Glitch Busters

April 2014

HOME OF WARBIRDS OVER DELAWARE

DELAWARE R/C CLUB

LUMS POND STATE PARK - KIRKWOOD, DE

UPCOMING EVENTS

Lums Pond IMAC Challenge 2014
May 31 - June 1, 2014

Warbirds Over Delaware 2014
July 9 - 12, 2014

NEXT MEETING
April 1
7:00 PM
Newark Senior Center

AMA #197 / IMAA #687

FROM THE PRESIDENT

No, not that President; I don't have any health care agenda. Well, I do try to eat well and...

OK, club business. I am pleased to report that the March Membership Meeting produced some great discussion and the approval of contracting field improvements to a well-known and respected lawn service company. Treatments will begin shortly to halt our overwhelming crab grass infestation and improving the quality of our dirt for better growth of grass. As seeding cannot be done until this Fall, the field may look worse before it looks better. We will post a schedule of when the four treatments will be conducted for the field will be closed during those periods. We also anticipate annual treatments to maintain and higher quality flying surface and surrounding grass areas.

More news from the March meeting: Each month we will announce in our Newsletters the upcoming programs that will be featured at each monthly meeting. I can tell you right now:

April Meeting - Stan Michalski will present a program about electric power and the value and use of watt meters. Stan is extremely knowledgeable regarding electric power.

May Meeting - Bill Netta will demonstrate the proper methods of having multiple servos on a single channel. If you have seen how well Bill flies, you know this too will be a quality presentation

As these guys are putting time into making their presentations interesting and user-friendly, the least we can do is show up for their programs.

Dick Stewart brought a very interesting HobbyKing auto gyro for show and tell and liked the build but recommended their V2 version.

Two more raffle items were won and we will bring new items to the April Meeting on April 1st.

Mark Your Calendars for Saturday, April 26. It will be our Clubs first "Open House."

To enhance our presence with the community and to have fun, we will be hosting this open house. All that really means is that the field will be open to regular flying on both flight lines but we will also be having a noon demo, dual control trainers for newcomers, and offer hot dogs and drinks. We will invite the public through various means and just have a good time without the complexity of a warbirds-type event.

SEE YOU AT OUR APRIL 1ST CLUB MEETING AT THE SENIOR CENTER

FROM THE EDITOR'S DESK

Sundays are usually busy days at the field. Last Sunday was overcast and damp. The high was supposed to be in the low 40's with light wind. The snow melted off a couple days prior, so I thought why not go out to the field with a camera and get some photos of all the folks there.

When I got to the field, Rob Pleasanton was there. He was waiting on Bill Bouchard, who was bringing a large plane in his trailer that Rob just purchased. Bill showed up and the guys began unloading the airplane. While they were doing that Terry Blanch showed up and started flying. We were there for over an hour, and that was all the activity. Today it's raining. Tomorrow's forecast is for more rain. I guess that is a good sign. At least it isn't snowing.

Dick Stewart sent some photos he took at the Lebanon Swap Meet. I appreciate the photos, and urge our readers to please send in photos. They don't have to be of club activities. We'd love to see photos of projects you are working on, or maybe your newest aircraft: airplane, heli, multi-copter, even autogyro. If it flies via radio control, we want to see it.

Speaking of photos. A while back I conducted an ugliest workshop photo contest.

I published a photo of my workshop, and asked for members to send in photos of their shop. I guess I won the contest, as I was the only entrant.

We are always looking for articles to put in the newsletter. If you have an idea for an article, or better still you would like to write an article, please send it to us. If you have photos you would like to share, please send them. Other clubs post our newsletter, and of course it is available to the public on our web site. You don't have to be a member of the Delaware R/C club to offer up an idea or submit an article. The email address is: roger@mcclurgstudios.com

TARANIS UPDATE - by Roger McClurg

Last month I introduced the FrSky Taranis transmitter. Little did I know that our illustrious club president would have one for show and tell at the very next club meeting. They are becoming more numerous. That's for sure.

