

# *The Flyer* **Crash 'n' Splash**

Nelson Model Aero Club

<http://nmac.org.nz>

August 2018

## President's Piece

Presidents Piece from Murray Irvine.

In June Brian Ransby advised us that he would step down from the secretary position. Brian hasn't had the opportunity to do any flying at the strip since his back operation nearly 18 months ago and this has made it difficult for him to contribute as effectively as he would like. We have several capable people on the committee and he felt that now was a good opportunity to transition the role over to another member. I am very pleased to let you know that Andrew Reeve has volunteered to take over the secretary role. A big thanks to Andrew for putting himself forward and helping us get through the remainder of the club year.

Brian has been secretary for 6 years and has done terrific work for NMAC. On behalf of the members I would like to express our thanks to him for keeping the club affairs in order. Hopefully when the weather gets drier we will see Brian out flying with us again.

In our last newsletter I mentioned that the committee were in discussion with the CAA and Nelson Air Traffic Control (NS ATC) to clarify the requirements for model flying at Wakapuaka. In June I was very pleased to complete a Memorandum of Understanding (MOU) between NS ATC and NMAC. It effectively says that we have agreement with the NS ATC that we have permission to fly in the controlled airspace around Wakapuaka and that clearance is not required providing the model remains below 400ft, stays within visual line of sight and within the confines of the sand flats area. We are getting a sign made to advise every one of the rules; when the design is finalised I will email you with the details.

In June our 'Second Sunday' was a 'loop and roll day'. It was a perfect morning, fine and dry, and lots of pilots turned up to enjoy the conditions. Some photos are in the newsletter.

In July we had the 'Battle of the EF Xtras'. After much banter and trash-talking John, Steve, and myself turned up with our EF Xtra racers for a simulated pylon race. These models are small (975mm) and fast (160 km/hr); they fly on rails and are heaps of fun (if you can keep up with them). We were anticipating a shower of foam confetti but we all somehow survived the flights... phew! The judges are still evaluating the protests and the official results are some time away – I think another race might be needed to sort it out!

Thanks to those who completed proxy voting forms last month to give to Suetonia Palmer for the MFNZ AGM. Most of us are happy to turn up and fly at our field whenever we want to and think nothing of it; but among other things we need a NMAC committee, and a national body (MFNZ), to ensure that things are done in the background so that we can continue to enjoy our hobby. We are lucky to have Suetonia to represent us as the 'Area Councillor for Northern South Island' and I'm pleased that we were able to support her by providing our proxy votes.

This time of year is particularly challenging for those who have sports and hobbies that rely on good weather – and in particular those who fly regularly at Wakapuaka. I suppose it offers us workshop and planning time to build, change, and repair, but after a month of inactivity I am looking forward to getting some planes in the air. Good weather is always not too far away and the sooner it arrives the better.

Happy Flying,  
Murray Irvine

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## Notices

### Your committee

Your committee members for 2018/2019:

President	Murray Irvine
Vice President	Andrew Reeve
Treasurer	Peter Stevens
Secretary	Andrew Reeve
Power Captain	Doug Stratton
Heli Captain	Lance Walford
Committee	Ron King
Committee	Gary Iti
Committee	Ben Carmine
Committee	Paul Troon

CnS Editor	Paul Troon
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**The CnS newsletter is published every two months; Feb, Apr, Jun, Aug, Oct, and Dec.**

### WhatsApp Group:

If you are not connected to WhatsApp give Murray or Phil a call.

### Facebook:

We are now on Facebook. For those Facebook users out there, look up the Nelson Model Aero Club and add a 'like' to our page.

<https://www.facebook.com/search/top/?q=nelson%20model%20aero%20club>

### Care of Your Strip and Track:

Remember if it has rained any time in the 24 hours preceding your intended flying session can you please check the condition of the track **before** you drive out to the pits – *that especially includes 4WD owners.*

### Special offer for NMAC Members

**COOL POWER** – 1 Gal (US) or 3.785 litre containers **\$65 each**

**BACK IN STOCK - NITRO** ~ \$35 per litre

I don't have any bottles for the nitro so it's BYOB (Bring Your Own Bottle).  
Contact Peter Stevens.

