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Soaring Digest

July 2012

Vol. 29, No. 7

INTELLIGENT REALTIME PROCESSING MICROCOMPUTER SYSTEM

THE ULTIMATE RADIO CONTROL SYSTEM
EM
ADV WITH ADVANCED DIGITAL TRIM

mx-22

July 2012

Vol. 29, No. 7



Front cover: Concentration at Jerilderie (Australia) 2012. Photo by Andy MacDonald. More of Andy's photos from this event will appear in the August issue of *RCSD*.
Nikon D200, ISO 400, 1/4000 sec., f2.8, 200 mm

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Canon EOS-1D Mark III, ISO 800, 1/2500 sec., f7.1, 700 mm

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In the Air

"The charm of RC thermal soaring is that it is the pursuit of what is elusive but attainable, a perpetual series of occasions for hope." -- with apologies to Scottish author John Buchan (1875 - 1940) who was describing fishing rather than RC thermal soaring.

ServoCity.com in Winfield Kansas has added a page of conversion tables to their web site. If you pick up a servo with torque measured in kg-cm, you can very easily and quite rapidly find the oz-in equivalent. In addition to this handy torque conversion, you'll find length, weight, electrical current and angular velocity conversions. Check it out!
<http://www.servocity.com/html/conversion_tables.html>

Bill Northrop, member of the AMA Hall of Fame, passed away in May. Bill was an active modeller, starting in 1936 at age 14, and set a model aircraft altitude record of 16,610 feet in 1965 using Dee Bee Engineering Co. Quadruplex radio gear. A frequent contributor to aeromodeling magazines, including being the radio control editor for *Model Airplane News* in the mid-late 1960s, Bill established *Model Builder* magazine in 1971, and, with his wife, Anita, founded the International Modeler Show (IMS) in 1978. *Model Builder* was published for 25 years and all of the published magazine plans continued to be made available through Bill Northrop Plan Service; IMS was sold to the Academy of Model Aeronautics in 1998 and continues now at the Ontario California Convention Center every January as the AMA EXPO.

Time to build another sailplane!

SUNGAZER 2012

SCALE SLOPE FESTIVAL

Text by Mike May, photos by Izak Theron

This year's scale soaring event was hosted at our favourite inland slope site at Tamatieberg just outside Volksrust. This is the fifth annual event, and it was certainly one of the best.

The public holidays on the last weekend of April allows us to fly the event over four days, and this gives a bigger weather window. But this year the wind played along and all days were flyable — some days a bit strong for the less brave.

Early Friday the group started gathering and greeting. The guys driving up from the warm Durban climate stand out in their short sleeves. The rest of us, we dress for the cold, as winter sets in earlier at our altitude.

Pilots briefing, which is a laid back affair, with most of these pilots responsible and in touch with the safety side of flying. General frequency control was great with most guys on 2.4ghz, but still a few on

older channels. Also no fly zones, landing approach, and general etiquette on the slope front. Then it's time for a group shot. This year we managed to get an aerial shot, from an antenna tower.

A real nice mix of sailplanes, some old and some new, a couple of maiden flights and some old dogs, all flew and had a great time. As far as I am aware only one "very" enthusiastic youngster, Wouter, crashed. You couldn't get this



guy to land. He was having a ball, but eventually his batteries gave out and his little CMPRO Discus fell to earth, trashed unfortunately. But he will be back, I am sure. He is a great youngster and we need more like him coming into our hobby.

Some stunning flying at sunset and pictures to match. We experience smooth valley release lift, late most afternoons on this west facing slope,

with some of the best air around sunset. It's a special time to fly if you don't get blinded.

Also some pics of the fast moving storms that pass by. Always a good idea to take cover when the lightning starts. The strikes captured on film are some distance away.

Last but not least, the small band of scale soaring enthusiasts, continue to grow and as the organiser I would

like to host next year's event on a different mountain so we can get a new background. Just kidding!

We have found a potential site about 100 km away and all it needs now is a slope trip to check it out.

Time to pack the gliders and head out. Regards from South Africa!

























Reducing the cost of flying sailplanes

Research Project - Part 1

*Looking at the economics of upgrading
72 MHz sailplane radios to 2.4 GHz*

Ed Anderson, aeajr@optonline.net

I am in constant research mode. One of my latest research projects has been to look into options that can lower the cost of the radio systems we use to fly our sailplanes. This research is particularly for the benefit of newer members of the club who have not yet purchased a sailplane radio or club members who are flying on 72 MHz and thinking about moving to 2.4 GHz.

This will be the first in a two article series. This one is going to look at used 72 MHz sailplane radios vs. new 2.4 GHz sailplane radios. Part 2 will be about a new approach to radio systems based on an open source hardware/software approach using the SkyFly TH9X, also marketed as the Turnigy 9X. Watch for that next month.

If you are flying 2 or 3 channel RES gliders or 3-4 channel electric RES gliders, any 6 channel computer radio will serve you well. And you can fly a full house glider or e-glider on that same 6 channel computer radio, but you won't be able to do all the things that





Graphic provided by
 <<http://www.alofthobbies.com>>,
 USA Distributor of FrSky.

glider pilots want to do with full house six servo gliders or full house e-glidern. For that you need a radio with at least 7 channels and sailplane mixes. A radio like a Spektrum DX7 has 7 channels, but it lacks the sailplane mixing to be called a sailplane radio.

If you are still learning about sailplanes and sailplane radios, this article on the Eastern Soaring League web site might be of interest.

Selecting a sailplane Radio – What to consider

The sailplane radios I normally recommend include the JR9503 (\$550), Futaba 8FG Super (\$480), Airtronics SD-10G (\$440) or the Hitec Aurora 9 (\$400). Each comes with a receiver. Add on

receivers cost \$70 to \$150. Don't forget that these also include at least a 1 year warranty which you won't get with a used radio.

There is a large market for used 72 MHz radios that are great sailplane radios. I can't cover them all, but I will look at two that I know to be typical of the market, the JR9303 and the Futaba 9C Super. These will allow me to illustrate the economics of buying a used radio and upgrading to 2.4 GHz. An upgrade to 2.4 is not required but as the trend is to 2.4 that will be the basis of my analysis.

RC computer radios are made up of two components. The part that we think of as the radio is the box with the sticks and dials. It houses the main circuit board

which includes a processor that runs the program that displays the menus and translates stick and switch input into signals that are sent to the radio frequency, RF, section of the radio to be transmitted to the receiver in the plane. Some RF systems are one way and some systems are two way. Two way RF systems enable telemetry back to the radio.

Since the need to change channels went away when 2.4 GHz arrived, most new 2.4 GHz radios have the RF section built in so you cannot easily change it. But most 72 MHz sailplane radios were module based so you could change from one 72 MHz channel to another to avoid channel conflict. It is the module based

nature of these 72 MHz sailplane radios that will allow us to easily upgrade them to 2.4 GHz to bring them into the modern age of radio control. So let's look at the economics.

The JR 9303 was one of the top competition radios only a few years ago. Looking on the RC Groups radios for sale area we see that the 72 MHz 9303 going for about \$225 to \$275, often with several 72 MHz receivers. A new JR 9503, including a 2.4 GHz receiver costs about \$550.

Let's do the math to buy a radio and put 4 full house gliders into the air.

New JR 9503 (\$550 with 1 receiver) and 3 add on AR7010 receivers at \$90 each.

$\$550 + \$270 = \$820$ for a new radio and 4 receivers to put up 4 full house gliders.

Used 9303 + Spektrum 2.4 GHz module/receiver package and 3 add-on AR7010.

$\$250 + 110 + 270 = \600 . A savings of \$190

Let's do the same with the Futaba 9C Super. I fly the 9C Super which I have upgraded to Futaba FASST 2.4 GHz using Futaba modules.

Looking at the Futaba line today we see the Futaba 8FG Super would be the new alternative to the used 9C Super.

New Futaba 8FG Super \$480 including 1 receiver and 3 add on receivers at \$90 each.

$480 + \$270 = \750 for a new radio and 4 receivers to put up 4 full house gliders
Used Futaba 9C Super, FASST module/receiver package and 3 receivers at \$90 each.

$\$200 + \$200 + 270 = \$670$ – A saving of \$80. Perhaps not enough to justify buying used based on the high cost of the Futaba FASST module/receiver package.

Futaba's FASST system, but much less expensive. The module and receiver package is \$40 at HobbyKing and add on receivers are about \$30. Since we can put this FrSky module into a JR 9303 or Futaba 9C let's look at the numbers.

JR 9303 + FrSky module/receiver and 3 more receivers.

$\$250 + \$40 + \$90 = \380 . That is about half the price of the new JR 9503 and

You have to make the decision.

You fly at your own risk no matter which system you use.

Third party 2.4 GHz module system

What if we go to a third party 2.4 GHz module and receiver system? There are several available, but research has shown that the FrSky system, available for Futaba, Hitec and JR, is rock solid. The photo on the title page is of a Futaba 9C with a Frsky module replacing the 72 MHz module.