In my last column, I mentioned that I got a precision variometer sensor for my sailplane. I've since acquired a voltage sensor that reports the total battery pack volts, and the lowest cell volts. It also has an LED readout on the side of the sensor that shows the voltage of each cell in the battery (up to 6 cells). I also purchased a current sensor, that reports the AMPs being used, the maximum APMs used, and the total battery consumed in milliampere hours. FrSky recently came out with A GPS. Unfortunately they are sold out everywhere. A new airspeed sensor is promised, but so far it is vaporware.

I don't need a GPS. Not actually NEED a GPS as such mind you, but I would really like to have one to play with. Then again I already have a GPS. Heck, I have two: one that works with my EagleTree flight recorder, and one that works with my RUBY autopilot. The problem is that neither works on FrSky's S.Port telemetry bus. I'd need an interface.

I recently discovered the OpenXVario project (which is now the OpenXSensor) project. These guys have worked out how to make an off the shelf variometer circuit work with the older FrSky sensor hub, and then they got it working on the new S.Port. They also worked a voltage sensor into their project. They were using a very tiny (about ¾ inch by 1.5 inch) microprocessor board called an Arduino mini. The mini is available all over the place for under $7. I decided to get a mini and a programmer for it and try making my own S.Port interface for the EagleTree GPS. Total cost about $15.

While waiting for the new toys to arrive, I scouted for some code I could use for the interface. I stumbled on a project over at DIY Drones. This person was taking data (including GPS data) from the autopilot and sending it over the S.Port to the Taranis. The problem is that the guys at DIY Drones convinced me that the GPS and the S.Port both needed a hardware serial port to handle the rapid data rates. Some GPS units only run at 1k packets per second, but the EagleTree runs at 5k. It definitely needed it's own port. The problem is that the mini only had one serial port. The OpenXSensor guys solved the problem by using other hardware on the board and a software serial port to connect to the variometer. A vario puts out relatively little data, and sampling at even 100 times per second (.1k) generates more data than is needed for model use. So the mini was fine for the vario guys but not for the GPS. I needed to use what the DIY Drones guys were using, a Teensy 3.1.

Yep, that's what it's called. A Teensy 3.1. It's the same size as the mini, doesn't need a programming board (just connect it to the computer via mini-USB), it has a much faster processor, more memory, 3 hardware serial ports, 21 analog input ports, 2 analog digital converters, an output digital to analog converter. 12 PWM pins, and it is 5 volt tolerant. Wow. Cost $24 shipped. Oh well, I'll find a use for the Arduino mini some day. I ordered the Teensy. In the mean time I got GPS and S.Port code from every source I could find.

The first thing I noticed was that these things are programmed in a language called C++. Over the course of 40 some years doing programming, I learned over a dozen computer languages. Unfortunately, C++ wasn't one of them. Oh well, one more hurdle to get over. It didn't take long actually. Reading the code and referring to an online C++ reference, I figured out what the programs were doing, which ones I wanted to use, and how much of them I needed to keep.

Once the Teensy Arrived, I jury rigged some connections to the GPS, and proceeded to try and get data out of it. Thanks to the people at Adafruit (nice people to do business

with) I got some code to dump the raw GPS data. It was easy. The code loaded into the Teensy first try, and I was looking at raw GPS data seconds later. Great start. Now to get formatted information (Lat-Long, Course, Ground Speed, etc) out of the data. That required a different code and some libraries. I never had to use Arduino libraries before. OK, about an hour later I got the libraries worked out, and lo and behold, I was getting real Lat-Long, course, etc printing across the screen. Of course, up to this point I just had to change the speed on the serial port. I never actually had to program anything.

Getting the DIY Drones code to even compile on the Teensy took a couple hours. Did I mention that I never had to use Arduino libraries before? Well I got the libraries sorted out, and the Mavlink-FrSkySPort programs compiled and loaded into the Teensy. That was great. It all did nothing, because: A) I didn't have the Sport actually connected to the Teensy, and B) it was a GPS not an autopilot connected to the other serial port.

Before I could connect the S.Port, I needed to take a knife, and cut a circuit trace on the Teensy, so I could have the USB and the S.Port (which also supplied 5V power) connected at the same time. It took a while to get the nerve to go carving on my brand new board. After all, I just got it working. Cutting the trace worked, and I hooked up to the FrSky receiver.

