



G-CIOF joins the Yorkshire Gliding Club fleet as a replacement for the club's Super Cub (Richard Cole)

LOOK FORWARD TO LOWER COST



Visibility out of a EuroFOX is excellent, both on the ground and in the air

With in excess of 1,000 towing hours, Richard Cole explains why Yorkshire GC now has two EuroFOX in its tug fleet

AFTER five months' work in the workshop and in the back of Yorkshire Gliding club's 'vintage' hangar, our second EuroFOX tug, G-CIOF, flew for the first time on 29 December 2015. The new aircraft joins G-MOYR, a Rotax 912ULS powered EuroFOX, as a replacement for the club's venerable Super Cub, and the combined EuroFOX towing hours at Sutton Bank now exceed 1,000 hours.

So why did YGC choose the EuroFOX as a replacement for the Cub/Pawnee fleet that the club had operated for decades? First and foremost was the need to dramatically cut the cost of maintaining two Pawnees and a Super Cub, which were draining the club coffers of cash and had put the club on an unstoppable financial 'final glide' from which there was no apparent recovery. Apart from the maintenance and operating costs, the old tugs were tired, unreliable and quite fragile in

their old age; Sutton Bank is quite bumpy in places, and both a Pawnee and the Super Cub had suffered undercarriage collapses during the previous couple of years.

Banbury Gliding Club was already operating EuroFOX under the LAA engineering regime as an Annex 2 aircraft; their experience, and that of clubs in Slovakia and Australia, effectively sealed the deal to go with the EuroFOX. Three years on from the start of the YGC EuroFOX project, we operate the EuroFOX at a fraction of the cost of a Pawnee, and have reduced launch charges by 20 per cent. The savings have enabled the club to build a new hangar for the tugs, and offer training and development opportunities for junior glider pilots at reduced cost.

Building the second EuroFOX (912 iS) was more straightforward than the first (sorting out the tricky bits second time round is a lot easier), but has taken almost

as many man hours (400+) and calendar months (five) to complete. As always, Roger Cornwell and Adrian Lloyd at EuroFOX UK have been on the end of a phone to help with anything and everything. Now we have established our tug fleet (two EuroFOX and a Pawnee) we can reflect on some of the decisions taken, and the processes that we have been through.

The building experience

At the start of the YGC project, the most daunting prospect was getting to grips with the actual build of the new aircraft. However, the Light Aircraft Association (LAA) and its network of LAA inspectors is completely supportive of projects like this. In order to use the LAA engineering regime, the builder has to be a Full Member Plus of the LAA or, for a club project, the club joins the LAA as a Corporate Member. Once the project is registered, the LAA provides all the relevant documentation required for the build, and lots of written articles and advice needed to keep the build 'on track' and within the rules.

The chaps from EuroFOX UK take the builder to the Aeropro factory in Slovakia to cover the airframe prior to factory finishing, and they provide the opportunity to understand and really 'get inside' the EuroFOX aircraft. The builder returns to the UK with some of the build stages signed off and has about six weeks to organise workshop space ready for their kit delivery. Teaming up with a LAA inspector at this stage is important as the inspector can provide plenty of help and advice at this early stage of the build, which will pay dividends later on.

From the outset we expected the build to last over four months, and we limited the number of spanner-wielding, amateur engineers to four. This meant that we could keep track of progress, cross-check each other's work and satisfy our inspector that we were doing things properly (in accordance with the build manual) at every stage of the build.

We were 'warned' that after a couple of months we would get to the "90 per cent of build done, 90 per cent to go" point; this proved to be the case as you finish with a complete aircraft, but issue of the initial Permit to Test depends on LAA Engineering's acceptance of correctly completed paperwork, including insurance, aircraft registration with the CAA, and weight and balance – all of which takes time and a lot of organising and writing.

