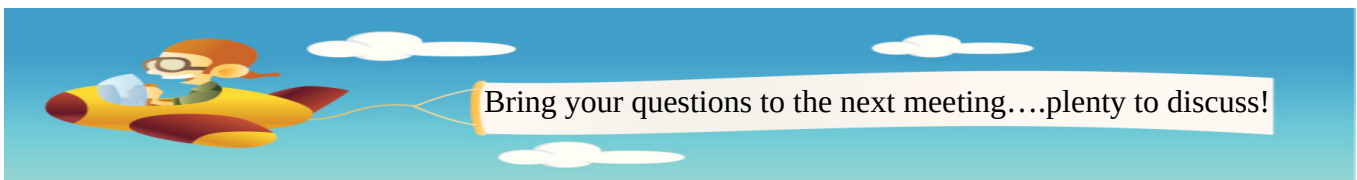
**Answer:** The standard climb gradient for departure is 200 feet per nautical mile, and in many cases, is insufficient to clear obstacles. We can dip into the readily available instrument procedures to find the required climb gradient to avoid obstacles.

If the standard climb gradient is not adequate to ensure terrain clearance, a non-standard climb gradient is determined, and a “T” in an upside down triangle is depicted on approach plates for the runway in question. The required climb gradient is provided in the published Takeoff Minimums, (Obstacle) Departure Procedures (ODP) and Diverse Vectors (Section L of the U.S. Terminal Publications).

Note that the climb gradients are provided as feet per nautical mile (nm), rather than climb rates feet per minute. Pilots can use the chart provided to calculate their climb gradient for their ground speed and climb rate (feet per minute). Note that the climb rate is dependent on aircraft weight and the prevailing density altitude.

Source: AIM paragraph 5-2-9.e

Suggestion: Create a table for your own aircraft using your rate of climb at several density altitudes and your normal climb airspeed in knots.





## August in aviation history.....

### AUGUST 2

1911 — The first woman in the United States licensed as a qualified pilot is Harriet Quimby, a drama critic.

### AUGUST 3

1921 — Lieutenant John A. Macready of the United States Army Air Corps finds a new use for airplanes when he sprays a patch of ground infested with caterpillars. This practice becomes known as crop dusting.

### AUGUST 4

1959 — The first medical evacuation by helicopter from a Mobile Army Surgical Hospital (MASH) team takes place when a Sikorsky S-51 Dragonfly transports a casualty from a fire along the Pusan Perimeter.

### AUGUST 8

1908 — Wilbur Wright makes his first flight in Europe by flying the Wright Flyer A from the racetrack at Hunaudières, 5 miles south of Le Mans, France.

1910 — The first aircraft tricycle landing gear is installed on the United States Army's Wright airplane.

### AUGUST 12

1946 — President Harry Truman signs a bill authorizing an appropriation of \$50,000 to establish a National Air Museum in the Smithsonian Institute in Washington, D.C. The small museum eventually becomes the National Air and Space Museum—the most visited museum in the world.

### AUGUST 15

1922 — First delivery of an automobile by air. The Aeromarine flying boat Buckeye carries a Ford car from Detroit to Cleveland in 90 minutes.

1951 — Test pilot Bill Bridgeman reaches a record altitude of 79,494 feet msl in the No. 2 Douglas D-558-II Skyrocket (BuNo 37974, c/n 6568, NACA-144) rocket research aircraft, although this does not qualify for FAI (Fédération Aéronautique Internationale) recognition.

1958 — Congress approves a bill creating the Federal Aviation Agency (FAA) to regulate all United States commercial and military aviation.

**AUGUST 17**

1946 — The first person to be ejected from an airplane by means of its emergency escape equipment is Sergeant Lambert at Wright Field in Ohio.

**AUGUST 19**

1871 — Orville Wright is born in Dayton, Ohio. He is co-inventor, with his brother Wilbur, of the first airplane to achieve powered, sustained, and controlled flight, and the first fully practical powered airplane. Orville piloted the famous first flight at Kill Devil Hills, North Carolina, after winning a coin flip against his brother.

1929 — The first metal airship built for the United States Navy makes its first flight. The ZMC-2 is a 22,600 cubic foot helium balloon supported by transverse metal frames and longitudinal stiffeners with a thin metal covering forming the outer skin.

**AUGUST 24**

1956 — A United States Army helicopter becomes the first rotary-winged aircraft to fly nonstop across the United States.

**AUGUST 25**

1949 — National Airlines tells the Civil Aeronautics Board that “reduction in fares are essential to placing its operations on a sound economic base.”

