

TURBINE TOPICS

LEGACY PRODUCT FILLS A NICHE GEMINI ST / TWINRANGER BY SOLOY

Firefighting is a dangerous job and fire suppression from the air is even more dangerous. These were some of Doug Daigle's thoughts as he was rappelling firefighters into drop zones from a Bell 206L3. He realized there would be even more hazards if the engine failed.

In the 1990s twin engine Part 27 helicopters that had engine out capability approaching that for Cat A performance did not exist. Doug began dreaming of a solution: A helicopter that could lose an engine and continue flying safely.

With that idea in mind, Doug, president of his company, Tridair, came to Soloy to design, build and certify the installation and to complete the certification as a Part 27 (Federal Aviation Regulations for Airworthiness) Category A (CAT A) helicopter.

Soloy was up for the challenge. At the heart of the installation was the Soloy Dual Pac gearbox that incorporated clutches for each engine on the output

shaft of the gearbox and independent oil systems for each input section.

In the testing phase, the gearbox was subjected to a full endurance run, an extended run on a single input shaft of 130% of maximum torque to satisfy an infinite fatigue gear life and a 30-minute oil run dry test. All passed with flying colors.

CAT A helicopters have to not only continue flying safely after one engine fails but to also takeoff and land safely. The modified Bell using turbine Rolls-Royce 250-C20R engines became the only twin engine helicopter certified as a single engine helicopter having the ability to carry out flights on a single engine as well as shut down and restart the backup engine in cruise to increase endurance.

CAT A also requires that the manufacturer establish take off

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PROFILE: PIMA COUNTY SHERIFF'S DEPARTMENT AIR UNIT.

Nearly one million people call Pima County home. Whether they are living in the middle of Tucson or the edge of the Sonoran Desert, Pima County's Sheriff's department is committed to keeping every one of its residents in the 9,200 square miles of mountains, deserts and forests safe and secure.

That very dedication is one reason the Air Unit was incorporated into the

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TURBINE TOPICS - TIME TO CONSIDER HEAT PADS

Any aircraft mechanic that has watched a turbine engine slowly spool up on a cold winter day has likely experienced anxiety relating to possible engine temperatures exceeding published limits during start. The combination of cold thick oil being asked to lubricate driveline components

and gearboxes, and the effect of low temperatures on battery efficiency is a formula for achieving a slow start, a spike in engine start temperature or, worst case, a hot start.

Aircraft mechanics and pilots both know that the best solution is a heated hangar, but this is not always

possible. In the case of a helicopter, preheating of specific components such as gearboxes, transmissions, and other complex components can eliminate these potentially damaging conditions by lowering the viscosity of cold soaked fluids. One method of preheating is to


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LEGACY PRODUCT FILLS A NICHE CONTINUED...

weights based on power available from a single engine to ensure either a safe landing, in the event of an engine failure or a safe climb out. Each engine in the Soloy modification was rated at the transmission limit giving the Gemini ST helicopter (the name for the Soloy modification) extraordinary performance.

The existing Bell 206L1, L3 and L4 helicopters that Soloy converted were known as Gemini STs. The Soloy conversion kits were delivered to Bell Canada in the mid-1990s where they were incorporated into airframes on the Bell 206L4 production line and known as TwinRangers.

Ascent Helicopters of Parksville,

British Columbia, Canada, is currently operating two factory installed TwinRangers. Their customers who charter the TwinRangers for extreme skiing, medevac, mining or fire suppression can rest assured of a safe journey with Soloy's conversion kit. 

TURBINE TOPICS - TIME TO CONSIDER HEAT PADS CONTINUED...

install an electric preheat system.

The preheat technique is quite simple to explain in words: Raise the temperature of all helicopter critical fluids and components to a warm steady state. Over time, the temperature will stabilize similar to the internal temperature of a nominally heated hangar.

Electric preheat systems are shoreline (hangar or ground outlet) powered by 115v or 230v AC and designed to draw between 5-13 amps per helicopter. Because the system operates on shoreline power and is not operated in flight, the installation does not require Supplemental Type Certificate (STC) approval but is regarded rather as a minor alteration. Additionally, battery heaters can be installed into the main cabling for the component heat pads which will improve the efficiency of cold batteries during engine start.

Many operators working in extremely cold climates have the heaters installed on the main rotor gearbox, tail rotor gearbox, engines, oil and hydraulic oil tanks and batteries. The electric preheat system increases operational readiness and shortens take off times.

