

ANGEL FLIGHT WEST'S DEC 2012 SANTA FLIGHT

On December 20, 2012 the Utah Wing of Angel Flight West (AFW) completed its annual winter holiday special service project that has been designated "Santa Flight". This year AFW selected Monroe Elementary School, located in central Utah as the recipient of the mission.

The organization teamed with the Boy Scouts of America and collected over 5,000 pounds of supplies and items. The donations included clothing, toys, books, and school supplies and a cash donation of \$1500 to be used for the students of Monroe Elementary School. The pilots were greeted by 180 of the school's 650 students at the Richfield airport as they arrived with the gifts and supplies. AFW organized 15 airplanes to fly the donated items for the school as well as bringing Santa Claus, Mrs. Claus, and two elves. The pilots attended a short assembly with the students and then returned to Salt Lake City.

Although Santa Flight is sponsored by Angel Flight West, interested pilots are invited to participate. If you would like to be involved with next year's Santa Flight or if you'd like to join Angel Flight West, please e-mail Steve Bollinger at steveb@tvspec.com.



AIR SIM CORP CELEBRATES 1ST ANNIVERSARY

In celebration of its one year anniversary, Air Sim Corp is offering the first ten people that contact them by e-mail at deals@airsimcorp.com a free one hour session in their simulator including its live air traffic control services.

This offer is for pilots, student pilots, and even would be pilots over the age of 16. Please e-mail your contact information, and the first ten people will receive a confirmation with instructions as to how to register for a unique call sign to be used during a simulation flight, as well as instructions on how to schedule the sim-flight appointment.

For more information about Air Sim can contact them on their website at www.airsimcorp.com. They may also be reached at (801) 657-5311.

Air Sim is located at 337 North 2370 West, Ste. #222, in the Kibbie Executive Terminal at Salt Lake City International Airport... just north of TacAir FBO.

COLD WEATHER WILL AFFECT YOUR ENGINE

by Gary Schmidt

Probably no single law of physics has a more powerful impact on the operation of mechanical apparatus' than does temperature. Heat results from converting fuel to energy and power plants deliver a lot of heat. We build our engines to accommodate very hot temperatures. Cold rarely gets as much attention. Cold climate pilots know this well.

Let's focus on the power plant. Cold affects the various parts of an aircraft engine in different ways. Metals contract at different rates changing tolerances. Lubricants lose their viscosity creating friction and wear issues for moving parts. Plastics and rubber parts become brittle. Even the elements such as moisture contained in the air that surrounds all parts behave differently affecting the internal combustion process.

A drop in temperature causes most matter to contract. This naturally causes a change in the tolerances of parts. The result is a tolerance that may not allow enough room for cold oil to flow to lubricate the parts.

Contracted piston wrist pins shorten the stroke and that fact is the major reason pilots must be reminded that hand propping a cold engine can cause damage.

Once combustion occurs, it produces a 1,200° to 1,400° F flame in direct contact with the aluminum piston, which produces significant growth of the piston while the cylinder wall warms and grows more slowly. The result is potentially more piston and ring scuffing.

Automotive lubricants have received the major engineering focus in the world of engines and cold weather. The characteristics of oil and grease change dramatically in very cold temperatures. With the advent of multi-viscosity oils, that seemed to solve everything. In an automobile the transmission and bearings were a little stiff but the engine started and if it started you could force everything else to go.

In aviation, however, that is an extremely costly and dangerous operating practice. One 20W50 oil on the market has a "pour temp" of -29° F. That means you could tip a cup of oil upside down and it wouldn't fall out.

In cold temps it takes longer for the oil to travel from the sump to rockers and lifters... hence less lubrication when needed the most. Tests show that multi-viscosity oils, when warm, are prone to drain off of surfaces leaving little oil for lubrication, the cold piston will have at least five strokes before oil reaches the part.

Lab tests revealed that multi-viscosity oil is subject to the same effects of cold as single weight oils, only not to the same degree. That means that 15W50 oil does not flow as freely when it's cold.

Other tests show that used oil doesn't flow as well as fresh oil. The assumption is that the impurities in the oil collect the congealed oil creating "globs" that do not flow smoothly through the 1/4-inch hole.

During combustion, burning a pound of fuel creates about a cup of water. If a spark plug fires once or twice it creates a small bit of moisture. In a cold soaked engine, that moisture will condense on the plug as frost and it will not properly fire again until the frost is gone.

What about priming? Because fuel does not vaporize well in cold temperatures, pilots have a tendency to over prime. This extra fuel can wash off any oil that hasn't already drained off the cylinder walls... so prime sparingly.