**AUGUST 26**

1959 — President Eisenhower replaces his airplane with a jet, a USAF VC-137A, which is a modified Boeing 707 jet airliner. The switch allows the President to cut his travel time in half.

**AUGUST 27**

1910 — Radio is first used to send messages between the ground and an airplane when James McCurdy both sends and receives messages from a Curtiss biplane at Sheepshead, New York, using an H.M. Horton wireless set.

**AUGUST 29**

1949 — The United States Senate OKs a 70-group United States Air Force.

**AUGUST 30**

1933 — Air France, France's national airline, is formed.

**AUGUST 31**

1932 — Air Corps pilots flew 5 miles above the Earth's surface to photograph an eclipse of the Sun.



Oshkosh from Space.....

An unobscured image taken on July 27th. (PHOTO © 2023 PLANET LABS INC. ALL RIGHTS RESERVED. REPRINTED BY PERMISSION)





## Upcoming EAA Webinars

EAA gratefully acknowledges the support of Aircraft Spruce and Specialty Co. for their generous sponsorship of EAA webinars. **Registration is required, and space is limited.**

| Date    | Time   | Title  | Presenter(s)   |
|---------|--------|--|--|
| 8/8/23  | 7 p.m. | <b>Homebuilt</b>   | Paul Dye   |
|         | CDT    | <b>Highlights from AirVenture 2023 Homebuilders Webinar Series</b> | <i>Kitplanes Magazine's Editor at Large Paul Dye and EAA's homebuilt community manager Charlie Becker will cover the important homebuilt news, products, and just plain cool aircraft that caught their attention at AirVenture 2023. Even if you attended AirVenture 2023, put this one on the calendar as you just can't see it all.</i>   |
| 8/9/23  | 7 p.m. | <b>Unbelievable</b>  | Mike Busch   |
|         | CDT    | <b>Compressions Qualifies for FAA WINGS and AMT credit.</b>        | <i>The FARs require a differential compression test to be performed at every annual inspection, but it's a really terrible test that is neither reliable (i.e., repeatable) nor a valid indication of cylinder health. In this webinar, Mike Busch, A&amp;P/IA, demonstrates its shortcomings, explains its pitfalls, and emphasizes why poor compression alone should never justify cylinder removal unless backed up by more trustworthy supporting evidence such as a borescope inspection.</i> |
| 8/16/23 | 7 p.m. | <b>Vintage Aircraft</b>  | Tom Charpentier  |
|         | CDT    | <b>Parts Substitution Qualifies for FAA WINGS and AMT credit.</b>  | <i>The EAA government advocacy team gives a briefing on the various FAA policies used to keep vintage aircraft in the air, including the FAA's new Vintage Aircraft Replacement and Modification Article (VARMA) program.</i>  |
| 8/23/23 | 7 p.m. | <b>Swift Fuels</b>   | Chris D'Acosta   |
|         | CDT    | <b>Unleaded Avgas Qualifies for FAA WINGS and AMT credit.</b>      | <i>Chris D'Acosta, Swift Fuels CEO, will discuss current and future Swift Fuels plans for the transition to an unleaded fuel for piston aircraft. Chris will share what's happening with their high-octane 100R unleaded avgas product and their premium UL94 unleaded avgas.</i>  |
| 8/30/23 | 7 p.m. | <b>Introduction to</b>   | Doug Stainbrook  |
|         | CDT    | <b>Siemens Solid Edge CAD Program</b>                              | <i>Doug Stainbrook with Siemens Solid Edge provides a basic program overview and demo of the Siemens Solid Edge computer-aided design (CAD) program made available to EAA members by Siemens. Learn how to take advantage of this powerful 3D modeling tool and create complex 3D models using a variety of parametric and direct modeling techniques.</i>   |
| 9/6/23  | 7 p.m. | <b>Legal</b>   | Mike Busch   |
|         | CDT    | <b>Interpretations Qualifies for FAA</b>                           | <i>We all love the FARs, right? Those regulations are written and maintained by a large team of FAA lawyers who work for the FAA Office of Chief Counsel. If</i>   |

**WINGS and AMT credit.**

*you have a question about the meaning of a particular rule, you can request a "legal interpretation" and usually the responsible FAA attorney will draft one for you. More than 1,000 of these legal interpretations can be found online. Some are quite surprising and counterintuitive, and some significantly alter what most of us thought the regulations mean. In this webinar, Mike Busch, A&P/IA, reviews some of the most interesting, surprising, and significant ones that pertain to aircraft maintenance.*