# Radio Controlled Soaring Digest

December 2007 Vol. 24, No. 12

# CONTENTS

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Front cover: The cockpit of Tony Elliot's ETA, a home-built scale model with a span of 10+ meters. Tony designs and builds his models from scratch, including the molds, and he flew this ETA at a Monroe Washington aerotow event.
Photo by Dave Beardsley.
Canon EOS D60, ISO 100, 1/350 sec., f5.6, 400 mm.



Back cover: David Hauch flies off a grass runway usually utilized by full size aircraft (as you might tell by the yellow marker cones). David took this photo of his sailplane in flight against a spectacular Fall backdrop with camera in one hand and transmitter in the other!
Kodak DX7440 Zoom, ISO 80, 1/500 sec, f5.6

# R/C Soaring Digest

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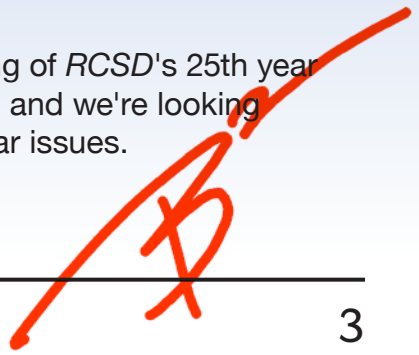
# In the Air

Need ideas for holiday gift-giving? Well, this is the issue for you! That's right, this, the December issue, contains the annual Christmas and gift-giving list. The list this year has items from under $10 to over $1000, with sizes ranging from about one inch to 50 feet. We hope it's helpful as you shop this year.

*RC Soaring Digest* is a communication device which not only expands the worlds of its readers, it also expands the world of its Editors. We recently had the chance to communicate with Curtis Suter of Montana, and he mentioned his web site <http://h1.ripway.com/cloudyifr/>. In the Files section of Curtis' site are a number of Excel spreadsheets. Several are related to the design of RC sailplanes — one for cruciform-tail and the other for V-tail planforms — and there's a separate spreadsheet if you're interested in converting a sailplane from one tail configuration to the other. There's also a spreadsheet for determining flight times for electric models, and Curtis is currently working on one for the Panknin twist paradigm. Because of limited bandwidth, you may have problems downloading these spreadsheets, but contact Curtis via e-mail at suterc@msn.com and he'll send them to you directly. Opinions and suggestions for improvement can be sent to the same e-mail address.

This January will mark the beginning of *RCSD*'s 25th year serving the RC soaring community, and we're looking forward to publishing 12 spectacular issues.

Time to build another sailplane!



# Texas National Tournament TNT 2007

## The Soaring League of North Texas

Each year Texas sailplane pilots gather for the Texas National Tournament. This three day thermal duration contest has a rich history and serves as the major regional event in Texas.

While most of our pilots hail from the Republic, we usually draw from as far away as Kentucky, California and Chicago.

The current home for the TNT is the world famous Southfork Ranch, home of the TV series Dallas. The three day event includes Handlaunch and RES on Friday and a two day Open Class event on Saturday and Sunday.

2007 was the 23rd TNT, and we had a total of 55 pilots broken down as follows:

- 55 registered pilots
- 13 Handlaunch competitors
- 39 RES competitors
- 47 Open Class Competitors (Both Saturday and Sunday)
- 9 States represented
- 21 trophies given to 13 competitors

Weather has always been a challenge in North Texas, particularly in October. This year was no exception, while Friday delivered picture perfect conditions with light winds and bountiful lift. On Saturday and Sunday, as is more often the case then not, the winds picked up with gusts over 20 mph.

The first event of the event was the Handlaunch contest CD's by Tim Bennet. Tim always comes up with a wide variety of challenging tasks which never fail to test pilots to their limits. Thirteen flyer's flew five rounds of ten minute time slot competition with comfortably warm east winds on a field sprinkled with mulch chips from the Cattleman's ball held a few days before.

This year honors went to Houston and Tauno Knuuttila.

1 Tauno Knuuttila XP-5 4808
2 Dave Register XP-X 4784
3 Austin Williams Blaster 4654
4 Gary Warner Blaster 4490
5 Tony Bermudez Taboo GT 4319

After wrapping up the Handlaunch, Julian Tamez kicked off the RES event. As the day wore on, the conditions were superb, and the competition was exciting. A few airplanes were lost due to pilot error, radio failure and even a midair as two pilots were scratching at treetop level trying to get back to the landing area. At least twenty years of soaring innovation was represented, from Sailairs to Topaz's, Soprano's and the ubiquitous Ava. Several pilots flew with 2.4 GHz systems, a first time at the TNT and SLNT.

RES results below:
1 Jim Frickey 2064
2 Tauno Knuuttila 2018
3 John Luetke 1977
4 Don Richmond 1973
5 Robert McCleave 1957

In Texas soaring we have a saying, "If you don't like to fly in the wind... take up golf!"

On Saturday AM, Barry Kennedy, CD for the Open Class event, kicked off the event as scheduled. Per tradition, six rounds were flown on Saturday, five rounds of the Saturday event, and the first round of the Sunday event, which enables travelers to get on the road in time to see the Cowboys play, or whatever people do on Sundays in Texas!

The winds were big; so was the lift and the sink that followed. Over the ensuing 10 rounds, visiting pilots were reminded of the unforgiving nature of the Southfork tree line as several made the long walk. Fortunately, no airplanes were lost or severely damaged.

Trophies were given to the top five contestants in each event with a circulating trophy given to the contestant with the highest score for the tournament.

This year the top scorer was Tauno Knuuttila representing the Houston Hawks who absolutely dominated the event in placing or winning in all of the contests.

Saturday Results
1 Tauno Knuuttila, TAUNO 5375
2 John Luetke 5100
3 Jack Womack 5034
4 Gody Stahl 5011
5 Jim Frickey 4934


Gordy Soar

Opposite page, clockwise from left: Yes, Gordy was here! Don True and Tony Bermudez from Austin make their way to the landing area. This sure beats golf!


This page, clockwise from right: Just missed a 100! Gary Warner winds up on his way to taking wood in Hand Launch. Like father, like son.


FALL FEST

Sunday Results
1 Jim Frickey 5345
2 Tauno Knuuttila 5336
3 Tim Bennett 5321
4 Tim Gastinger 5235
5 John Luetke 5230

Overall
1 Tauno Knuuttila 10711
2 John Luetke 10330
3 Jim Frickey 10279
4 Jack Womack 10129
5 Tim Gastinger 10108

Cooperative weather, hardworking volunteers, old and new friends made for a successful TNT.

In '07 our soaring season has suffered due to heavy rains, so a weekend of friendly competitive flying was just what we needed.

For those who have never attended, be sure to mark October on your calendar and consider joining us next year for the 2008 TNT.

Thermals from Big D....

Dan Ahearn
Vice President, SLNT


Opposite page: Results of a mid-arir and Barry Kennedy and his Visalia Fall Fest t-shirt.

Above: He came, he took our wood, and went back to Houston.
Right: Scratching for lift.


QUIET FLIGHT CLUB
ISRAEL

# Quiet Flight Club

# Fly-In & BBQ

Rene Wallage, rene_wallage@yahoo.com

The Quiet Flight Club isn't really a club. We have no airfield, we don't pay fees, and come to think of it, we have no members…

We are a loosely-bound-together group of like-minded individuals who like to fly gliders, electrified gliders, and the odd electric model. Some of us fly competition (national and international), some with success, some with less, and some fly just for the heck of it.

The driving force behind all this is Israel Ofek, an accomplished RC pilot who's been flying competition for a couple of decades now. He's the guy who will be standing behind you, giving pointers on how not to screw up. The fact that he just so happens to be the 2007 F5J European Champion makes you pay attention...

In the past year or so that I have been a sort-of-member, I have met maybe six of the other sort-of-members. But I was told that there are many more. So after some calling around, it was decided to have our first Annual Quiet Flight Club Fly-in & BBQ on Friday, October 12th, 2007. The Friday was chosen over the Saturday (our weekend is Friday-Saturday), so that some of the religious members could join in as well. Something no other RC club in Israel seems to want to do.

The field we used for this occasion is a little out of the way airfield mostly used by ultra lights, close to Tel Mond, about 15 km East of Netanya (which is about 25 km North of Tel Aviv). Weather is usually not something we are too concerned about. This time of year we typically have 21-25°C and between 10-15 kph winds. This particular day we had the heat, but very little wind, so in the end it was quite hot.

A large frequency board was supplied by Gur Shapira, and a big industrial sheet was provided by Avner Hamdi, to give us some much needed shade.

What was there? Well, the models ranged from a 15+ year old re-designed Gentle Lady, via a few electrified Banana trainers, a Unicorn Flying Wing, a couple of Bird of Times, and some F5B's, all the way to top-of-the-line Glass Slippers and an F5J European champion. And I haven't even mentioned the scale electric Piper Cub, White Monoplane, Extra260, Fokker D VII, and some electric aerobats. All in all there were 21 pilots, plus their assorted crews.

One nice thing about these meetings is seeing, and sometimes flying, other planes. At least, I had great hopes of flying Eli's Formosa, and/or Twin Star II. After all, he brought those two, together with his Bird of Time, a ZoomZoom, one of those flying boat thingies, and his The World Models Fun World. But in the end, due to bent/broken motor shafts on the Twin Star, suspected imbalanced outrunner magnets on the Fun World, and a forgotten-still-connected-

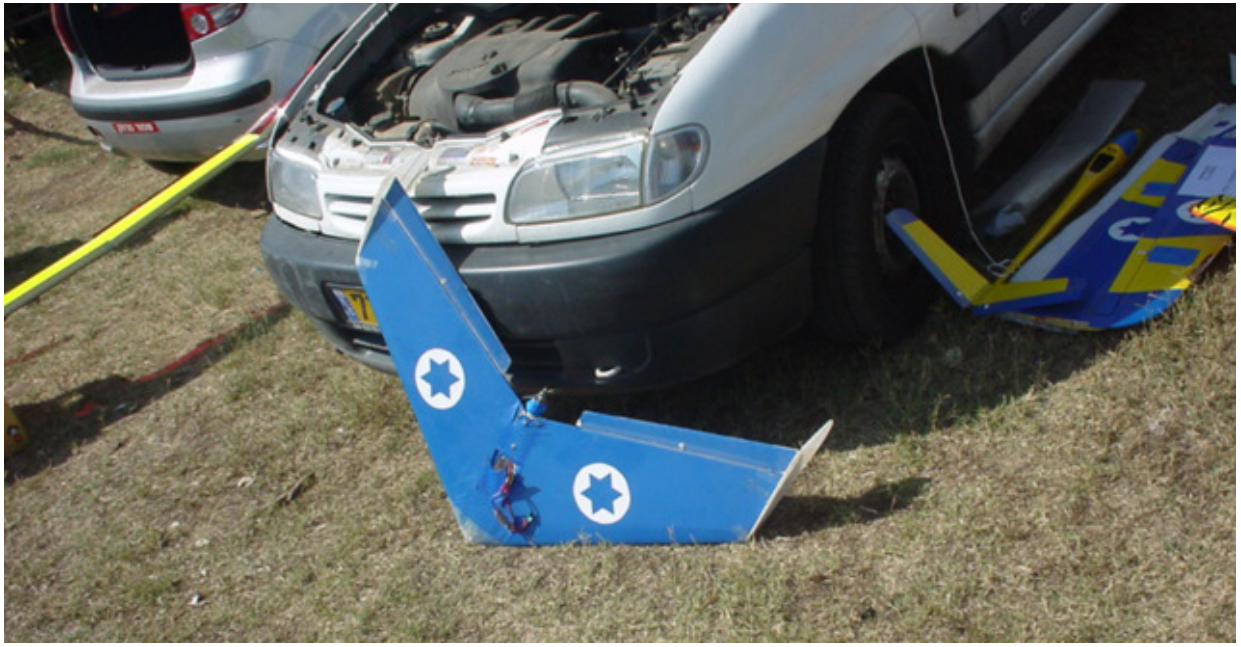
LiPoly-battery in the Formosa, only the ZoomZoom and the BoT where flying. So only Eli's son Ben got the pleasure of flying something else: I had my BoT up high and heard Eli's BoT being launched, apparently with Ben on the sticks. Ben's words "What kind of fun is this? It's boring!" changed a few minutes after reaching altitude and motor off, into an astonished "Hey, it's going UP!"

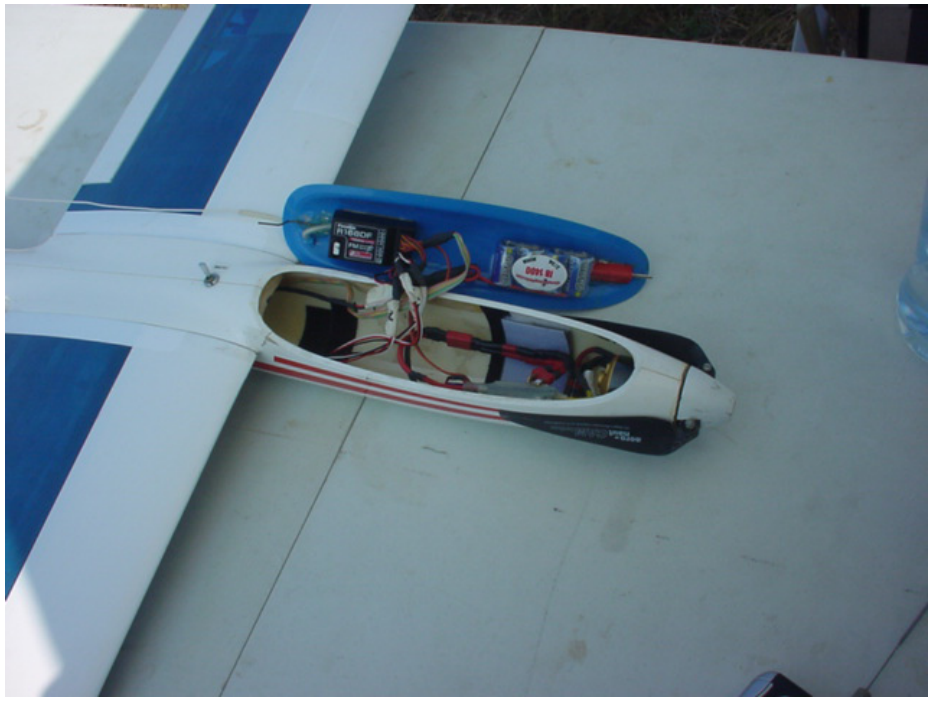
During the early hours in particular, thermals kept popping up here and there. Most gliders registered flight times of ten minutes and more on one motor run. Between the hours 10:00 and 12:00 there were constantly five or more gliders in the air. For me this was a whole new experience, as I usually fly alone, or at the most with one or two others. Thermal hunting while five or six other gliders are sharing your airspace takes some more concentration, and more (and faster) decision-making. It did make it crystal clear that with this many (or more) gliders in the air, a caller is a necessity, not a luxury. Not only to help you find the thermals, but more importantly, to keep an eye out for other flying things (including gliders, ultra lights, birds, etc.). There were some near misses (but at that altitude it was difficult to see how close we really came), but no damage; apart from one of the old timer gliders, which was caught by the East-Mediterranean-Glider-Grabbing-Tree. It's a rare tree, but usually appears at the far end of the field at the end of your vision…

After 12:30 the BBQ's were lit and the familiar smell of lighter fluid and burned meat filled the air. There was some charcoal smell as well. But seriously, there were some choice meats to be had… Zvi Solomon found a new way to fan his BBQ, by holding the fuse of his electrified Gentle Lady with swinging prop next to the grill…

By 15:30 we were all hot, tired, and stuffed. But a great time was had by all. Next year we'll do it again. And you are all invited!