The heat pads contain resistance elements which are sandwiched and vulcanized between two sections of flexible heat conducting pads. These pads are affixed with a cold cure bonding agent to specific heat conducting locations on fluid reservoirs

and components that if preheated will enhance the starting process.

General maintenance and inspection practices for 100-hour or annual inspections include such tasks as:

- Examine the cabling system for abnormal wear and integrity at attachment points and bulkhead penetrations, and the shoreline power plug and each individual cable lead for continuity to its respective heat pad element.

- Heat pad elements should be visually checked for cable lead integrity and security of the bonded pad to its heated component. If any portion of a pad heat element comes loose, it may be re-bonded using only factory specified bonding compound. The use of standard tool crib adhesive is not acceptable for use as a bonding material as it will interfere with heat transfer properties of the heat pad element.

- If a pad heat element exhibits a gray discolored area, it is likely due to an air bubble under a poorly bonded element and will require replacement.

- Once the visual inspection is satisfied, verify with an ohmmeter proper heat pad element resistances as published in the installation handbook.

A few safety tips worth passing on



regarding the handling of heat pads are, never apply electrical power to heat pads until they have been properly installed to the designated aircraft component. Applying power prematurely can potentially destroy a pad element before it is installed. Also, resist the temptation to touch a heat pad with your bare hand to see if it is working. Heat pad elements performing properly will radiate noticeable heat, so with electrical power applied touch the component adjacent to the pad to determine that it is working correctly.

For information on systems for your aircraft contact:

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150 Blaine, MN 55449-5126
Email: info@tanisaircraft.com
Phone: 952-224-4425

1-800-443-2136 (U.S. & Canada)



PROFILE: PIMA COUNTY SHERIFF'S DEPARTMENT AIR UNIT. CONTINUED...

Department's Special Operations Section in 1950.

The original Air Squadron of volunteers changed to the Air Unit in the late 1980's when deputies as designated pilots were employed. In the 1990's the Air Unit started looking to buy aircraft that were specifically suited for increasing patrol uses.

Lieutenant Jim Murphy, Commander of Pima County's Special Operations Section, said that while the majority of law enforcement agencies were building their fleets around rotorcraft, that solution wouldn't work in Pima County. The large and diverse geographical nature of the county with both rural congestion and urban sprawl, demanded a platform that offered more speed and range.

After considerable research, the Pima County Sheriff's Department purchased a Helio Courier as their first "official" aircraft in 2001. The best choice at the time, Pima County pilots have put an average of 1,700 hours a year on these rugged STOL aircraft.

Pima County's new-generation Sentinel MKII.

"Our mission profiles are expanding to more patrol and ground unit support and we needed to have an aircraft that not only offered higher-reliability, but also complemented that with new-generation search-and-rescue

and surveillance capabilities," stated Instructor/Pilot, Deputy Chris Janes.

The Soloy Sentinel is ideal for Pima County's missions. Equipped with a wing-mounted FLIR camera, the Air Unit recently located and found lost hikers in the MKII Sentinel.

"The Sentinel cruises to a remote location at 150-knots and then slows down to around 85-knots to loiter for surveillance missions. On station faster and staying there longer than a helicopter suits our missions. Plus, it's a steadier platform for the IR camera observer," Lieutenant Murphy added.

Of course, much of the aircraft's stealthiness is due to Soloy replacing the factory Lycoming with a new Rolls-Royce 250-B17F/2 engine and a 90 inch Hartzell propeller turning at 2,030 rpm. "It's also quieter and smoother than a helicopter," Lieutenant Murphy said. "Loitering at 55% power and at 2,500 feet AGL, people on the ground can hardly hear you."

"We learned a long time ago about the advantages of the turbine over a piston engine here in Arizona," stated Sergeant Jim Grisham, Maintenance Supervisor. "We have to operate in some pretty wide temperature and elevation deviations and the Rolls-Royce powered Sentinel is the perfect fit."

[Sentinel: On call 24/7/365.](#)

Crime doesn't take any holidays so Pima County's Air Unit and its aircraft

have to be ready when and where they're needed.

Last year alone the Air Unit responded to 2,050 calls in support of the patrol and specialized units. That equates to over 2,139 hours of flight time.

"The Soloy Sentinel conversions are easy to inspect and maintain. When you remove the cowling you can easily see and reach every part of the engine. It's an extremely well-engineered package," Sergeant Grisham added. "You can't find a better platform."

Pima County's one-two punch.

