APS *NEWS*

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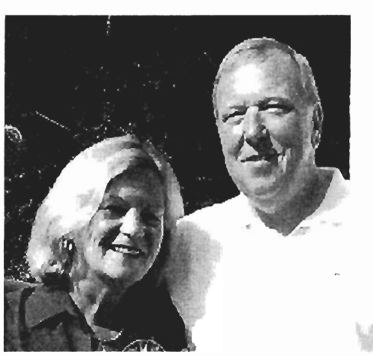
Soaring The Swiss Alps

On 14 August, 2003 ASA member Manfred Ringel self-launched at 12:50 PM from Eschenlohe, his home airfield in Germany, and soared his Ventus 2cM Southwest toward the Alps. It was one of the best days ever for soaring, according to Manfred, with thermal strengths up to 1,200 fpm topping at 16,000ft. His tour of the Alps took him over some beautiful Alpine areas including: Landeck, Patznaun, Samedan, Bernia Glacier, Ofen Pass, Wildspitze, Brenner Pass, Gross Glockner, Gerlos Pass, and Aachensee. Cloud base was between 14 and 16,000ft. His flight of 4.7 hours covered approximately 350 miles. The photograph above was taken at 13,000ft and is a spectacular view of Samedan and its airfield. Samedan, is a famous resort area and a favorite soaring site located in a deep valley in Switzerland. The field elevation is 4,700ft msl.



Manfred is a retired Lufthansa Captain with 23,000 total flight hrs including 3,900 hrs in gliders. His first glider solo flight was in 1961 at the age of 18. He and his wife Hertha live in Bernried, a small village about 32 mi southwest of Munich. They have visited Minden in the summer for the past eight years where Manfred flies his Ventus 2cM. He and a partner own another Ventus 2cM based in Germany.

Altitude-13,800msl; Airspeed-74mph

CARB-WISE

Temperature, Altitude
&
Humidity Affect Carburetor Performance

The carburetor's sole purpose is to deliver the correct mixture of fuel and air to the engine. Unfortunately, one of these variables, air, changes depending on the weather. As temperatures rise during the heat of the day the air molecules spread further apart and the air becomes less dense with fewer oxygen molecules in a given volume of air. Similarly, as altitude increases the air density decreases. Humidity, water molecules in the air, also displace oxygen molecules. These changes in air density can have a profound affect on carburetor performance.

Temperature

As the air temperature increases, the air density falls. This will make the air-fuel mixture richer. The reason is less oxygen content in the air but no change in the amount of fuel being supplied by the carburetor. In order to regain the perfect air-fuel mixture its necessary to "jet down" (chose smaller jets or adjust the high and low speed needles) to compensate for the lower air density. Conversely, cooler air temperatures will necessitate more fuel i.e. larger jets or opening the needle settings.

Altitude

Generally speaking as altitude increases the air density decreases. This will require less fuel flow to compensate for the lack of oxygen content at higher altitudes. Less oxygen and less fuel means less power. A higher compression ratio helps to make the most of the "thin air".

Humidity

Humidity, water molecules in the air, also displace oxygen molecules making the air less dense. This will make the air-fuel mixture richer and will require less fuel flow to compensate for the lack of oxygen content in the humid air.

Carburetor Adjustments

A motorized sailplane's carburetor/s should be adjusted for maximum performance (rpm) at the home airfield's altitude and average temperature at least once a year. If the motorglider is moved to a higher or lower field altitude another adjustment is necessary. Yes, as the motorglider climbs to a higher altitude a richer mixture will become present. Conversely if flown from a high altitude airfield to a lower altitude airfield the mixture will become leaner. While these changes in mixture are not large, when operating at a lower field altitude the mixture must be adjusted to a richer value. The signs of a lean mixture are high CHT, possible backfiring and loss of power (rpm) especially on application of full power. Its best to be a tad rich than a tad lean regardless of field altitude.

