Tale Feathers

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EDITOR – IAN DOLBY 0427 602 388
EMAIL-jenfury@bigpond.com

Hi Club Members
Welcome to another issue of Tale Feathers.

The usual Disclaimer:
Articles and comments by the Editor and contributors may not necessarily reflect the views of the Club Committee, probably won't be Politically Correct, but will be published anyway.

HOUSEKEEPING
Please remember that this newsletter is an information exchange and an open forum for anybody to have their say.
Please email stuff to me, (a Word, Excel or PDF document) be it technical, human interest, Club stuff, building/flying tips or if you just feel like a bit of a (polite) rant.

Photos (in JPEG format) are always welcome.
(Animal/bird/model photos courtesy of the Editor. A range of Hi-res copies available on request.)

Club Corner
As noted in the minutes of the last meeting, the start of the Club Fun-Fly competition has been postponed until the Sunday of the next meeting, 9 March.

A combination of very hot weather and members still building has been responsible for the delay.

The Hott's kit promoted by Brendan Tucker is a very attractive model and should perform very well with 3s power.

There will certainly be a wide variety of models when the Comp. does start.

Albury R/C Models raffle donation

A very big 'Thank you' to Ken Petts of Albury R/C for his very generous donation of another model for the Club raffles. The model is the amphibious foam delta 'Dragonfly', an example of which has been demonstrated a few times at the field by Dave Roberts. This sort of generosity deserves our support, as Ken is constantly increasing stock and will always listen to ideas for new and better items.

Club Ice-Box:
As approved at the last meeting, a large, 200L, Ice-Box has been purchased and is ready for use. Although primarily intended for main events, it is, of course, available for use at any time.
Please drain & clean it thoroughly after use and leave the lid propped slightly open to dry properly.
The smaller ice-box is perhaps more suitable for weekend use, but will need to be cleaned out first.

Committee Note:
Next meeting is on Sunday 9th March at 0930 at the Clubhouse.

TOTAL FIRE BANS

Members are thanked for respecting the policy of declaring the field closed to all flying during total fire ban days. Please check the newspaper, Rural Fire Service or Weather sites for latest details.

Fire Extinguisher training:

In the wake of the Fire Extinguisher inspection, several members have asked about the possibility of training in extinguisher identification and effective, safe use.

Interested members should contact their nearest, friendly Committee member. (if you can't find one of those, call me)

The following is presented courtesy of the MSA.

Motion Induced Blindness is an in-built human condition and can only be avoided by constantly moving your eyes when flying, driving, riding or even walking in public.

Click on the link if you haven't seen this before; it's a bit scary when you realise how much you could be not seeing!

"**Motion Induced Blindness.** In a motor accident, where a speeding car hits a slower moving vehicle coming from the side, the speeding car drivers often swear that they just didn't see the vehicle coming from the left or right. Well, often they aren't lying. They really don't see the vehicle coming from the side, even in good light conditions. This phenomenon on the car drivers' part is known as "Motion Induced Blindness" or sometimes as "Tunnel Vision".

Once airborne, pilots are taught to alternate their gaze between scanning the horizon and scanning their instrument panel, and never to fix their gaze for more than a couple of seconds on any single object or position in space. Because, if you fix your gaze on one object long enough while you yourself are in motion, your peripheral vision goes blind.

Even with radar and transponder detectors, the "heads on swivel & eyes moving" technique is the best way to spot other aircraft in the skies around.

For a small demonstration of Motion Induced Blindness, just click on the link below. You will see a revolving array of blue crosses on a black background. There is a flashing green dot in the center and three fixed yellow dots around it. If you fix your gaze on the green dot for more than a few seconds, the yellow dots will disappear at random, either singly, or in pairs, or all three together. In reality, the yellow dots are always there. Just move your gaze slightly and the yellow dots will reappear!

http://www.msf-usa.org/motion.html

So, if you are driving on a road with your gaze fixed on the road ahead, you will not see a car, a scooter, a buggy, a bicycle, a kangaroo or even a human being approaching from the side. **Now reverse the picture**. If you are crossing a road on foot and you see a car approaching, there's a 90% chance that the driver isn't seeing you, because his/her gaze is locked on the road ahead and peripheral vision may be blind! And you may be in that blind zone!"

This principle will apply when flying models, if you concentrate too hard on your model, others around you will disappear.

Keep those eyes moving!

…And on another subject entirely…

"Hmmm. I've seen that look before!"

BUILDING TIP (thanks to Steve Sutherland)

If you have difficulty fitting a very small drill into the chuck of your electric drill, or just need some extra reach into a tight spot, unscrew the knob off the end of your pin-vice and insert it into the drill chuck. (The pin-vice, not the knob)

You now have a powered, long-reach, fine drilling device. QED

Hmmm!

