News for TFE731 Engine Operators ● Deliver to Flight Dept.

DUNCAN INTELLIGENCE

Dedicated to "Perfecting the Craft" ● Edited by Jon Dodson ● Summer '99

AlliedSignal SB 76-3067

AlliedSignal SB 76-3067, which allows for the installation of the N1 controlled Digital Electronic Engine Control (DEEC), has been revised to include the Falcon 10/100 and Falcon 50. STC ST01006CH-D for the Falcon 10 and STC ST01007CH-D for the Falcon 50 were issued May 7, 1999.

The current design uses an Electronic Engine Control (EEC) which uses N2 to control N1 (Thrust). This may result in N1 overshoot during transient power lever movement. The N1 (DEEC) is a direct interchangeable unit that reduces pilot workload and maintenance effort by controlling engine fan speed directly and automatically recording engine and flight parameters. Direct control of N1 allows automatic stable thrust settings during takeoff, climb and cruise. It also eliminates "Pilot Trimming," required with the previous N2 controls (EEC). The Engine Condition Trim Monitoring (ECTM) software, integrated into the DEEC, automatically records all data needed to track component life, fault detection & reporting, trouble shooting and parameter exceeding events.

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Oil Pressure Problems

One of the topics at the recent Duncan Aviation Engine Service Center Open House and Trouble-Shooting seminar regarded oil pressure problems. When experiencing oil smell/smoke in the cabin, here are the questions the flight crew should be asking: What is the oil pressure and temperature? Has either engine been consuming oil with no external leaks? Has the crew been able to determine which engine is producing the oil smell?

Consult AlliedSignal's Light Maintenance Manual to troubleshoot the problem, and follow the procedures outlined.

Here are three actions that can help isolate the origin of the oil smell: 1) Isolate the smell by independently actuating bleed air to determine which engine is at fault. (Don't forget about the APU.) 2) Check fan blades and compressor inlet for evidence of oil. If oil is on the back of the fan blades, it's evidence of the #1 carbon seal leaking. If oil is puddled in the compressor inlet stator, it's evidence of the #3 carbon seal leaking. 3) Perform gearbox pressure checks, which will determine if the #4 or #5 carbon seals are leaking.

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Engine Matching

N1, N2, or ITT splits between engines frequently cause concern for 731 operators. The following information may prove helpful determining what is "normal" or acceptable. Tolerances in the associated systems: indicators, wiring & connectors, EEC/DEEC adjustment, hydromechanical FCU, and engine build tolerances, will affect engine match.

Basic instrument tolerances as specified by AlliedSignal are:

N1	+/- .25% (+/- .1% -5 series)
N2	+/- .5%
ITT	+/- 5C (700-900 C)
F/F	+/- 2%

For example, assume two sets of instruments, calibrated at the opposite extremes shown above were combined with two engines, also at opposite extremes of build tolerances. Were this combination operated at physically matched N1 RPM, the following indicated differences could be observed:

N1	.5% (.2% -5 series)
N2	1.9%
ITT	44 C
F/F	105 pph

Even with the differences depicted in this hypothetical example, all indications are still within tolerance and should be taken into consideration when requesting maintenance. This information combined with regular recording of inflight data will assist operators in recognizing any significant step changes from previous flights that should be investigated.