Now all I had left was carving up 3 programs, modifying a couple library programs, and writing the new code that joined it all together. Amazingly, it only took a week. The last couple days were mostly figuring out what the heck the Taranis was doing with the data I sent it. I was getting Latitude and Longitude of sorts, but nothing else. More talking over at DIY Drones and a lot of fiddling with a bunch of conversion factors, and I had it all working.

In the process I found a bug that had been confusing owners of the FrSky GPS unit for a few months now. Ground speed comes out in no units anyone can understand. It isn't Knots, MPH, ft/sec M/sec, or KPH. It's a known bug in the current
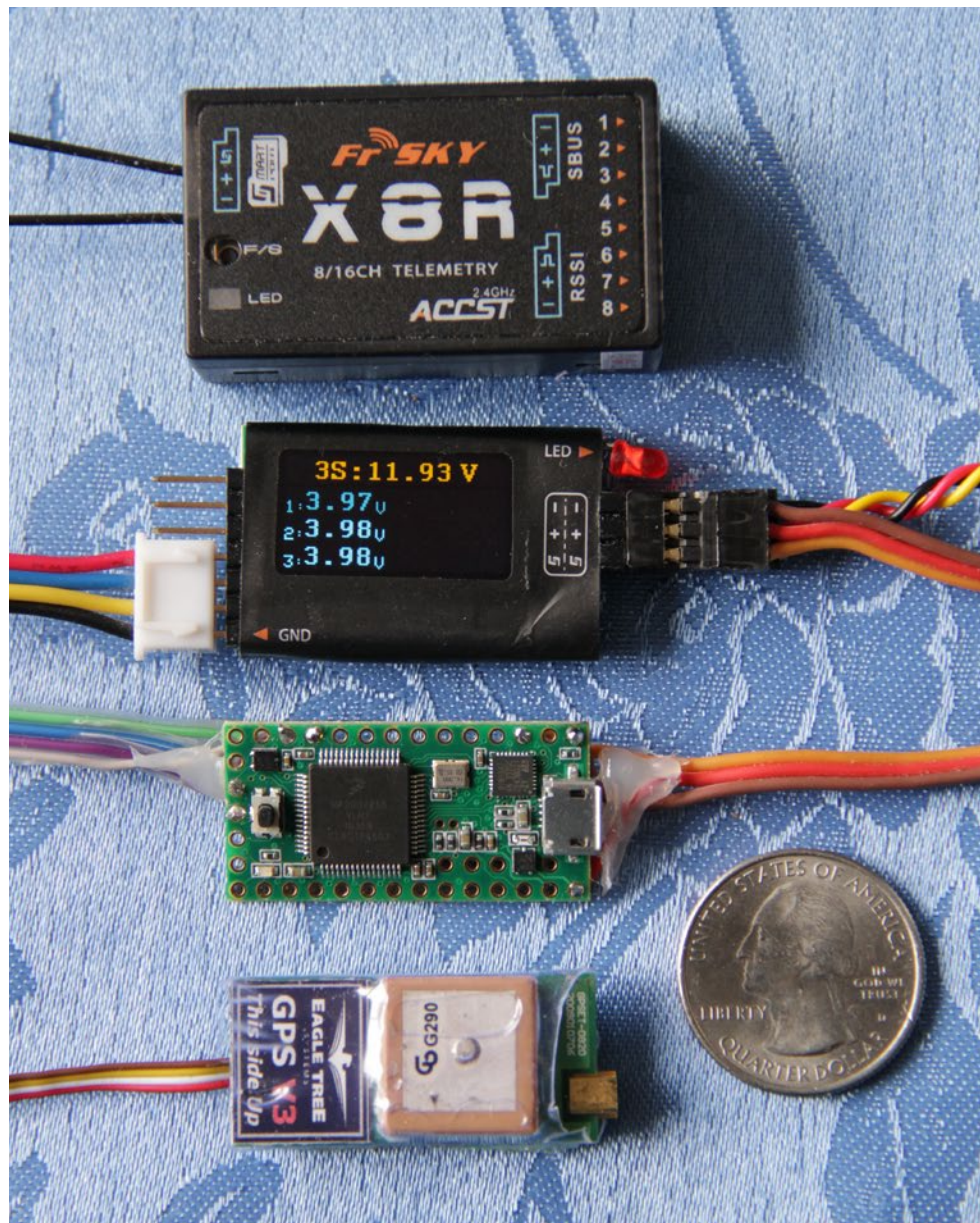
Taranis firmware that is corrected in a forthcoming release.