Engine preheating has been a common practice since pilots first tried starting aircraft in cold weather. However, preheat processes vary considerably because of facilities and equipment available as well as operator and maintenance preferences. Mechanics and pilots rarely understand the significance of preheating practices, how they solve (or fail to solve) the cold-impact issues can directly affect TBO.

Preheating with hot air was the only solution a half a century ago and is still being used today. Used properly, hot air pre-heaters work but there are noteworthy risks. Some of these are outlined in manufacturer service bulletins. Specifically Teledyne Continental Service Bulletin SIL 03-1 states, "excessively hot air can damage nonmetallic components such as seals, hoses, and drive(s) belts",— Because of the mass of the engine, the hot air heating process takes time, so resist prematurely discontinuing the heating before the engine is thoroughly heated or heat soaked."

Internal engine mounted externally powered pre-heaters mechanically affixed to the engine by glue or bolts are the most widely used today. There are two general types: those that heat only the oil and those that apply heat to the cylinder as well as the oil. Oil sump heaters are widely used, especially in milder climates. They must be limited to about 100 watts of energy, however. Putting more heat on the oil can potentially oxidize the oil and if thermostats fail, can boil the oil, totally eliminating its lubricating value.

Proponents of oil sump heaters indicate that it only requires 100 watts to heat an engine. This is true under two conditions: First, there is absolutely no air moving over the engine (it is securely covered with an insulated cover) and second, the heat is left on long enough. "Oil sump only" detractors, however, point out that putting heat on only the oil can force moisture in the oil out of the oil and that moisture will migrate to colder engine parts where it condenses.

Internal pre-heaters are also efficient. Heat applied directly to the cylinder head will migrate to other internal components quite rapidly. While the cylinder head will rise 90° F above ambient in about two hours, the valve guide will be 60° F above ambient and the wrist pin is nearly 40 degrees above ambient.

The most effective internal preheat application can be summed up by saying apply the heat to parts that need the heat as precisely as possible.

More can be said about the impact on engines as well as the preheat solutions. It is clearly a much more complex matter than just "getting it started." To adapt an old proverb: just enough heat to get an airplane started is just enough to be dangerous. Not just dangerous to the longevity of the engine but even to the occupants.

HELPFUL POINTS OF CONTACT

For GA operations, facilities maintenance, aviation newsletter, airfield, and SLC Title 16 questions contact: Steve Jackson, SLCDCA General Aviation Manager, (801) 647-5532 or e-mail at steve.jackson@slcgov.com.

For hangar lease and repair questions: Matt Jensen, Airport Properties Specialist at (801) 575-2957 or e-mail him at matthew.jensen@slcgov.com.

For aviation security questions call: Connie Proctor at (801) 575-2401.

For gate access problems call: Airport Control Center at (801) 575-2401.

**For emergencies call: at SLCIA, (801) 575-2911
at TVY or U42, 911 then (801) 575-2911**

For other GA information call the GA Hotline: (801) 575-2443

The previously mentioned Continental Service Bulletin states, "The engine may start and appear to run satisfactorily, but can be damaged from lack of lubrication due to the congealed oil blocking the proper oil flow through the engine . . . the engine may be severely damaged and may fail shortly following application of high power."

Cold is no trivial matter. Take time to learn more about cold and how to beat it.

SLCDA GA NEWS ELECTRONIC OPTION

If you would like to receive the Salt Lake City Department of Airports' monthly general aviation newsletter by e-mail, send a request including your current e-mail address to: steve.jackson@slcgov.com .

UPCOMING EVENTS AND NEWS

Leading Edge Aviation at South Valley Regional Airport (**U42**), West Jordan, UT and at Logan – Cache Airport (**LGU**) hosts multiple events each month including breakfast fly-ins, dinners, and informative classes.

For more information about Leading Edge events, visit: www.leaviation.com .

EAA 23, the Utah Chapter of the **Experimental Aircraft Association** holds its monthly meetings at the Civil Air Patrol (CAP) Building at 640 North 2360 West, Salt Lake International Airport (SLC) the second Friday of each month at 7:00 p.m. Contact Shawn_Crosgrove@msn.com or 801-568-2571, or visit their website at <http://www.eaa23.org/> for more information.

FEBRUARY FAA PILOT SEMINARS

Upcoming activity and seminar information is available at: www.faasafety.gov under the "Activities, Courses & Seminars" tab or contact Rick Stednitz, FAA Safety Program Manager at (801) 257- 5073.



Safe and smart winter flying!