FrSky also offers an extensive line of telemetry products for their module based system. I have see many posts by giant scale pilots, glider pilots, gas and glow pilots and electric pilots that say this system is every bit as good as

Spektrum receivers and almost 40% lower than a used 9303 using Spektrum module and receivers.

We see even better savings when we look at the Futaba set-up.

$\$200 + \$40 + 90 = \$330$. That is a \$420 or about a 55% saving over a new Futaba System and a \$340 or 50% saving over the used system.

Note in both the JR and Futaba cases a LOT of the savings comes from the lower cost of the receivers that we can use as a result of using the FrSky module. At a \$60 saving per plane, the more planes you put up the more you save.

So, you ask, is FrSky as good as Futaba FASST, JR DSM2? According to RCMModelReviews, the answer is yes. In fact the reports suggest that the FrSky system is every bit as good as the Futaba FASST system and is better than the Spektrum/JR DSM2 system that the modules provide.

The link below goes to a discussion on the Flying Giants forum that includes several posts by XJET. In this case he is talking about the FlySky 9X radio but he is talking about it with the FrSky module system I discuss above. His comments are quote revealing and typical of the reports I have received. BTW, in part two of this series I will be talking about the FlySky 9X radio as an even lower cost sailplane radio option.

<<http://www.flyinggiants.com/forums/showthread.php?t=62466>>

Glider pilots talking about FrSky for a Supra

<<http://www.rcgroups.com/forums/showthread.php?t=1552991>>

RFModule Shoot-out

<<http://www.rcmodelreviews.com/2.4ghzshootout.shtml>>

Of course, if you read the forums you will find negative posts too. But you can say the same for JR, Futaba, Hitec, Airtronics or Spektrum. Based on my research of the major brands and the FrSky system, the positive reports far outweigh the negatives

The FrSky receivers are about ¼ to ½ the price of the comparable Hitec, Spektrum, Futaba and JR receivers. When you take this into account the economics of upgrading a 72 MHz module base radio to 2.4 GHz looks very attractive.

What did you do, Ed?

You might ask why I did not go to the FrSky system when I moved my Futaba 9C Supers from 72 MHz to 2.4 GHz.

The answer is that I did not know about the robust nature and rave reviews that FrSky was getting at the time that I bought the Futaba FASST system.

I learned about the FrSky system while doing the research for the second article in this series. But by then I had already purchased two Futaba FASST modules and four 7-channel receivers at a cost of \$570.

If I had purchased FrSky to upgrade my radios I would have only spent \$140 for the same two modules and four 8-channel receivers. It was this discovery that leads me to write this article so that you could make a more informed decision than I did.

But I will note that I am very happy with the Futaba FASST system. It works great. However I have already purchased one Orange (relabelled FrSky) FASST compatible receiver and plan to buy a couple of FrSky FASST compatible

receivers as I continue to convert the fleet to FASST.

So, you have to ask yourself if you would be comfortable trusting your glider to a third party 2.4 GHz system. Only you can make that decision. Many pilots have put Spektrum 2.4 GHz modules in their non-Spektrum radios. I have a Spektrum module for my Futaba 9C Super. Hitec markets their Spectra 2.4 modules for Futaba and JR radios. And many Futaba pilots used Hitec Spectra 72 MHz synth modules in their radios. Using third party modules is not new. There are probably a dozen makers of 2.4 GHz modules for our radios.

I have provided references from reviews and pilot discussions about the FrSky system. I have plenty more. But in the end, you have to make the decision. Every launch is an act of faith and every landing a moment of relief. What makes you comfortable is up to you.

I will close this article on this note, whether you fly JR, Futaba, Spektrum, Hitec, Airtronics, FrSKY or something else, no one will guarantee you won't have a problem. And none of them will reimburse you for a crashed plane. So, you fly at your own risk no matter which system you use.

Clear Skies and Safe Flying!

Spektrum DX18

Sailplane Programming Review

Sherman Knight, duworm@aol.com

The DX18 has arrived and it is a Killer of a system. Everything I want in a radio is here. It even activates landing mode with the flap stick!

The Spektrum DX18 sits at the top of the line of Spektrum Radios. It boasts Spektrum's DSMX protocol but is also backwards compatible with DSM2. Unlike prior Spektrum radios (except for the DX10i), the DX18 includes a Sailplane template. Because I had never programmed a Spektrum radio before, I was not sure what to expect. I discovered the sailplane template is the real deal.

As with prior Spektrum systems, you navigate the various screens and menus with a scroll wheel. The wheel on the DX18 has a thin rubbery like coating and turns easily under your thumb.

The DX18 has a SD card slot for both transferring models and for upgraded both Firmware or Software.

The architecture of the DX18 software revolves around Flight Modes. If you want to use them all, you now have up to 10 flight modes to play with. A crazy number of flight modes, until I spoke with a world champion F3B pilot. Because of the varied tasks, he setup the first set of 5 flight modes for thermal tasks and the second set of 5 flight modes for speed tasks.

For those of you that fly V-Tails, there are two V-Tail setups. One for control horns above the V and one for control horn below the V. No



more banging your head against the table trying to figure which servo goes in which slot. Moreover, V-tail programming includes its own V-tail differential screen.

If you fly electric sailplanes, the sailplane template contains separate motor functions. By selecting the switch, slider, stick or trim in Sailplane Type to operate your motor, the radio sets a default ESC port or you can change it if you want. In addition, two new items show up in the Function List menu. Throttle Cut and Motor Curve.

The scale guys are gonna love this radio. In addition to the typical sailplane programming, there are eighteen channels, four dedicated mixes, fifteen programmable mixes (with programmable curves available on them all), sequential mixing and a six-servo wing mix. Channels can be remapped and reassigned at will.

With all those servos, where do you plug them all in? The Rx Channel Assignment screen automatically modifies itself as you select the options available in Sailplane Type. Just check this screen and it tells you where to plug it all in. If necessary, all the channel assignments can be modified by the pilot in case he/she doesn't like the ones chosen by the radio.

DO YOU FLY TWO AIRPLANES AT A CONTEST? The DX18 has a feature called Direct Model Access. While the transmitter is powered up, you can go directly to Model Select by pressing the Clear and Back buttons at the same time.

Model names are up to 25 characters long. No more sailplane name shorthand.

Can't decide if you want to fly mode 1 or mode 2? Now all four modes are software selectable. Changing the mode is a snap.

Two timers are available on the main screen. Either count down or stop watch. There are lots of ways to turn them on and off. Reset them both by pushing one button.

The throttle trim is digital so you can cross trim, moving the elevator trim to the throttle stick so you can trim the elevator without moving your thumb off the stick.



Do you have one of those trailing edges that lines up in cruise mode, but never quite lines up in the other modes? Camber Presets allow you to set a trailing edge trim for each servo, independent of the others, for each Flight Mode. (six-servo wing by 10 flight modes is 60 TE trim settings that can be modified by flipping a switch)

Camber System provides camber/reflex on a slider with independent amounts and direction of control movement for each flight mode. You now have trailing edge camber/reflex control on a slider or switch or a combination of both. Side sliders are back and they fit perfectly.

Landing control has the usual features. Flaps on a stick, elevator compensation, crow or flaperon, and my favorite, the ability to activate landing mode with the Flap Stick. Landing Mode allows you can change rates, differential, trim settings, TE control methods, turn off the camber slider, modify aileron to rudder mix and a bunch of others just by pulling down the Flap Stick.

If you are concerned about the voltage in your aircraft while it is still in the air, the DX18 provides telemetry for your sailplane. Currently, the telemetry that is of interest to sailplane pilots includes Rx battery voltage, altitude and Data Logger



In past radio reviews, I have stated that flexibility breeds complexity and this radio is as flexible as any radio I have ever seen. But, the DX18 keeps the complexity of the programming rather simple through its use of automatically expanding menus. Early in the programming, you must choose the type of sailplane you are flying. The choice you make early in the programming determines the depths of the subsequent menus. (you only see what you need to see!)

The sailplane types available are:

- Wing: 1-Servo Wing
- Wing: 2 Aileron
- Wing: 2 Ail 1 Flap
- Wing: 2 Ail 2 Flap
- Wing: 4 Ail 2 Flap
- Tail: Normal
- Tail: V-Tail A
- Tail: V-Tail B
- Motor: Select from a menu of possible means to control a motor.

When you select a type of sailplane, only the programming necessary for that Sailplane Type is displayed. If you select a single servo wing, your subsequent choices will be limited. Because Aileron Differential, Camber Presets or the ability to have Ailerons double as Flaps cannot be done with just one servo, those features simply do not show up in the menu.

