Newsletter

October 2020

To start us off this month, Jason kindly sent me this concerning the Corona virus and the signage in use at our field:-

Covid 19 Secure

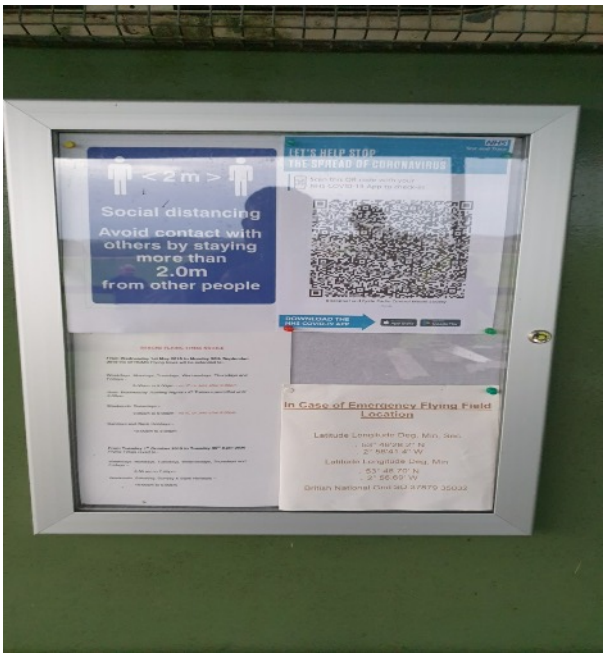
Model Flying after 14th September 2020 - England and Wales

From 14th September new restrictions apply to social gatherings in outdoor spaces in England and Scotland. The number of people allowed in an outdoor gathering has reduced from 30 to 6, appropriately socially-distanced unless from the same household. However, organised sport is one of several exemptions to the new restrictions, **provided that it is conducted in accordance with COVID-19 Secure guidelines.**

The guidance below offers practical advice on the measures that should be taken by model flyers, clubs, officials, volunteers and spectators before, during and after all outdoor model flying and associated activity as well as specific advice relating to clubs, competition and event organisers to ensure that they are COVID-19 Secure. It should be read in conjunction with the latest UK Government guidance.

To comply with this guidance the following sign-age and test and trace system have been put in place.

Covid 19 Secure Sign-age



Covid 19 Secure Sign-age

Covid 19 Secure Sign-age

A VIEW FROM THE HEDGE. (By Will Sparrow)

Day after day the sky, now almost devoid of contrails, has been filled with skein after skein of migrating geese, heading south to warmer climes with just a few confused individuals heading north: "follow me lads, I know the way…". I tried this migration lark myself a couple of years ago, only to discover that sparrows are not made of the right stuff for migration. I ask you, who in their right mind wants to spend the winter in Kirkham?

Just before the warm days vanished forever we had a spate of large, foam, electric gliders. I have counted a total of three different examples, allfromthe same stable, over the last few weeks. I just happened to be on my viewing twig when the last of this trio was to have its maiden flight. I was amazed just how well it flew. The test pilot checked out the trims, explored the stall characteristics, tried a bit of thermal-soaring and a spot of mild aerobatics and expressed himself both pleased and surprised. I sensed that he didn't expect a ten pound lump of foam to be as good as it was – a sign of the times, I suppose.

The last Sunday in September was a bit on the cold side, but was a lovely day for model flying: many members turned up to take advantage of the conditions. Apart from the usual sport flying, the day was blessed with not one, but two lovely electric twins. One was a tasty blue-on-blue scale model, hand built by the owner (such a refreshing change!). The model flew beautifully and really looked the part, presented as it was, against the blue-sky backdrop. The next twin to take to the air was not a new model, but it was new to the current owner, so this was really its maiden flight. First flights can be a bit stressful, but we were all able to relax as the model broke ground and cruised around the sky – I just love the sound of a twin. On the model's last flight of the day, as the model was being set up to land, I noticed that the left, main-gear retract had remained… err… retracted. Undaunted, the intrepid pilot (how these little plastic chaps cope is a mystery to me!) held the wheel-less wing up with a touch of right aileron to perform a pretty good landing: we all breathed a sigh of relief. The model had sustained zero damage.