Sighted in Holbrook recently- (thanks Brian)

TECH TALK

As a change from discussing the vagaries of those monstrous, methanol-munching machines so fancied by flocks of furious flyers, and following the last article about Wind Shear, let's look at how to use wind shear to fly many times faster than the wind, without a drop of methanol or petrol in sight.

Wind Shear

Just a quick reminder of what it is.

Wind Shear is defined as a rapid change in wind speed or direction with height change. Wind that is slowed close to the ground due to surface friction increases speed with height as friction decreases, sometimes quite dramatically, depending on the type of surface.

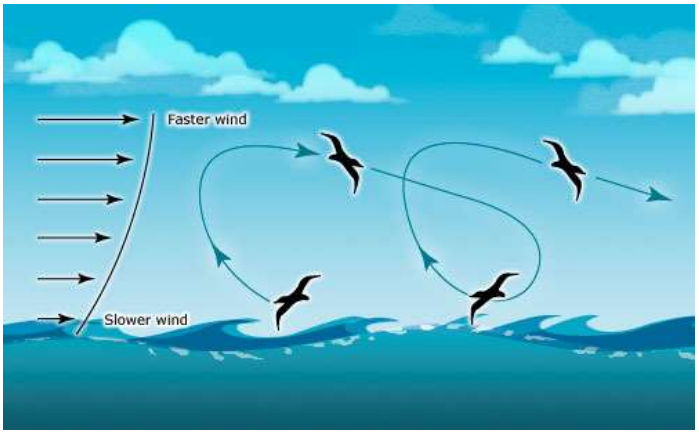
Here is one of the more fascinating and useful effects of this phenomenon.

Dynamic Soaring

For once, we have an effect wasn't discovered by either the Chinese 5,000 years ago or the Americans 10 years ago. Certain birds like pelicans and turkey vultures, but in particular members of the Albatross family, have always used it to stay airborne for days on end with only an occasional flap of their wings, although they do need to be over the ocean for this to work properly.

How? Read on.

Wandering albatross exploit the vertical wind gradient or wind shear above the open ocean, to gain energy for long distance and duration flights by using dynamic soaring, (D/S) with a typical airspeed of 60 km/h.



Over recent years, pilots of R/C gliders have exploited the wind shear associated with winds blowing over mountain ridges to achieve incredibly fast glider speeds, **reaching a record of 498 mph or**

801 km/h, in March 2012. An analysis of dynamic soaring physics predicts the possible maximum glider airspeed to be up to 10 times the wind speed of the upper wind layer (assuming zero wind speed in the lower layer and accurate flying by the pilot). This suggests that a glider could D/S to achieve airspeed of around 200 mph in a wind speed of just 20 mph, which is a far greater multiplication factor than an albatross could achieve.

Note; the current world record of 498mph (801 km/h), was achieved with an average wind speed of 68mph (109kp/h). This gives a multiplication factor of 7.3 times wind speed, so in theory, there is a top speed potential well north of 600mph (965km/h) in the same wind speed!

The main limiting factors to higher speed at the moment seem to be;

(a) Model strength, (the current record-holder is pulling around 60G in turns and momentarily more as it smashes through the turbulence layer twice each circuit) and;

(b) Keeping the thing in sight at those speeds, despite fluorescent colours, and

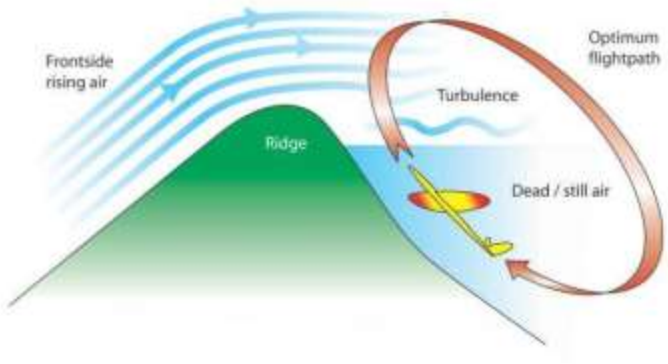
(c) Tracking it with a radar gun to record the speed, when the model is (very) briefly coming toward the brave operator.

The frontal profile of these dedicated D/S models is like the proverbial toothpick, which is why only 1 out of 4 circuits get recorded.

(During the record flight mentioned above, the speed gun operator said that there were many passes that were too fast to get a lock-on where he estimated that the aircraft was well above the 498mph recorded.)

The glider method using hills

With reference to the figure below, the glider would be launched on the upwind or normal lift side of the hill as usual. Once trimmed and some height gained, it is then flown over to the backside of the hill and the fun begins.



The glider is firstly dived steeply down through the turbulent zone beneath the river of air pouring over the hill until it is in the dead air zone beneath the turbulence.