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# From around the club

## Show and tell evening 24 June

*On 24 June we had another show and tell evening - John Reid has been kind enough to provide the following report from the evening.*

My better half can't understand why I would want to listen to a lot of blokes talking about model aeroplanes; she thinks we must have a stripper. You will be relieved to hear that none of the following presenters removed any clothing.

Paul was up first with further progress on the project he introduced last time. The wing is finished now and looks good. Holding it by the tip (hardly typical of flight stresses) Paul waved it around vigorously to demonstrate the strength. There was a loud crack followed by an anguished gasp from the assembled



multitude. Luckily, close examination revealed no surface damage or floppiness. You must be more *gentle* Paul. Paul had the fuselage too, nearly finished. Up front a ply inner frame supports the motor, battery, undercarriage, and wing. The remaining structure is Bunning's foam hot-wire cut into sheets and used like depron. The structure is reinforced liberally with carbon fiber and looked very good. At the tail a carbon spar braces the tailplane and simultaneously hinges the elevator. Should have flying report next time.

At this point Paul somehow sparked a vigorous discussion on dihedral. Who would have thought that people would have such strong views? I doubt that anyone changed their minds but it's all food for thought.

To calm everyone down I showed a video I took about a year ago, of Keith Mitchell test flying his Harvard. Keith died recently not long after attending the last S'n'T. He was a past president of the club. The Harvard was a complex model complete with flaps, retracts and excellent sound system, but quite small, not much more than a metre. Keith flew it so smoothly that in the video it looks quarter scale. Pretty good at nearly 90 years of age. We will miss you Keith.

Lance was last with his Voltigeur kit. It is 1.2 metres span, foam construction, aerobatic, 3s electrics. Seems like excellent value and will look very attractive.

It would have been nice to have more presenters. What have *you* got? Great oratory is unnecessary. The meeting is informal (chaotic?); just hold something up and let the roller coaster ride begin. Partly finished projects are good. Do you have a plan you are thinking of building, a magazine article the rest of us should know about? A disaster story? We all love those. It's much more fun learning from other people's mistakes than your own.

See you next time.

John.

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## EF Xtra's



John, Steve, Murray; all smiles after completing round one of the battle of the EF Xtras. All relieved to complete the task and land in one piece - the editor reckons John won on the basis of endurance, speed is not everything ☺. Steve definitely was fastest and Murray gets points for sticking to it. It was great to watch and we look forward to round 2.

## Loop and roll day photos

Here is a collection of photos from the recent loop and roll day.



From top left we have Bill with Sbach, Phil with Cessna hybrid, Sam with Cobra, Wayne with Foxjet, Doug with Avanti, Karl with Trojan, Doug with Addiction, Peter with Harrier and Murray with Sundowner.



Again from left to right, Dennis with Skylark, Dennis with Biplane, Sam with Sbach, Phil with Sportster, Jamie (on right) and trainer, Dennis with Extra, Matt and Edge, Andrew and Survivor and Dave with Tiger Moth.



## Lake Forsyth event coming up

From Ben Carmine.



**Float & Field at LAKE FORSYTH**

**25-26 August, 2018**

Come and join us for a weekend of fun flying from 4 flight lines. Buy, Sell & Exchange, MFNZ Wings Badges required.

Peter Hewson   022 0884766   jillhewson@xtra.co.nz

The Lake Forsyth fly in is held by the Christchurch radio fliers every year at the last weekend of August. It has four simultaneously operating flight lines being powered fixed wing, helicopter, float flying and FPV/rotocross. It is a fantastic event, usually most people camp at the lake and fly all day and night. The night flying is both fun to do and spectacular to watch. Campervans can be rented fairly cheaply at that time of the year as well. It's not a competition weekend, just a great gathering where like-minded people come from all over the country to camp out and be immersed in the hobby for the weekend.

Here are a couple of links to whet your appetite:

<https://www.youtube.com/watch?v=lOKZE8qgxN0>

<https://www.youtube.com/watch?v=aRrH3FRWwv8>

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## Flaming ESC

From Paul Troon

Fires are extremely serious onboard full size aircraft. With models, a fire can at the least be annoying leading to the loss of a model, or downright disastrous if a larger fire is started when the model arrives at ground level.

