



Building a basic Gyro from a kit

Traditionally microlights in NZ were "tube and rag" aircraft, often homebuilt at low cost.

Autogyros are no different and as with their fixed wing counterparts, low cost basic options still exist for those on a budget. Parakai based pilot, Oskar Stielau built and flies such an aircraft. He wrote this article about his GyroBee for KiwiFlyer.

ULTRALIGHT single-seat gyros were made popular by Igor Bensen who designed the Bensen gyro in the 1950's. This gyro was available either in kit form or could be homebuilt from plans. Thousands of Bensen kits and plans were sold, some of which ended up in NZ. The temperamental McCulloch drone engine was its weakness and when Rotax arrived on the scene many new designs were developed using Rotax two stroke engines. One of these is the GyroBee, available in kitset from StarBee gyros in the USA.

The GyroBee was originally designed by Ralph Taggart and used a Rotax 447 engine. It performed well with light pilots but struggled with heavy pilots. Most GyroBees now fly with Rotax 503 (52hp) or MZ202 (65hp) engines, which gives the aircraft a very good power to weight ratio.

Cost of a GyroBee

A pre cut and drilled GyroBee kit from StarBee costs less than US\$15000 and comes with everything needed to fly including a pre-rotator. The only thing that needs to be added to fly legally in New Zealand is a compass.

For those on a low budget, all the material can be bought and then cut and drilled as per the plans which can be downloaded for free on the internet. The cost saving is not large though as about 50% of the cost of a gyro is typically in the engine and rotor blades. Odds and ends such as rotor head, prerotorator, prop and

instruments make up a large proportion of the remaining 50%.

Building a GyroBee

About 2 years ago I ordered an UltraBee kit from StarBee gyros. The kit arrived with an MZ202 engine, Sportcopter rotor blades, and nearly all the parts for the airframe pre-cut and drilled. The airframe bits (mostly aircraft grade 6061) came in their bare state, and I decided to have everything powder coated bright yellow. Powder coating is a quick and easy way to get a good finish and it has proven to be very good for corrosion resistance. Other options would have been to leave the metal as it is, polishing, painting or anodising.

Once the cosmetics had been worked out building the kit is a bit like building a big Meccano set. All bits are simply bolted together with aircraft grade bolts which are provided. The documentation is very good, but was hardly necessary as the kit comes with a set of photos which are easy to follow.

Firstly three pieces of 2x2 alloy (the mast, keel and tail boom) are bolted together. To this is bolted the main gear consisting of two triangles with springs for suspension. The nose wheel and pedals are bolted to the front of the keel, while the tail and rudder are bolted to the back of the tail boom. Cables run along the keel from the pedals to the rudder. After about 10 hours of assembly I had a rolling airframe complete with tail.

One issue with the powder coating was that the holes lined up perfectly before coating, but after the powder coating there were a few holes that were out by the thickness of the powder coating. This was easily solved by scraping off the coating at a few strategic spots, but just showed how accurately the various parts had been cut and drilled.

The finer details always tend to take a lot

longer than anticipated and added roughly another 20 hours to the build. Here some cutting and drilling is involved as the seat position and controls are custom fitted to suit the pilot. Fortunately everything is open and accessible. There is no need to get your hands into small confined spaces as is the case with enclosed aircraft.

Probably the trickiest part of building the

GyroBee is getting the weight and balance correct. Since pilot weight is often nearly as much as aircraft weight, the aircraft has to be built for a certain pilot weight range. A hang test needs to be done with the pilot sitting in the seat so that the position of the rotor hang point relative to the airframe can be correctly determined.

The Finish

After everything was bolted together the gyro was registered, letters stuck on the vertical stabiliser (there's no room anywhere else) and the annual condition inspection done. Then it was simply a case of flying it and there has been a great amount of fun obtained from that!



Oskar Stielau imported this minimalist gyro kit from the USA and assembled it in a week.

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