ASA Members Set Motorglider Records in 2003**

STATE RECORD

Single-Place MG, Arizona

In late May and early June, 2003 several Arizona Motorglider State Records were established by Mike Parker (ASH-26E) and Steve Dashew (DG-800B):

Distance around a Triangular Course
Parker and Dashew 472.1 mi.
Speed over a 750km Triangular Course
Parker-64.4mph
Speed over a 100km Triangular Course
Dashew-78.63 mph
Out and Return Distance
Parker and Dashew-467.4mi
Speed over a 750km Out & Return Course
Dashew-56.8mph
Free 3-Turnpoint Distance
Parker-549.9 mi.
SSA Distance Awards Total Points
Dashew-1515.10
Parker-1512.79

Washington

Free 3-Turnpoint Distance
Eric Greenwell 240.4mi ASH-26E
Speed over 300km Triangle
Eric Greenwell 67.8mph ASH-26E
Nelson Funston 76.07mph Nimbus 4M
Free O&R Distance
Eric Greenwell 190.9mi ASH-26E
Speed over 100km Triangular Course
Nelson Funston 80.7mph Nimbus 4M
Speed over 200km Triangular Course
Nelson Funston 80.64mph Nimbus 4M

Wisconsin

Absolute Altitude/Altitude Gain
Daniel L. Johnson 10,010ft/8,124ft Ventus CM

US NATIONAL RECORDS

Single-Place MG

Speed over 1,000km Triangular Course (Claim)
Mike Parker 76.1mph ASH-26E Tonopah, NV
Distance around a Triangular Course (Joint Claim)

Mike Parker ASH-26E and Steve Dashew
DG-800B-1,008.5km Tonopah, NV
Out&Return Speed 1,000km 73.73mph (Claim)
Rick Howell ASH26E, 10-02-03 Julian, PA
Free Dist Out and Return 1,027.24km (Claim)
Rick Howell ASH26E 10--02-03 Julain. PA

Multiplace MG

Speed over a 500km Triangular Course (Claim)
Allan Martini and Deborah Kutch Stemme S10-VT

67.97mph

** claims and data as of Dec 5, 2003

The Sailplane Pilot & Stalls and Spins

When was the last time you entered a spin on purpose and made a recovery and how much altitude was lost after the recovery to level flight?

Inadvertently stalling and entering a spin while in the landing pattern can be fatal as there is not enough airspace between you and the ground to complete a recovery. And this is where many stall/spin accidents have claimed lives. The best that can be hoped for in this low to the ground stall/spin situation is to neutralize the elevator and aileron controls and apply full rudder against the spin but there will still not be enough airspace to recover from the spin and return to level flight. It's a lose/lose "coffin corner" situation. This can be termed an "incipient" spin that progresses slowly but surely as the stalling speed increases when the angle of bank is increased. The high wing can drop (stall) suddenly and the aircraft can roll inverted as the spin begins. Gusty cross-wind conditions contribute to this type of stall/spin.

A stall/spin in the landing pattern is possible when overshooting the runway center line and increasing the angle of bank to return to the centerline or when making an angling approach that requires a steeply banked final turn to line up with the runway. If it appears you are going to overshoot the centerline, the safe alternative is to close the spoilers, if open, reduce the bank angle while lowering the nose to increase airspeed and return to the centerline using a milder bank angle. Yes, you may overshoot but its best to accept that fact and return to centerline using a more gentle bank angle. FLY THE AIRPLANE.

The classic spin recovery taught at altitude is:

1. Stall the aircraft by continuous application of up elevator and apply full rudder at the stall to induce the spin. In many sailplanes it takes a determined effort to induce a spin and may require generous use of crossed controls (aileron and rudder) which can cause the glider to flip inverted opposite the rudder applied. You know you have entered a spin if suddenly the bird is inverted.
2. Neutralize ailerons and elevators (Center the stick).
3. Apply full opposite rudder against the spin. (If the spin speeds up you have applied the wrong rudder).
4. Apply forward stick firmly (down elevator).
5. As the spin stops (you may be in a vertical dive) gently and firmly apply up elevator to regain horizontal flight. A hard yank can put the bird back in the spin.
6. Once in level flight, relax and note the altitude loss.