The flying experience

Prior to ordering both YGC EuroFOX, EuroFOX UK provided both nose-wheel and tail-wheel demonstration aircraft in Rotax 912 ULS and iS engine versions. The trials helped determine the configuration of both YGC tugs, which is tail-wheel, tundra tyres, Rotax 100 HP, with the Tost CRG (cable retract guillotine) towing system. This set-up has been very safe and reliable in all respects. The shake-down and test flying on both aircraft was carried out 'in-house' with no nasty surprises (again plenty of guidance from EuroFOX UK and the LAA), and once the Full Permit to Fly had come back from the CAA (via the LAA and another three-week wait), tug pilot conversion and aerotowing started. The following points, in no particular order, describe the EuroFOX experience at Sutton Bank:

- TMG pilots converted more easily than those with no motor glider experience. Compared with Pawnee/Super Cub, the EuroFOX is very comfortable and easy to fly, and does not require heavy hands and feet on the controls – fingers and thumbs are sufficient, and big muddy boots are not required!
- Low pressure tundra tyres enable towing off soft ground. The glider dictates how soft is acceptable, and correct glider pilot technique during the take-off roll is important when the ground is soft.
- Visibility out of a EuroFOX is excellent, and the field of view through the roof transparency, towing mirror and door transparencies aids a good lookout round the tug, both on the ground and in the air. The FLARM installation enhances overall situational awareness.
- The ground ride is soft compared to both Pawnee and Cub, and the wide composite gear absorbs bumps well. Ground handling in strong winds is easier than both Piper tugs, and the EuroFOX is easier to control in turbulence and crosswinds. When operating in limit wind conditions, the EuroFOX does get bounced around, so strap in properly and enjoy the ride!
- EuroFOX aerotowing techniques are the same as for the heavier tugs, but require considerably less tug pilot effort. The 50-metre CRG tow ropes are shorter than the 'fixed' variety, but 'boxing the tow' and out of position exercises are easily handled, when flown correctly at the



The field of view aids a good lookout round the tug

BASIC INFORMATION ON KIT FOR AEROTOWING GLIDERS:

- 560kg MAUW for SEP/SSEA version
- 472.5kg MAUW microlight
- 450kg MAUW microlight
- Advanced kit equipped for towing operations ranges from about £40,000 plus VAT.
- Kit contains everything to finish the aircraft to a flying condition and contains airframe, engine, basic instruments and paint.
- A number of options are available, including strobe lights, back-up electric fuel pump, parachute recovery system and extra large tyres

■ The flying numbers vary depending on the variant. This is the 560kg, 100hp version, which would be appropriate to glider towing:

- Empty weight:** 285-299kg
 - Fuel capacity:** 86 ltrs
 - Stall speed:** 38kts
 - Cruise speed:** 90kts
 - VNE:** 124kts
 - ROC at MUAW:** 900fpm
 - Baggage weight:** 20kg
 - Max wind:** 25kts
 - Crosswind limit:** 15kts
 - Max flap extension:** 80kts
 - Glide ratio:** 9:1
 - Range:** over 600 miles (statute)
 - Wingspan:** 29ft 10in
 - Cockpit width:** 44.1 in
 - Max width, wings folded:** 7ft 10.5in
 - Length:** 21ft
 - Main gear width:** 7ft 2in
- www.eurofoxuk.co.uk

THE STRUCTURE IS EXTREMELY ROBUST, AND ITS SMALL SIZE BELIES THE CLEVER DESIGN AND SOLID ENGINEERING UNDERNEATH THE FABRIC COVERING



The Rotax 912 engines are very reliable and simple to maintain, and YGC uses unleaded AVGAS (Richard Cole)



Richard Cole has led the YGC team that has built two EuroFOX tugs. He has 3,000 hours in gliders (solo at 16) and three FAI Diamonds. Richard, who has a BGA Diploma, has also been a competition pilot and instructor. A retired fast jet pilot, QFI, IRE in the RAF, his flying includes 7,500 hours - Lightning, Phantom, F/A 18 Hornet, Tornado F3, Jet Provost, Hawk, Tucano, etc. Richard also has 1,600 hours PPL, mostly motor gliders and aerotowing. He is trained on Cessna 150, Chipmunk, Jet Provost, Folland Gnat and Hawker Hunter

✎ glider end of the rope.

