

Test Flying - An Introduction

Warbirds President, Air NZ B737 and A320 Captain, A-Cat Instructor, and pilot of most things that fly, Frank Parker is frequently asked to test fly some of New Zealand's newly rebuilt and very exotic warbirds. It's a tough job... etc. In part one of two, Frank explains how this came to be and the basics of what is involved.

AS AN adolescent my Dad ran a garage workshop, in short I grew up with grease under my fingernails and an interest in most things mechanical. My sixth form year was half wasted on my 'bikie' project, an Army Indian motorcycle in a Easyrider style.

So when I qualified as an Iroquois pilot on No. 3 Squadron I was attracted to maintenance test flying and thus began a long association with this aspect of flying.

On 3 Squadron a large proportion of maintenance flying was rotor smoothing. Individual rotor blades have a softness or bendability and the rotor has to be tuned though pitch changes and trim tab adjustments to fly 'in plane'. An out of track blade is akin to an out of balance wheel on a car, a bumpy ride. In the 1970s before electronic aids, balancing the main rotor system was an art-form achieved with tracking poles, chinagraph pencils, stroboscopes and seat of the pants. For the test pilot this equated to a lot of five minute flights and plenty of start-up practice.

There was the occasional test flying excitement, a mismatched engine governor could cause an engine surge on full power (topping) checks which were completed at 8000 feet plus, a seemingly long way to fall! Or incorrect guide vane operation and a compressor stall which then required an inspection of the entire drive train. In general however, predictability was the order of the day.

As I became involved in the Warbirds scene, this experience was a foundation to assist in maintenance flying for these aircraft, initially Harvard flights post regular maintenance which later developed into heavy metal post rebuild flying.

The maintenance test pilot's task is generally straight forward - take an aircraft from the engineer who has just given his utmost attention and check that all operates normally. In fact the aircraft is rarely more 'serviceable' than immediately after a rebuild or major maintenance check.

Successful test flying is a contract between engineer and pilot and the more complex the maintenance, the more complex the contract. I start the process with a general chat about what maintenance has

been performed and a review of the aircraft logbooks. I follow this up with a specific discussion as to the test flight format, specific checks and recording required. Naturally a close examination of the aircraft follows before committing to flight.

The nature of maintenance determines the depth of test flying. An engine replacement will entail extensive ground runs followed by a flight check and maybe a few hours of flight proving. An aircraft rebuild will require an approved programme of flights over several hours, with progressive extension to the flight envelope.

In general the flight is a non event. As noted above the aircraft has just had the attention of a team of maintenance professionals and is in the best possible condition. Nonetheless the first take off in a newly rebuilt aircraft is an edge of the seat occasion, just in case! There is always a calming of the pulse rate as you level out over the airfield, establish cruise and check the gauges. For major work that is often the first flight - over the airfield, cruise around for 10 or 15 minutes, establish controllability, exercise the engine and propeller, then land.

Major rebuilds will generally require a specific test flight approval and have a flight requirement of five to ten hours. Following the first couple of flights which are taken easy, the pilot will progressively extend the flying to encompass the full flight regime of the aircraft. For a fighter type this will include a full stalling program; clean, approach configuration, power on, manoeuvre (at two or three 'G') and high speed dives, all looking for adverse handling characteristics of the aircraft

engine or propeller control. The fun part is aerobatics where I put the aircraft through all the classical manoeuvres.

Between all this we check out the avionics, such as these aircraft have, maybe a VHF comm and transponder. Nonetheless it's surprising how a comm's check of five on the ground degenerates to a three - barely readable with background noise (that's Allison or Merlin) once airborne.

All the while I am looking and listening for trends. Each flight requires recording of stable engine parameters for comparison with previous flights. The senses are on high alert to new noises and vibrations, or anything else which may be an indication of something not quite right.

I guess at the end of the day it's just one of those horrible jobs someone has to do!

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Part Two of Frank's Test Flying article 'Putting it into practice' will be in the next issue of KiwiFlyer.



In the 1970s, tracking Iroquois rotor blades involved plenty of test flights and seat of the pants assessments.



Frank was asked to test fly both of New Zealand's Yak-3s, the first some 7 years ago and again just recently (see separate article in this issue).



More Capability at Central Aero Engineering

OFFERING aircraft owners and operators a total service results in satisfaction not only for the aircraft owner but also brings benefits when dealing with regulatory issues and requirements. Paul Waterhouse, principal of Hamilton based Central Aero Engineering says they frequently demonstrate the advantages that can accrue from one stop shop maintenance and advice. This includes both fixed and rotary wing, with a number of the latter projects passing through the hangar recently. Central Aero assisted with the acquisition and local commissioning of HAL, a Bell Jetranger III, from the US for Waikato based Heliworx who will be operating it primarily in an ag application role. As well, a re-commissioned Hughes 269A, HLQ has now departed to the South Island for private ops and HOW, a Mini500 has also recently been readied for private ops.

"We've steadily expanded our capability over the last nine months primarily through widening our general and recreational aviation activity" says Paul. With two LAMEs who have ARA capability, Central Aero has added hot air balloon inspection and system testing to its portfolio. Both Paul and Steve have become licensed balloon inspectors. Coverage is primarily through the central North Island and already an average of one balloon a month has been passing through the workshop.

Glider maintenance is also occupying an increasing part of the business, particularly avionics inspection and testing to satisfy the 24 month certification requirement for pitot/static systems and transponder function. A continued investment in tooling and equipment sees new portable test equipment to enable either workshop or on-site visits. And a recently acquired set of



Central Aero have recently added hot air balloon inspection and system testing to their maintenance portfolio.



Portable test equipment enables remote avionics inspection to be completed, popular with the gliding community.



JetRanger HAL, recently arrived in NZ and commissioned by Central Aero for Waikato based Heliworx.

scales for weight and balance confirmation further adds capability.

Cessna SID Programme Support

Paul says there has also been an increasing demand for maintenance control and consultancy relating to forthcoming regulatory issues for GA aircraft owners; "The requirements outlined for compliance with the forthcoming Cessna Supplementary Inspection Documents (SIDs) are occupying many owners' minds. A one-stop shop such as this that has a depth of experience without high overheads offers the opportunity of a total personal service at a realistic cost. The Cessna SIDs programme for 100 series aircraft has a June 2014 compliance date and this is an extensive check and confirmation exercise. A number of customer aircraft are currently undergoing the process and it will be advantageous to book a slot now rather than later. As an incentive Central Aero can offer a 'cash back' credit if work arising from the SIDs inspection is carried out by Central Aero. Having a 20 month envelope of time before compliance is mandated can spread the cost of the programme and enables a custom maintenance programme to be evolved for the owner. In fact, all aircraft owners should pay attention to what Cessna have done regarding corrosion issues."

For more information

Central Aero Engineering welcomes enquiries from balloon, glider, and Cessna owners, as well as all those seeking one-stop personal servicing for their aircraft. Contact Paul on 07 843 1200 or 021 743 033, email: paul@centralaero.co.nz or visit www.centralaero.co.nz



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