

# Cabletalk

## Surrey Hills Gliding Club Newsletter

March 2021

### Editor's notes

Firstly may I apologise (as I had to last year) that this issue is the first issue for some months – it has been a very strange last 12 months.

Because of Covid-19 there has not been as much flying as we would all have wanted, especially since November 2020, and therefore there has been little to report.

However, the first two articles in this issue are old ones – so they need to be read with that in mind. However the points made are still very relevant.

### Please take care!

*Jonathan Hill*

Gliding is a skilful activity needing commitment and application to master. Attention to detail is needed to keep the gliders safe and fit to fly. When we arrive at the airfield we need to become air-minded. When you strap on a parachute do you familiarize yourself where its deployment handle is? The handles are in different places on different chutes, not something you want to explore as you plummet toward terra firma. When you do your cockpit checks do you focus on the variations between gliders and why you're going to lay off a particular way and approach at a specific speed and why you're turning a particular way for a launch failure, or do you rattle out CB-SIFT-BEC and go for it? Hopefully you

do your checks meaningfully and are not distracted by by-standers.

I always tell my trial flights, gliding is 1/10th flying and 9/10ths pushing and shoving and as you've discovered I'm not far wrong, so get involved. It's all part of the activity which means handling gliders sympathetically and correctly on the ground leaving them undamaged and serviceable, a moments inattentiveness easily results in a long and expensive repair.

I'll give you some examples. A Grob 103 replacement Mecaplex canopy . . . if you can find one, supplied and fitted, £5k, please keep them closed. The Vega's damaged auto connect funnels amazingly cost just £40 to be welded (no replacements exist) replacement bolts £37 and a considerable amount of time freely given by our inspector, it hasn't even had its annual inspection yet! Most gliders have their quirks when being rigged, a common



*The Vega damage – it is still not airworthy a year later.*

one is the air brakes should normally be unlocked as well as accurately lining everything up. If it won't slide into place STOP, don't force it, CHECK and find the problem, DON'T just push harder. The K8's damaged tip rib was found during a thorough DI, it had suffered crush damage. Thankfully repair materials were to hand but despite inspector Ian P's skill, the glider was off line for almost two months. Having the spoon under the K6's main wheel at too acute an angle and ramming on the lifting bar caused a wheel to strike the fuselage by the cockpit hard enough to put a visible 4" split in the cold moulded ply which, upon closer inspection, required a piece 8" x 5" be cut out to remove all the damaged timber (thankfully a fuselage frame wasn't damaged). New ply had to be purchased, a piece of aircraft grade 2.5mm birch ply 4' x 2' £45 + p&p = £72 + £28 for paint. This doesn't include expensive resin, dope, fabric and an awful lot of time put in by inspector Ian, not just actually doing the repairs but researching and saucing everything.

So here are some ground rules. If in doubt, don't. Double check and ask. Please don't manoeuvre gliders using buggies near other gliders and other obstructions, do it by hand, ONE person on the wing nearest the obstruction whilst another one or two to pull. Only push on leading edges, never the thin trailing edges. Don't drag the tails round, it torques up the rear fuselage which can cause serious damage (if it snaps off up the launch it'll be your last!) and it wears out the tail wheels, more £s. PLEASE be careful taking out and returning gliders to the hangar. Use the spoons and bar carefully and follow the white lines and their extension into the hangar accurately, they've been very effective in reducing contact with the hangar sides, BUT care is still needed.

It'll soon be time again for winter maintenance and annual inspections,



*Damage to the K6 – the person responsible did kindly pay for the materials.*

these are made easier if gliders are kept clean. Yes YOU can wash out the wheel wells after daily use with the hose pipe, or even vacuum cockpits occasionally. Dirty gliders descend quicker because they are not efficient, so wash them with just a sponge and water and blade off the surfaces gently (not the canopies – which should be regularly cleaned inside and out with canopy cleaner and a clean micro fibre cloth with fore and aft wipes only).

During winter maintenance come and help, you'll learn what makes them work and YOU should help maintain the gliders YOU fly, shouldn't you?

In conclusion, when you arrive on any airfield switch on, become air-minded, think about how you handle the gliders as well as how you fly. A moments 'ham fistedness' or inattentiveness can have the gliders unserviceable, not earning, and club funds used up on repairs rather than

invested on improvements. Our friendly inspector won't be with us for ever . . . then who's going to repair all that avoidable damage?