LiPo Batteries get a lot of press because of their potential to cause fires, however it seems from observation that a fire in an electric powered model is more likely to be started by the **Electronic Speed Controller (ESC)** as was the case for the owner of the Mosquito in the adjacent picture.



Such a fire is directly related to the battery because that is the source of the heat which is essential for any fire to develop. There have been a couple of ESC fires (that I know about) so I thought we could look at the causes and preventative measures that can be taken. ESC heating can be a common cause of so-called radio failures, the reasons for which will become apparent when we look at how these things work.

An ESC generally performs two functions - these are; Motor speed control and provision of the 5 volt power that runs the radio receiver, servos and accessories. This is known as the **Battery Eliminator Circuit** or BEC). These two functions are performed by two distinctly separate circuits on the ESC board.

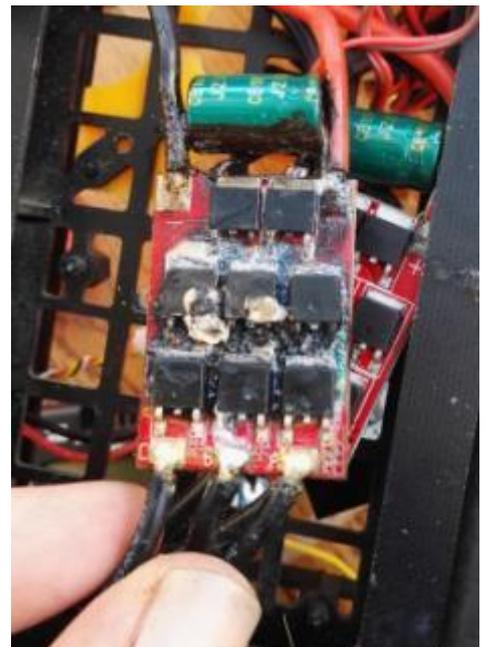
The motor speed control uses technology that has been around for many years, the motors are 3 phase AC motors that are driven by circuitry on the ESC that converts the DC battery voltage into AC and modifies it so the motor speed can be varied.

The 5 volt BEC is also technology that has been around for many years and in the cheaper ESC's (the vast majority of those in general use) this is done using linear integrated voltage regulators. More sophisticated BEC's use switching regulators - more on that later.

So let's have a look at the anatomy of an ESC - the one in the picture to the right is very typical of the cheaper models many of us use and has already been set on fire which is most convenient for our purposes here.

Typically, this circuit board would have a metal plate heat sink mounted on the burnt area, and the whole thing is wrapped in a piece of heat shrink tubing - this has all gone in the photographed example.

In the lower half of the picture we see the 6 black objects on the board that look the same. These are the switching transistors that direct the AC power to the 3 windings of the motor via the 3 large wires at the bottom of the board. There are 2 similar looking black objects at the top of the board, these are the linear regulators that provide the 5 volt power. Underneath the board is a computer and its associated components - its job is to create the AC drive signals for the motor in response to the throttle setting from the receiver.



The green device (partially blackened) is a filter capacitor on the 5 volt BEC output.

As with all semiconductor devices there are 3 parameters that must be respected in order to avoid device failure. These are voltage, current and temperature.

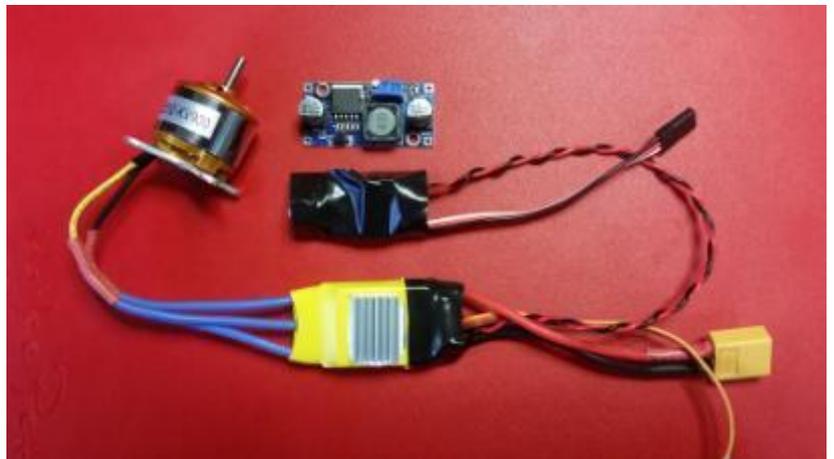
1. **Voltage.** The maximum voltage for an ESC is often referred to in terms of number of cells. If an ESC is rated for 3S it is not a good idea to use it with 4S because the higher voltage might overstress the components - then again the ratings are usually conservative so if you are feeling adventurous go for it.
2. **Current:** The maximum current is usually indicated for an ESC. I am looking at the specification for a 30A ESC and it is good for 40A for 10 sec. This means the semiconductors can happily handle 40A.
3. **Temperature:** This is usually the killer. All power semiconductors are designed to be used with heat sinks that remove heat from the internal junctions. Without adequate heat sinking the junction temperature rises until device failure occurs, this happens at quite high temperatures, easily capable of starting a fire.