At a safe altitude, it may be possible to induce a landing pattern incipient spin:

1. Extend landing gear and flaps (if installed) and 1/2 spoilers. Note your altitude.
2. Begin a 180 degree descending turn at pattern airspeed (55-60kts) at a 40 degree angle of bank.
3. After 150 degrees of turn steepen the bank to 60-70 degrees and decrease airspeed to 50 kts.
4. As the controls start to get mushy, reduce the angle of bank while lowering the nose, close the spoilers and increase airspeed.
5. If a near stall occurs note your altitude loss. If a stall/spin occurs, close the spoilers and proceed with the classic spin recovery. Note your altitude when in level flight.

Submitted by Pete Williams and edited by Steve Wiley

Letters to the Editor

"Lethal Distractions" Nov-Dec 03 APS News

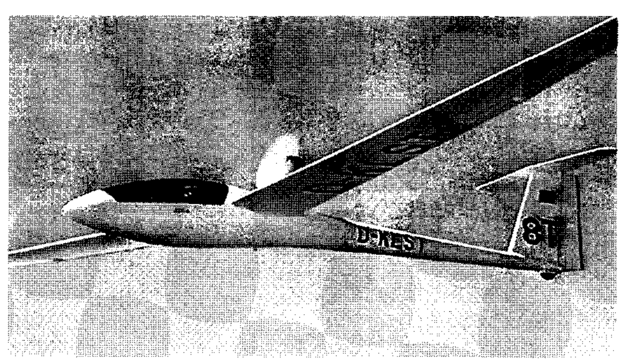
Robert Mudd CFI A/G

In the Nov-Dec. issue of the APS news Dave Wiley, (a Designated Examiner) is quoted about his dislike of the 200 ft. call out during aero tow and says students told him that after calling 200 ft. they could "make it back to the airport." He proved that cannot always happen by pulling the release and apparently landing off the airport a time or two. Mr. Wiley says he did not "Believe in it as a standard" however neither does Tom Knauff and he is the chief advocate of the 200 ft. call out.

Going back as far as a 1982 article titled "Premature Termination of the Tow", Tom clearly states that " This minimum altitude would have to be raised to take into consideration aircraft performance, pilot abilities, wind, and density altitude." He goes on to say that " Even if you are above 200 ft., it still might be better for you to land off field in that giant field that requires no risk than to attempt a low turn that you have never practiced." I do not believe Tom has changed his stand on this in subsequent years. It is a point where your options change and others can come into play, that is all.

Tom Knauff

I'll take this opportunity to quote from my book, "Glider Basics From First Flight To Solo:" "Normally, the minimum altitude from which a glider pilot can safely accomplish a 180 degree turn is 200 feet. This minimum altitude would have to be raised to to take into consideration aircraft performance, pilot abilities, wind, and density altitude." The book continues to explain this minimum altitude is nearly universally accepted around the world. Further, the minimum altitude for today's conditions needs to be determined before takeoff. So, it is highly possible to have a 300 ft, 400 ft or 500 ft minimum turn around altitude, and there may not be a safe turn around altitude in some rare conditions. Pete's point of only announcing "200 ft" while disregarding other considerations is well taken. The above descriptions are also in my book, "Transition To Gliders."



LS-8T in powered flight

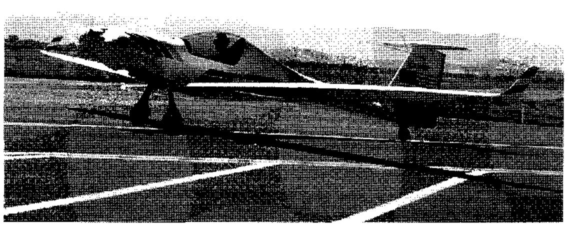
How's Your Log Books?