## Costings

Phil Chapman

### ***The cost of weak link breakages***

Nuts and bolts	£1.41
New link	£3.75
Search time	Varies
Repair time	Varies
Total	at least £5.16

### ***The cost of strop losses***

Nuts and bolts	£1.41
New link	£3.75
Tost rings	£32.18
Ferrules	£0.64
Search time	Varies
Repair time	Varies
Total	at least £38.18

As you will be aware the weather recently has been pretty poor and this has had a detrimental effect on the stock of weak links and strops.

7 weak links have been broken and 2 strops lost at a cost of £102.00 plus search and repair time. That's the cost of 10 launches just to replace the metalwork.

Many years ago I was taught to attempt to release the cable after a break as soon as it was safe to do so, the theory being it saved dragging a length of steel cable around the sky and it help to drop the strops on the airfield.

Perhaps one of our many instructors could give the latest preference on this practice.

While I'm at it, the Tost rings on the tow out rope that happily bounce along the runway behind the buggies are the same Tost rings that cost £32.18.

## Building the club simulator

### - Part 1 - Lockdown

Sam Coole

It all started when I tried running Condor on the club computer, and thought about adding a joystick and pedals so the members could have a bit of fun. After thinking "I could also add this" several times, I soon had quite a project on my hands! To add to my growing list of tasks, the committee agreed I ought to have a surround display setup, as we can't teach much without lookout being involved.

Before I could build a simulator in a fuselage, I first had to find one. My first thought was that Ian Pattingale would know of one lying around, and I was right. He sourced an Olympia 460 fuselage (well, cockpit) for me, which was in great structural condition.



*Pictures of the fuselage before being delivered to the club by Ian . . .*

I now had to work out how to get all the control inputs (no less than elevator, ailerons, rudder, air brakes, trim and cable release) into a computer and into Condor (the simulator software). My initial thought was using potentiometers, small sensors that vary their resistance depending on the position of a mechanical slider or rotary motion. I could then connect these up to something like an Arduino board (a small, programmable circuit board that would enable the sensors to “talk” to the computer).

After hours of research, I scrapped this idea due to the fundamental issue with potentiometers – they are mechanical devices that wear out over time, and give dodgy outputs once dust accumulates inside them. The newer alternative is “hall effect” sensors. These are very small sensors that vary their resistance based on their position relative to a North and South magnetic pole (i.e. they can be used next to a magnet that moves forward and back). These have quite a few advantages – they are incredibly accurate, there are no moving parts so they do not degrade over time, and they actually end up being cheaper. I also found a better way of connecting these to the computer – a specifically designed joystick controller, instead of the Arduino board. There were a few reasons for this – it wouldn’t need programming, which would save me a lot of hassle! It is also 12-bit as oppose to 10-bit, which means the sensors can detect 4096 different positions instead of the 1024 of the Arduino (1024 was probably plenty, but bigger numbers are more impressive).

Since the sim would be using 3 displays, I knew I would need a good computer. I wanted to make sure that Condor could run on its highest settings, with the frame rate never dropping below 60. I played around with my computer running Condor at different resolutions, and estimated



*Before (left) and after (right) the additions, and not to mention the improvement in cable management!*

what graphics card I would need to run the sim (processor etc is pretty negligible in Condor). Chris Leggett was very kind to donate a spare PC from his storage unit, and it turned out to be very good (apart from having no graphics card, typical for an office PC). I soon enough found a bargain on a suitable graphics card and I put the computer together. Sure enough it runs Condor flawlessly.

It was still early January, so I had plenty of time to get the software running nicely. I decided that having buttons for operating the computer as oppose to using the mouse would be quicker and easier. Unfortunately, Condor doesn’t have any assignable buttons for navigating the menus or for anything that isn’t in flight. The only way is to use keyboard “macros”. This works by automatically moving the mouse and clicking on things, saving the user from doing it. It’s a bit of a bodge, but actually works very well if programmed properly. So, this was my solution – a standard keyboard with custom printed key caps for various functions.

A lot of tedious programming later, all the buttons worked. I achieved my target of making Condor as easy as possible to



operate – once the computer is logged on, it's possible to start a flight by just pressing one button.

Unfortunately, it was winter and I didn't have anywhere to work on the fuselage inside. However, the instrument panel was separate from the fuselage so I brought that home to work on. This is what I was working with.