By simply selecting a two-servo wing, the menu expands to include these features. Expanding menus can also occur based upon choices you make later in the programming. Flap differential is available, but only after you first activate the AIL > FLP mix. If you select a six-servo wing, a new line for Tip Aileron differential appears. It's Pretty cool.

To demonstrate expanding menus based upon Sailplane Type, see the page at the end of the article with screen shots to show you how it works. The first page of screen shots shows the difference between the following three types of Sailplanes.

- One servo wing, standard tail, motor.
- Two aileron, two flap, v-tail, motor.

information. You can see the quality of the reception for each independent receiver antenna, altitude or battery voltage in real time from your transmitter. With real time altitude, I managed to substantially better my launch technique. I have a g-force sensor on the way that is going to be real interesting.

The carry handle contains a second antenna. With two transmitter antenna fixed at 90 degrees to each other, transmission antenna diversity is good as it gets. The small vertical antenna is fixed, unlike many 2.4 antenna on the market, this one is robust and nearly impossible to break.

Spring tension of the gimbals can be adjusted without taking the back off the transmitter.

Battery charging is built into the DX18, but it only charges at 200 mah. That means no more rapid field charging at the last minute. The up side is the battery lasts from 15 to 18 hours on a single charge! Never connect an external battery charger to your DX18 transmitter.

In addition to the switches, the DX18 also allows you to turn any stick, trim, knob or slider into a switch with assignable kick points. It is this flexibility that allows the Flap Stick to become a Landing Mode switch, automatically switching to Landing Mode when the Flap Stick is pulled down.

- Four aileron, two flap, v,tail, motor.

With up to 10 flight modes, you would think that keeping track of them all would be difficult. The Spektrum people developed a unique Flight Mode Table to keep it all straight. First, you select the number of flight modes you want and then choose which of the switches you want to use. You then name the flight modes and finally assign any flight mode name to any switch and switch position (0, 1, or 2)

As Function List menus expand, they are automatically populated with the various Flight Modes you set up.

The second page of screen shots shows how this works.

Later in the programming, you decide the values you want to assign to each flight mode, again in expanding menus.

Another way they simplified programming is to reduce the information on a single screen. Because there are so many possible flight modes, only the programming for a particular feature and a particular flight mode shows up on the screen at one time. Take differential as an example. If you have two flight modes, differential will have two screens, one for each flight mode. You switch between the two Flight Modes simply by flipping the Flight Mode switch. The flight mode name on the screen will change depending on the switch location.

The number of differential screens is the same as the number of flight modes. If you are using five Flight Modes, there will be five differential screens. To keep from getting lost, the current flight mode is clearly identified on each screen.

The third page is screen shots showing five screens for five flight modes. It provides an example of one screen per flight mode feature.

Horizon Hobby sent me the radio for preproduction testing without a manual! Frankly, it forced me into learning what every screen was possible of and kept me from just skipping over what I didn't think I needed. I have never programmed a Spektrum Radio before, so some of the nomenclature was different from what I was used to. In general, the learning curve

was much shorter than I thought it might be. Yeah, there were a couple of functions that had me stumped, but with very little help from the people at Horizon Hobby, it all fell into place.

I have been flying a pre-production version since February and discovered that there is often more than one path of programming that will accomplish your goals. I have tried all those that I could find and have concluded that the most efficient means of programming is to use as many of the features of the radio as possible.

Let me give you two examples. Don't use Travel Adjust to set Aileron Differential. If you do, you are stuck using the same Differential for all your flight modes and it requires changing four settings every time you want to change the Differential. Use the Differential menu. It provides as many Differential settings as you have Flight Modes and you only need to change one setting to change the Differential on both ailerons.

Don't use Travel Adjustment to program more down elevator so you can push over at the top of the zoom. If you do, you are stuck using the same amount of down elevator for each Flight Mode. Instead, use the Dual Rate menu in the radio. The Dual Rate menu allows you to adjust the rate for control throw on each side of neutral stick. It is easy to input the extra down elevator here

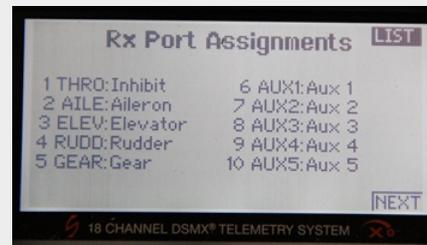
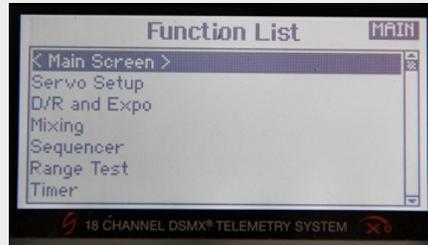
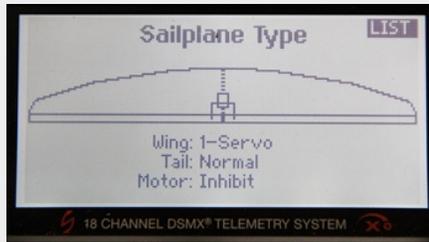
To shorten your learning curve, I developed a six-servo programming guide along with a template that you can download to your DX18. My home club, the Seattle Area Soaring Society has it posted on their website <<http://www.seattleareasoaringsociety.com>>. It can also be found on Kennedy Composites at <<http://www.kennedycomposites.com/transmitters.htm>> and Soaring USA <<http://www.soaringusa.com/Spektrum DX18.html>>.

I will be flying the DX18 in contests this year.

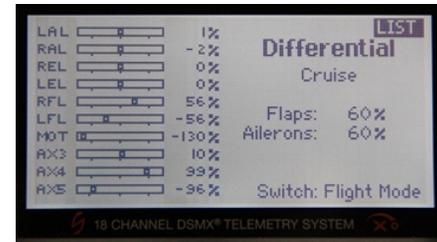
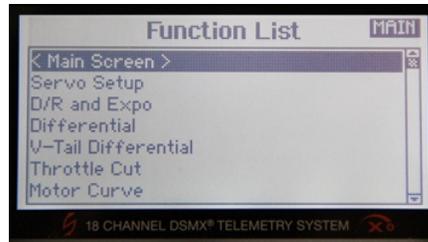
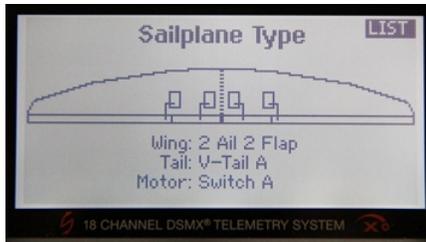
Have Fun!



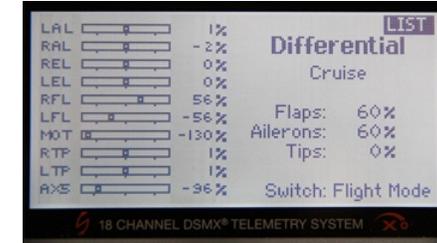
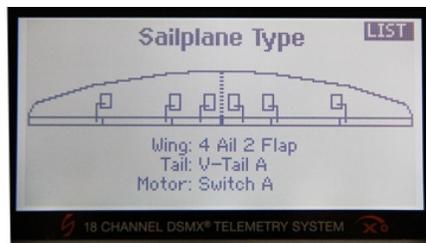
Expanding Menus Based Upon Sailplane Type



A one-servo wing is the simplest Sailplane Type you can choose. Notice in the Function List Menu, there are very few options to choose from. As an example, Differential is a function that cannot be done with a single servo, so Differential is not available. If a motor was selected here, the Rx Port Assignment would have assigned it to port number one.

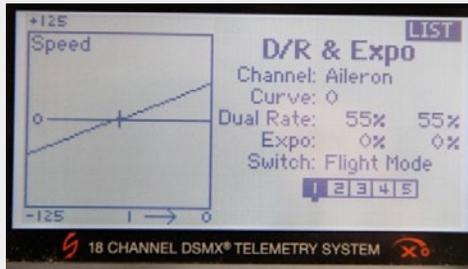


Select a more complicated sailplane and the Function List menu and Rx Port Assignments expand automatically. V-tail Differential becomes available along with several options for a motor. Motor is moved to port seven. Differential becomes available for Ailerons and Flaps.

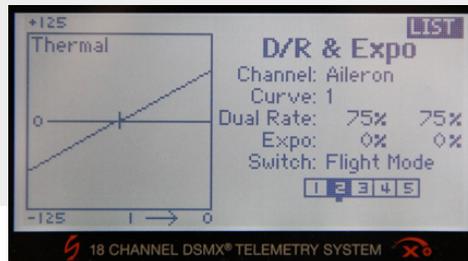


With a six-servo wing, the Function List Menu remains unchanged, but the Rx Port Assignments changes again and Tip Ailerons are added to the Differential screen. Notice a Flight Mode name appears on the Differential screen. (in this case "Cruise"). This screen only sets differential for "Cruise" Mode. To adjust the differential in a different Flight Mode, move the Flight Mode switches until a different Flight Mode name appears on the screen. Adjust the Differential values for each Flight Mode independently.