After delivery of the first airplane Soloy started work duplicating the avionics for the second Sentinel.

"Aircraft familiarity and consistency are very important for safety and efficiency," Lieutenant Murphy said. "Our officers are under enough stress without trying to relearn systems on the airplane."

Another feature of the Sentinel that helps reduce pilot stress is that it's just a rock-solid easy to fly airplane. The combination of turbine operation and the new-generation Garmin avionics take a lot of the "work" out of each mission.

"It's an extremely stable and well balanced platform," Deputy Janes said.



WASHINGTON STATE PATROL BUYS SECOND CAMERA MOUNT


An erratic driver is speeding on I-5 south of Olympia. The driver doesn't realize that a Cessna 206 equipped with a FLIR Star Safire 380 camera mounted with Soloy's STD'd wing-mount system is surveillancing his behavior. The aircraft belongs to the Washington State Patrol (WSP) Aviation Section piloted by WSP troopers. The camera aids in supporting ground troopers in vehicle pursuit management. Or catching the 'bad' guys before they can harm others on the road.

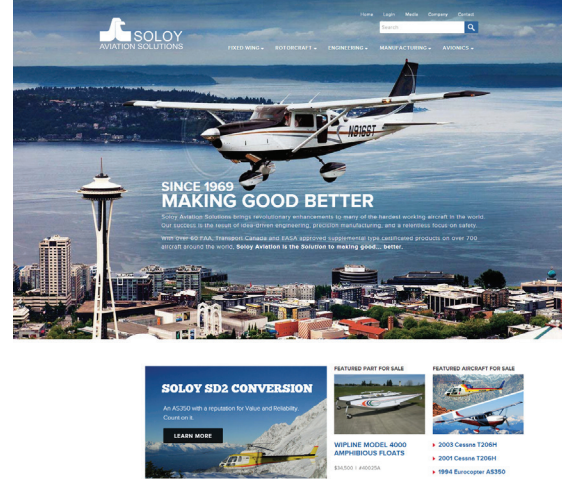
That camera with a 360 degree view on the Cessna 206 patrolling overhead is the second one that Soloy Aviation Solutions has installed for the WSP. The WSP Aviation Section maintains a fleet of two King Airs, three Cessna 182s and two Cessna 206s both of which have the FLIR cameras installed with the Soloy wing mounts.

Soloy's STC wing mount hardpoint is readily adaptable for the forward looking infrared (FLIR) cameras that record in a variety of lights and thermal imaging. The wing mount can handle cameras up to 100 lbs. Installation is clean and very straight forward and readily removed for camera maintenance.

The wing mount location also allows for more visibility and better operational awareness for the camera operator. The camera is placed away from the hot exhaust trail emitted from the engine to protect the camera lens. This placement also protects the lens from runway debris.

The stability of Soloy's STC creates virtually no effect on aircraft handling or safety. That's a huge plus for public safety and the WSP flying throughout the state. For more on the WSP Aviation Section's air patrol, read the article in the Nov/Dec 2014 issue of Air Beat. While you're thumbing through the magazine, check out the story on p. 32 for Soloy's MKII Sentinel contribution to Pima County AZ Sheriff's Department.

To date Soloy has sold a total of eight camera mount kits to law enforcement agencies. 



SOLOY LAUNCHES NEW WEBSITE

Communicating with our customers and future customers – essential. Providing you with information on our products and services – necessary.

With that in mind, we are launching a new website that is beautiful to look at with lots of imagery and information on our products.

You'll be able to keep up with our latest news, products and videos. And we're going social. Follow us on Facebook and 'like' us. Publication subscribers, you will have a secure log-in section from which to download info.

Besides our online presence, you're invited to come visit us. We're located at the Olympia, Washington Airport (KOLM).

AIRCRAFT FOR SALE



1994 AS350SD2 S/N 2789, N350ST

20 Hours since conversion and 12 year, Gold LTS101-700D-2, Soloy EEMS engine panel. Cargo swing hook with load cell, Squirrel cheeks, VR window, AFS filter

2001 Cessna T206H Turbine Powered Mark II S/N 20608256, N412TH

975.0 Total Time Since New

2003 Cessna T206H Turbine Powered Mark II S/N 20608396, N5270L

1,100 Total Time Since New

LOOK FOR SOLOY AT THE MAJOR 2015 TRADESHOWS

HAI Heli-Expo 2015

EAA AirVenture

Sun 'n Fun International

AOPA Regional shows

ALEA Expo 2015

NBAA