And now, dear readers, I have for you a tale of mystery and suspense. One fine day, at the end of September, just as modellers were starting to pack up for the day, a "package" was noticed lying on the table on the club hut veranda. The

"package" turned out to be a Multiplex model bag. The zips were sealed with cable ties and there was a label addressed to one of your members – by this time, being insatiably curious, I had flown over for a closer look. Members present were totally puzzled. The package had been there for a considerable time and no one had come to claim it. Just as the members were considering a controlled explosion (one can't be too careful these days), the addressee drove into the car park so all would now be revealed. Except that it wasn't! The addressee hadn't a clue as to who had left a package for him. When the seals were cut the bag was found to contain a Multiplex glider, complete with servos: not a cheap bit of kit, then. To this day, the donor of this model is unknown. Are you the Secret Santa? We are all dying to know who you are…

As you all know, first-person-view flying is not permitted at the field. However, models equipped with all the FPV kit can be flown as ordinary models. The down-side of this is that a model, equipped with loads of batteries, cameras, transmitters and countless aerials is going to be heavy. Such a model will need to fly fast in order to fly at all. One such model, sprouting more electronic surveillance kit than GCHQ, made a field appearance in mid-October. The model was a sort-of foam flying wing, very futuristic looking and in need of a hand-launch. With a trusty ~~agent~~ piloton the sticks, the owner, who had demonstrated his sprinting abilities only a day or so before, staggered forward and delivered the second worst hand-launch observed in recent times! The model covered ten feet before hitting the ground: flying speed had not been achieved. Often, at times like these a hero steps forward; in this case a member, swift of step and strong of arm. It was surely time for the leaden model to embrace its destiny and fly into the wide, blue yonder. With a manly sprint and a giant heave the model slipped out of the launcher's hand to travel ten feet before hitting the ground for a second time. I had just witnessed the worst hand-launch in recent times. The model suffered some damage but not before it had its revenge… The pusher prop cut the launcher's finger and took a bite out of the top of his head! That's enough mystery and excitement for the time being. Mind how you go…

WS

The BMFA Scale Contest

These excellent photos sent in by Jason

I guess his is Jake's Extra 330

D H Tiger Moth on take off

What an absolutely superb shot you've taken here of the Stearman - brilliant.

The Corsair taking off.

The DH94 Moth Minor about to rise off ground.

John Higgin's Fournier - I love this model (and the way he flies it!)

Aerodynamics

October 2020

Article by Brian Holdsworth

In aerodynamics, the state defined as balanced flight is important for analysis. This is during steady, straight and level flight, when all the forces on the aircraft are balanced so that it continues without deviation. Because the surface of the Earth is curved, such flight is theoretically impossible, but this is ignored for most purposes. The slightest air disturbance would disrupt the state, but aircraft are designed with stability so that the state is effectively present for reasonably low levels of disturbance.

Wind speed and direction define the motion of the air with respect to the ground, and there is often a vertical component which may be relevant.

Airspeed is the speed of the air over the aircraft with its direction defined with respect to the aircraft reference axis (generally along the fuselage centre axis in plan view and parallel to the tailplane chord line in profile view). A vertical angular difference is termed Angle of Attack. A horizontal angular difference is termed Sideslip and is generally undesirable, with increased Drag, erratic control response and a tendency towards a violent stall. The first instrument on early aircraft took the form of a ribbon in the airflow, visible from the cockpit, to indicate any Sideslip for correction by pilot action with the rudder. Due to its simplicity, it remained in use for many years before being replaced by more capable (expensive) equipment in the form of "Turn and Slip" indicators etc.