Contact address for the Israel Quiet Flight Club is Israel Ofek (israelofek@walla.co.il).




Opposite page: Eli Sayag and his “flying boat, and Rene Wallage’s Unicorn.

This page: The business end of Boaz Barnea’s Grace, the Quiet Flight Club frequency control board, and an F5J machine on its maintenance stand.

This page: Avner Hamdi at rest, lighting the barbeque via Zvi Solomon's (R) electrified Gentle Lady, and "the pose" as demonstrated by Boaz Barnea and Arie Halperin.

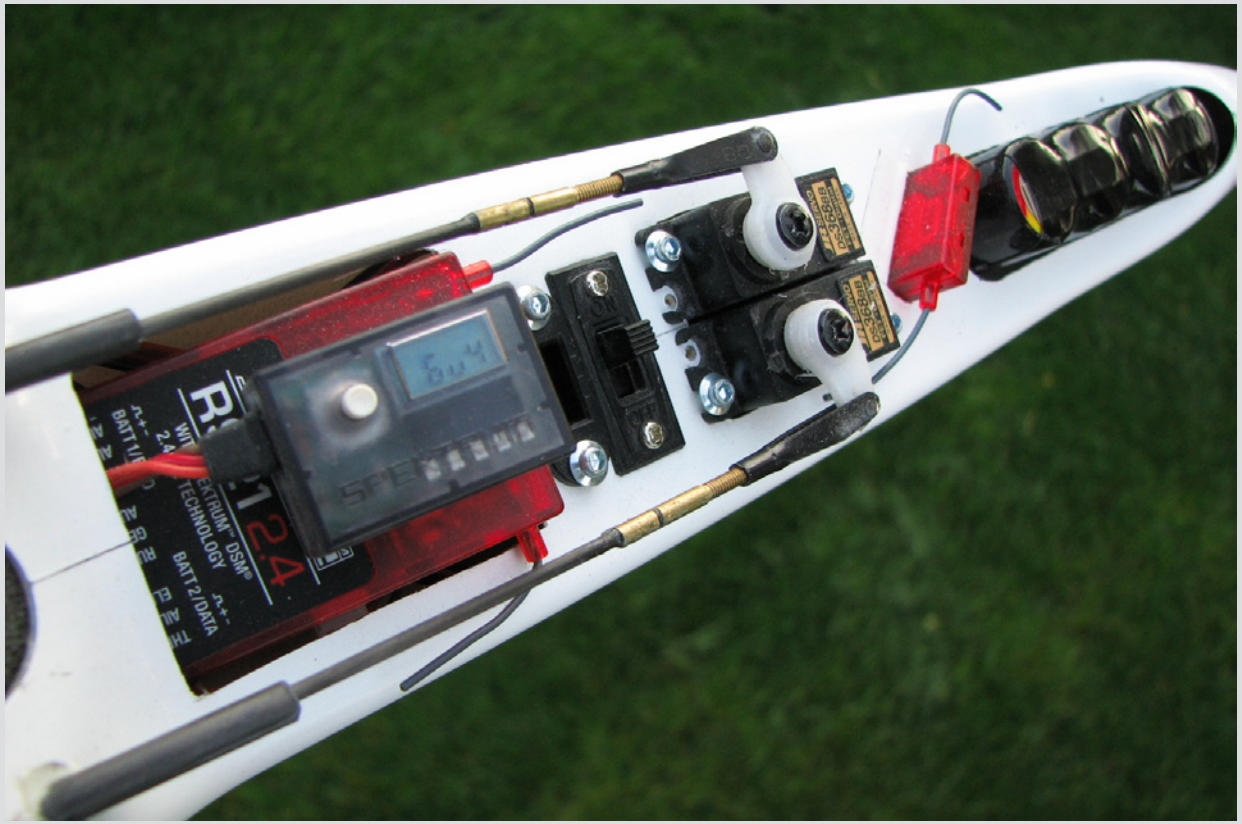
Opposite page, clockwise from upper left: F5B and F5J machines ready for flying, and oldtimer hybrid, Zvi Solomon launches his electric Gentle Lady, and Rene Wallage's Bird of Time and scale White Monoplane.


Left: Israel Ofek and his F5J model. Israel is the driving force behind the Quiet Flight Club.

Below: Smoke from the barbeque drifts from under the large industrial sheet provided by Avner Hamdi. ■

Sherman Knight

# Working with JR's new X9303 radio




## It has arrived

for full house sailplane pilots — freedom from the frequency board, and freedom from having to worry about some guy that took a stupid pill for lunch shooting down your $2500 sailplane with the $100 ARF he purchased on his lunch break.

In addition, freedom from interference from electric motors. (The frequency electric motors operate at is far below the new 2.4 GHz radios.)

Wait there is more — freedom from flying with the wrong model loaded in the radio. Holy cow, what is next, the radio flying the plane for us?

---

The JR 2.4GHz Spektrum system in a "2.4-friendly" Kennedy Composites Supra.

At the field the other day, I began to realize the number of misconceptions about 2.4. I asked ten people, “How does Spektrum work?” I got ten completely different answers. Not just slightly different, but night and day different. Everything from “it is just a scam” to “it is an artificial intelligence like you see on Star Trek.”

This article will try to show you what 2.4 is capable of, but first a little visit to 72Mhz.

72 Mhz is the frequency we have been flying on for decades. It works as long as the antenna is not blanketed by an engine block or carbon fiber. As a modeler, these are issues we can work around and reduce or eliminate the antenna problem. However, there is an issue that is beyond our control as pilots.

One airplane in the air, one transmitter on the ground, both on the same channel and everything is just fine. Someone turns on a second transmitter on the same channel and “another one bites the dust.” That is all it takes to really ruin your day, maybe your week.

So what does the X9303 2.4GHz radio do that is different? Can 2.4 gig really eliminate the guy with a stupid pill from ruining my day?

**Well, here’s the short version**

If the receiver is turned on first, all servos except for the throttle will be driven to their preset fail-safe positions set during binding. At this time, the throttle channel doesn’t put out a pulse position, preventing the arming of electronic speed controllers or, in the case of an engine-powered aircraft, the throttle servo remains in its current position. When the transmitter is then turned on, the transmitter scans the 2.4GHz band and acquires two open channels. Then the receiver that was previously bound to the transmitter scans the band and finds the GUID (Globally Unique IDentifier code) stored during binding. The system then connects and operates normally.

If the transmitter is turned on first, the transmitter scans the 2.4GHz band and acquires two open channels. When the receiver is then turned on for a short period (the time it takes to connect), all servos except for the throttle are driven to their preset fail-safe positions while the throttle has no output pulse. The receiver scans the 2.4GHz band looking for the previously stored GUID, and when it locates the specific GUID code and confirms uncorrupted repeatable packet information the system connects and normal operation takes place. Typically this takes 2 to 6 seconds. (Page G-25 of the manual)

Is that cool or what?

**JR’s new X9303 – 2.4, the long version**.

The radio looks just like a standard 72Mhz 9303. There is both a helicopter and airplane/sailplane version. The only difference is the push button on the upper right has been replaced with a three position switch. Many purchasing the 9303 for sailplanes are purchasing the helicopter version and using two switches on the right side of the radio for switching through the five flight modes.

The programming appears to be the latest found in the 72Mhz 9303. A review of the programming didn’t locate any new features.

The module on the back is fixed in place and cannot be removed or replaced with a different one. It does have a button that can be depressed for binding and range checking. More on that later.

**The JR R921 Receiver**.

Up to four receivers in one!

The JR R921 incorporates dual internal receivers, and one or two remote receivers offering the security of up to four simultaneous RF links for the ultimate in multi-path RF security.

Two internal receivers are located on the main PC board, while a third remote receiver must be plugged into one of the antenna ports in order for the system to operate. Optionally, a second remote receiver can be plugged into the remaining remote antenna port giving a total of four operational receivers. By locating these receivers in different locations throughout the aircraft, each

receiver is exposed to its own RF environment, greatly improving path diversity (the ability of the receiver to see the signal in all conditions). The R921 REQUIRES at least one remote receiver be used. (Page G-17 of the manual)

Yeah it's cool, and at Visalia in October it worked without fail, at great distance and exactly as advertised.

**ModelMatch**

The X9303 2.4 features patented ModelMatch technology that prevents the operation of a model if the wrong model memory is selected.

During binding, the receiver actually learns and remembers the specific model memory (1 thru 30) that the transmitter is currently programmed to. Later, if the incorrect model memory in the transmitter is selected and the receiver is turned on, the model simply won't operate, preventing a possible crash. Change programming to the correct model memory and you're set to fly, or rebind it to a new model memory. (Page G-18 of the manual)

**Failsafe/SmartSafe**

There are now two failsafe positions, similar to the old "hold" and "failsafe" positions. The old "hold" position is now called SmartSafe. The manual describes it as:

> "When the receiver only is turned on (no transmitter signal is present), all servos except for the throttle are driven to their preset fail-safe positions, normally control surfaces at neutral and the landing gear down. These fail-safe positions are stored in the receiver during binding. At this time the throttle channel has no output, to avoid operating or arming the electronic speed control. In glow-powered models, the throttle servo has no input so it remains in its current position.
>
> "When the transmitter is turned on and after the receiver connects to the transmitter, normal control of all channels occurs. After the system makes a connection, if loss of signal occurs, SmartSafe drives the throttle servo only to its preset fail-safe position (low throttle) that was set during binding. All other channels hold their last position. When the signal is regained, the system immediately (less than 4 ms) regains control." (Page G-20 of the manual)

The old Failsafe position is now Preset Fail-Safe. Similar to the old failsafe positions. The manual describes it as:

> "When the receiver only is turned on (no transmitter signal is present) all servos except for the throttle are driven to their preset fail-safe positions, normally control surfaces at neutral and the landing gear down. These fail-safe positions are stored in the receiver during binding. At this time the throttle channel has no output, to avoid operating or arming the electronic speed control. In glow-powered models, the throttle servo has no input so it remains in its current position.
>
> "When the transmitter is turned on and after the receiver connects to the transmitter, normal control of all channels occurs. After the system makes a connection, if loss of signal occurs preset fail-safe drives all servos to their preset fail-safe positions. For sailplanes, it's recommended that the spoilers/flaps deploy to de-thermalize the aircraft, preventing a flyaway. Some powered modelers prefer to use this fail-safe system to program a slight turn and low throttle to prevent their aircraft from flying away. When the signal is regained, the system immediately (in less than 4 ms) regains control." (page G-20 of the manual)

**The Flight Log**

I am one of those guys that likes to know WHAT, HOW and WHY. JR finally gave it to me with the new Flight Log. If you are concerned with 2.4 gig, you are going to love this little piece of equipment. It is smaller than the end of my thumb, has a digital readout, and measures voltage, antenna fades on each of the four separate antennas, frame losses,


In a Kennedy Composites Supra...

The orange box with two grey antenna sticking out is the R921 receiver. Held on top of the receiver with two sided tape is the Flight Log described in the text. The white button on the Flight Log cycles the display to check voltage, fades, frame losses and holds. Moving to the right is the battery charge port, the on/off switch and the JR DS386 servos that drive the rudder and elevator.

and the number of holds. You can scroll through all the information by pushing a small button on the flight log. Talk about increasing peace of mind.

The manual interprets the information from the Flight Log as follows.

Antenna fades — represents the loss of a bit of information on that specific antenna. Typically it's normal to have as many as 50 to 100 antenna fades during a flight. If any single antenna experiences over 500 fades in a single flight, the antenna should be repositioned in the aircraft to optimize the RF link.

Frame loss — represents simultaneous antenna fades on all attached receivers. If the RF link is performing optimally, frame losses per flight should be less that 20. A hold occurs when 45 continuous (one right after the other) frame losses occur. This takes about one second. If a hold occurs during a flight, it's important to re-evaluate the system, moving the antennas to different locations and/or checking to be sure the transmitter and receivers are all working correctly. (Page G-23 of the manual)

The Flight Log can remain connected at all times or can be plugged into the receiver to read the information stored inside the receiver at the end of the flight, before it is turned off.

What do the numbers mean? In a ten minute flight, the transmitter sends out

45 frames per second, multiplied by 60 seconds in a minute, multiplied by 10 minutes comes to 27,000 frames. A hold (SmartSafe or failsafe) occurs when 45 continuous frame losses occur. Once a frame is successfully captured, control is regained in 4 milliseconds.

**Binding**

Finally the new stuff. This is where all the magic happens. It is necessary to bind the transmitter so that the receiver will only recognize that specific transmitter, ignoring signals from other sources. *If the receiver is not bound to the transmitter, the system will not operate. The radio and receiver are shipped un-bound and will not work until binding is complete.* During binding, the servo's failsafe positions are stored.

The manual describes how to bind using the three wire switch and charge jack that comes with all JR transmitters. It is too big and heavy, so none of us glider guys use it. So try this instead.

The R921 receiver has 11 servo ports on it. The two extra ones are labeled Batt/Data and Batt/Bind. This configuration leads you to believe that the battery must be plugged into one of these two ports. Instead, plug the battery or switch into one of the unused servo plug slots (7 through 9). That way the Data and Binding ports are left unused.

Because we tend to bury the receivers in sailplanes, the bind and data plug ports are impossible to get to without removal, and removal of the receiver is usually a pain. However, it is easy to make this pain go away. I simply left the Flight Log plugged in permanently so I don't need to get at that plug anymore. For the binding port I made up a five inch servo extension cable, plugged it into the BIND port, buried the receiver in the fuselage leaving the other end of the extension cable easy to get to for binding.

Binding with SmartSafe is fairly straight forward:

1. With the transmitter and receiver off, plug the bind plug in the end of the servo extension from the bind port on the receiver.

2. Turn on the receiver.

3. LED's will flash on the receiver and remote receiver indicating ready to bind.

4. Move the stick on the radio to the failsafe position.

5. Press and hold the bind button on the back of the transmitter and turn the transmitter ON. LED's on the receivers should go solid.