Do you maintain two log books, one for the engine/airframe and one covering your flight time? Are you regularly logging each flight including engine hrs and total air time. Do you log the route of the flight? Do you note any engine or airframe problems in the engine/airframe log book? Accurate and legible record keeping is a must especially if an accident or incident occurs. The log books are the only documents that record the history of your flight time and your glider.

Alisport Silent IN USA Sales

There are currently 8 Silents in the US. All are 12m self-launchers and 2 of these were kit built. There are three Silent 2 self-launch sailplanes scheduled for delivery this Fall/Winter. Of these, one is a kit. There is a fourth order for a 13m ship about to be finalized. Sales have been stronger in Europe since there are no currency exchange influences and the factory backlog is good (about 7 to 8 months).

Submitted by USA Dealer Leo Benetti-Longhini <info15@alisport.com>



Pilot Impressions
CARAT Motorglider

The first USA-delivery of an AMS Flight Carat was last Aug 23rd. By mid-September Oliver Dyer Bennet, the dealer, had completed 100k, 200k, 300k, 320k, 400k and 500km flights checking out the soaring ability of the Carat. The last flight a 500km out and return was at a respectable 69.1mph. Oliver believes the discus-winged Carat has proved itself to be quite capable of long distance engine off operations.This may be a first for a tractor-engined motorglider and as such sets a new standard.

Joe Stuart is the owner of the Carat and he is quite satisfied with the high quality of workmanship, ease of trailering and flying. Another local Minden pilot David Bingham liked the Carat's smoothness of engine starting and stopping as well as its climb rate and overall maneuverability.

POWER

The first self-launch of a retractable engine sailplane was in 1935 when the British Carden-Baynes Auxiliary left the ground powered by an air cooled 2-stroke 9 hp motorcycle engine. Since then much has transpired in the development and installation of a retractable engine in a high performance sailplane. In 1966 Scheibe introduced the 15-meter SF-27M powered by an air cooled 26hp 4-cylinder, 2-stroke Hirth engine. Schempp-Hirth took the lead in 1974 by building seven Nimbus 2 Open Class sailplanes equipped with a 55hp air cooled 2-stroke Hirth engine. This was followed by Eri Avion's PIK-20E in 1978 and DG's 400 in 1981 both using a 43 hp air cooled, dual cylinder, dual carburetor 2-stroke Rotax engine.

2-Stroke Engine Applications: The 53hp two-cylinder, single carburetor, water-cooled Solo 2625 powers the DG-800B/808 series and the Schempp-Hirth Ventus 2CM. Solo's 63hp 2625, equipped with dual carburetors is currently installed in the DG-505MB, Schempp-Hirth Nimbus 4M and 4DM. The 2- stroke engines used in the new "light" powered sailplanes are all air-cooled. They are the dual cylinder 39hp Rotax 447 (TesT's TST-10 and Albaster's Apis M), the single cylinder 28hp MZ35 with carburetor (Russia's AC-5M) and the 28hp A302efi single cylinder with electronic fuel injection (Alisport"s Silent Series).

Rotary Engine Applications: The Diamond AE50R Wankel-Rotary is the prime power plant used in Schleicher's ASH 26E, ASH 25M and ASW-22BLE. This 50hp engine was originally installed in these aircraft. However an electronic fuel injected version AE50 Mi with an output of 56hp is currently installed in serial production ASH 25Ms and ASW-22BLEs. The AE50 was initially designed and produced by MidWest Engines in England and is now produced by Diamond Aircraft Industries in Wiener Neustadt, Austria.

Down Draft Carburetion: The down draft carburetor was designed to operate in a vertical position. Once the engine is retracted to the horizontal, there is a tendency for the fuel in the carburetor passages to seep out into the air filters. This tends to saturate the air filters with fuel which can impede the flow of air into the throat of the carburetor. Removal, inspection and cleaning of the air filters is a good idea if the aircraft is not flown regularly or has been trailered for some time.