Ground speed is with respect to the ground and is the combination of airspeed and wind speed. Heading is the horizontal angle between the aircraft reference axis and the ground, defined with respect to North. For convenience, wind speed is divided into headwind and crosswind components with respect to the aircraft. Track is the horizontal angle between the ground speed and North. Headwind greater than airspeed will result in a negative ground speed which looks to a ground observer that the aircraft is flying backwards. A crosswind component will make Track differ from Heading, often termed Crabbing since it looks to a ground observer that the aircraft is flying sideways (which it is not). A similar difference will be produced by a Sideslip when the aircraft really is flying sideways.

The classic representation of the forces on an aircraft shows, from a single point, Lift acting vertically upwards and Weight acting vertically downwards, Thrust acting horizontally to the left and Drag acting horizontally to the right. Drag is roughly proportional to the airspeed squared with part being non-linearly proportional to the generated lift (induced drag) and the remainder due to the friction etc of the air over the structure (parasitic drag). As covered earlier, using the term Mass would be preferable to Weight since its definition is unaffected by acceleration.

This representation is unstable in the event of a rotational disturbance about the reference point so that a more complex configuration is required, usually in the form of a wing with a separate tailplance mounted a considerable distance behind. A fixed arbitrary reference point, typically at 25% mean wing chord at the intersection of the reference axes, is used with the various

Aerodynamics Continued....

Article by Brian Holdsworth

forces represented by their magnitude and direction from that point together with rotational moments about that point. The lift generated by a wing can move significantly along the its chord line with changes in airspeed and angle of attack, requiring the resultant varying pitching moments to be considered. Mass will be offset in the vertical axis generating rotational forces for changes in angle of attack. Thrust and Drag will be offset generating rotational moments which will also need to be balanced. The combination can be arranged to provide stability in the pitch axis. Similar representations are needed for the roll and yaw axes. Pitch is reasonably isolated, but roll and yaw have considerable interactions with each other.

However, the simplistic representation is adequate for an initial analysis. If Lift is greater than Mass, a vertical acceleration is produced causing altitude to increase and, if less causing decrease with a corresponding increase/decrease in potential energy (proportional to the height above the ground). Similarly, if Thrust is greater than Drag, a horizontal acceleration is produced causing speed to increase to the left. For such a configuration to be stable, a mismatch must eventually generate restoring forces to limit the duration of the acceleration. For example, an increase in Thrust and consequent eventual increase in airspeed will also result in Drag increasing until it matches Thrust, re-balancing the forces. Kinetic energy increases, being proportional to the square of ground speed.

The opposite state, unbalanced flight, is better described as accelerated flight since it is mainly involved with manoeuvres such as speeding up and down, climbing and diving, turning etc. In model flying, straight and level flight duration is limited to a few seconds, due to the need for frequent turns to keep the model sufficiently close for visibility; thus a model is usually in accelerated flight. This contrasts with full-size aircraft such as airliners on long flights, which often spend several hours in continuous balanced flight.

Steady, straight and climbing/diving flight is balanced in the sense of being stable. Potential energy is gained/lost due to the increasing/reducing height above the ground, which is not a steady, sustainable state. In the representation, Thrust, Lift and Drag are rotated by the climb/dive angle but Mass remains acting vertically down. Kinetic energy remains essentially constant, being defined along the Drag axis; its horizontal component is reduced but a vertical component is introduced.

In a dive, the required Thrust is reduced due to the component of Mass acting along the Thrust axis. A dive would increase speed until sufficient drag is generated to balance the forces. If the dive is sufficiently steep, no Thrust would be needed to maintain airspeed, termed gliding flight. At some point, the airspeed would reach a value termed VNE (Velocity Never to be Exceeded); beyond this value, the probability of structural failure, especially during recovery, is considered excessive for airworthiness certification purposes. In a vertical dive, no lift is generated with no induced drag, leaving only parasitic drag - the resultant high airspeed with full thrust is termed the terminal velocity and will often be greater than VNE, especially under full power. Kinetic energy in the horizontal axes becomes zero, becoming proportional to vertical velocity squared.

Aerodynamics Continued....