6. Remove the bind plug from the receiver and store it in a safe place.

7. You can now program your model.

8. Once the model is programmed (sub trim has reset neutral position of the sticks) you must RE-BIND the system so that neutral stick/control surface position are reset. THIS IS EXTREMELY IMPORTANT.

9. This process sets control surfaces to the "hold" mode.

Binding and setting a failsafe position is similar, but slightly different.

1. With the transmitter and receiver off, plug the bind plug in the end of the servo extension from the BIND port on the receiver.

2. Turn on the receiver.

3. LED's will flash on the receiver and remote receiver indicating ready to bind.

4. Remove the bind plug from the receiver and store it in a safe place. The Receivers will still be blinking.

5. Move the stick on the radio to the failsafe position.

6. Press and hold the bind button on the back of the transmitter and turn the transmitter ON. LED's on the receivers should go solid.

7. You can now program your model.

8. Once the model is programmed (sub trim has reset neutral position of the sticks) you must RE-BIND system so that neutral stick/control surface position are reset. THIS IS EXTREMELY IMPORTANT.

9. This process sets control surfaces to the "failsafe" mode.

**Range Testing**

This safety check is still a critical part of the pre flight check list. The Spektrum equipment provides a simple range test.

Move 90 feet from the model. With transmitter and receiver already on, depress the binding button on the back of the transmitter. This reduces the output power of the transmitter. (Similar in effect to lowering your antenna, but the 2.4 antenna is already a short fixed stubby thing.) You should have total control.

**Advanced Range Testing**

The advanced range test uses the Flight log to determine the RF performance of each individual internal and remote receiver and to optimize the locations of each individual receiver and antenna.

1. Plug a flight log (optional) into the data port (or in our case into the servo extension plugged into the data port) in the JR R921 receiver and turn on the system (transmitter and receiver).

2. Advance the Flight Log until F- frame losses are displayed, by pressing the button on the flight log.

3. Have a helper hold your aircraft while he observes the Flight Log data.

4. Standing 30 paces (90 feet) away from the model, face the model with the transmitter in your normal flying position and depress and hold the bind button on the back of the transmitter. This causes reduced power output from the transmitter.

5. Have your helper position the model in various orientations (nose up, nose down, nose toward the transmitter, nose away from the transmitter, etc.) while your helper is watching the Flight Log, noting any correlation between the aircraft's orientation and Frame Losses. Do this for one minute. The timer on the X9303 can be used here.

6. After one minute, release the bind button. A successful range check will have recorded zero frame losses. Scrolling the Flight Log through the Antenna Fades (A, B, L, R) allow you to evaluate the performance of each receiver. Antenna fades should be relatively uniform. If a specific antenna is experiencing a high degree of fades, then that antenna should be moved to a different location.

7. A successful advanced test will yield the following:

H- 0 holds

F- 0 frame losses

A, B, R, L- Antenna fades will typically be less than 100.

It's important to compare the relative antenna fades, and if a particular receiver has a significantly higher number of antenna fades (2 to 3X), then the test should be redone. If the same results occur, move the offending receiver to a different location. (Page G25 of the manual)

**Conclusion**

As you can see, 2.4GHz is a jump, a big jump in frequency control (no frequency board for 2.4), elimination of shoot downs, (since you can't fix stupid, you just take away the ability to be stupid), flying on two frequencies simultaneously - so if one is interfered with, the other steps in, elimination of flying the wrong model memory, and, with the Flight Log, the ability to do individual, real time testing of antenna locations in the aircraft. All this in just one package! Until I did the research and set up my first 2.4 gig sailplane, I did not realize just how big a jump 2.4 gig represents.

Bottom line...

By spring time, all my aircraft will be converted to 2.4.

In this and future editions of this magazine, there will be examples of setups in various sailplanes using various receivers.

Thanks again for everyone's help over the years.

If you have any questions, please don't hesitate to email me at duworm@aol.com. ■

# Sherman Knight

## The Supra and JR's new x9303 2.4 GHz radio

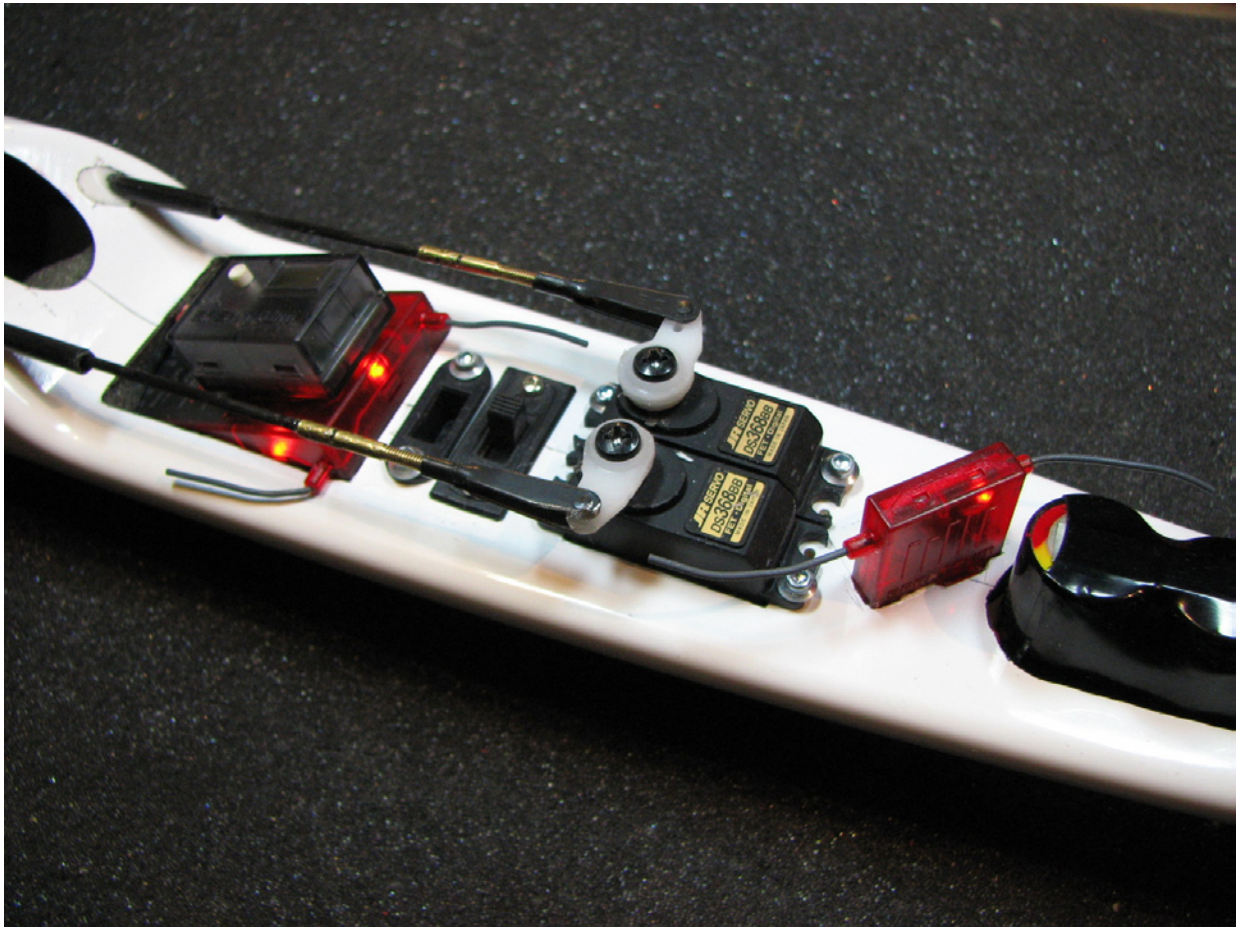
## Will they play together?

# Michael Knight

Remote control aircraft of all types have been flying on 72Mhz for a long, long time. Over that time, the radio manufactures and the model builders worked most of the kinks out of the systems.

Capacitors were placed on motors to reduce stray RF (radio frequency) from interfering with radio control. Capacitors were placed between signal and ground at the servo to stop chatter of servos with long servo leads. Antennas were routed out wings so the motor would no longer blanket the antenna when it was routed

Mikie on his way to the flight line at Visalia 2007 with his new 2.4GHz-friendly Supra. Notice the short stubby antenna on the 2.4GHz X9303.



Here is what is under the nose cone of the 2.4 gig friendly Supra. On the left is the R921. It is the orange box with two grey antenna sticking out. Held on top of the receiver with two sided tape is the Flight Log showing 6.5 volts. The white button on the Flight Log cycles the display to check volts, fades, frame loss and holds. Moving to the right is the battery charge port, the on/off switch and the JR DS386 servos that drive the rudder and elevator. To the right of the servos is the satellite receiver with its own two antennas. It is very small and thin. It simply sit in a slot cut in the equipment deck and is connected to the main receiver below the deck with three twisted wires. To the right is a five cell, 1500 mah battery pack. There are two LED's in the main receiver and one in the satellite receiver to let you know they are on. They blink when the receivers are in binding mode.

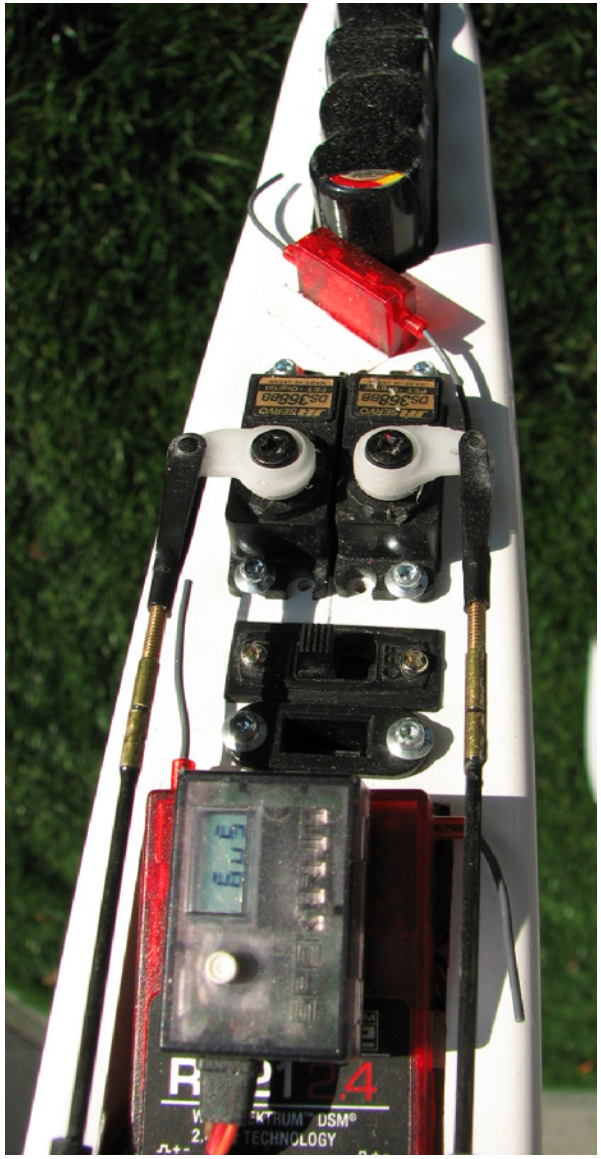
down the fuselage towards the tail. Just a few of many issues with 72Mhz.

Unfortunately, getting shot down on 72 Mhz by an idiot forgetting to check the frequency board before he turned on could never be completely fixed. A primary purpose of clubs around the country was to provide education and to enforce frequency protocols. Unfortunately, they didn't always work.

Just when we thought we were getting 72Mhz figured out, something magical happened. Carbon fiber came to the modeling community. It came in the form of rods, tubes and cloth. Carbon fiber was suddenly everywhere in a sailplane — reinforcing the spar, reinforcing the trailing edge, making up the tail boom, and reinforcing the fuselage with strips of carbon. Fiberglass cloth and polyester resin gave way to carbon fiber cloth and flexible epoxy resin.

The stuff was amazing. I even had a bumper sticker on my car that said, "I LOVE CARBON FIBER."

Soon entire wing skins and fuselages were made of the stuff. Suddenly, expensive models would not pass a range check. "Houston, we have a problem!" The result was long antenna wires dangling from sailplanes. It was ugly, usually effective, but not always. We were willing to sacrifice looks for the strength-to-weight ratio that carbon brought to the sailplanes.



Held on top of the receiver with two-sided tape is the Flight Log showing 6.5 Volts. The white button on the Flight Log cycles the display to check Volts, fades, frame losses, and holds.

I knew from personal experience that 72Mhz had problems with carbon fiber. I had heard that the 2.4GHz had problems with carbon, but was unaware of the level of difficulty. The power and helicopter communities were converting to 2.4 gig at an incredibly high rate. The sailplane community was slow, molasses slow, at accepting the 2.4 gig standard of Spektrum or JR 2.4. Very little information was available. It was a little frustrating.

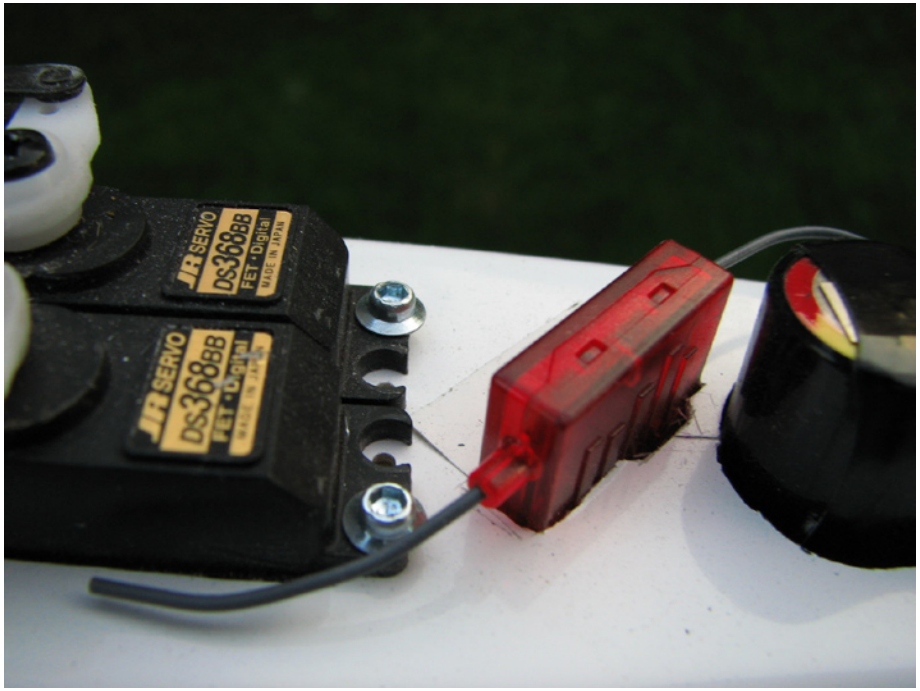
At the F3J team selection trials in Chicago, Barry Kennedy of Kennedy Composites told me about his new 2.4GHz-friendly fuselage pods for the Supra. John Dietz from JR was also there and said the X9303-2.4 was just around the corner. Hmmmmm, could I get a new plane, a new radio, build it in the next three weeks, and have it ready for Visalia? Well, second hand information was not getting me anywhere, so I decided to jump on the 2.4 gig bandwagon and try.