I solved the problem by adjusting the conversion factor in my code so that ground speed shows up in MPH on the Taranis. When the new firmware comes out, I'll update the transmitter and put the correct conversion in the Teensy. Shouldn't take more than 10 minutes tops.

Now that I've got a nice GPS readout on my transmitter, wouldn't airspeed be nice? I found a couple of nice airspeed modules available, and I still have lots of ports on the Teensy I can use. Let's see the difference in pressure read from the pitot tube is equal to ½ the density of air times the square of the velocity of the airplane. Solving for velocity the equation becomes ...

I'll let you know how this story turns out. So far I've had weeks and weeks of miserable flying weather to keep me at the computer. Working on this project is fun, but I want to go flying.

So I expect the airspeed sensor will get put on hold, when the weather finally improves. It is going to improve. Isn't it?

LEBANON PHOTOS - by Dick Stewart

BLADE NANO QX - by Scott McClurg

In our last issue, I wrote about the Estes Proto X, a magnificent little quadcopter. After writing the article, I saw a YouTube video from the folks at FliteTest about the new Blade Nano QX. It looked amazing and the BNF version was just $70, so I snatched it up. Here's a review, written by someone with very little quadcopter experience.

Let me start by saying I love the Nano. It has its warts, but it's an amazing little machine and I plan to fly it for a long time to come.

The Nano QX flies remarkably like it's larger cousin the 350 QX. The Nano has the 350's stability and agility modes, but lacks the GPS and smart mode. It's not surprising that such a small heli wouldn't have the GPS. It's really designed for indoor flight, which means no wind and really close quarters. The 350 's smart mode prevents it from flying closer than 15 feet from you, but when I fly the Nano indoors I rarely have it further than 10 feet from me.

The Nano can be flown outdoors, but it's really light relative to it's surface area, which makes it highly susceptible to wind. If you're one of our many amazing heli pilots, you probably would be comfortable flying it in 10-12 MPH winds. For me, anything more than 5 is really pushing it.

SIZE COMPARISON: Proto X (left) and Nanao QX (right)

The Nano is very stable and flies very smoothly in stability mode. With a little practice, it's really easy to fly it withing a 6'x6' space. Control is also very precise. And in agility mode, you can do all the flips and rolls you desire. On Blade's site, they show some cool tricks you can do in stability mode, like the "hacky sack," where you put it upside down on the toe of your shoe, kick it up, and add throttle. Then, you just watch it flip itself right-side up. Let's just say it looks easier than it is. Fortunately, the heli survived the experience. If you plan to try it, I'd suggest doing it in a gym with tall ceilings and no obstructions or outdoors on a calm day. I wouldn't do it in the kitchen. Not that I did. Ahem.

The Nano has some very effective prop guards that allow you to fly it all the way up to the ceiling and not have a prop strike. They are also very effective it protecting the props from walls, but they're not so great against potted plants. Couldn't tell you how I learned that one.

The Nano uses the same 150 mAh 1S 45C batteries as many other Horizon micro aircraft. If you have any of ParkZone's ultra micros, you probably have a dozen or more batteries lying around that you could use with it. If you like after market batteries, check the dimensions carefully. The battery on the Nano slides into a rectangular slot that just fits the Blade battery. I tried my older HobbyKing batteries and most worked, but the NanoTech was too thick.

The Nano also comes with HorizonHobby's new 1S charger. Rather than the old one that's powered by 4 AA batteries, this one is just a small sleeve. At one end, you slide in the battery. On the other, they have a USB plug. So, you can charge it by plugging it into your computer, your car (at least if your car is awesome like my Mustang and has a USB data/charging port), or just about any USB cell phone charger. Flights are around 7-8 minutes. Charging takes about 25 minutes, but batteries are cheap. I usually have 6 charged and ready to go at any given time. This is a big advantage over the Proto X, which has shorter flights and doesn't have swappable batteries. So, you fly for 3 minutes and charge for close to 30.