October 2020

Article by Brian Holdsworth

In a climb, greater Thrust is required to balance the component of Mass acting along the Drag axis. In a vertical climb with no lift being generated, the Thrust is equal to the sum of the Mass and parasitic drag. Kinetic energy in the horizontal axes becomes zero. In a prophang with no airspeed, Thrust is equal to the sum of Mass and the parasitic drag from the propwash over the structure; the parasitic drag would be zero for a jet or ducted fan if the efflux and air intake flows are sufficiently clear of the structure.

There are other conditions where the accelerations become stable and definable. Spiral dives and spins are examples where the forces are stable with respect to the aircraft, while it is rotating about one or more axes. Slow oscillations in an axis can occur where the stabilising forces lag the disturbing forces. Pitch oscillations are common and are termed "phugoids". Yaw oscillations are descriptively termed "fish-tailing" due to their resemblance to a swimming fish. Similarly, roll oscillations often occur.

A particularly awkward oscillation in all three axes is a "Dutch Roll" and swept-wing and delta configurations are prone under some flight conditions. The Boeing 707 had particular problems which sometimes became evident as the nose was being raised when the aircraft was slowed in the final stages of a landing approach with pilot correction very difficult. The only recovery option was to overshoot and try again, with some needing multiple attempts which was obviously undesirable. Some pilots persevered to attempt landing with tragic consequences as the aircraft slammed into the runway and exploded, killing all on board. The problem is caused by the interaction of pitch, roll and yaw stabilities worsened by pilot input and a solution was urgently needed. A yaw damper actuator controlling rudder application and overriding pilot input was implemented but demonstrating the integrity of such a system took considerable effort over several years before the equipment was installed for all such configurations, solving the problem.

The difficulty of achieving sufficient integrity became very apparent a few years later, when several Boeing 737 aircraft experienced a rudder hardover during their landing approach, causing the aircraft to roll over and dive into the ground. The devastating impact made diagnosis difficult, but the yaw damper was suspected though extensive experiments failed to identify any problems - the actual damper was too damaged for meaningful testing. Eventually, one aircraft survived when the rudder hardover stopped soon enough for control to be recovered, permitting a safe landing. The involved aircraft was grounded and its actuator examined and its operation exhaustively tested. Eventually, a hardover condition was produced, under very extreme conditions considered to be impossible in practice. Almost in desperation, the yaw damper actuator was replaced with a different type across the entire 737 fleet, and no problems have since been identified. It would obviously be preferable if a definitive answer could be identified and the inevitable concern is that similar problems may recur in such items if the unidentified combination of conditions should be repeated.

Brian Woods P51 Build Blog

Hi Peter

Made some progress this week on the u/c doors,firstly I made a mould off the underside of the wing. The doors aren't flat they have the same curve in as the wing, layed some glass up and when it was cured I cut the inner and outer doors out.

They were trimmed to something like the correct shape allowing for some fettling room. Next the hinge that connects the door to the wing was made.