Menus that Expand with Flight Modes



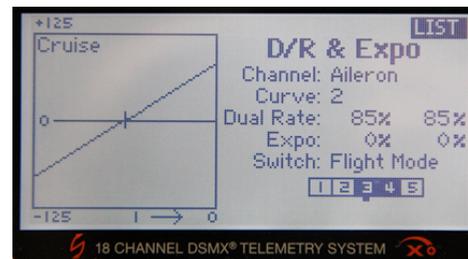
These five screen shots represent expanding menus by Flight Mode. If there is only one Flight Mode there would be one screen for D/R & Expo. But, if you have five flight modes, you have five D/R & Expo screens. Flip the Flight Mode switches to travel from screen to screen. (It really is that simple) When six or more Flight Modes are active, a second horizontal box opens below the one on the screen.



These images demonstrate the one screen per Flight Mode that is typical throughout the software. When the Flight Mode appears (see upper left of the screen), the values on that screen are ONLY for that Flight Mode.

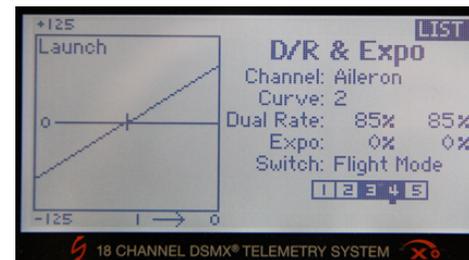
As Flight Modes are added to the Flight Mode Table, all subsequent programming that takes advantage of Flight Modes is automatically updated with the new Flight Modes.

Curve is a fancy term for "Rate." Notice how Cruise (FM3) and Launch (FM4) are using the same curve or rate and the corresponding boxes under Flight Mode have been darkened.

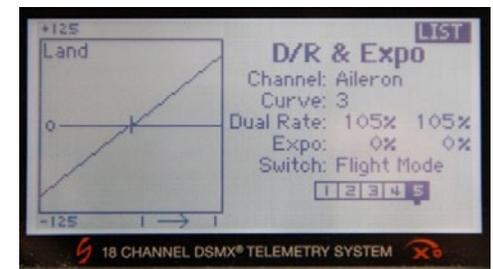


Switch allows you to select any switch, slider, trim, knob or stick to act as a switch. Selecting Flight Mode directs the DX18 to use the Flight Mode Table for name and switch assignments. Under Switch will appear the numbered boxes to match the number of available flight modes.

Switches can be selected in the Flight Mode Table or any of the following can be chosen: Inhibit, On, Flight Mode, Switch A, B, C, D, E, F, G, H, I, Throttle Stick, Aileron Stick, Elev Stick, Rudd Stick, R Knob, L Lever, R Lever, LTrimD, RTrimD, LTrimA, RTrimA, Clear, Back, Roller, Combo Sw,



Below the bottom of the five Flight Mode boxes, is a small black dot. This small dot represents the current Flight Mode the transmitter is currently set to, based upon the position of the Flight Mode switches or Flap Stick.

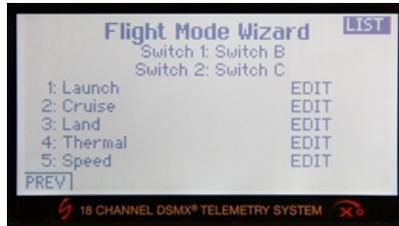


Expanding Menus Based Upon Flight Mode Setup.

Flight Mode setup only determines two things; the name of each Flight Mode and the switch you assign the Flight Mode to. The Flight Mode names and switch locations you choose here are then replaced throughout the rest of the programming.

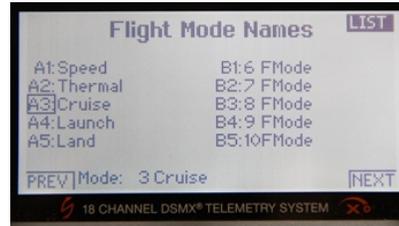
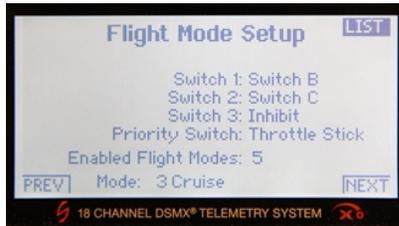


Flight Mode Wizard asks to choose from three types of Flight Modes. When 2/3 Flight Modes are chosen, the next screen provides some default values. Scroll over Switch and select the switch you want to use. The name of the Flight Mode can be changed by selecting EDIT. For assigning a switch position to a particular Flight Mode, scroll the cursor over any Flight Mode name and a box will appear surrounding one of the Flight Mode names. Start moving the Flight Mode switches and the box will move around to different flight modes. If you don't like what Flight Mode appears for a particular switch position (Pos 0, 1 or 2), click the Scroll bar and the box will start to blink. Scroll and you will be presented with all the Flight Modes to choose from.



When you choose 4/5 Flight Modes the next screen provides the 5 canned Flight Modes. You must now choose a second switch which activates these two new Flight Modes.

When you choose Custom (my favorite) you first must select your switches and choose a priority switch, if any. Priority Switch allows a switch to override all other Flight Mode Switches. This allows the Flap Stick to act as a switch, in this case selecting Landing Mode when the Flap stick is pulled down. Priority switch is only available in Custom Setup.



Scroll the Cursor over a Flight Mode in Flight Mode Table. Now start moving the Flight Mode Switches. If you don't like what Flight Mode appears for a particular switch position (Pos 0, 1 or 2), click the Scroll bar and the box will start to blink. Scroll and you will be presented with all the Flight Modes to choose from. Click on the one you want.

To activate the second set of five Flight Modes, assign a switch to Switch 3 found in Flight Mode Setup.





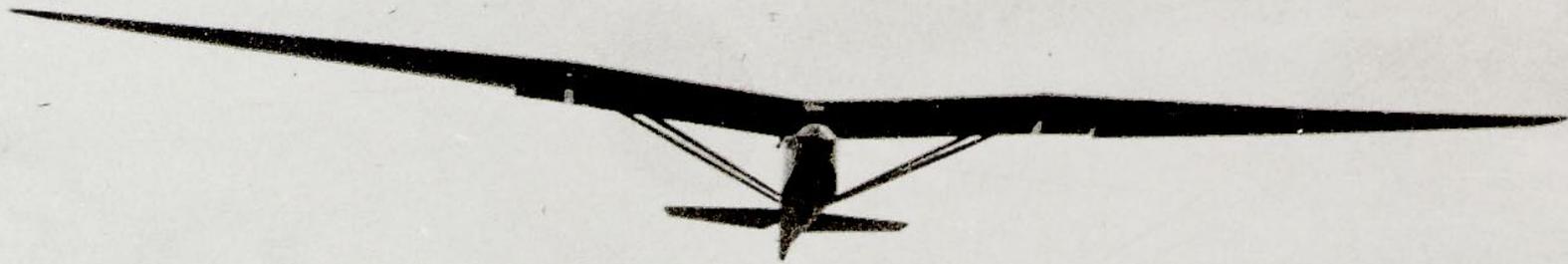
Fernanda Ardino, balasandres@yahoo.com captured this photo during a contest in Argentina. This episode took place during an RC gliders competition. It was a very windy day and a pilot was trying to make a dynamic flight over the trees. Suddenly, a gust of wind surprised him and his model was trapped in the

branches of a tree. The contest was interrupted until the glider was recovered without damage. After removing the model from the tree, Fernanda was approached by the local volunteer fire department — they were interested in hiring him.

Nikon D5000, ISO 200, 1/500 sec., f11, 35mm



LUIGI TEICHFUSS'
SUPERGRIFO, CIRCA 1935
1:5 MODEL BY FREDERIC FISCHER



Vincenzo Pedrielli, vincenzopedrielli@gmail.com

In this article I would like to introduce one of Luigi Teichfuss' best designs, the Supergrifo, where "grifo" refers to the Grifon Volture, one of the masters of soaring flight among the birds. His intention was to emulate the Griffon and create a very efficient sailplane, suitable for competition. Supergrifo is a great subject for a scale project!