I called Barry Kennedy and was able to obtain one of the brand new fiberglass pods for his great flying Supra sailplane. (The nose cone is also available in Kevlar which is also 2.4-friendly.) My son and I managed to build it and have it done a week before Visalia.

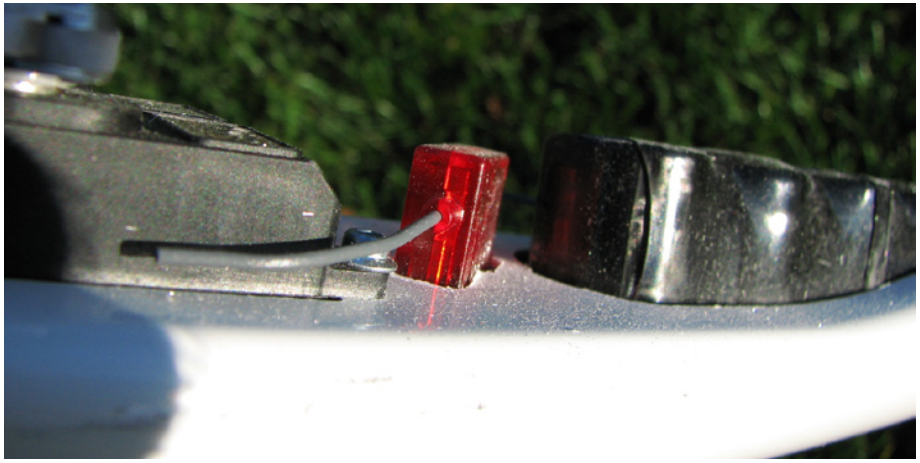
With a little begging, I managed to talk my way into a new X9303 2.4GHz radio that showed up the morning the planes were being packed in the trailer. My son and I started the installation of the new JR R921 9-channel DSM2 receiver and its satellite receiver. All four of the antenna are inside the nose cone. There are no “whiskers” hanging out in the air stream. Unfortunately, we did not have time to flight test the new Supra before it was packed in the trailer and on the way to Visalia.

The R921 receiver comes with a satellite receiver connected with 3-strand twisted wire. You can purchase different lengths from six inches to 36 inches. This allows the second receiver and its antenna to be placed in a different location within the airframe. The satellite receiver is small and very thin and could easily be installed inside a wing. As the JR website states;

> “The JR R921 receiver combines Spektrum’s exclusive, patent-pending DSM2 protocol— plus the brand’s DuaLink™ feature—and the result has been revolutionary. The radio system simultaneously transmits on two frequencies, creating dual RF paths. This dual path redundancy, plus the fact that each of the two receivers is located in a slightly different location exposes each to a different RF environment and creates a superior path diversity RF link in all conditions.”




The satellite receiver is really small. It is thin enough to go inside a very thin wing. About 1/3 of this satellite receiver is below the equipment deck. It simply sit in a slot cut in the equipment deck and is connected to the main receiver below the deck with three twisted wires.



The R921 also has a second port for connection of a second satellite receiver. Four receivers and six antennas. Holy cow!

Yeah, but does it work?

Thursday at Visalia we managed to finish the install and maiden the plane. We had to recharge the plane three times Thursday because the Supra was in the air all the time. The plane flew without any indication of interference. Michael commented that it flew very “smooth.”

Friday at Visalia is typically a train wreck of competing radio control frequencies. There are so many radios turned on at the same time, you can almost feel the hair on the back of your neck stand up. To the veterans, Friday is known as the “day of carnage.” Although there is a frequency board, the excitement of “the day before” causes many to become, “forgetful.” (OK, OK so “forgetful” is a kinder, gentler way of saying “stupid.”) The Seattle club took 19 individuals to Visalia this year and the veterans strongly recommend to all the rookies not to fly Friday after lunch. Except, of course, for the 2.4GHz X9303 radio and R921 installed in the new Supra. It flew all day Friday. All day and the plane never did anything other than exactly what the sticks told the plane to do.

The plane never stuttered, never momentarily flew away, never made Mikie or me wonder, even for a second, if we had lost control for ANY period of time.

Throughout the weekend, the X9303 with the MulitLink receiver and the fiber glass pod of the Supra was a fantastic combination. To fly in that kind of environment, with that many active radios and never worrying about getting shot down was a truly “worry free” experience. To fly and not have to worry about someone else becoming “forgetful” was refreshing. 2.4GHz is here, and it is here to stay.

The fiberglass nose cone on the Supra held up wonderfully. The Supra was fitted with a carbon fiber nose skeg nearly

two inches long. The hard “dork” landings at Visalia didn’t phase it one bit. Only time will tell, but the fiberglass nose cone seems to hold up just as well as the carbon nose cone.

Over the next several months, Mikie and I will be trying out several plane/receiver combinations and report it here in *RCSD*. Those combos will likely be:

- Supra with a fiber glass nose cone with the JR R921 receiver.
- Supra with a carbon fiber nose cone with the JR R921 receiver.
- Pike Perfect Lite with the JR R921 receiver.
- Sharon Pro 3.7 with the JR R921 receiver and the R7000 receiver.
- Blaster 2 Hand Launch with R6200 receiver.
- Quick 400 pylon racer with R6200 receiver.

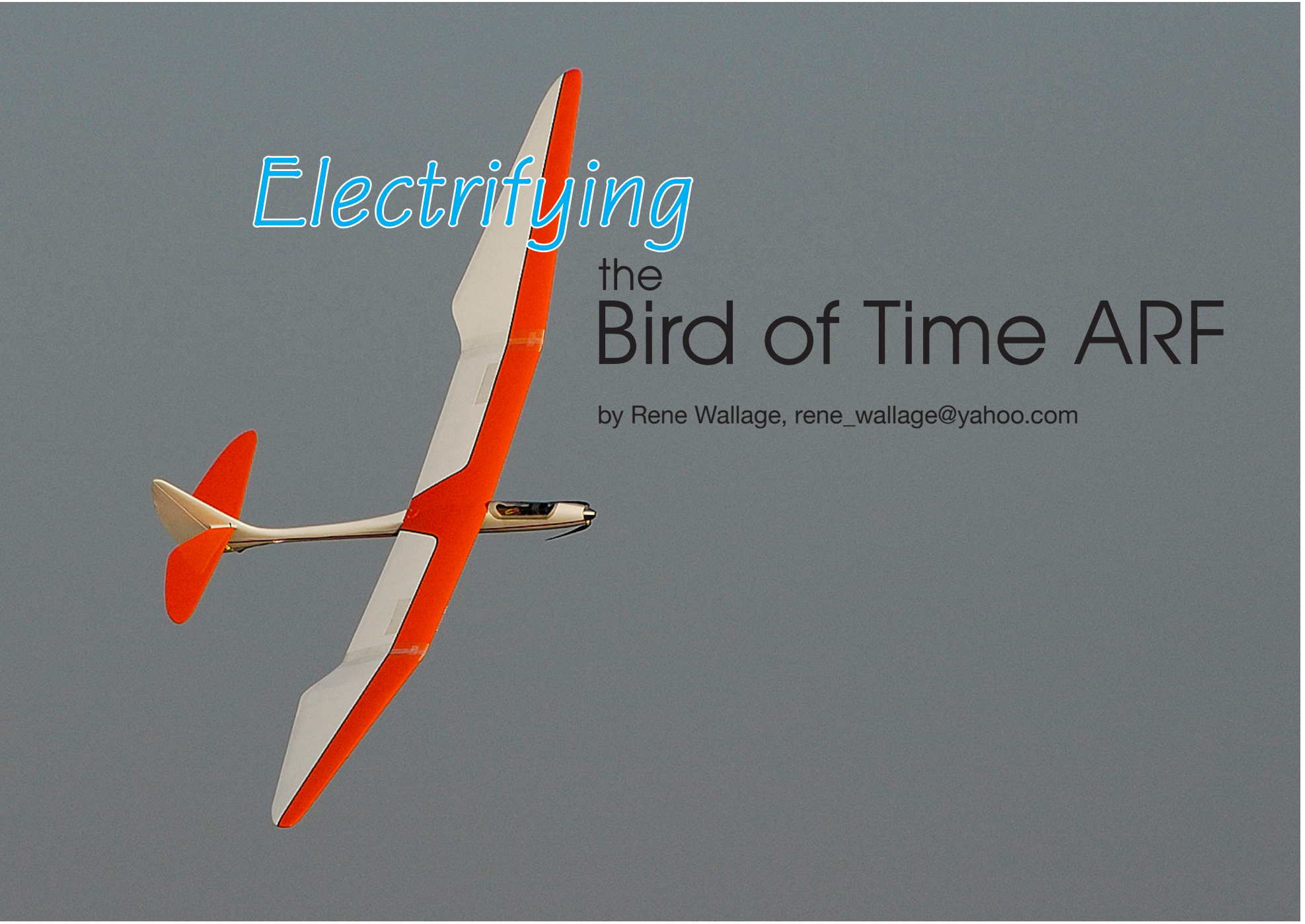
As you can see, my son and I are jumping into 2.4 with both feet. By spring, I expect to have all my planes converted. I am sold.

So, if you see us at the field, just come up and ask to give it a try.

You will love it. ■

Mikie flying on Sunday at Visalia with his favorite timer, Brendon Beardsley. Brendon went on to finish first in Juniors and Mikie finished third.

All of the images are taken of the installation of a Supra from Barry Kennedy at Kennedy Composites. The new Supra can be ordered with an equipment deck and slip-off nose cone made from fiberglass or Kevlar or carbon/Kevlar mix. Only the fiberglass and Kevlar are 2.4GHz-friendly. This plane was flown at Visalia in 2007 using 2.4GHz with great results.



# Electrifying the Bird of Time ARF

by Rene Wallage, rene_wallage@yahoo.com

When I started to look around for something to re-start RC flying, somewhere in 2002, for the shortest time I considered the Bird of Time. Its classic look had the strongest attraction for me. And at 3 meter wingspan you won't loose sight of her quickly.

But at that time there were only kits available. Lacking the skills, time and work area (not to mention the $$$), I set my sights on flying wings to start with instead, and placed the BoT on the "planes-I'd-like-to-own-when-I'm-retired-or-won-the- lottery-or-both" list.

I started with the 48" Unicorn, added later a Filip600Sport and some EPP slopers. I got really comfortable flying all those. Later I replaced my 48" 'Corn with a 42" brushless version, for some wilder "yank and bank" and general "scaring the heeby jeebiez out of birds, innocent bystanders, and fellow RC'ers."

That left my Fillip for the more sedate flying. And she just wasn't made for that. My Fillip and Unicorn had overlapping flying characteristics, and I wanted something to really sit in my easy chair and thermal away.

In the meantime Dynaflite came out with an affordable ARF BoT. Reading eagerly the various posts in RCGroups.com, it was clear there were teething problems. The main spar in the wing's center section had serious problems, and had a tendency to snap under pressure. Apparently in the earlier ARF BoT the grain of the wood of the main spar was horizontal instead of vertical. It was the wrong way, and it made for a very weak spar that could break at too much pressure, like with a winch launch. Much has been written on the web about this, but suffice it to say that Dynaflite added in the manual that the BoT was intended for hi-start launches only, and not (the much more powerful) winch launch. Later on they also seem to have solved the main spar problem. Add to this the fact that I intended to electrify my BoT, so I would have no need for a hi-start or winch. My BoT will not be subjected to excessive pressure on the wing during launch.

Of course, purists will always say that a "good" BoT is one that you build yourself from a kit. And they are right. There are several really good kits on the market, or you can just get the plans and build from scratch. If you do a search on RCGroups (and the web), you will get plenty of links. Don't expect that building from a kit or plan will be cheaper than the ARF version, though. But you will have the satisfaction of knowing that every piece of wood in that glider has been lovingly shaped, sanded and fitted by you.

But for people like me, who lack the skill, a knowledgeable local support group, and build area, there's the ARF market. After driving my friend Eli Sayag up the wall with my flowery descriptions and showing him the various pictures and video clips I had collected, he also wanted a BoT. As he is on friendlier foot with our local hobby shop (LHS) than I am, he organized our purchase of two Dynaflite ARF BoT's, thus keeping costs at an acceptable level. In the end, the LHS actually ordered four BoT's, probably assuming that after seeing our BoT's in Israel, others will follow. Personally, I think he's right...

For some reason, Eli has the delusional idea that I am very good at the assembly of an ARF with some modifications. Don't ask me why. So being the nice guy I am, I assembled his and mine.

We both had a power package ready and assorted stuff waiting.

Eli's setup was going to be:

- MP Jet MJ20201 outrunner
- 3S1P 2100 15-20C TP "Pro Lite" pack
- Dualsky 60A/70A Brushless Motor ESC (some serious overkill, but that's what was in the spare parts drawer)
- Graupner CAM Folding Prop 12x6 with Turbo Spinner
- Castle Creations Berg 7
- Servos – 2 x GWS Park HPX for rudder and elevator, 2 x GWS Naro HP-BB for the spoilers

And my setup is:

- AXI2820/10
- 3S1P 2250 20-30C hexTroniks motor pack
- Jeti40 ESC with BEC disabled
- Intellect 4x1200 Rx pack
- Graupner CAM Folding Prop 12x6 with Turbo Spinner
- Futaba R126F Rx
- Servos – 2 x GWS Park HPX for rudder and elevator, 2 x hexTroniks 900 for the spoilers

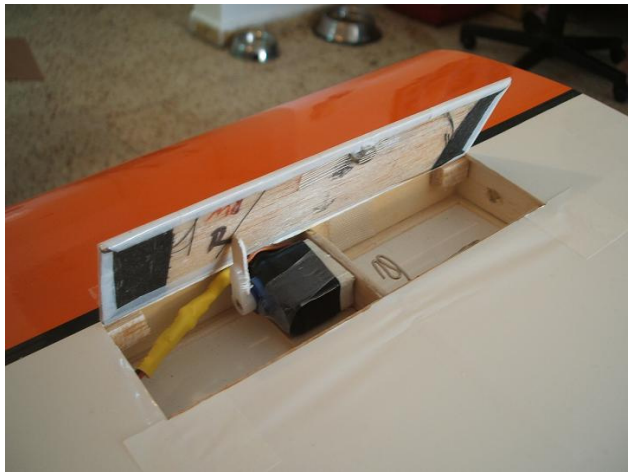
As you may notice, I have disabled my ESC's BEC and added a receiver battery. My rule of thumb was always "if the model is more expensive than the receiver, she deserves her own receiver battery." Obviously, that was before the invasion of cheap receivers from China. For my peace of mind, I just don't want to rely on the motor battery for the receiver and servos. With this glider, who knows how long I will stay up?