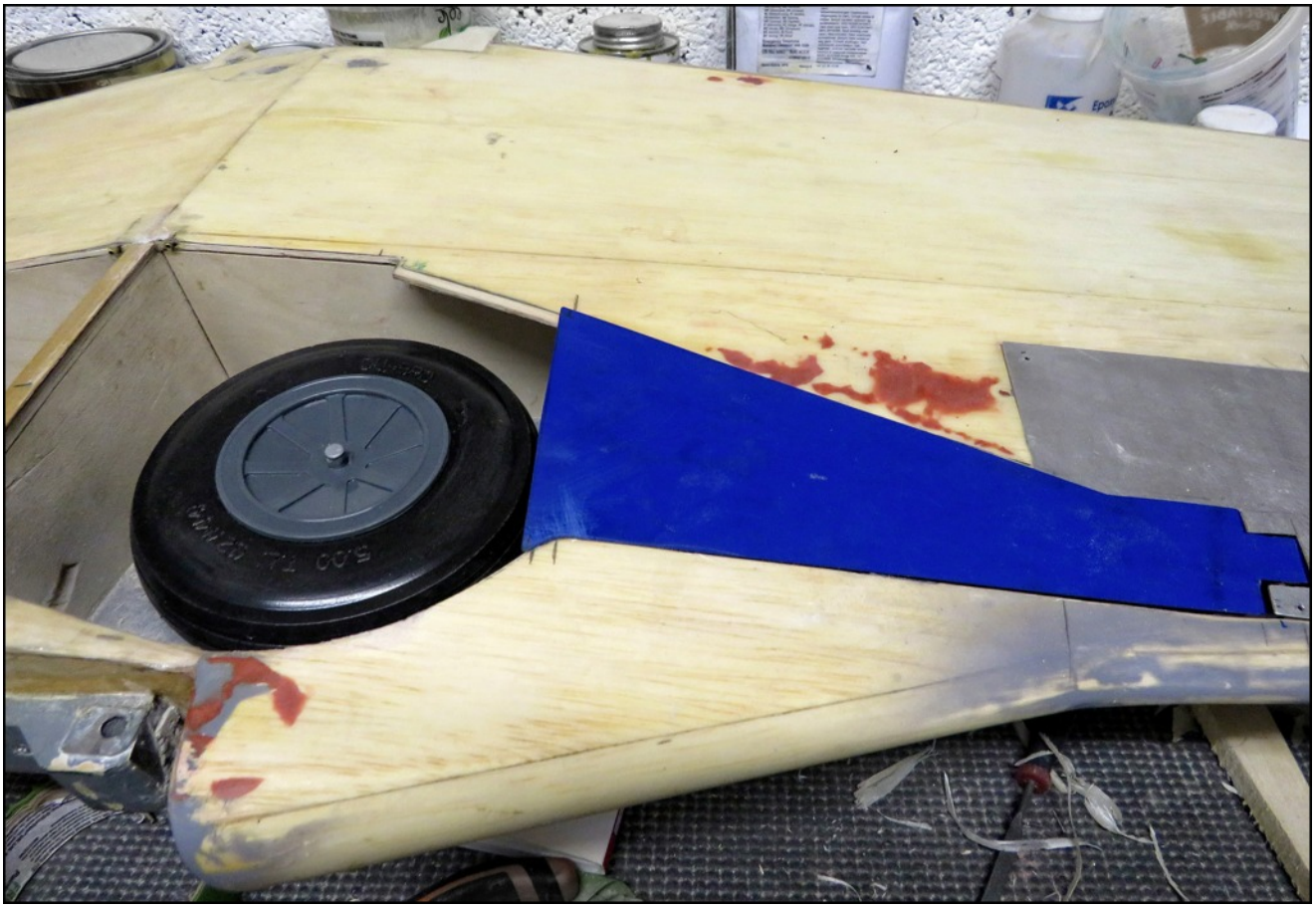
This is a two axis hinge which allows the door to go up and down and slightly fore and aft to allow for the changing geometry when retracting.

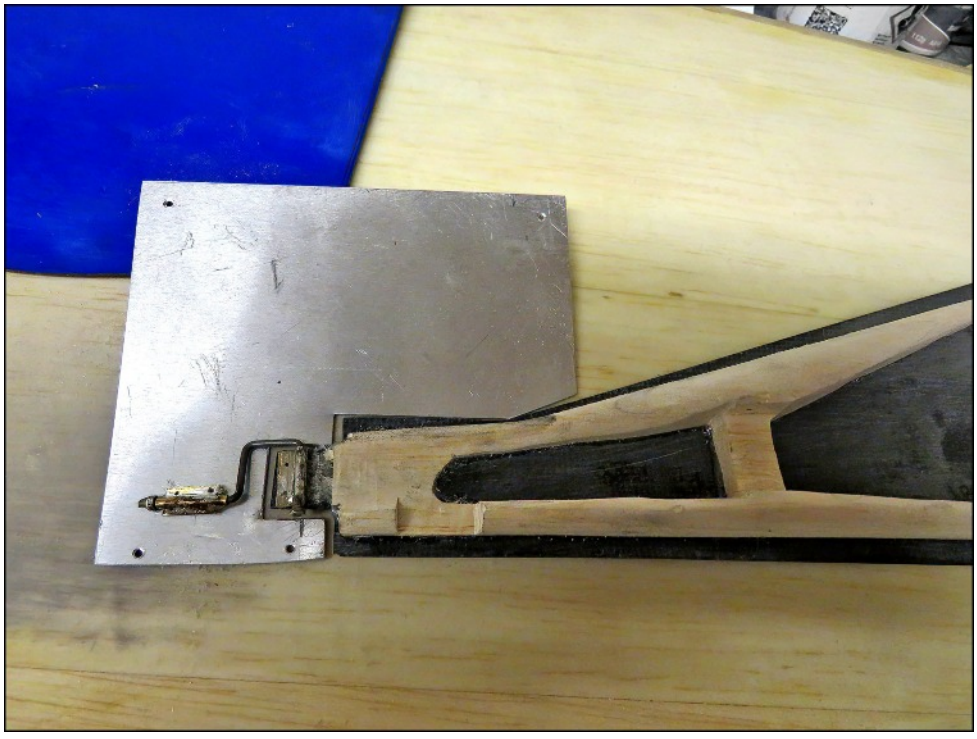
Next is the inner skin of the door made from balsa and stuck on this will get finished when the door set up is complete the door is then connected to the u/c cover plate.