Fuel Injection: Two-stroke and rotary engine fuel injection using a Fully Automated Digital Electronic Control (FADEC) system programmed with an Electronic Control Unit (ECU) is the wave of the future. Such a system does away with weeping carburetors, adjusting air and mixture controls and choking for starting. The system also automatically adjusts fuel injection flow as the density altitude changes. This system controls the power plant, providing it with the correct fuel, air and ignition ratios required for optimum performance with minimum fuel consumption. With electronic fuel injection, the air to fuel ratio is delivered with much greater accuracy. This results in greater longevity for all engine components. It also releases the pilot from having to adjust the engine at different altitudes. At this writing the Wankel AE50 Mi and the Alisport A302efi engines are equipped with electronic fuel injection.

Pete Williams

CUSTOM TOW BAR

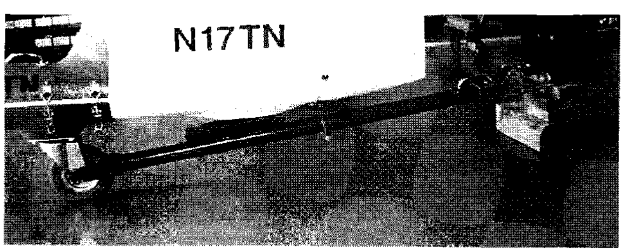
Relieves Stress on Tail Boom

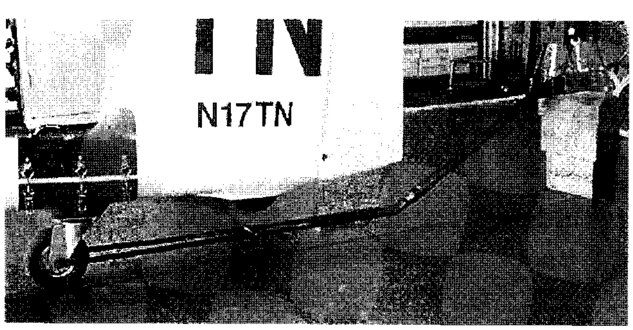
I have recently learned that at least one US glider repair shop has seen damage to a motorglider that was attributed to the use of a ground tow bar of the type that lifts the tail. Picture 1 shows an example of such a tow bar. When the tow bar is attached to an automobile it lifts the tail of the glider. Neat arrangement, but in so doing it places a large upward force on the tail wheel and a large downward force on the tail dolly. These two opposing forces create a bending moment in the tail boom between these two points. The heavier the tail, the larger the bending moment and apparently in this case the tail was heavy enough to create a bending moment large enough to damage the fiber in the tail boom. This probably happens over time and is exacerbated by shock loads due to driving over bumps. Repair of such damage is neither easy nor cheap. As I understand it, the problem has not been observed on the non-self-launching versions of similar gliders due to their lower tail weight.

I was concerned enough to develop an alternate tow bar that keeps the tail dolly wheel on the ground and does not stress the tail boom. Picture 2 shows the result. The main part of the tow bar is thin wall, mild steel tubing. The tow bar attaches to the tail dolly axle via a fork made of 4130 aircraft tube. To attach the dolly the legs of the fork are deflected outward by hand to slip over the axle - just like a Cessna nose gear tow bar. The attach point of the fork to the bar is a pinned slip joint; there is a second pinned slip joint at the lower bend of the tow bar, so the bar comes apart easily into three short sections. The tow bar was made long enough to give me ample clearance between the elevator and the spare tire on my van to accommodate sharp left turns - something that always made me nervous with the short lift-the tail tow bars I've used in the past. Those of you who use a lift-the-tail tow bar or something like it with your motorglider may wish to reconsider. I developed my tow bar with Rich Roberts, who also fabricated it for me; if you would like one, Rich may be willing to make more. You may contact him at: rcroberts@netzero.net.