On to the modifications...

First job at hand was making the spoilers. I blatantly copied someone else's method. I took two strips of 2mm balsa 2" wide, epoxied some carbon fiber on them and let them cure in between sheets of greaseproof paper, while weighted down on the D-box of the wings. That way the spoiler blades will be following the contour of the wing. The covering was cut away, false spars put in for the TE of the spoilers to rest on, servo trays put in, and then I hit a small snag...

In all the pictures I've seen from other BoT spoiler installations, there were big holes in the wing ribs to lead the servo wiring through. But in ours the holes were tiny! That's no good... Following advice from RCGroups users I devised a simple way around the problem.

inserted a pushrod (piano wire/music wire) through the small holes from the tip rib to the center. This was very easy to do. Obviously, the holes were totally in line, a testament to a straight build. I sharpened the end of a piece of copper tubing (long enough to reach the wing panel's center). I marked where the tube hits the center of the panel (I used duct tape), and inserted a piece of dowel in the blunt end so the tube end can be inserted in an electric drill without squeezing the tube. I then inserted the tube over the pushrod, to stay centered,



and slowly let the sharpened end work it's way through the balsa. Care must be taken not to push through, or the balsa ribs will break. I pulled the copper tube out a few times to re-sharpen the end. Within 15 minutes I had taken care of both Eli's and my wing. Pushing a wire through for the servo cable was also easy. Just tape a wire to the pushrod and feed it towards the wing's center. Of course I did make some holes in the wing's bottom for the cable to come through...

The servo arm was too short to push the spoiler fully open, so with some CA and dental floss I made servo arm extensions. To keep the spoiler closed I glued a small rare earth magnet to the spoiler, and a paperclip (going high tech here) to the false spar. The servo is covered with masking tape, and then with heatshrink. I then put a dot of glue on the heatshrink and pressed the servo in place. Now if I have to remove the servo, I just slice the heatshrink and remove the servo. The spoiler blade is hinged with Blenderm hingetape.

That's one mod out of the way. On to the nose.

On most gliders, when you convert to electric flight, you can measure and trial fit, before cutting the nose off, thereby getting the thrust line just right without a lot of sanding. With the BoT that is not possible, as there is this great lump of iron stuck in the nose. So with my caliper in hand I measured the motor, then the fuse. Then the motor again, then the fuse again... I taped some masking tape on the nose, so I could draw clear lines. When I was completely satisfied with the location of the cut, I added 5mm towards the nose, just to be on the safe side. Following the traditional prayers for a circumcision ("Oh Lord, please don't let me screw this up. Master of the Universe, please make me get the cut just right…") I put a cutting disc on my Dremel and cut away the fiberglass nose, revealing the iron blob *in situ*.

On one of the RCGroups discussions it was mentioned that the iron was hot glued into the nose. So I aimed my heat gun at the nose for 5 minutes, and gave the iron some tentative knocks with a hammer. Nothing moved. More heat gun application and slightly harder hits showed no better result. Frustrated, I gave an almighty heave-ho and scared the heeby-jeebiez out of me.... and the iron blob apparently, because it had receded into the fuse.

For future reference, it was epoxy, not hot glue...

Then it was just a case of trial fitting the spinner and sanding, trial fitting the spinner and sanding, trial fitting the spinner and sanding, trial fitting the... You get my drift. I used my PermaGrit© sanding block for this. I don't know how I survived without one.

Once the spinner fit, I made a motor mount of two pieces of 2mm ply epoxied together. As the nose is elliptical, it took some trial fitting (done that before...) to get it right. I then transferred the motor mounting screws, shaft, and cooling holes positions onto the mount and drilled the appropriate holes. To fix the mount at the recommended seven degrees down and zero degrees left/right (again from RCGroups), I made a balsa roundel with a piece of dowel stuck straight onto it. Pushing this through the motor mount from the inside, I could measure the angle eyeing the dowel with the fuse's centerlines. Once I got that right I added a few drops of medium CA to hold the mount in place. I then mixed some 5 minute epoxy with some soda bicarbonate (baking soda; just as good, but cheaper then micro-balloons), and applied it to the outside of the mount. I prefer to glue only the outside so that with a nose-in the motor mount can move back, thereby reducing the chance of damage to the fuse. It will of course not make any difference if you lawn dart at full terminal velocity from 200'. I suggest prayers in that case.

As the bard wrote; "A nose of beauty is a joy forever..."

And the last mod (to date).

According to the manual, the elevator servo is supposed to go inside the vertical stab. For that purpose there is a factory-made hole in the stab, and Dynaflite provides a plastic cover with red stripe that fits nicely over the opening. Also provided is a pre-z-bend pushrod with plastic attachment for the forward elevator connecting rod to go through. Nice.

Now, this is purely personal, but I don't like the idea of a micro servo servicing that big full flying elevator. I'm sure it'll provide the necessary torque, but on rough landings very often the gears suffer. Keeping that in mind, and the fact that due to my motor mods I'll need all the weight I can get in front of the CG, I opted for a forward positioned servo. More weight forward, and I can use the slightly larger GWS Park HPX servo. I've had these in my Unicorn, and try as I might, they wouldn't break.

That meant of course either a flexible pushrod, or a bell crank for the elevator. I opted for the bell crank, as I didn't think I would be able to get a flexi-rod inside there and have it be slop free. The pre-

Top: A 4-point servo arm from an old, old full size servo, a copper bushing, a wood screw, a piece of ply, and a piece of hardwood. I treated the wood with some thinned epoxy, to keep it from splitting or breaking.

Above: Put all together and epoxied inside the vertical stab after sanding the area and wiping with alcohol.

installed antenna tube was just right for the elevator pushrod. It did cause me to install the elevator servo under the wing saddle on the higher part of the ply frame inside the fuse. That in turn caused me to install the EZ connector on the underside of the servo arm, otherwise the connector would stick up out of the fuse and inside the wing. We wouldn't want that.

Just to show you that you don't need to go all fancy-shmancy with ready-made bell cranks, here's how I did Eli's bell crank:

A 4-point servo arm from an old, old full size servo, a copper bushing, a wood screw, a piece of ply, and a piece of hardwood. I treated the wood with some thinned epoxy, to keep it from splitting or breaking.

Put all together and epoxied inside the vertical stab after sanding the area and wiping with alcohol.

Some more minor things I had to do before I could put a "DONE" stamp on the birds:

• I had to make a short Y-connector for the two spoiler servos. A shop-bought one could easily do the job, but they come in two sizes: too long, and waaay too long. I don't like too many wires lying about, so I made a short one out of three pieces of 2" wiring.

• When trial fitting the elevator, testing the servo, servo throw, and checking for servo binding, I found that the front elevator connecting rod (the one that is connected to the servo) showed a lot of binding. Some Dremel work had to be done, enlarging the opening in the vertical stab. This was necessary in both Birds.

• You may have noted that, despite putting a motor in the nose, I did not make any openings in the fuse for cooling air to get in. That is because we use a Turbo Spinner. There's a hole in the spinner that lets cooling air in straight over the motor and into the fuse. I also did not (yet) make any exhaust holes. My thinking at the moment is that, with the approximate one minute motor run to get to altitude, and then soaring for any amount of time, the motor/ESC/Lipo will not get enough time to get hot. And if they do get warm, there will be plenty of time to cool off while soaring around. After the total of six flights I've had now, only the Lipo came out slightly warm. But not nearly as hot as it would come out of my Unicorn. Both the motor and ESC were cool. If need be (I hate to cut holes in the fuse) I may make some openings in the rear part of the canopy. Or cut a hole in the bell crank cover.

• I added dark blue stripes on the (white) underside of the wings, and some IAF roundels on the outside panels of mine, so we can see who's who's when Eli and I fly together. I fail to understand how you can design a glider specifically for thermal flight, and leave the wing underside white!

• To balance on the recommended 3 1/4" CG, I had to add 35 grams of lead inside the nose.

• I fly with a Futaba T6Xas. My flight setup is Ch1 rudder, Ch2 elevator, and Ch3 throttle. On this transmitter, Ch5 is meant for landing gear and Ch6 is meant for flaps. I could not get the flaps channel to work properly with the spoilers, so I decided to use the landing gear channel. LG is typically either up or down, which is more or less the same I want for the spoilers. Using the ATV settings I programmed the spoilers to open 60°. I also included a spoiler/elevator mix of 10% down trim.

Maiden flight was done one late afternoon. Wind was about 12 mph and receding. After a thorough range check and motor test (~38 Amp/~385 Watt/ ~10 Volt) my BoT was launched by a visiting friend. Climbing easily at 60-70°, I leveled at about 50 meters altitude. During the climb I had to feed in some down elevator. (I probably could have added more down thrust during construction.) But other than that, climb out was uneventful.

With the motor off she needed quite a bit of down trim (6 clicks). That could be due to the full flying elevator not being exactly

on zero. I didn't think a bird of this size would be so sensitive to a few millimeters up or down trim! (Back home that evening I re-set the elevator servo/pushrod and fly now with one click down trim.) I also needed two clicks right trim, despite me putting three pieces of lead shot on the right wing tip for lateral balance.

Once the trims were sorted out I made some tentative turns. As was expected, she turns very gracefully, and can be slowed down considerably. Stalls from level/straight flight are uneventful; nose down, pick up speed, and you're on your way again. Stall in a turn though, and she can easily fall into a spin. What I did not expect was the impressive speed she can pick up very quickly when the nose is pushed down.

Once all this was sorted out I started to relax, and I started to look for thermal indicators. The BoT not only indicates very well when entering a thermal, she also rises in the lightest of thermal puffs. That first flight lasted only about 20 minutes, but I had to force her down! That gave me the opportunity to try the spoilers. I found the 60° opening I had programmed could easily be increased. The 10% spoiler/elevator mix was totally inadequate. Opening the spoilers caused a violent ballooning effect. Quick on the stick, I managed a close to perfect soft landing, albeit 40 meters away.

Before the second flight that same afternoon, I increased spoiler throw to 85° and spoiler-elevator mix to 20%. Less wind now, climbing to altitude was again uneventful, and I was picking up thermals like I have never done before! She makes me look like I know what I'm doing!

On one motor run I specked out, opened spoilers, and specked out again (on thermals only). Not once, not twice, but three times. I could have continued, but I had to land to welcome Eli to the field! The 85° spoilers is fine, but 20% spoiler mix is too much. Again, I had to be quick on the stick when opening the spoilers.

Rene Wallage and Eli Sayag with their Bird of Time models.

A quick word on landing. As I am used to fast and nimble (and/or indestructible EPP), the BoT is a whole new experience. It takes more planning to get the BoT down where you want her. She floats forever, and without spoilers you'll need a long final approach. The large rudder will help keeping you pointing in the right direction, but the rudder effectiveness diminishes when slowing down.

Of course, I have the luxury of aborting the approach, applying some throttle, and trying again. Unless I have been foolish enough to drain the motor battery (as happened last weekend at the end of flight #6).

Overall, after six flights of an average of 20 minutes each (and each one terminated for other reasons than loss of lift and/or battery time) I can say that, without a doubt, this is one heck of an ARF! ■

An aerotow project...

# Jim Marske's Pioneer V

Carlos Roberto Vilela Granha, aeromodelos@bol.com.br

Hello, people in the United States and elsewhere.

In the beginning of last year, I started to research this project through the web page of Jim Marske Flying Wings <http://www.continuo.com/marske/>. I decided by the 3-view drawing of the Pioneer V to do my own project.

**Construction report**

Unfortunately, I did not take any construction pictures because I was not believing that it would fly well.

Step 1- Rudder- I followed the same system used by Roman Fraisl for his Pioneer lll — all balsa longerons and ribs. <http://www.continuo.com/marske/Models/Pioneer%20III/Roman%20Fraisl/Roman%20Fraisl.htm>

Step 2- Fuselage built with seven bulkheads conected to several longerons and covered with 1/16" balsa sheet. The fuselage was painted because I've had difficulty applying Monocote on curved surfaces. The nose was constructed from a hard balsa block and sanded until it had perfect curves.

Step 3- Wing ribs were cut from a 3/32" balsa, 23 ribs for each wing panel, so 46 ribs in total. The main spar is glued to all of the ribs, and is about four inches behind the leading edge. The wing tips were made from a soft balsa block, and finally the leading edge was sheeted with 1/16 balsa. Aillerons and elevators were constructed following the same system used for the wing.



Above: Before take off, everyone goes over the check list. Otavio Granha, Carlos' son and Pioneer pilot; Sidney Pimenta, tow plane pilot; Rafael Granha, Carlos' youngest son; Sidney's son Miguel; and Carlos Granha.

Right: Ready to fly!

Upper right: Carlos' Pioneer V on tow.

Above: A strong climb to height. The tow plane, a Stick 120 powered by a Webra 2-stroke engine, has good pulling power.

Right: Otavio Granha, Pioneer pilot, and Sidney Pimento, tow plane pilot, coordinate the climbout.

Step 4- Radio used is an old Airtronics 6-channel and was located in the wing with 2 mini servos at the ailerons and two standard servos for the elevators.

Step 5- Covering. All the parts are covered with Monocote except the fuselage.

Step 6- For the wing connection, I used an aluminiun tube in each wing panel, and another inside the fuselage to hold a steel bar. This didn't give a precise connection because of clearance. There is quite a change in dihedral angle during flight. If you dive the Pioneer in flight, increasing the speed, it makes a lot of flexion in the wing root. I'll correct that now.