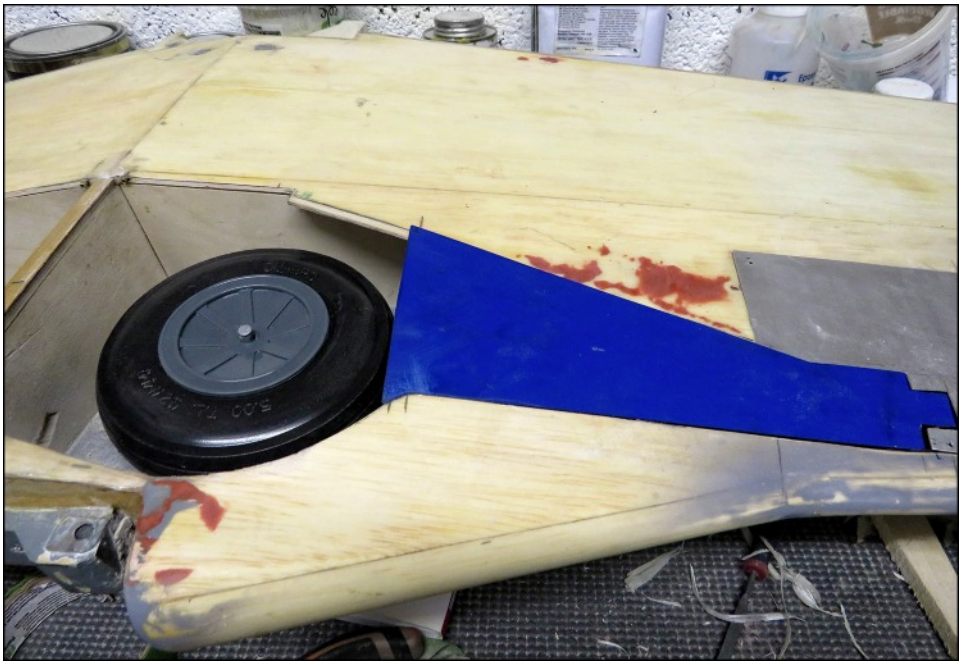
The door is connected by 2 adjustable links like the full size. These links are adjusted in length to get the correct fit of the door when retracted. First trial fit turned out OK and only minor adjustment is required.

The mounting tubes for the links can be blended into the inner skin which can now be filled finished and detailed which will be done at a later stage.

Next start the process again for the port leg .







Club Instructors

Jason Reid, Mark Conlin, John Higgins, Brian Holdsworth, Chris Vernon, Andy Harrison, Jim Sheldon, Paul Cusworth, Justin Goldstone, John Prothero and Kevin Watson.

In Conclusion

I am very grateful to you gentlemen who have so kindly contributed to this newsletter.

Stay safe guys.

Peter