Standard ESC's have a metal plate attached to the semiconductors which is then wrapped in heat-shrink. This is a satisfactory heat sinking arrangement if the ESC is overrated for the motor and if the motor is not run for long periods at high power, and if there is adequate cooling air passing by. That is a lot of ifs....

The simple fact is if you are running a standard ESC and you use full throttle a lot of the time you can probably expect overheating and subsequent problems. These semiconductors have multiple internal junctions and an over temperature can cause some to fail but not others, and so the problems may not become apparent for a while (a bit like how excessive consumption of alcohol affects brain cells) - but eventually there will be failure.

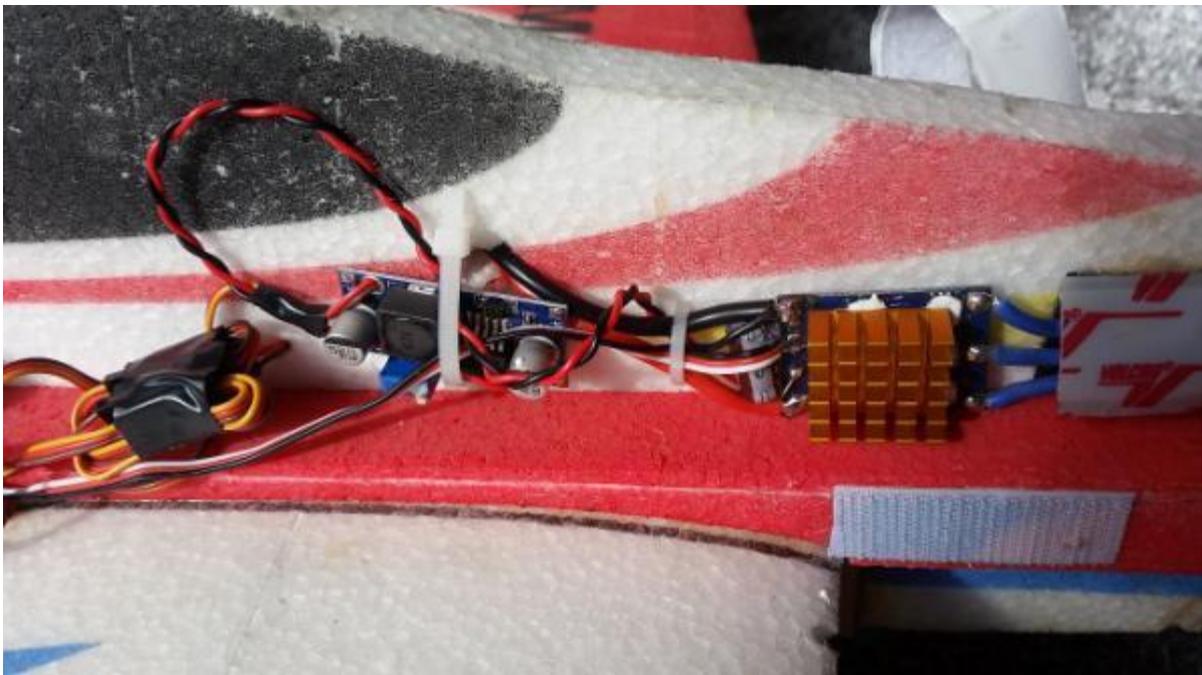
Fortunately, this problem is easily solved by adding an external heat sink as in the photograph to the right. Here the metal plate has been exposed and an extra heat sink attached with heat conducting compound. Better still, the plate may be removed and an even larger heat sink attached. I have tested such modified ESC's at full continuous power and with a bit of air flow they never get too hot to touch which is excellent.