**Flying**

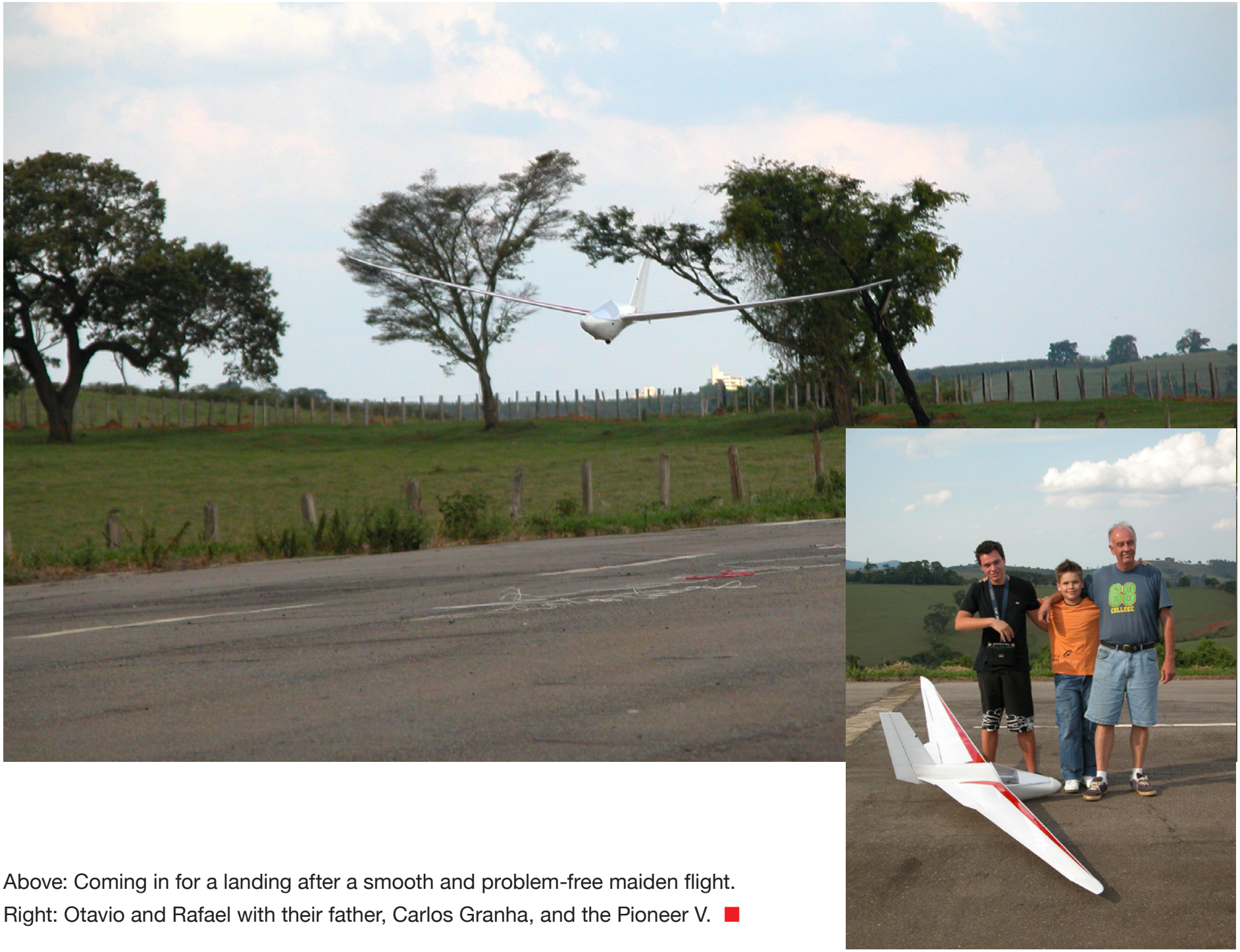
I'm very glad to let you know that the Pioneer V had its maiden flight in Varginha MG Brazil on November 2 at 4 o'clock PM and it was fully successful. In flight it is very stable with no tip stall. I have never in my life seen such a stable and nice flight.

The tow release in the nose shows no problem, although I agree that the full size Pioneer system of hooks on the wing root section may work much better.

My next step I think will be to produce it here in Brazil. I need to finish the fuselage plug in order to make it in fiberglass. For the other parts I'll keep the balsa construction system.

Flying free! This model is very realistic in the air.

Here are the people involved in this adventure:
Manufacturer: Carlos Roberto Vilela Granha
Pilot: Otavio Rathsam Granha
Aerotow Pilot: Sidney Esteves Pimenta
Electronics placement and adjustment: Alberto Guedes



Above: Coming in for a landing after a smooth and problem-free maiden flight.
Right: Otavio and Rafael with their father, Carlos Granha, and the Pioneer V. ■

# Matching Transmitters to Antennas

By Peter Carr WW3O, wb3bqo@localnet.com

In a previous article I mentioned tuning the RF deck to the antenna. It's amazing how many people change antennas without a thought to the effect on system range.

For example, I've been told that some "rubber duck" type antennas are actually cut down from CB radio antennas. If that is true there is no way to know what the antenna impedance would be.

I have modified a standard telescoping antenna with a PL-259 connector. The transmitter case has an SO-239 connector. The mating connectors are rated at 50 ohms impedance. The operating frequency is in the Amateur Six Meter band. I plan to use the transmitter with a magnetic-mount antenna on top of a chase vehicle to try the LSF-V goal and return task. When chasing the airplane I can plug the maggy-mount antenna directly into the transmitter for better range.

There are three main items that make up the radiating system of an R/C transmitter. Obviously, the first is the antenna. The second is the RF deck, and the third is the person holding the transmitter.

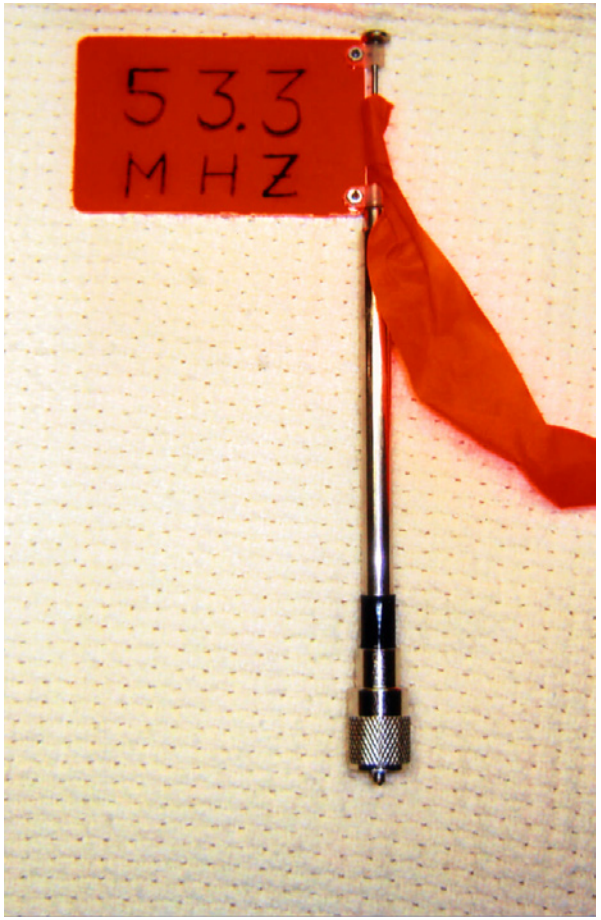
Since the antenna is considered a monopole, the transmitter case and the body of the person holding it act as the other half of a dipole. If the case is aluminum there is a very good counterpoise by the person to the antenna. If the case is plastic the counterpoise is not as good and affects the radiation pattern.

The mission is to achieve maximum transfer of energy from the RF deck to the air around the antenna. To do that we need to match the output impedance of the RF deck to the impedance of the antenna.

The RF deck that I use is an old ACE R/C unit that was transplanted into an ACE MicroPro transmitter. Modulation from the encoder is connected to the RF deck via a 3-pin Deans connector. The three wires are ground, 9.6 VDC and the encoder pulse stream. The other connector on the RF deck is the output to the antenna. There are two tunable slug coils near the antenna connect. These will match the output to the antenna.

I use an old Heathkit model HD-1426 absorption wavemeter with a piano wire antenna. The internal circuit is basically a meter which is fed rectified DC from a diode/cap combination attached to the piano wire. A schematic of a similar meter is listed in the Resources section. Signal that is picked up by the antenna is changed into DC that is fed to the meter. The meter needle indicates the relative strength of the received signal.

As seen in the photo, the wavemeter is placed close to the transmitter that is turned on. The meter has an adjustment




The modified standard telescoping antenna with a PL-259 connector. Notice the Ham frequency is prominently displayed.

knob that is used to position the meter needle somewhere between zero and half scale.

The two tuning slugs of the RF deck are now tuned to achieve maximum meter reading. If the meter pegs to the right on the scale the adjustment knob can be used to reduce received signal. As each slug is rotated the needle will either increase or decrease.

As you can see, the RF deck is hanging by its wires so care must be taken to prevent it shorting to inside parts. I also keep a hand on the case to make sure the final tuning includes my body presence.

Once the slugs have been tuned alternately several times there should be no further improvement in meter reading. The transmitter is now matched to the antenna.

Most transmitters have an RF output of around 1/2 watt. You can connect a milliampere meter in series with the transmitter battery and determine the total current draw. This includes the encoder and runs about 160ma on the ACE.

A second method is to compare the output of the transmitter to another one using the wavemeter. This is done by setting up the wavemeter next to a “factory” transmitter, adjusting the meter reading for full scale and measuring the distance between the two antennas. This is the benchmark. Then, set up the newly tuned transmitter and the wavemeter without touching the adjustment knob.

Set the two antennas the same distance apart as measured on the benchmark. The wavemeter should indicate very similar needle deflection. We still don’t know what the radiated power is. It really doesn’t matter since we have measured the transmitter against a factory unit.

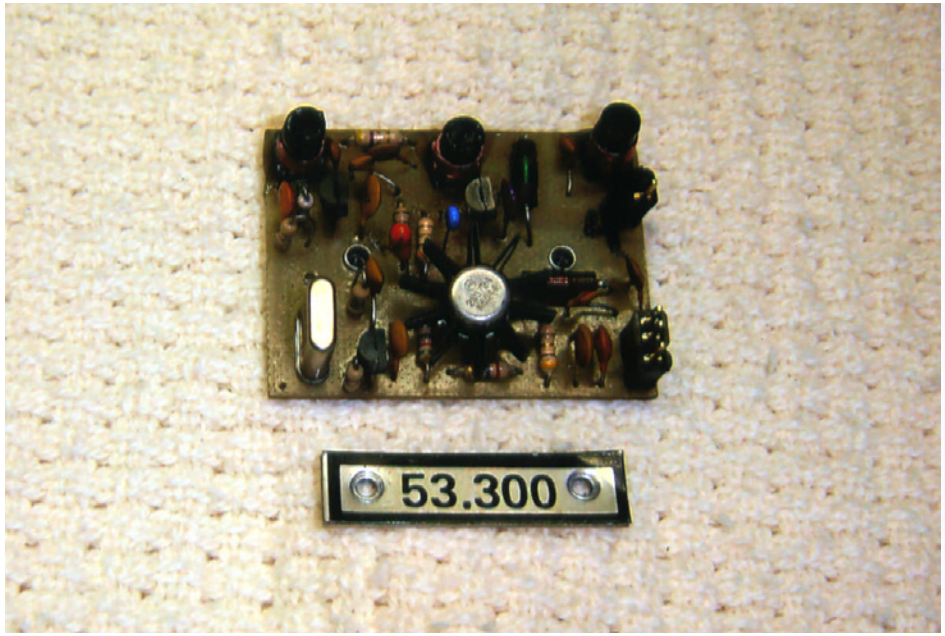
If the RF deck of the tuned unit has a bad output transistor or other fault the output will be significantly less than the benchmark. I have done this test several times on different transmitters and occasionally found that the factory unit had a problem.

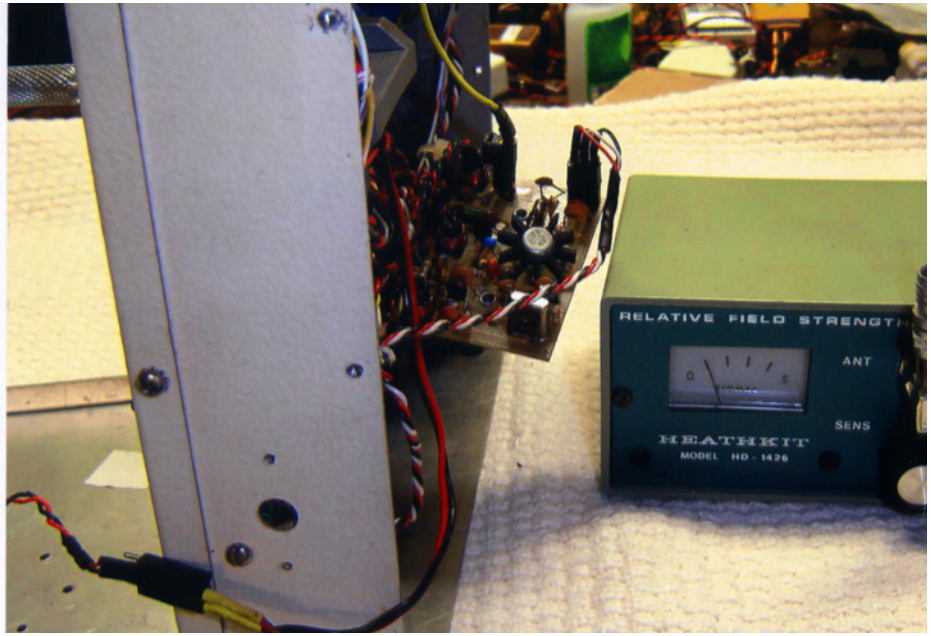
For example, I have used a Futaba 9VAP transmitter as a benchmark and found its output less than some of the ACE radios. The problem was a worn and dirty section of the Futaba antenna.

Once a transmitter is serviced it is best to take a known good receiver and experienced airplane and go do tests.

Ground range tests are a matter of experience. If you do ground tests often you will get a feel for what is the normal expected range with antenna collapsed.

Similarly, if you normally fly wood aircraft and then go to a ship with carbon fiber

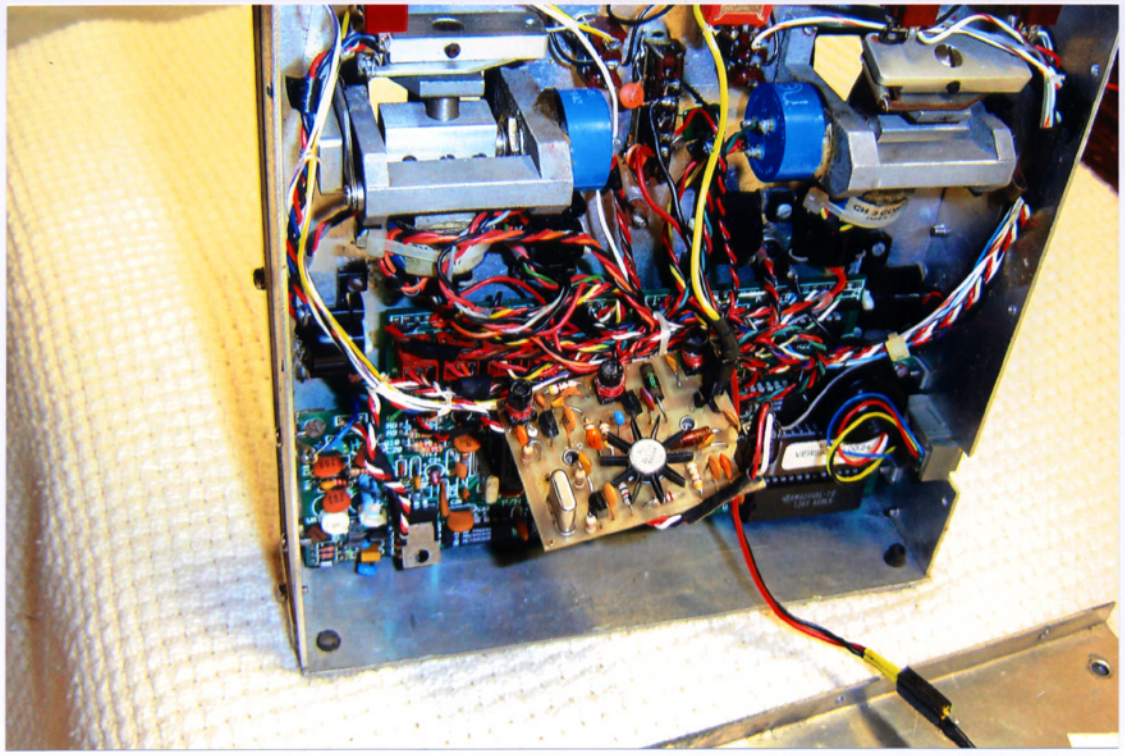



Above: The RF deck. Notice the crystal at the bottom left and the two tuning coils at the top.

