

## **Pilot Report – MU-2P -10 Upgrade**

**By Rick Wheldon**

On April 6, 1998, I had the opportunity to fly the TPE-331-10T engine upgrade installed on N333RK, a P model MU-2 owned by Intercontinental Jet, Inc. of Tulsa, OK. I met Intercontinental Jet's pilot, Joe Bacon, on our ramp at Dallas Addison airport for the test flight. The airplane had just recently received certification for the upgrade from the Southwest Region's Aircraft Certification Office.

On the walkaround, the only difference noted between a Solitaire and N333RK was in the engine inlet. The Solitaire's engines are controlled by a Single Red Line (SRL) exhaust gas temperature system, which receives P2 pressure inputs from a sensor in the inlet. (This sensor is separate from the P2T2 sensor in all TPE331 models, which connects to the fuel controller.) On N333RK, because the upgrade does not incorporate an SRL system, the P2 sensor was not installed. Once we got into the cockpit, the obvious differences noted were that there were EGT gages in place of the ITT gages found in the -5 powered P model, and there were no SRL switches.

Book takeoff performance is identical to the TPE331-5 powered P model, because IJI elected to use current certified performance of the P model to accelerate the certification process. However, because the P and the Solitaire are both substantially flat rated, the certified performance numbers remain similar between the P model and Solitaire whenever temperatures and altitudes are normal. During high or hot days, the actual performance of the -10T upgrade will meet or exceed P model book performance.

Starting procedures for N333RK are similar to the -5. Because there is no SRL, the start temperature and acceleration are controlled manually by use of the start fuel enrichment switch.

Takeoff limitations are handled differently than in the Solitaire. In the Solitaire, the SRL system always indicates 650 degrees at the temperature limit. With the -10T installation, the EGT limit varies and must be determined from a simple chart based on the outside air temperature. During takeoff, since I regularly fly a Solitaire, my impressions of N333RK were that it flew identical to the Solitaire. Acceleration was crisp at our weight of 9100 pounds with four persons on board and full mains and outers.

Cruise speeds were comparable to Solitaire cruise speeds. At 23,000 feet, we observed an IAS of 222 knots, RAT at -22, and weight of just under 9000 pounds. This equates to a cruise TAS of 312 knots, and is right at Solitaire book values. Of course, this flight was conducted during the cooler temperatures of early springtime, and this speedy TAS cannot be expected during the warm summer months. Even so, it's in line with the numbers for the top of the line Solitaire.

After landing, I had a chance to discuss the modification with representatives of IJI. According to Dave Milligan, General Manager of IJI, the modification consists of completely disassembling and inspecting the engine, replacing the existing -5 hot section

with a -10 engine hot section, certifying performance in the test cell, and re-identifying the engine as a -10T engine. Engine modification is accomplished in Phoenix at AlliedSignal Engines. Engine removal and installation, airframe modifications, and flight tests are done at IJI. Airframe installation consists of exhaust pipe replacement, some rewiring, bleed air plumbing modifications, and replacing the ITT indicators with EGT indicators.

Currently, only N and P model MU-2s are certified for conversion. IJI and AlliedSignal are working on an STC to upgrade TPE331-6 powered aircraft (J, K, L, and M models) and expect to have this done by the end of the year.

There are two options for modifying an aircraft. If the current engines are nearing overhaul, then an overhaul can be accomplished concurrently with the upgrade. A less costly option is for a continued time engine modification, if the engines have adequate time remaining before overhaul. Either way, provided the engines meet Service Bulletin requirements, overhaul can be extended until 5000 or 5400 hours.

The -10 upgrade program offers a cost effective way for an operator to approach the performance of the top of the line MU-2 models at less cost. For owners who are looking for performance and value, this is definitely worth looking into.