THE DOWN SIDES

BINDING

Binding the Nano QX is a mess. A real mess. Roger and I tried to bind the silly little thing for hours, gave up, did research, tried more, gave up, tried the next day, tried more, gave up, did more research and FINALLY succeeded. First, we gave up on my JR transmitter

and stole the transmitter that came with PJ's HobbyZone Champ. The Champ uses the same transmitter that Blade sells with the RTF version. They just slap a Blade logo on it. Eventually, I wanted to play around with expo and other settings, so we went back to the headache of binding the Nano with my JR. Eventually, we figured out the trick. Take off the canopy and actually touch the transmitter antenna to the center of the Nano circuit board. When I finally got the Nano bound to the JR transmitter, I found it flew better with the other transmitter. Who woulda thought? So, I went on eBay and bought one for $25 so PJ could have hers back.

WIFI

DO NOT try to fly your Nano anywhere near a WiFi transmitter. I did and started to think the thing was possessed. Roger suggested moving a little further away and it became smooth and tame. This came as a surprise because I've flown my Proto X within 4 feet of a wireless access point and it generally flew fine (though in retrospect, it did sometimes do odd things). The Nano QX was completely unpredictable within 12 feet of the same WiFi device.

DURABILITY

Overall, the Nano is very durable, but it has it's weak points. One of them is the frame. It is shaped like a tall "U" where the motors fit. The base of that "U" is very thin. One good fall and it will break. I found that out after my encounter with a tall potted plant. Given the type of plastic and the lack of surface area, you're not going to be able to effectively glue it back together. I was able to fix mine with some 12 chord (waxed string). It's not quite as pretty as it once was, but it works. I've since bought a new frame (they're cheap) but I'm just not ambitious enough to rebuild it for the one crack. I'm waiting for more serious damage. It'll happen. Based on comments posted online, there are other parts of the frame that are prone to break, too. The canopy's very flimsy, but so far mine has held together. They give you a spare one, so that's not really a worry.

I've read reports that the motors tend to burn

ABOVE: The frame where the motor mounts.
BELOW: The damaged frame repaired with 12 chord.

out quickly. Mine have held together well, but I picked up a couple spares anyway. If they do burn out, I'm not going to want to wait for super-saver shipping or pay for expedited. I've also heard of crashes so spectacular that they crack the gyro, which is a $35 part. Based on my own misadventures, I suspect you'd either have to have really bad luck or be doing something really adventurous in agility mode to pull that off. My recommendation would be to only get crazy if you're flying over carpet or grass.

BATTERY INDICATORS

The LEDs in the canopy are supposed to blink when you're running out of battery, but you really would have to be looking down on the heli to see them. So, for me the most obvious indicator that the battery is getting low is when it suddenly plummets from the sky. I am getting better about landing before then, but its easy to get engrossed and forget the clock.

NIGHT FLIGHT

Aside from the LEDs in the top of the canopy, there aren't any lights. So, night flying is out unless you rig up your own LEDs, which may be possible, but the weight alone will probably have a big impact on your flight times. This is another place where the Proto X shines over the Nano QX. The Proto X is so small you have no choice but to use its colored LEDs to determine its orientation. The plus is you can fly the Proto X in pitch black if you know where the obstacles are. And that can be a lot of fun.

SHOULD YOU BUY ONE?

Absolutely. But, if you don't already have one of Horizon's RTF transmitters, buy the RTF version. It's only $20 more and you can always hock the transmitter on eBay for a profit. While you're at it, buy an extra frame ($6), and a clock-wise and counter clock-wise motor (about $10 each). That brings the price to about $116 before shipping. Still, it's a really good deal for all the fun you'll have.

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KIRKWOOD DE

RW382

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www.DelawareRC.org/warbirds

- IMAA Warbirds flying 9am to 5pm every day
- Fun flying & mayhem 5pm 'till dark
- Breakfast & lunch daily by Boy Scout Troop #30
- Pilot Sign-up Fee $35 (includes Park Entrance Fee & Saturday Night Barbecue)
- Registration forms and info at DelawareRC.org
- RV's on site (no facilities) or at adjacent campground w/facilities
- Giant Lunchtime/Halftime Show on Saturday
- Many vendors on site
- Pit Passes available to spectators $10 ea (kids free)

We'd like to thank G-Force Hobbies for their generous support of our club:

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