If you are observant you will notice from the photograph that the metal plate heat sink is applied to both the motor control semiconductors and those used for the linear BEC. By design these standard linear voltage regulators will shut down if they get too hot - so if the motor control part gets too hot, that heat is transferred through the metal plate to the linear regulator which will shut down. By the time you get to the crashed model it will have cooled off a little and the regulator will come back to life, so a radio glitch is blamed for the failure.

I had one experience where exactly that was happening; I thought it was a radio failure but later managed to reproduce the problem on the bench and confirmed that it was the linear regulator shutting down momentarily. I reckon this is probably a common undiagnosed cause of "radio glitch" failures and is entirely avoidable.

In the photograph above I have added a cheap external switching regulator to supply the models 5 volt power and having fitted this arrangement to all my models I have not since had a "radio glitch". This has also put into service several components I was previously going to throw away, and I have had no recurrence of "glitch" issues I previously had with them.



The setup I describe (with a larger heat sink) is shown installed on a Hummer in the photograph above - the BEC in this ESC caused many crashes, no problems have been experienced since installation of the external BEC.

If you are not into DIY, higher quality ESCs can be purchased with heat sinks, and plug-and-play external switching BECs are also available - see the Hobbyking web site for more information. If you want help with the DIY just let me know.



# Technical tips

## CAA part 101 - part of the fun.....

From Paul Troon.

On 10 March 2017 the CAA Part 101 rules came into effect as legislation, this happened in response to the ever-increasing incidence of ignorant idiots flying drones where they should not. As a club we pride ourselves on being neither ignorant or idiots, and demonstrating that we are not may well make the difference between being able to continue to fly or not in the future.

There are unfortunately many negative views regarding these rules and the people administering them, and I believe misguided hearsay and rumour is responsible for a lot of this. We intend to run a series of articles in the newsletter on these rules to further educate us as a club and dispel some of the unhelpful misinformation out there. **We would appreciate member questions which we will attempt to answer in future newsletters.**

As Murray has mentioned in his presidents piece, the club has recently taken steps to comply with the Part 101 rules by obtaining Air Traffic Control (ATC) permission to operate our models within the Nelson Airport control zone. Nelson ATC have been extremely helpful in this matter by discussing with us how we might all share the air space safely rather than taking a "no you can't" attitude. I have personally had the same helpful response from the Motueka Airport operator (Tasman District Council) and am enjoying flying in my local park within the 4km airport zone.

There are rules, they are reasonable, and they are there to ensure safe sharing of air space. We should all know and respect these rules.

It is difficult to know where to start, however two things immediately come to mind;

Firstly you can obtain a copy of the rules for yourself from the following link:

[https://www.caa.govt.nz/assets/legacy/rules/Rule\\_Consolidations/Part\\_101\\_Consolidation.pdf](https://www.caa.govt.nz/assets/legacy/rules/Rule_Consolidations/Part_101_Consolidation.pdf) , and secondly Airways run the website <https://www.airshare.co.nz> which has some useful information. Airways are the air traffic control people who, amongst their other responsibilities, administer the Part 101 rules.