● The guillotine is easy to operate should the need to dump the glider arise. The weak link in the CRG rope is 300kg (Tost 'green'), and big snatches break the link; this is due to CRG rope being less stretchy than the fixed ropes.

● Climb rates on tow are slower than a Super Cub (30 seconds to 1 minute to 2,000ft), but the Rotax engines can be throttled right back after glider release without shock cooling, and very fast descents are possible. Turn round times are quicker, and the EuroFOX tugs average five tows per engine hour.

● Short landings at low touch down speeds with the rope retracted are straightforward and reduce turn round times.

● Tailwind launches are non-starters, so do not be tempted, and heavy two-seaters (Duo Discus, etc) prefer the Pawnee, which provides a greater initial pull at the start of the take-off roll.

● Mode 'S' transponder, FLARM, LED strobes and all-over Ferrari red paint scheme make the aircraft highly visible to other

pilots and Air Traffic controllers.

Maintenance

At first sight the aircraft looks delicate, but the structure is extremely robust, and its small size belies the clever design and solid engineering underneath the fabric covering. YGC's first EuroFOX has now flown nearly 900 hours, the majority of which has been aerotowing off a bumpy grass airfield 920ft above sea level. Most of the routine maintenance can be done by the owner(s), as the list of permitted Pilot Maintenance tasks is extensive. The LAA inspectors supervise the more complex checks and adjustments, and a Permit Maintenance Release (PMR) is required for this work before the aircraft can fly again.

The Rotax 912 engines are very reliable and simple to maintain, and YGC uses unleaded AVGAS (UL91). Use of leaded AVGAS adversely affects the gearbox dampers and slipper clutch, and the lead deposits and fouling necessitate more frequent oil changes. The DUC Windspoon propellers used for glider towing are set up during the build with the blades set to 14 degrees pitch measured 14cm in from the tip. At full throttle this setting revs the fuel injected 912 iS at just under max continuous RPM (5,500) at 65-70kts IAS, and the engine is producing

maximum torque. The twin carb 912 ULS needs the propeller pitch set slightly finer, and revs at a comfortable 5,400 RPM at glider towing speeds. The propellers are ground adjustable, and fine tuning to the correct pitch angle (5,200 static full throttle RPM) is a straightforward procedure requiring your LAA inspector's check and a PMR.

All flying and engine hours are recorded in Aircraft and Engine Log Books supplied by the LAA, and all maintenance events are entered in the appropriate log book pages. We keep separate folders for completed worksheets (downloaded from the LAA website), which are also referenced in the log books. The YGC tugs are maintained on a 50-hour cycle; every 150 hours the engine compressions are checked and logged, and the gear box damper torque checked. Because the engines work hard at full throttle for much of their running time, we change the oil and filter, and check the filter elements and magnetic plug every 50 hours. The Permit to Fly is renewed annually, and the aircraft gets a really thorough 'annual' service at this time, which includes new spark plugs, carb balancing and general TLC.

So far, so good, so EuroFOX

The EuroFOX tugs at Sutton Bank have exceeded expectations, and they have been proved both efficient and reliable. The aircraft was never intended to replace our gas-guzzling Pawnees, and the big tug still has its place on the fleet for towing very heavy gliders. YGC has 'put together' one respectable Pawnee with a CRG system from two very rough aircraft, so the tug fleet caters for most (if not all) tugging eventualities.

From the start of project, the biggest challenge of all has been to convince the club membership that the little EuroFOX really is a superb glider tug. We are now seeing the benefits of equipping the club with 21st century equipment that is safe, reliable and (importantly) quite 'green' as well. All the tug pilots have adapted to the light touch required to fly and operate the EuroFOX efficiently, the glider pilots enjoy the cheaper launches, and the club-based LAA maintenance regime is simple and effective.

The club has been able to reduce launch fees, but can now invest in the future and continues to improve the whole gliding experience at Sutton Bank. The EuroFOX can "tow 80 per cent of the fleet at 20 per cent of the cost", but the benefits reach much further than that.