Above right: An old Heathkit model HD-1426 absorption wavemeter with a piano wire antenna is used to match the antenna to the transmitter. The meter needle indicates the relative strength of the received signal. The wavemeter is placed close to the transmitter that is turned on.
As each slug is rotated the needle will either increase or decrease. The RF deck is hanging by its wires so care must be taken to prevent it shorting to inside parts. I also keep a hand on the case to make sure the final tuning includes my body presence.

Right: The RF deck inside the transmitter.



fuselage and the receiver antenna inside, there will be a difference.

If ground tests are normal, go and fly the ship and watch for glitches. These can be apparent in a thermal circle when the ship is either headed dead away or straight toward the transmitter. Hopefully the flight will be free of incident.

I keep transmitters a long time. They are subject to high temperatures inside vehicles and from being in the sun. They also are subject to aging, especially the crystals.

The tuning we have done on the RF deck only matched it to the antenna. We did not verify the RF deck frequency.

If the transmitter has aged and the crystal has drifted there can be a problem with range. The receiver also has a crystal and may drift as well.

If the range tests on a retuned transmitter show problems, the next step is to verify that transmitter and receiver are on the same frequency.

There are RF deck adjustments for frequency but that is outside the scope of this article. For now, you can be sure that the carrier from the RF deck is maximized.

The adjustments we have discussed should not change the frequency of the transmitted signal, only the intensity.

Licensed Amateur Radio Operators are authorized to make these adjustments on Ham equipment.

There are several R/C equipment service shops that can perform both frequency and output adjustments on your non-ham transmitter. Their ads are found in most of the better radio control magazines.

There are several resources available about the RF deck. These are listed below. Unfortunately, many web pages pertaining to the ACE Silver Seven, MicroPro and similar RF decks are no longer available. You might want to ask questions of the listers on the RC Soaring Exchange or R/C Universe.

Many of the valued documents I use were sent to me by modeling friends who dug them out of cabinets, drawers and closets. These gentlemen were instrumental in providing me with countless hours of fun over the years.

To each and every one of you, thanks and best 73.

Resources:
http://www.fmadirect.com/support_docs/item_1082.pdf
http://www.mstar2K.com/downloads/rfdeckdrawings
http://en.wikipedia.org/wiki/absorption_wavemeter
http://www.creative-science.org.uk/absorb.html

Gordy Stahl catches his (2006) Supra

Full Carbon Supra 73oz, 130" span
Balance 98mm from LE
Tow hook 215mm from nose cone lip
Powered by Volz Micro Maxx X XP Digital Servos
Airtronics Stylus Tx, Polk Tracker II Synth Rx
Antenna extends 16" from the rear boom for 300' ground range
Photo by Tony Utley, Louisville Area Soaring Society

# Removable Easy Glider Tailgroup for Traveling

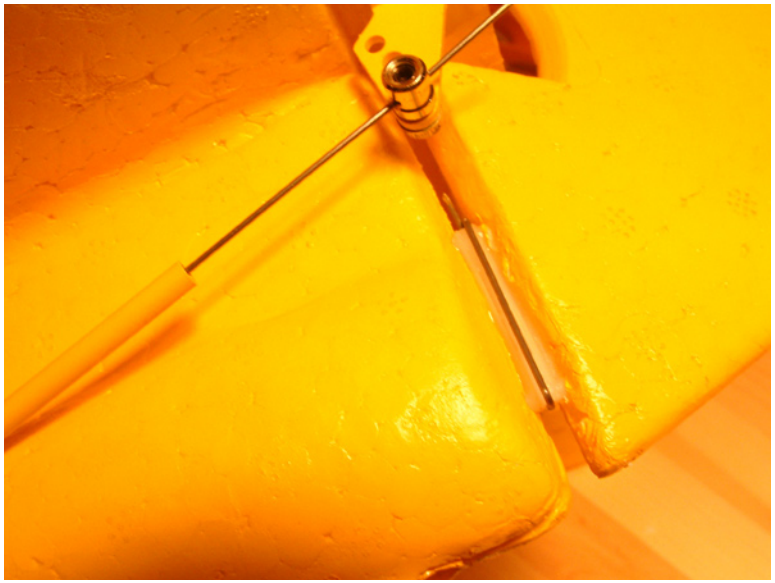
Chris Adams, cadamsEG@spieltek.com

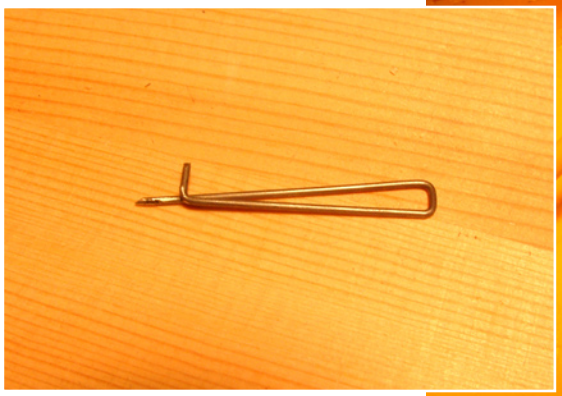
The following pictures show how I set up the Easy Glider to have a removable tailgroup.

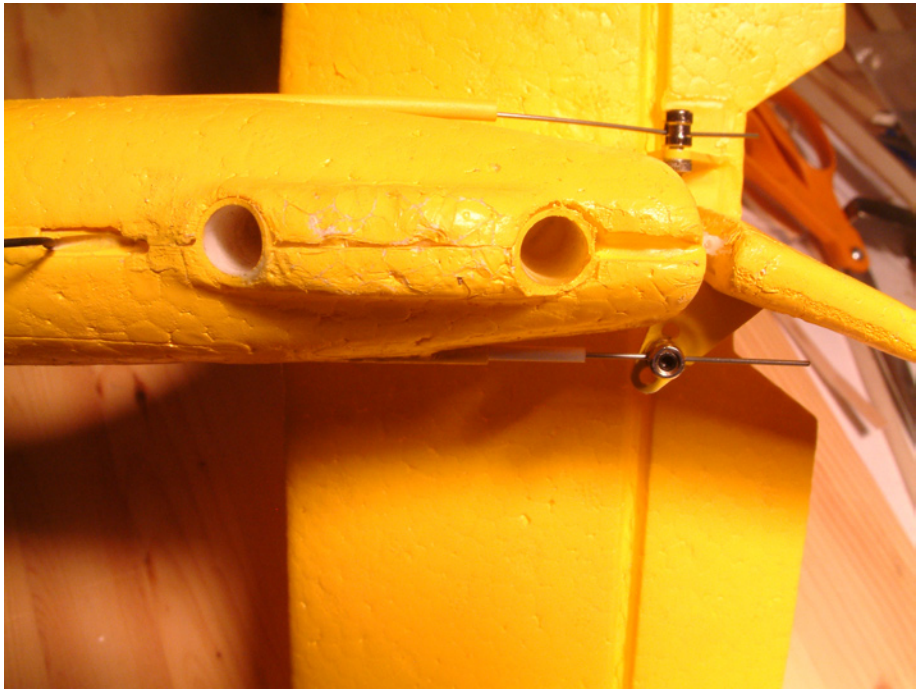
My design goals were to be able to put the entire Easy Glider back in the box it shipped in. In this manner, I could use it as a carry-on for airplanes, or just pack it away in the trunk of my car. The parts are readily available at the local hobby shop.

So far I have entered it in two of our local club contests, added ballast via the spar additions, and have tried to zoom tow it off the top of the winch. I have not seen any issues with strength. The fuselage was modified during the build. Since the plane is for fun flying, I used JR 517 servos and balanced it per the directions of Mike Reagan.

• Let's start with a disassembly. The hinge pin for the tailgroup is like a small safety pin. I suggest you make a few of these as they are easily lost. The removal of this pin is the first step of the disassembly.







• These are the mounting screw holes as seen from the bottom of the plane. These tubes pass from the top to the bottom of the fuselage under the elevator. They transfer the bending forces to the fuselage.

In order to drill the holes for the plastic tube, I sharpened the end of a brass tube of the equivalent diameter. I then bored the holes while I had the rear end of the fuselage clamped together.

You have to make sure that the holes are parallel and that they are not tilted one way or another because the rudder needs to be vertical.

The tubes here are the largest of the tubes that are used. I used white ABS plastic tubes that are commonly available. The tubing diameters are such that each telescopes in the next smaller/larger. This was handy for the build. The tubes were glued in using thick CA per the Easy Glider instructions.

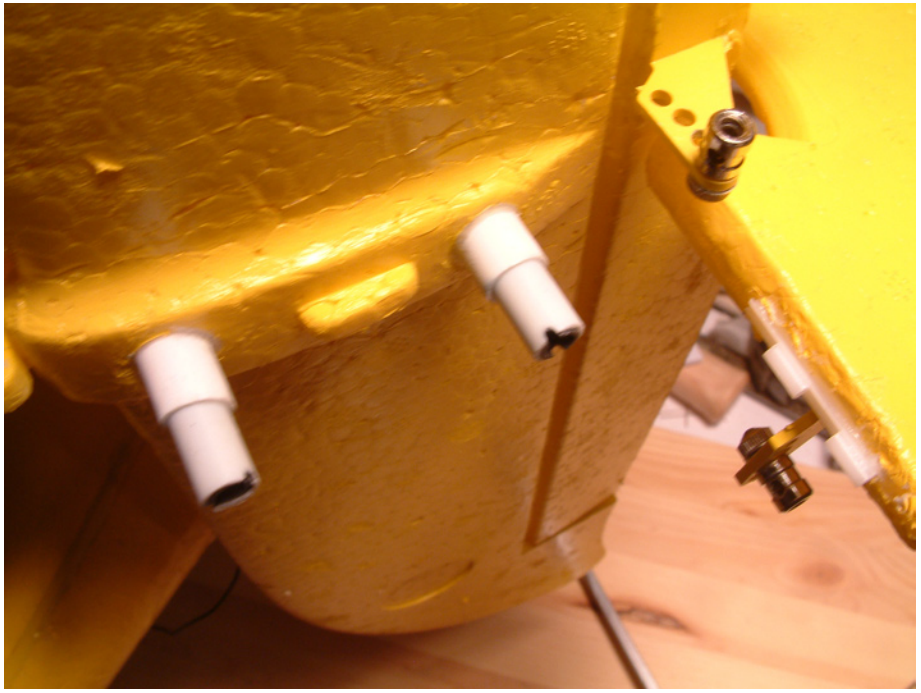
• The tubing is large enough to use a standard screw driver. The tubing is the size of the nylon screw head.

• Once the nylon screws and the hinge pin are removed, the tailgroup slides out of the two main tubes in the fuselage. The inner tube contains a carbon fiber shaft that acts as the main bending load support.

Basically, as you will see later, elongated carbon fiber screws have been made.

The interesting part of the construction is the short tube that extends below the elevator. This performs two functions. The first is to provide better elevator stability between the fuselage and the elevator. The second is that the length of the tube can be adjusted so the decalage can be adjusted/held fixed. The short portion inserts into the fuselage tubes. In the fuselage tubes, an identical diameter tube is glued in place. The fuselage tubes act as a stop for the elevator as well as providing a stop for the nylon screws used for the attachment. The inner tubes extend into the rudder as will be seen in the following pictures.

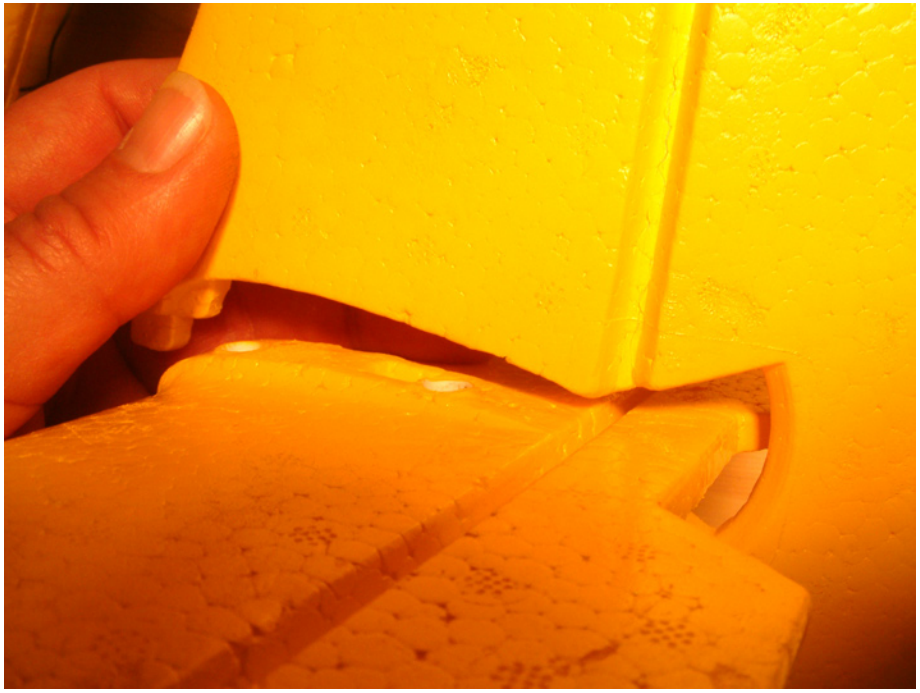
• This is a better view of the elevator extensions and the tubes that extend into the fuselage. This is the bottom of the elevator.