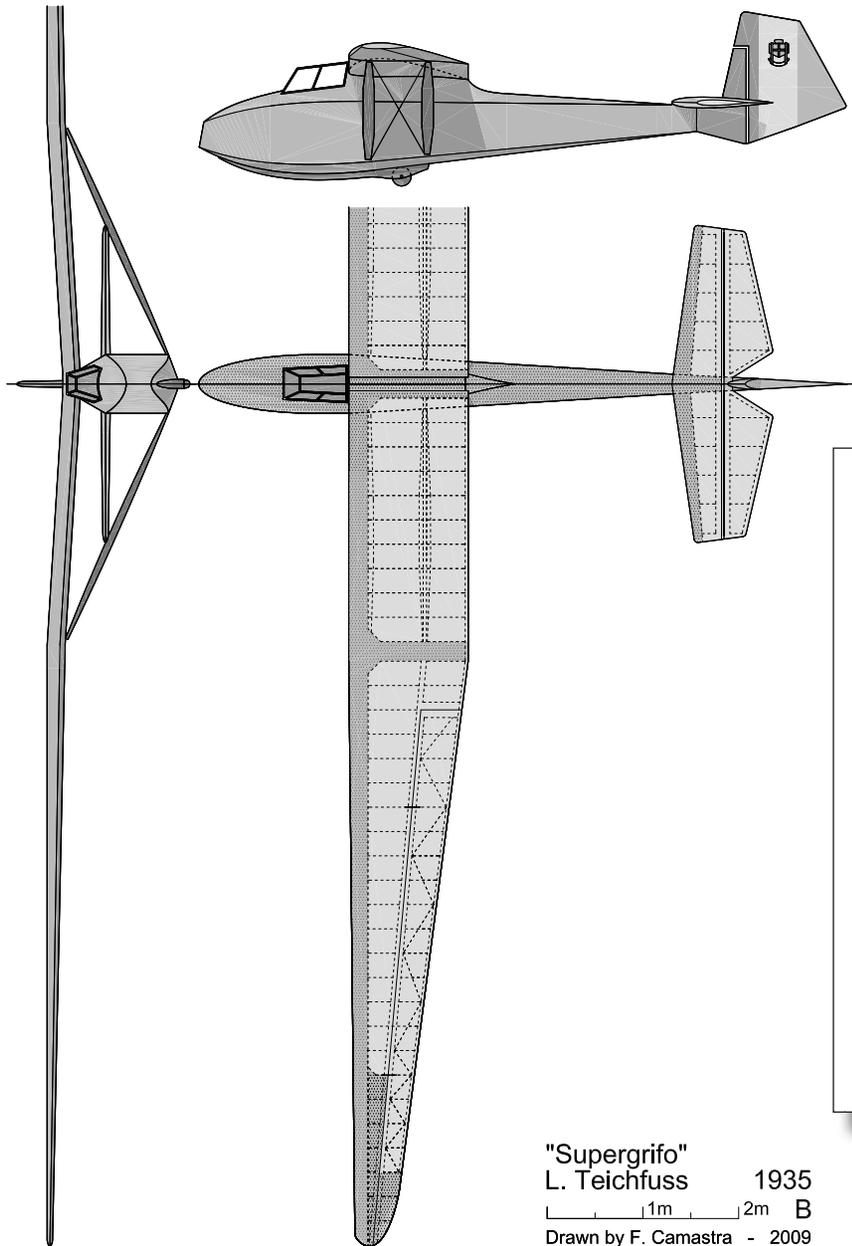
Luigi Teichfuss designed and built the Supergrifo in 1935 in the workshops of the Pavullo gliding school. The mono-spar wing,



Supergrifo at Asiago, 1938



Vico Rosaspina on board the Supergrifo

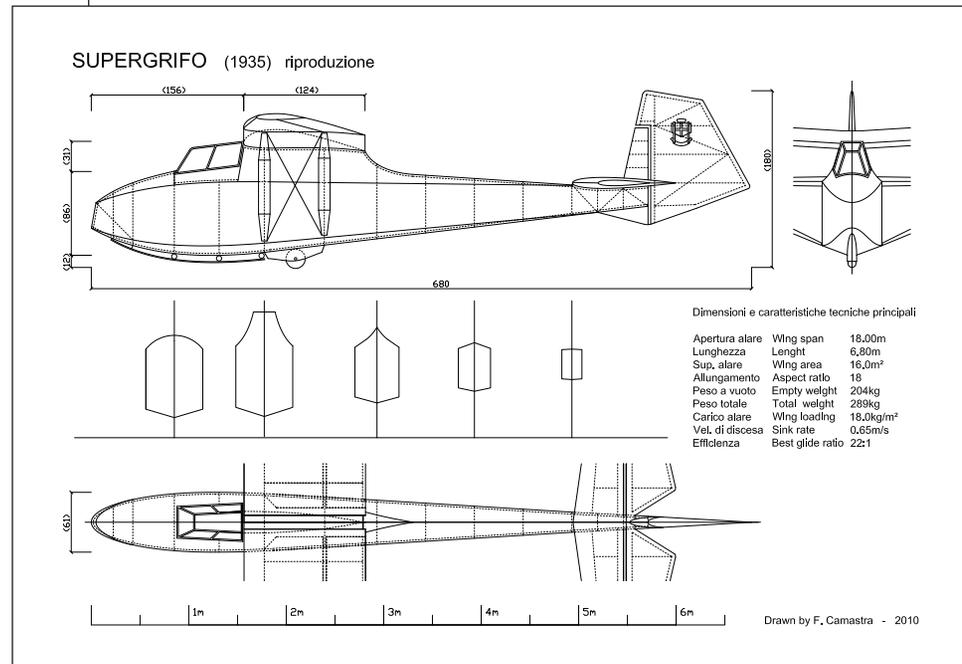


"Supergrifo"
L. Teichfuss 1935
1m 2m B
Drawn by F. Camastra - 2009

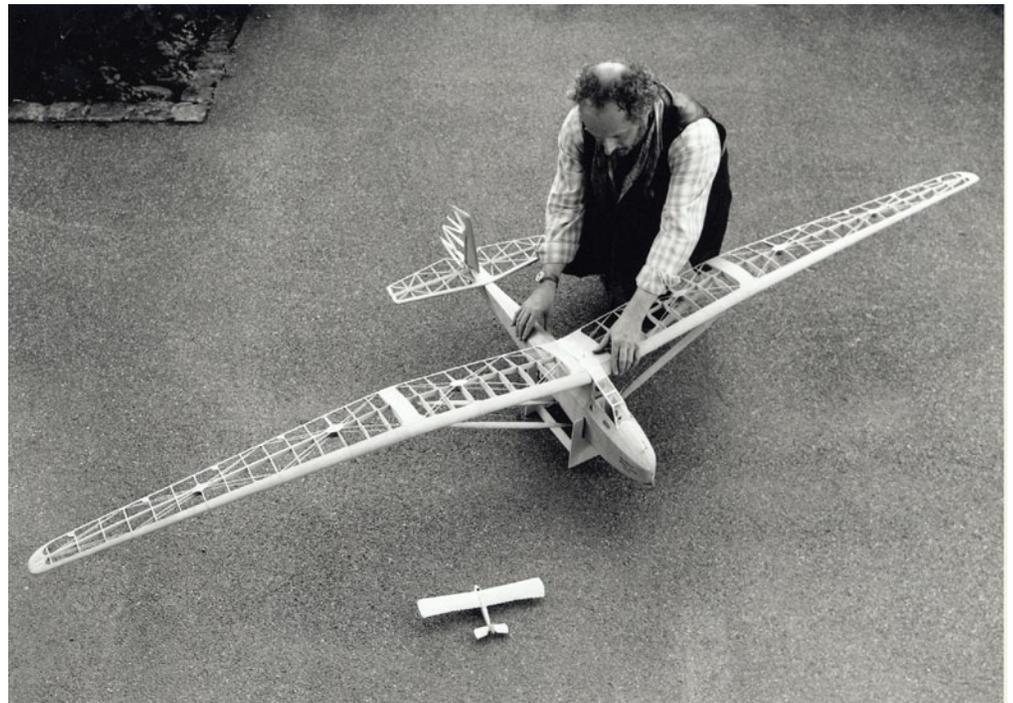
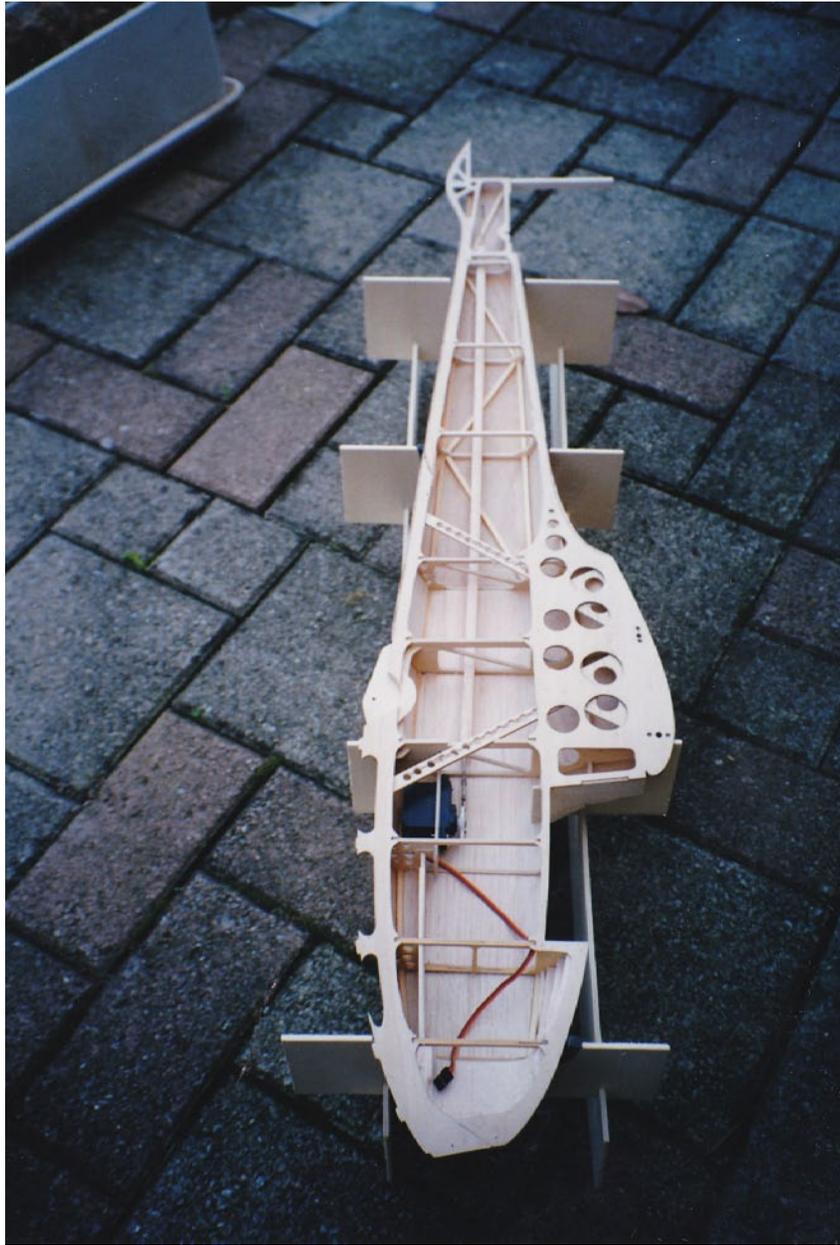
with an extended span and a modest gull dihedral, had a rectangular centre-section with tapered outer panels and rounded tips, braced with two pairs of wooden struts.