Submitted by Jerry Kaufman <gjk@fc.hp.com> Pho: 970-898-4453 (CO)

Alfred Spindleberger of COBRA Trailers submitted this comment: "We have two systems for motorgliders with steerable tail wheel, One lifts the tail, but there is a saddle for the tail boom, so the tail wheel is free and has no load on it. The other is with a hinge on the tail dolly. This one does not lift the dolly during driving, but with this tow bar you can lit the tail boom. This makes it easy to put the tail dolly on or to remove it."





Apis Production & Support Taken Over By AMS

News out of Slovenia is that AMS has taken over the production, development, and support of the Apis line of gliders from Albastar. Who, you may justifiably ask, is AMS and what is their background? In September 1999, AMS was established, under the leadership of Ales Cebavs and Matjaz Slana, to continue the existing aircraft production line of Elan's Flight Division. This was the long-time builder of gliders for Glaser-Dirks, now DG Flugzeugbau. As of August 2003, a combined record of 1000 JAR-22-certified sailplanes and powered gliders were produced by Elan (909) and AMS (91). Aircraft built include the Carat, DG-303 ELAN, DG-505 ELAN, DG-1000S, and DG-1000T. AMS has 50 employees and its own engineering team.

Now, AMS has acquired the rights to the Apis line of gliders including the Apis WR FAI, Apis 13, Apis 15, and Apis M self-launch sailplane. Further developments of the Apis line are on the drawing board. In a sense, the Apis has come home as the development team got their training at Elan building gliders for DG. This move will insure the smooth production, and continued refinement, of the Apis line. Albastar's specialty is R&D, but AMS has the production experience, staff, and backing to continue Albastar's good work. AMS is a certified manufacturer and authorized distributor of DG-Elan-AMS Sailplanes and the Carat Motorglider. They are also a certified supplier of composite aircraft components. AMS Sales Projections for 2004 are 2.6 million EUR For more information visit their web site at: <www.ams-flight.si>

This news release submitted by Robert Mudd

President's Message

By now most of you have made up your mind to attend the SSA Convention in Atlanta Feb. 5,6,&7, '04. If you haven't you will be missing a fantastic get together. The organizers of the Convention have been working hard to present a program that will be of interest to everyone. With over 50 exhibitors, and 25 speakers, the opportunity to view interesting new equipment will be very important for all glider pilots. There should be a number of auxiliary-powered sailplanes including several new aux-powered sailplanes that have recently come onto the market.

The ASA is sponsoring two presentations concerning auxiliary powered sailplanes and gliders. This includes a presentation by Mr. Karl Weber, of DG Sailplanes, who will talk about what is new at DG and also the merger between DG and Rolladen-Schneider. The other presentation will be by Mr. Wilhelm Dirks, of DG Sailplanes, who will talk about the new NOAH cockpit evacuation system he designed for DG. The ASA Breakfast will be a highlight of ASA's presence at Atlanta. Wilhelm Dirks will be honored for his involvement in the development of the Aux-powered Sailplane. This will also be a time to honor this years champions both in the motorglider class of the "Return to Kitty Hawk" and those that took part in the "Alamogordo Soaring Camp".Pete Williams will give an update of 16 years with ASA because it was in Atlanta in 1988 that the ASA was founded. Let's have a good ASA turn-out. Looking forward to seeing you at Atlanta !!

Skip Atwell, Pres. ASA

Avgas v.s. Autogas - AKA Who's on First ?