I knew I wouldn't need the few instruments that were left, and they were held in by 4 bolts each – so in theory would be easy to remove. It turned out that only a few of them were not completely rusted into position, so I had to drill through the bolts to remove them . . . rather difficult with a hand drill!

The plan was to mount a screen behind the panel, and program the instruments to show in the holes where they would be. After taking measurements I decided that the best fit would be a 12" 4:3 screen. Ideally, I just needed the screen and accompanying circuit board – monitors have large plastic bezels which would get in the way and cause problems for the buttons I also wanted. I didn't have much luck in finding one to buy, so I decided

the best option was to purchase a monitor of the size I needed, and dismantle it and remove the outer shell.

This was rather nerve-racking, as we had bought the monitor brand new and I really didn't want to break anything!



*Right – preparing the panel for the screen. Left – the screen after being bolted to the panel.*

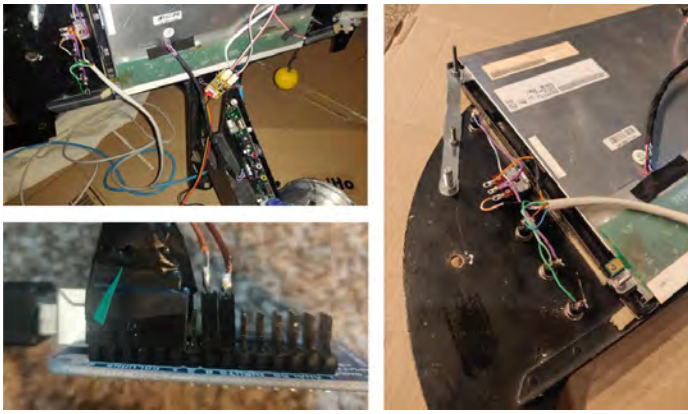
After carefully prying open the case, and unplugging everything, and spending a good hour removing all the hot glue that was holding the screen against the case (very elegantly manufactured!), I managed to separate the screen.



*The instruments showing after being set up.*

Over the next few days, I drilled more holes for the buttons, painted the panel, and stuck labels for the buttons. This is the finished product:



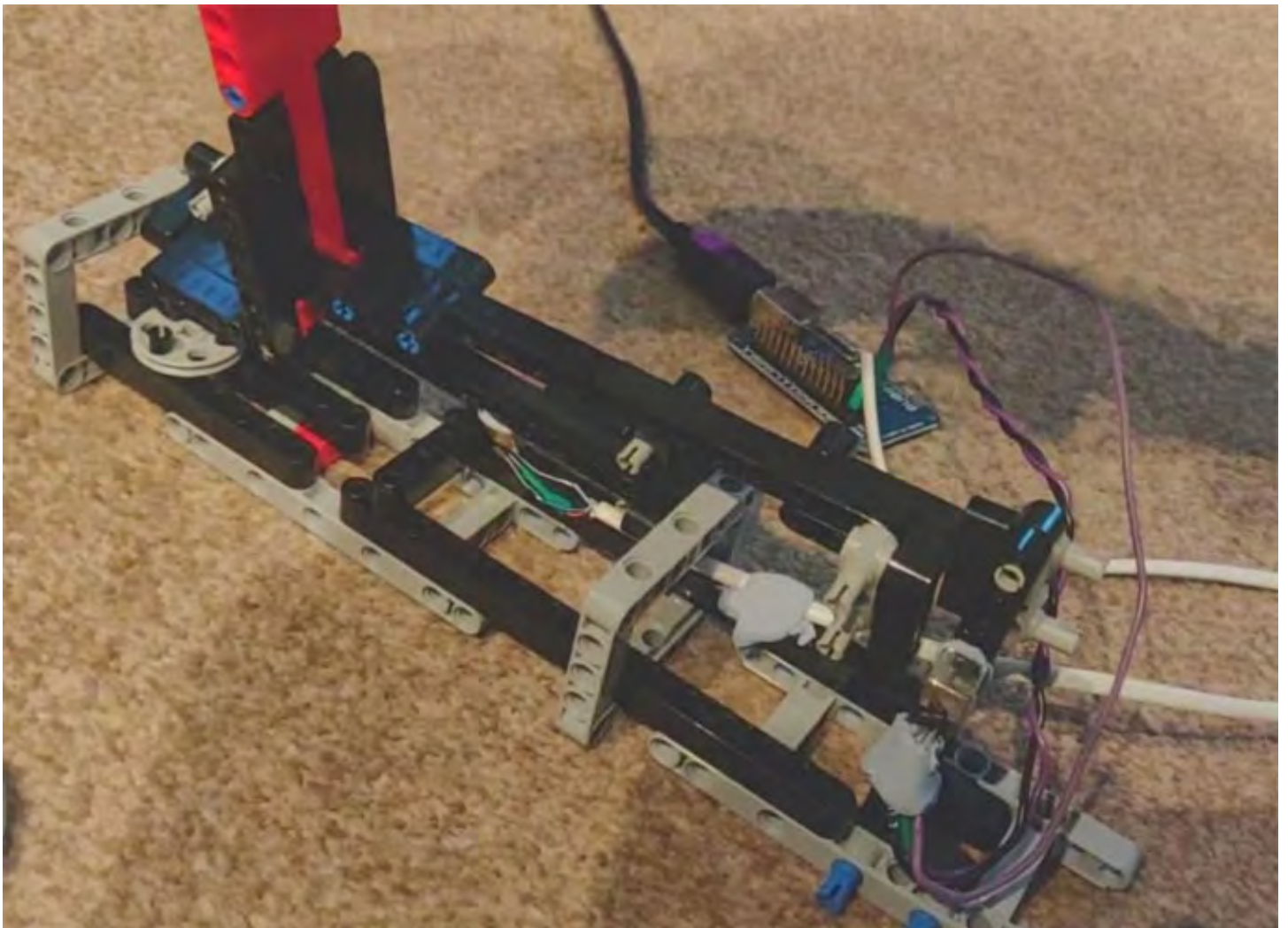


Next, I had to connect up all the buttons. They are quite simple to do – one pin goes to each button input pin on the controller, and the other pin goes to ground. Fortunately, all the grounds can be connected together, so I needed 12 wires in total. Instead of routing all these separately, I thought it would be a better idea to repurpose some sort of cable that has several wires in it.

I decided to use a few ethernet cables, as they have 8 wires each. So, I just cut off the connectors, stripped the wires, and soldered them all up. To my surprise, they all worked first time. Just a little more programming like with the keyboard, and they were all functional!

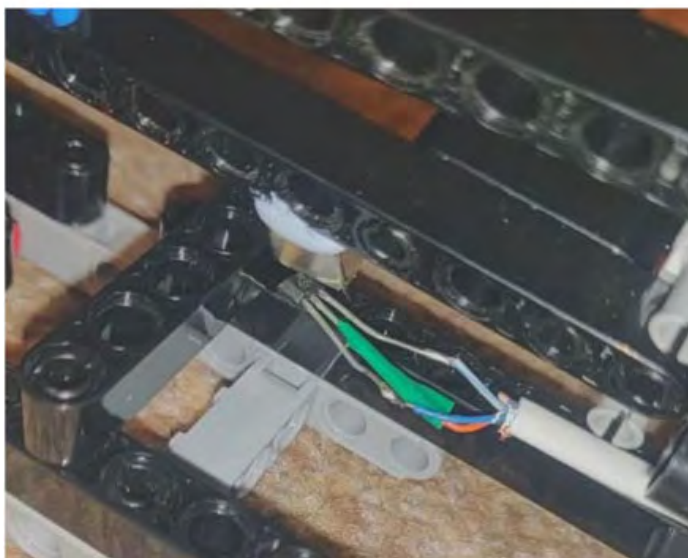
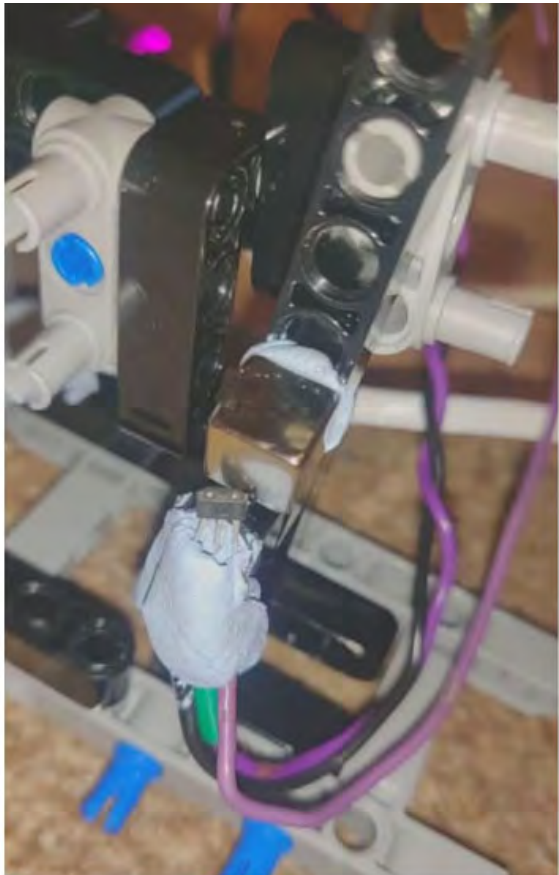
By this point I had run out of things I could set up from home. However, I did think of one last thing – creating a mock-up of how the joystick is going to connect to the sensors. I copied the mechanism that is in the fuselage already, which separates the ailerons and elevator into 2 separate rods – one that rotates and one that moves forward and back.