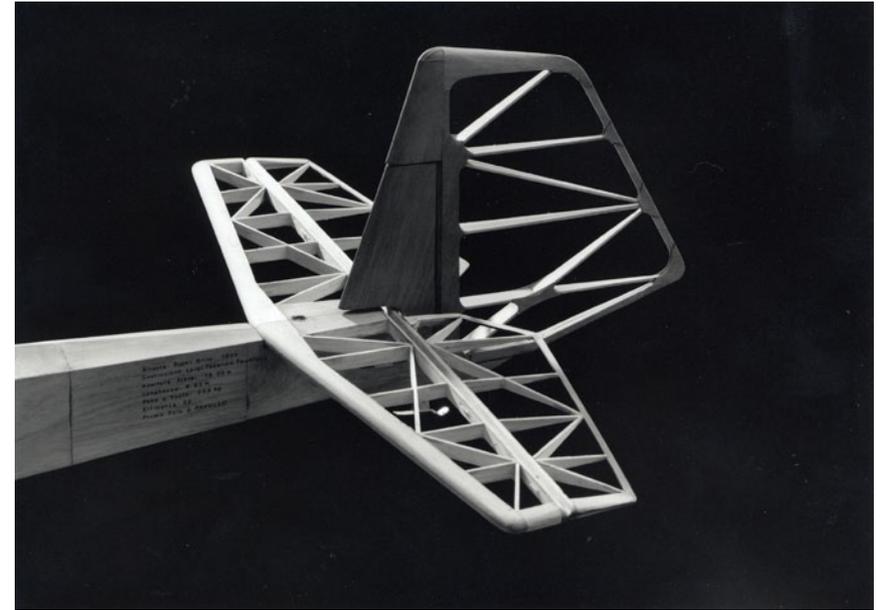
The wooden framed fuselage had an hexagonal cross section and was skinned with plywood. The cockpit was enclosed with a transparent canopy.

In 1938, during the 2nd National Gliding competition in Asiago, Mantelli landed the Supergrifo in Vicenza after a flight of 3 hours and 39 minutes winning the "City of Vicenza" prize.



Illustrations on this page by Francesco Camastra from *Alianti Italiani d'Epoca - Italian Vintage Sailplanes* by Vincenzo Pedrielli, EQIP, Bonn, 2011.





The Supergrifo disappeared with the end of WWII, as did most of the Italian gliders designed and built by Luigi Teichfuss. All that remains is an original three view drawing in a scale of 1:40 and a couple of photographs.

My Swiss friend Frederic Fischer, a great admirer of Luigi Teichfuss and, I would add, his best biographer, was very intrigued by this unique sailplane and decided to bring it back to life in a 1:5 scale.

Firstly, Frederic had to decide which airfoil to use, as the original GÖ535 was not suitable for a model of such a small scale. He went for an NACA airfoil and cut and sanded the ribs by the usual “sandwich method,” assembling the two halves of the wing. The leading edge was shaped out of balsa wood and two degrees of washout provided improved stall behaviour. After that the two wing halves were assembled and secured with steel rods.

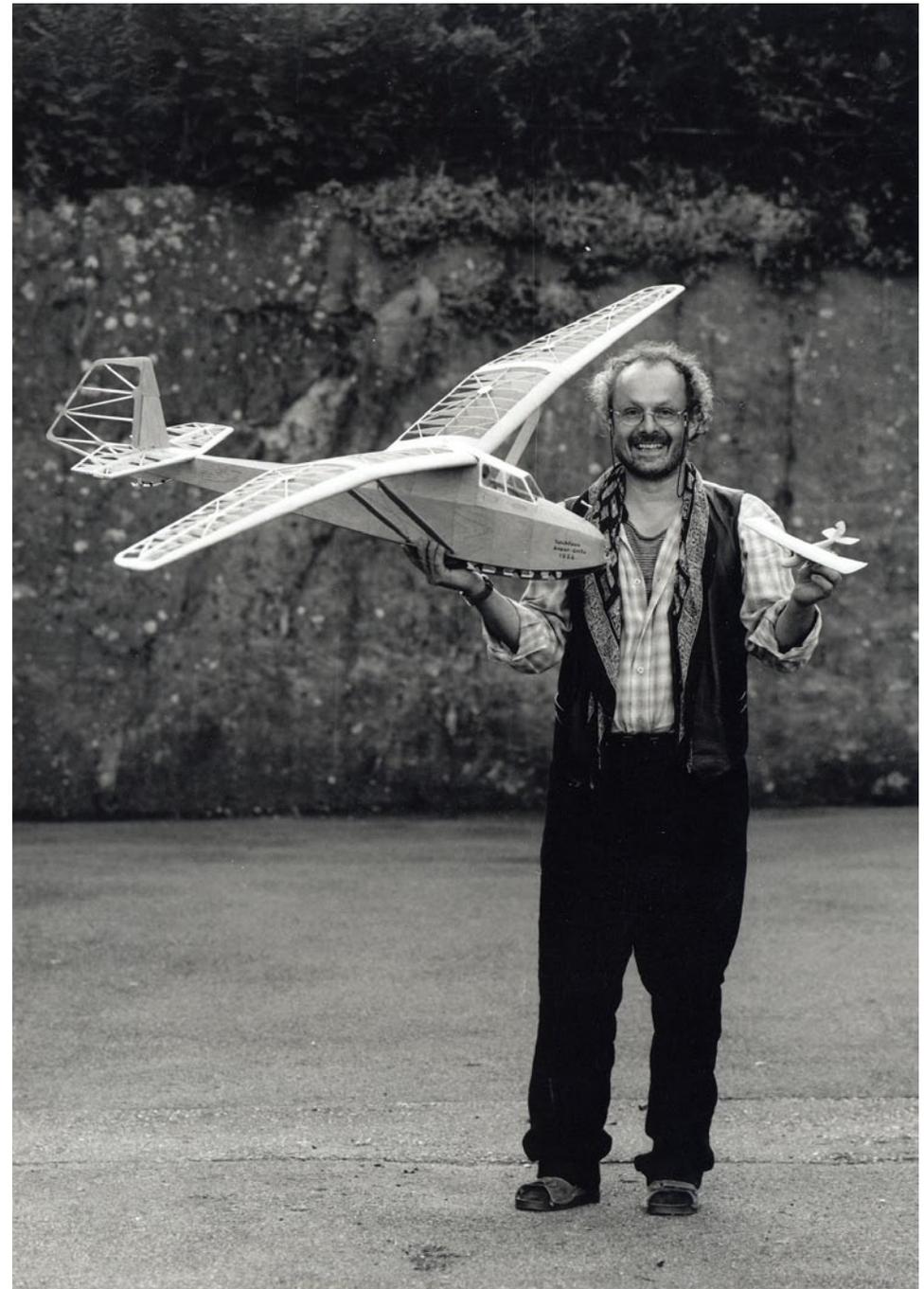
Then he started work on the fuselage. Again, the two-halves system was adopted to avoid distortion and misalignment. At this stage, Fisher had developed his own technique for assembling the fuselage. It consisted of cutting the longitudinal section of the fuselage out of 1/16" birch plywood, laying it over the plan and adding 1/8" plywood formers, which were subsequently connected by 1/4" square spruce stringers.