Elevator is pulled quite sharply to turn the model toward the hill and back up through the turbulent layer into the smooth, but fast-flowing air stream above where a lot of energy is gained. (Ground speed decreases while airspeed increases)

Once into the upper wind layer, a hard turn is pulled away from the slope to put the glider into a dive back down to the dead air zone (where ground speed increases and airspeed remains steady) and the cycle repeated. Once speed builds, the flight path resembles a large loop, somewhat oval, but laid slightly over on its side. The best flight path shape will depend upon the terrain and wind conditions.

The climbing portion should be closest to the back slope to keep the model in dead or even rising air, before it climbs back into the high-speed airstream above. Turns need to be tight and are virtually continuous, as minimum time should be spent in each zone, or speed will be lost.

With successive cycles the glider will quite rapidly gain speed if the pilot can keep it accurately transitioning the two zones; dead air down low and much faster air up top. Turns need to be quite sharp, as time spent in straight flight or loitering in each zone will reduce speed gain or even lose speed. (See photo below)

While both sea birds and gliders are using the same principle, they each apply the principle differently.

Birds using D/S aren't really interested in flying at 0.65 Mach! They just want a free ride to get from A to B, or hang about and do a spot of fishing.

Why it works for sea birds over the (relatively) flat ocean --the feathered technique

As over land, wind blowing over water will produce a gradient of differing wind speeds, (wind shear) with wind speed at a maximum around 30 meters or so above the surface and at a minimum or even zero right at sea level in the trough between waves.

Sea birds will climb upwards, into the wind, to around the 30-meter mark and then dive, often crosswind, gaining air speed and at the same time, covering substantial distance. When their glide reaches almost sea level, they turn quite sharply into the wind, and using their momentum, once again climb into the stronger wind gradient higher up.

During this rapid climb through ever-increasing wind speed layers they lose ground speed, but gain height due to additional lift generated from climbing through the increasing wind speed.

This height is then converted to speed and distance as the bird dives back down to repeat the cycle over and over, enabling them to cover vast distances, rarely flapping.

This is where their flight pattern and the way they use wind shear that differs radically from that of a D/S glider.

The albatross could gain much more energy from this process by flying faster and making tighter turns, but there are limits to how much stress its wings can carry. Also, the bird doesn't need to fly faster as it's always on the lookout for fish to catch and if necessary it can cheat and have a bit of a flap.

The model glider situation

For once we have a huge advantage over birds. By using modern materials like carbon fibre, we are able to make the airframe much stronger than any bird and this allows the glider to pull some serious G's in the turns and therefore build up some serious speed.

Soft, wide turns lose speed.

Virtually any strong R/C glider can be used for Dynamic Soaring, even foamies. The main restriction to achieving sustained D/S is that of being able to pull tight turns without losing too much speed. Therefore, aerodynamically clean, heavy, super-strong models models work best.

A recent offering to the D/S slope gods was a 130"/3.3m span, all carbon fibre glider which weighed 35kgs! The mind boggles at the thought of that monster whistling past at 800kp/h, pulling 60g in turns.

Do the sums-it's scary!

The full-scale situation

High speed Dynamic Soaring will remain the sole province of the model glider due solely to the G-forces needed to make to work.

One crazy pilot has tried to duplicate the model D/S flight pattern in his full-scale 20m glider, but scared himself silly with the rapid build-up of speed, the G-forces needed to make it work, the turbulence and the very close proximity of the ground.

He only completed two circuits before departing the hill and has vowed never to attempt it again.

High Altitude air-mass shear soaring

Full scale D/S has also been achieved by using the

shear layer between different air masses moving at different speeds at altitude. An Australian glider pilot, Ingo Renner was the first to do this back in the 70's. He stated that, although he was able to maintain height for around 40 minutes without the aid of any thermal lift, it was impossible to make any overall gain of height, as he was restricted by the position and constant height of the two air mass layers.

The system he used was similar to the bird technique, not the R/C model hill technique.

Beyond the slope

The next step in D/S development is for pilots of R/C gliders to demonstrate high-speed dynamic soaring over the ocean in realistic winds and waves. This would only be possible using the extremely efficient, low drag designs such as the fully moulded composite airframes used by the faster models.

Final Word; As mentioned, an American pilot holds the current world record for the fastest R/C aircraft, with his dynamic-soaring GLIDER. This model is 100" or 2.5m span, all-carbon fibre construction and top speed is currently a stunning 498 MPH or 801.45 KP/H as recorded by a radar gun.

To put it into a different perspective, that converts to Mach 0.65. A German pilot holds the record for the fastest R/C jet with his own design delta at a mere 709 KP/H/Mach 0.58. Wind rules!

Chinese Aviation Philosopher, Confuse-Us says;

Any attempt to stretch a dead-stick glide is guaranteed to increase the head wind along with the height of the boundary fence.

When a crash seems inevitable, endeavour to strike the softest and cheapest object in the vicinity, as slowly and gently as possible.

When a flight is proceeding incredibly well, something was forgotten.

Tale Piece from the Cat.

Straight Take-offs, Soft Landings and stay away from the tyres.