The aileron part is easy – my sensors can detect rotational motion so its just a case of strategically placing a magnet and sensor. The elevator is a bit harder as I



*The whole joystick, which I completed several flights with on Condor!*

need to convert about 11cm of linear motion into rotational motion. This isn't helped by the fact that the rod rotates slightly when the ailerons are used, so I needed to remove this motion. I managed to get something that worked very well – hopefully building it for real will go as smoothly!



*The sensor and magnet for the elevator (top) and the sensor and magnet for the aileron (bottom).*

One last bit of progress I can note is finding 3 55" TVs. One is coming from Mark Kidd, another from one of my friends and another one that we got in exchange for a trial lesson! The latter two are currently being stored in the clubhouse.

I would say that they're pretty well hidden back in the clubhouse ready for installation after lockdown.



I think I can say for certain this project has come a long way since the idea of having a joystick with the club computer! I hope that when restrictions allow me to build the simulator, and we are allowed to use it, it proves to be a valuable training tool!

## AGM

In light of the unknown position with Covid and the rules that may or may not be relaxed, the AGM will again this year be done electronically via Zoom. The date for this year's AGM will be 11th May, which Trevor reliably informed the committee is a full moon!

If there are any full members that would like to join the committee then please feel free to make your availability known.

# Chairman's notes

Chris Leggett

There has not been a period like this and Covid-19 has created some very different problems.

I would like to personally thank the whole committee – we have had more meetings than usual to deal with the changing edicts from the government and some of them at short notice. What would we have done without Zoom?

While thanking people I would also like to thank Dorcas – she has always been available to deal with the many emails the club has had and, thanks to FreeFlight and electronic records, we have been able to keep the records up to date while all working from home. I know some people are struggling to use FreeFlight but from a club point of view we would be in a very difficult position without it and we have come to rely on it.

Again, while thanking people, and please don't feel offended if I don't mention you,

there are four people who deserve a special mention. Mark Kidd, as Treasurer, has kept on top of all the grants we have been able to apply for, as well as sorting out the furlough system that currently applies to Phil Chapman. Then there is Jonathan Hill who has planned all the work on the gliders so the paperwork and annual checks will be done by the time we are able to fly again. Thanks also go to our inspector Ian Pattingale who has been masterminding what needs to be done. Lastly there is Sam Coole, who has been Jon's assistant in doing work on the gliders and has spent hours working on the simulator.

615 VGS would have been back flying if it had not been for Covid-19 – the winches (yes two of them) have arrived and the gliders are due soon. The airfield will soon be back to flying most days, weather permitting.

As I finish my fourth year as Chairman I would like to thank the members and the committee for their support. I hope everyone stays well and I look forward to seeing you all at the airfield soon.

## Contact Details

*The Directors of the Club are:*

Jason Barton

Terry Hagerty

*The Club Committee is made up of:*

Chris Leggett (Chairman)

Marc Corrance (Secretary)

Richard Fitch (CFI)

Mark Kidd (Treasurer)

Paul Hayward (Safety Officer)

Jonathan Hill (Technical Officer)

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*Comments on this newsletter and any contributions or photographs are welcomed and should be sent to the 'Cabletalk Editor' at the above email address.*