After that the fuselage was ready for skinning with 1/32" birch plywood for the front of the fuselage and 1/64" for the rear. After the two halves were completed, Frederic glued them together, checking carefully for perfect alignment and then gluing a block of balsa to form the nose, properly shaped according to the drawing and previously carved to accommodate the battery pack.

The frame of the canopy was shaped to fit the fuselage and cut out of 3/32" birch plywood. Now we can say that the fuselage is ready and looks exactly like the drawing. At this stage the Supergrifo has started to take its actual shape and showing its elegant and beautiful appearance.

Oh, sorry Frederic, I almost forget the tail-plane; actually there is not too much to say about it except it conforms to well known recommendations: make it light, strong, and easy to rig and dismantle.

And, the very last part of the Supergrifo, the struts, which have been made with a 1/16" birch plywood core, sandwiched with two layers of balsa wood, shaped properly to reduce drag. Now most of the work is done and the result is there to be seen. However, two important operations have yet to be considered; the first is the radio installation, the most critical decision for any model builder as it strongly influences the flying capabilities of the model. The second being the finishing, which sometimes means dope and fabric to be 200% authentic, but could also be any thermal





Frederic Fischer's 1:5 scale Supergrifo on its maiden flight.

shrinking material providing that the final appearance is the same as the original full sized sailplane.

Frederic opted for the second solution as it is much quicker and allows you to be "in the air" sooner than the original method.

How about the colour scheme? A good question. Most of the people who saw the original Supergrifo are no

longer with us and the very few who are will have forgotten it. This is why it is so important to find some original photographic material, but the only photo of the Supergrifo is not enough to define its colour scheme. Well, in those days two colours were commonly used and these were cream and silver. Frederic selected the first. Actually, who can prove otherwise?

Should anybody stand up and claim "No, it was not cream it was silver or light blue" Frederic and myself would be very happy to meet them because they would have solved our enigma. Maybe this person could still exist and possibly be living in Pavullo where Frederic wants to take his Supergrifo and make it fly again where it was "born" by the hands of Luigi Teichfuss.



BEWARE

CARBON DUST

Rene Wallage, rene_wallage@yahoo.com

I am building a new glider, and started opening the (carbon fiber) tail boom for the elevator stab. First a straight line with the Dremel, and then some elbow grease with a hand file for fine tuning. After a few minutes I stopped to check the result and saw the carbon fiber dust on my worktable. I then realized I had forgotten to replenish my supply of dust face masks, so I wasn't wearing one!

Carbon fiber dust is very fine, and can stay airborne for quite a while, depending on the room's temperature, humidity, and airflow. It gets into your lungs and, like asbestos, stays there. So obviously, this is not a healthy thing.

So the next day I bought some masks, and that evening I Dremeled and filed three small slots in the carbon fiber tail boom while wearing a dustmask.

Look at the picture of the mask. Note the dark smudges? Those are carbon fiber dust. I wore this mask while making only three small slots in a carbon fiber tube. I would have inhaled that dust...

Remember, this stuff can kill...!



Chevron ballast method,
fin attachment and placement,
and "Why do they fly chevrons, anyway?"

Philip Randolph, amphioxus.philip@gmail.com

Back some time ago I bought a Sonic kit for twenty bucks at a SASS meeting. That's a 48" chevron with a JW (Joe Wurts) airfoil. It was the precursor to the JW, built for a while by Bowman's Hobbies.

But this article isn't about Sonics. Which I gather are a basketball team in Seattle. Which gets me scratching my head. Basketball is that one where they hit a ball with a stick, right? What did the ball ever do to them? Better to fly toys.

Oh, I got off track. ADD does that.

Ballast

In 2009 I built the Sonic, and covered it with 10 mil laminating film. This 'new stuff' comes in various thicknesses. I got some 10 mil and 5 mil from a buddy. Search RC groups for sources. The actual thicknesses are generally less than nominal, and include the hot glue layer. But it bonds well to EPP.

I threw three mild innovations at the Sonic, probably done many times, but not that I'd seen. First I put an internal ballast on the CG. It's just a metal bottle cap filled with six ounces of lead, and a 1/4" nylon flat-head bolt to hold it in. I gooped a blind nut into place to hold it. I filled another cap with a mix of Gorilla Glue and water, for when I don't want ballast.

To make a good ballast compartment, I cut out about the right shape from the EPP of the Sonic underside, slopped in a bit of the Gorilla-Glue-Water slurry, and pushed a cap in. The cap was covered with tape, which in

Foaming ballast pit with Gorilla Glue and water



Ballasts and pit





Ballast blind nut



*Note
countersunk
hole for flat-
head nylon bolt*

turn is generally covered with mold release. A screw into the cap let me get it out.

In use, I covered the ballast with a flap of tape.

This ballast method wasn't a bad idea. And external ballast is required for ballasted slope combat.

But, on a recent impact with the ground, the ballast and blind nut ripped right out of the foam. The problem of ballast, in hard landings, is that it adds to impact, and destruction. On a future chevron, I might consider 3/16" nylon bolts holding on an external spoon-mold of lead. It's still fairly neat, better than taping lead on, and the bolts, rather than the foam, might sheer on one of those landings I disavow having any knowledge of.

Fin attachment and aft placement

Everyone who flies chevrons dislikes the traditional method of taping Coroplast tiptlets in place. Which raises the question, 'Why do they fly chevrons anyways?' (As opposed to, 'any which ways?') The answer to that, for the zippy little things, is 'Because they can.'

But why, the previous? Hu Nose why they do, if by 'they' is meant, 'slopers in parts of the country with decent landing zones.' And even here, in Washington State, them what only goes to our few slopes with grassy LZs mostly flies crunchies. But them what wants to git out into the wilds, and also fly, in Warshington, we has ourselves a problem. Western Warshington is covered with

trees, with relatively few bare slopes. The mountains are rocky. Eastern Washington is layered lava flows. That means, rocky, in spite of a powdering of volcanic ash. One solution is to fly EPP.

But even EPP busts. A buddy, on a recent CEWAMS trip, broke his Super Scooter (standard planform) into multiple pieces. So, as Michael Daily explained to a new guy, “Since we fly around rocks, too much, it’s good to have a low investment in our toys.” Low investment means, ‘chevron.’ Or, ‘delta.’ Flying wings. EPP.

Well, to be honest, for once, there is another problem. The founder of the non-organization, CEWAMS, intrepid slope explorer Chris Erikson, has an internal compass that points to rock piles. One of our favorite places to fly is a fifty-foot cliff above a talus slope. See?