By Gary Evans, DG808B, GE1

The question of which U.S. fuel is the best choice for our 2 cycle self-launcher engines has been kicked around for a long time with no clear answer emerging. Without taking a personal position on the subject I've listed on some rro's and con's that may be helpful in your personal decision-making. The chemical composition of gasoline is very complex but the factors important to us are not that hard to understand. The most important single factor in any fuel selection is octane. Octane rating is important, as it must be high enough to prevent pre-detonation for each specific engine. Simply put, the octane rating of the fuel reflects the ability of the unburnt gases to resist spontaneous auto ignition under the engine test conditions used. If auto ignition occurs, it results in an extremely rapid pressure rise, as both the desired spark-initiated flame front, and the undesired auto ignited end gas flames are expanding. The combined pressure peak arrives slightly ahead of the normal operating pressure peak, leading to a loss of power and eventual overheating. The end gas pressure waves are superimposed on the main pressure wave, leading to a saw tooth pattern of pressure oscillations that create the "knocking" sound. That knocking sound is the audio evidence of what is called detonation and it has the capability of doing major engine damage. The effect on pistons is similar to being hit repeatedly with a hammer and it can crack pistons and collapse the top ring land in short order. It is therefore critical that the octane be high enough to prevent detonation under all conditions. There is no penalty for octane being higher than necessary except for the higher fuel cost. To complicate our understanding of requirements there are different octane rating systems in use in the U.S. and Europe.

In the U.S. gasoline pumps typically post octane numbers as an average of two different values. Often you may see the octane rating quoted as (R+M)/2. One value is the research octane number (RON), which is determined with a test engine running at a low speed of 600 rpm. The other value is the motor octane number (MON), which is determined with a test engine running at a higher speed of 900 rpm. If, for example, a gasoline has an RON of 98 and a MON of 90, then the posted octane number would be the average of the two values or 94. In Europe only the RON method is used and the German language version is ROZ. There is typically an 8-10 point difference in the two rating systems for any given batch of gasoline. If you average, you'll find the pump rating for U.S. RON/MON is about 4-5 points less than the European ROZ rating for the same fuel. European octane rating of 95 is therefore equal to a U.S. octane rating of 90/91 so fuel meeting the European manufactures recommendation is readily available here. For clarity all octane ratings in this article have been converted to the U.S. standard of R+M/2. You will find little consistency in manufactures recommendations for octane levels on our 2 cycle aircraft engines. For example the Solo manufacturer recommendations for their 2625 engine fuel are as follows. The stated compression of this engine is 9:1. 91 octane leaded or unleaded or - Avgas 100LL(only if 91 octane is not available) or -Mix 50% Avgas 100LL and 50% Unleaded min 88 octane

Rotax, one of the leading manufactures of 2 cycle aircraft engines on which compression runs as high as 11:1, recommend only octane of 87 and Hirth engines with compression up to 10.6, recommends 91 octane. Obviously the manufactures either have significantly different opinions on octane requirements or the engines themselves are engineered with quite different combustion properties. Another less technical reason could be that recommending a leaded fuel would simply be politically incorrect and marketing new engines today that require leaded fuel may even have legal ramifications. So, is our common U.S. auto gas octane adequate for our 2 cycle engines or not? The manufactures state that it is, but let's take it a little further. While the exact octane requirement of a given engine will be based upon its combustion chamber design, load and corresponding operating combustion temperature there are general guidelines that have been around for a while.

Compression Ratio	Octane Number Requirement
5:1	72
6:1	81
7:1	87
8:1	92
9:1	96
10:1	100
11:1	104
12:1	108

The general rules suggest that 9:1 may be the limit for our U.S. 92/93 octane but there is no way to know this for certain short of elaborate expensive lab testing. I personally believe these aging guidelines to be on the conservative side for modern engines designs and fuels with better control of combustion temperatures. Another factor to consider is that as engines age the octane requirement increase due to the build up of combustion chamber deposits, which in turn raise the compression ratio. High atmospheric temperatures and low humidity also raises the engines octane requirement.

Continued on Page 7......

