



A matter of a pinion

Autoflight release new Gear Reduction Drive for V6 Suzuki powered Titan T-51 Mustangs

WAIKATO BASED Autoflight Limited was formed by Neil Hintz in 2003 to manufacture Dominator autogyros, under licence to Rotor Flight Dynamics of the USA. Many of Neil's customers were installing automotive engines in their recreational aircraft and this brought about the need to design and manufacture suitable reduction drives. Whilst a healthy number of autogyros have been produced, the offshoot gear reduction drive business has now surpassed autogyro manufacturing.

Why use a reduction drive ?

Homebuilders historically have used direct drive or toothed belt reduction drives. Direct drive applications miss out significantly on thrust available due to inefficient prop speeds and expose engines to reduced life given the crankshaft was never designed to have a large, poorly supported flywheel mass (propeller) attached to it. Toothed belt drives are equally undesirable due to the side load being applied to the crankshaft and the potential for belt damage and deterioration.



This Titan T-51 Mustang at Matamata is the first to be fitted with the new Autoflight gear reduction drive. Owner Mike Crene was delighted with the trouble free installation.

The advantage of selecting the most efficient prop speed by using different gear ratios cannot be overlooked and fully enclosed gearboxes offer a number of advantages over belt drive counterparts. From the safety point of view there is nothing to get jammed in a belt, sun degradation of the belt is not an issue and the sealed unit is not affected by dusty operating conditions. Units in service in Australia are passing 1,000 hours in service and the Australian 'red dust' is notoriously abrasive. A further advantage is that in many cases Autoflight gear drive units are lighter than the belt drive units they replace.

Options and new developments

Autoflight offers a variety of two gear reduction drives to suit different applications. These include output shaft offset up or down specifically for Subaru EA, EJ and H6 series engines. A universal unit can be readily adapted to any engine up to 160hp.

Mazda RX8 Renasis and 13B engines can also be accommodated, as is the new Rotomax engine featured at Oshkosh this year with an Autoflight gearbox attached. Current development centres around two reduction drive projects both involving three gears within the casing. In the larger engine stakes consideration is being given to an Australian requirement for a two gear unit to couple to a V8 developing 800 hp.

The first three gear application arose from a customer request to develop a unit for a Suzuki V6 engine installation in a Titan T-51 Mustang. In this case the belt drive reduction unit was not performing

as expected. Neil explains: "A two gear reduction drive would have been very large with 218mm centres. Three gears reduced the centre distances to 84mm and allowed a very compact casing. The outcome is a unit that is as light as practicable but robust enough to continuously handle 300 hp. The completed drive actually weighs 3.5kg less than the belt drive unit." Further units have since been completed

for a Honda Legend V6 and a turbocharged Suzuki four cylinder engine.

Development included close monitoring of running temperatures, particularly since the alloy case expands faster than the gear train. Ground running temperature stabilises at 50°C and drops to 40°C when airborne. The unit was internally inspected following 15 hours of running and gear clearance was adjusted slightly to allow a little more backlash. Titan T-51 owner builder Mike Crene has now completed the 20 hour developmental test flying regime required by the CAA and is delighted with the unit and its trouble free installation.



The aircraft is a work of art and so is the gear reduction drive which weighed 3.5kg less than the belt drive unit it replaced.

With flat 4s and 6's, V6's and now V8's, will a V12 feature in the line up? There is every chance. Recently Autoflight completed the machining of raw cylinder heads for a series of vintage Lincoln V12 engines for hot rodder and classic aircraft enthusiast Garth Hogan. The real McCoy is only a matter of time.

Availability

The Autoflight workshop might be small in size and staffing but packed into its four walls is an impressive array of CNC and manual machinery. Neil insists the whole operation depends on the special relationships established with local foundries, gear cutters and heat treatment suppliers. Now with customers in Australia, United States and Europe, Autoflight is becoming the reduction drive of choice for several recreational aircraft manufacturers around the world. Order books are consistently full and export sales are accounting for 90 per cent of production. If you have a project underway Neil recommends making contact as early as possible so that a unit can be scheduled for availability at the required time.



Using three gears to span the 218mm offset allowed a very compact casing to be created.

For more information contact Neil Hintz at Autoflight on 027 271 0602, email: nckm@wave.co.nz, or visit www.autoflight.co.nz