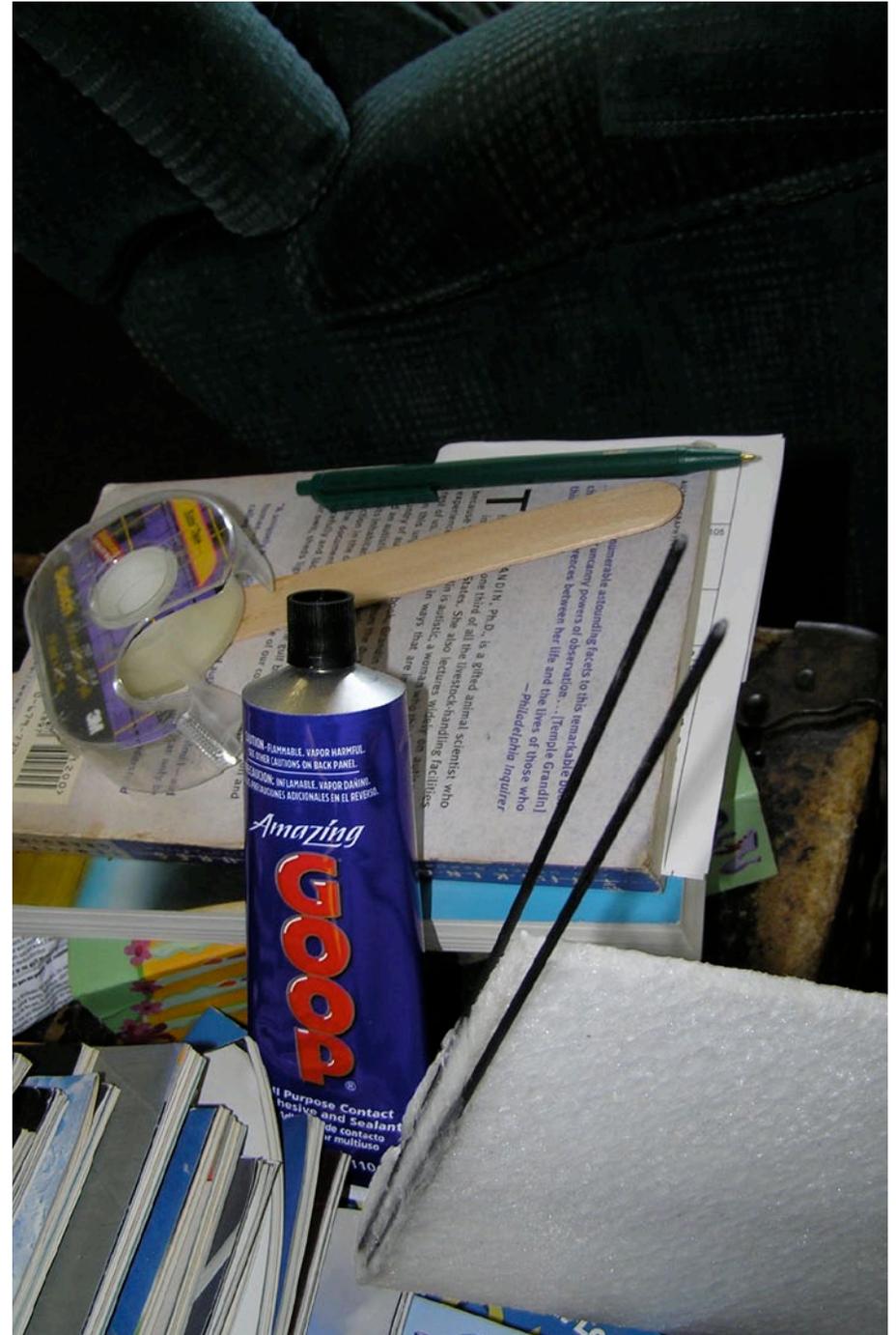
Oh, yeah, this was about fin placement. I got distracted. ADD again.

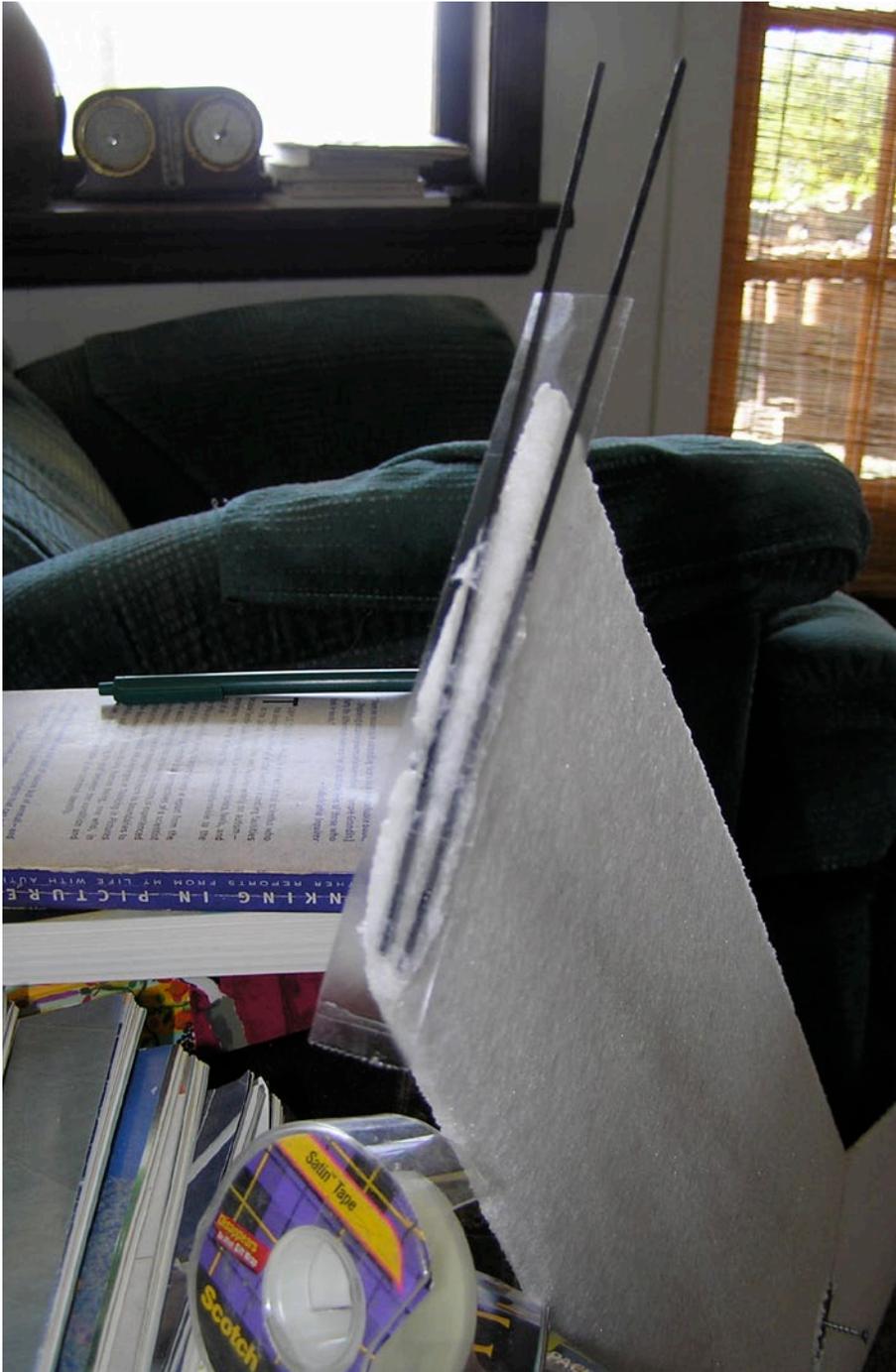
Fin attachment and aft placement, for real this time.

As said, taping fins on chevrons is unaesthetic. One CEWAM holds them on with Velcro. Another uses nylon bolts into sleeve anchors. I’ve done that. But with the Sonic I decided I’d try a mistake. I didn’t set out to make a mistake — that’s not what I mean. But it turned out to... Oh heck, I shouldn’t have to do so much explaining.

First, wingtip fins are dumb, on toys. A few years ago, Stephen Allmaras, Ph.D., then

*Gooping in
0.075" carbon
rods (too light
and breakable)*





*Tape is a mold
release*

working for Boeing, got another Ph.D from Boeing to come to a SASS meeting to tell us all about winglets.

The gist of his talk was that they can design them to reduce drag, but they really only do any good at the speed and angle-of-attack they are designed for. For passenger jets, the winglets are optimized for cruise. For 4' EPP chevrons, well, Boeing doesn't design those. But they fly at such a variety of speeds and AsOA (The placement of the 's' is like that in Attorneys General) that it would be hard to design for.

Worse, our Coroplast triplets aren't even airfoils. Or they are just 'barn door' airfoils. Worse yet, sticking them right in the middle of wingtip vortex turbulence may increase drag. Which may be why scuttlebutt says that center-fins make faster planes. Hu Nose.

I decided that I wanted to put the fins further back, for more lever-arm. And I didn't like that thick Coroplast. So, as the pics tell, I gooped some .075" carbon rods onto the wingtips, and reinforced the bond with gooped kite string. When dry I slid the fins on.

The mistake was that .075" rods snap too easily. I fixed that by adding .10" carbon rods. Tougher.

I shoved a small screwdriver up the thin Coroplast to cut out one web. Then the thicker rod went right in. Works better.

The center flap

The center flap's purpose was for braking, to slow the Sonic for landings. I haven't tried it yet. I had to figure out how to program my own radio, but that's another story, and embarrassing, but, later. Bother. I'll tell you when I try it. I can say that it makes it harder to throw.

All in all? A bit of a review of a chevron you can't get anyhow.

All said and done (well, fat chance of that, but), on a recent trip the Sonic flew quite well. It was, however, out-spaced by the 60" EPP Planks. Steve Allmaras's Lumberjack was faster. And Michael Daily's M60, designed for slope pylon racing, was faster yet. Span rules.

So there — in spite of claiming this article wasn't about the Sonic, a bit of a review.

Oh, sorry. I forgot standard review format:

- It came well packed in its box. (Well, I got it with its pieces held together with blue tape.)
- The instructions were clear and complete. (I got some on-line by calling Pat Bowman.)
- It went together quickly. (I think too much to be a fast builder.)
- You can get yours at bowmanshobbies.com (Naw, they don't make them anymore.)



*Alignment
by tongue
depressor*



*Fin with thicker,
tougher,
0.10" spar.
The surviving
smaller spars
still work
for vertical
alignment*