AUTO GAS

Autogas achieves its octane through the use of Oxygenates such as Ethanol and Methyl tertiary butyl ether. These ingredients vary not only by brand but also by region and season. Modern automobile engine have digital electronic control systems that through the use of oxygen sensors are able to adjust fuel delivery to automatically compensate for these formula changes on the fly. Our 2 cycle engines have no such electronic systems yet and are currently tuned by the use of lawn mower technology employing needle valves so constant hand adjustment may be required to tune for the variations in fuel. Without needle jet adjustment a change from Avgas to Autogas will result in a leaner mixture. The leaner mixture will result in elevated combustion and EGT temperatures. This is because oxygen in the fuel cannot contribute energy; consequently the fuel has less energy content. For the same efficiency and power output, more fuel has to be burnt. A lean mixture is also more prone to detonation. Vapor pressure of auto gas can range from 7 to 15psi (avgas is maintained at 6.5psi), which makes it more prone to vapor lock. In a modern automobile this isn't a big issue since electronic fuel injection, in tank pumps and higher operating pressure lessen the odds and if it should occur you could just pull off the road. Autogas has different distillation characteristics than avgas, which includes the use of heavier petroleum fractions. These tend to include hydrocarbons less stable to oxidation, less clean burning, more prone to form combustion chamber and induction system deposits. The storage characteristics of auto gas are less desirable in comparison with the good storage characteristics of avgas. After several months, stored auto gas may suffer loss of octane rating, and tends to cause hard starting from loss of volatile components, along with forming gum deposits that can cause fuel-metering problems. The turnover of auto gas is so fast that long-lasting storage characteristics are not required.

AVGAS

The common aviation fuel for use in our engines is 100LL(low lead), which attains its octane rating through the use of tetra ethyl lead. While leaded gasoline has pretty much been phased out in the U.S. for automobile use it still remains a standard for aircraft due to their use of high compression engines and soft exhaust valve seats that require the lubrication properties provided by lead. Lead can form deposits on sparkplugs but it has not proven to be a significant issue. The lead by itself adds no significant power or burn properties but does provide some lubrication to upper cylinder components. The formula for avgas (unlike auto gas) is closely maintained for quality and consistency and is traced from refinery to delivery. The formula consistency in a 2-cycle engine reduces the need for carburetor adjustments. Bromine compounds are added to avgas to scavenge lead residues from the engine. The burning of this compound produces lead bromide most of which is carried out with the exhaust gasses. A small amount however remains in the engine. When mixed with water, which is produces as fuel is burned, the lead bromide produces a corrosive liquid that can be damaging to engine components. 4 Cycle aircraft engines use special crankcase oil for this reason but 2 cycles do not hold oil in a crankcase where the bromine compound can accumulate. It is a good idea however to spray oil storage preservatives into an engine stored more than 30 days. 100LL is available at all airports, which sell fuel.

SUMMARY

Autogas

Pro's = Relatively lower cost and greater availability
Con's = Not commonly available over 92/93 octane
Ingredients vary from brand to brand, by region and season
Less protection from detonation
Potentially more carburetor tuning required due to formula changes
Poor storage characteristics resulting in loss of octane/formation of gums
Greater potential for vapor lock

Avgas 100LL

Pro's = Higher octane providing more protection from detonation
Batch-to-batch consistency and quality
Less carburetor tuning required due to formula stability
Additional upper cylinder lubrication
Good storage characteristics
Less likely to cause vapor lock
Con's = Relatively higher cost and airport only available
Possible sparkplug deposits

From this data is could be concluded that avgas provides more protection from detonation and greater upper cylinder lubrication at a premium price. An equally important factor in favor of avgas may be the avoidance of oxygenates and the associated tuning problems that result from seasonal and brand formula changes. With either choice you should not switch back and forth due to the need for jetting changes. Stick with a single brand and store/mix no more than you will use within a short period. Autogas is known to have aging problems, especially if stored at high temperature, such as the tendency to rapidly form gums, loss of octane and volatile components, which can contribute to hard starting. Tightly sealed metal containers and cool temperatures are recommended.

REFERENCES and CONTRIBUTORS:

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