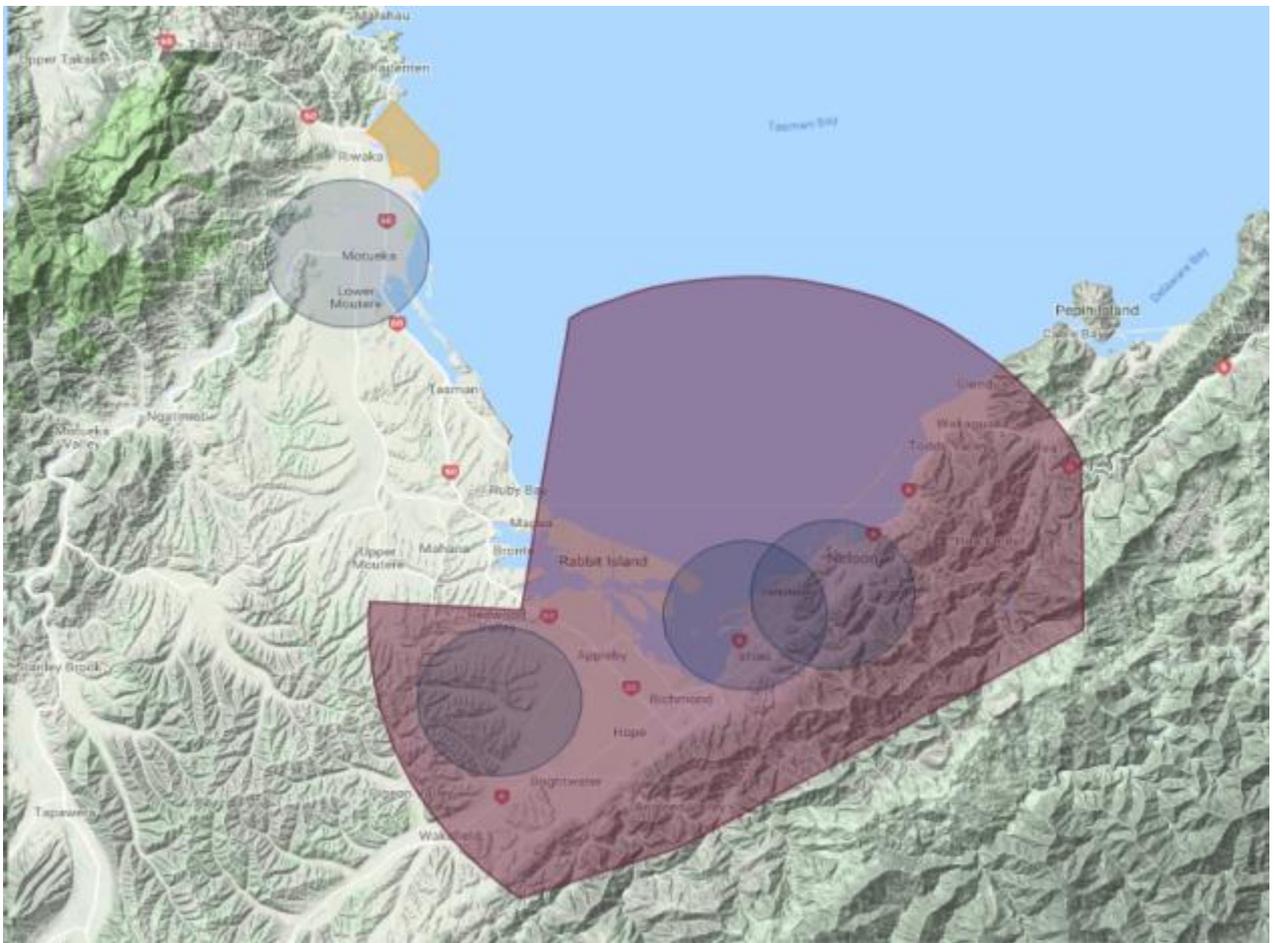
I have reproduced from the Airways site <https://www.airshare.co.nz/maps> the map of restricted flying areas for the Nelson / Tasman region which appears below.

Pilots flying full size aircraft may not recognise this map as it differs from other air space maps used by them. The colours on this map indicate areas (to ground level) where there are restrictions on the operation of RC drones and model aircraft under the Part 101 rules.

The first thing to notice is the orange area on the coast at Riwaka. This is a low flying zone for full size aircraft and is the only zone in which we must not fly models under any circumstances. Everywhere else we may be able to fly, BUT there are conditions that we must meet.

The blue circles are the 4km radius around an airport - in the case of Nelson hospital the helipad is deemed an airport. Within these areas conditions apply and you must have permission of the airport owner / operator.

The red (sort of) shaded area is a control zone around an airport. Within a control zone conditions apply and you must have permission of the relevant airport ATC people - this of course is what we have done with the club because as you can see our flying area is within the Nelson ATC control zone.



We will get into more detail about general flying rules and the requirements for operating near airports and in control zones in future articles, for now please respect these zones, enjoy your hobby and fly safely.