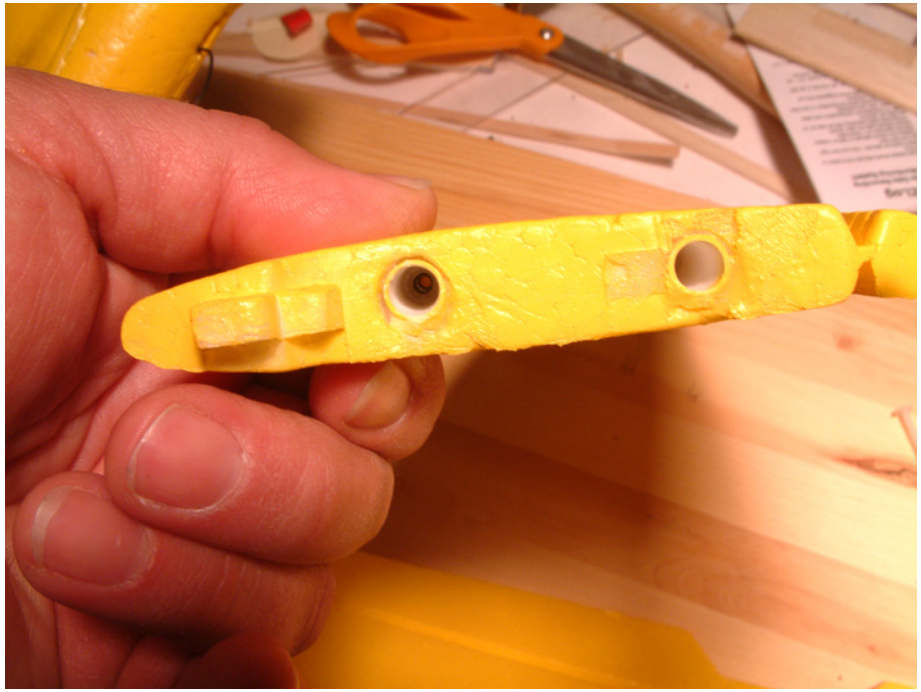
• The inner carbon fiber tubes are really screw extensions. The front pin has been screwed out from the rudder, while the back one remains.

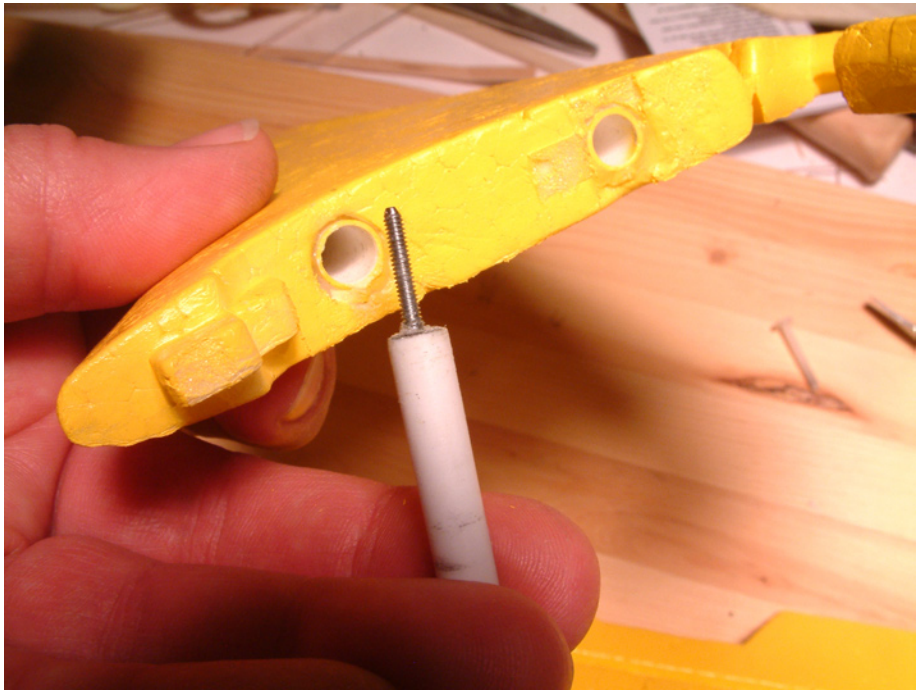
The ends of these CF tubes are tapped to accept the nylon screws.

The CF tubes are small arrow shafts that I had around. They are available at a local archery shop. They are a small diameter, not the standard 1/4" diameter of arrows. They are extremely stiff.



• Once the inner pins are removed from the bottom of the elevator, the rudder can be moved sufficiently to separate the moveable part of the elevator from the rudder.

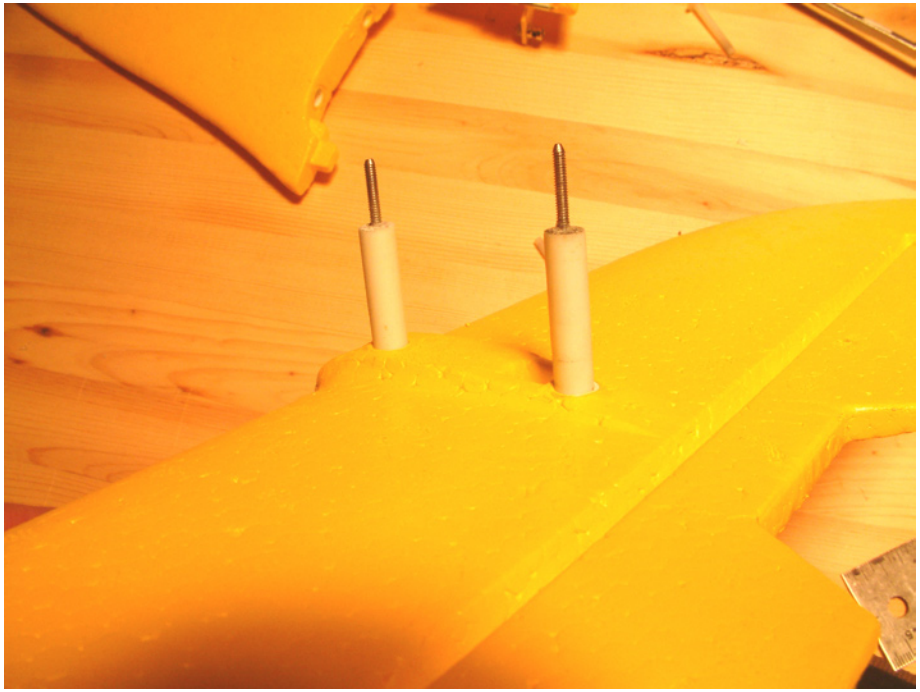




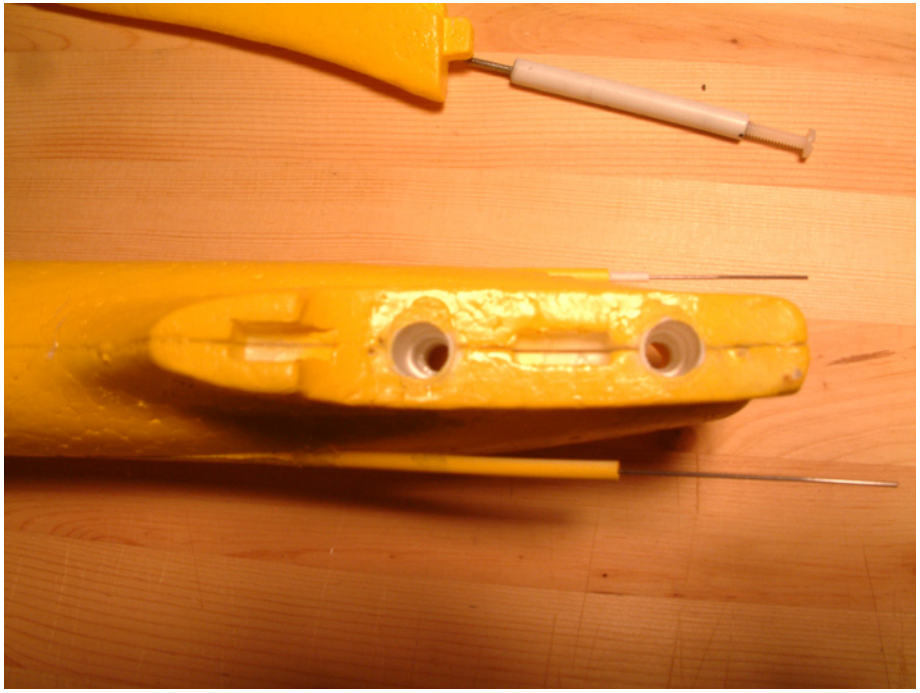
• The tubes that are glued into the rudder are the same diameter as the elevator tubes. The rudder tubes sandwich the elevator to the fuselage. If you look closely inside the tube, you will see that there is a blind nut epoxied at the top of the tube. The t-nut is centered using a piece of the tube that is used for the inner tube. In this way, the nut is centered.

• The screw that was used was from a Dubro quick link. We have all these spare parts in our toolboxes because we remove them from our wooden pushrods. Gee...Does that date me???

• This is another view of the center CF screw mount. The inside of the tube has the CF tubing CA'ed in place. The white tubing is basically used for its telescopic ability into the next size higher tubing. Also the plastic tubing helps in part to keep the CF from splitting, since it is extruded. This may not matter, but is a good reason anyway.



• This is a picture of the CF rod-screws that hold everything in place. Additionally, this is a top view of the fuselage just under the elevator. Look closely at the fuselage tubes. The nylon screws come up from the bottom and pass into the tapped CF tubing.



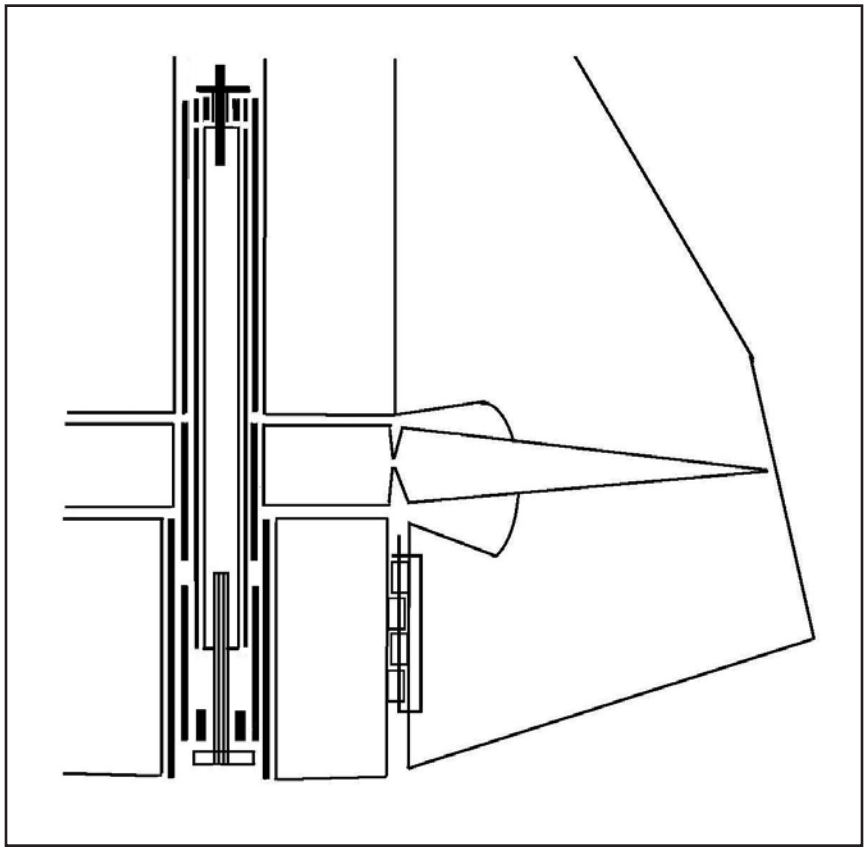
• The tubes that are glued into the rudder are the same diameter as the elevator tubes. If you bore holes in the rudder with a sharpened brass tubing be careful. If you do not drill them parallel and you don not drill them vertical, the rudder will be on a slant when the tubes are glued in. You can drill larger holes and use the holes to align the rudder to the elevator at right angles.

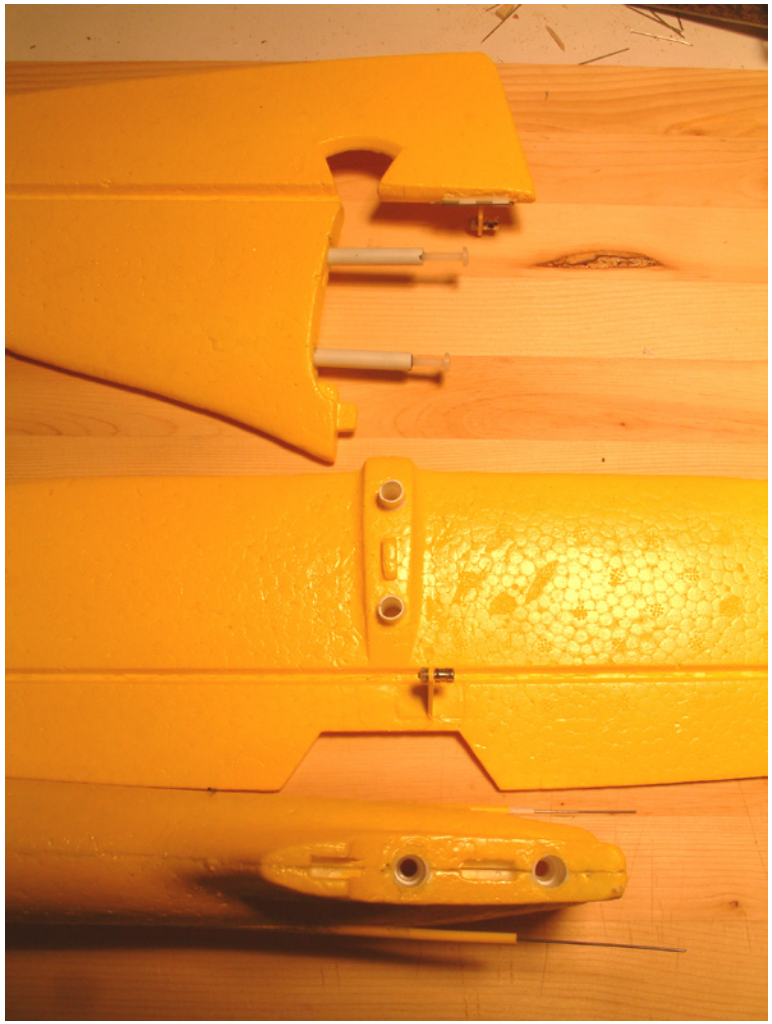
• **Opposite page**: A picture of all three pieces on my building board. The order of assembly is the following:
- The elevator is slipped into the rudder and the two CF tubes screws inserted and screwed into place. This mates the rudder with the elevator.
- The CF tube extenders need to be screwed in tightly.
- The rudder/elevator assembly is then inserted into the fuselage holes, and two nylon screws inserted from below and tightened.
- The rudder hinge needs to be aligned and the safety pin hinge pin inserted.

The piano wire control pushrods should be short enough to insert into their respective connectors, aligned, and tightened with the Allen wrench. Additionally, I find it easier to turn the servo control horns more toward the front of the plane so that a longer control wire can be used.

• This is a quick diagram of the tubes and how they telescope into one another. I think it is self explanatory. The tubing is white ABS and glued with thin CA. Some of the tubes are nested inside and glued. These nested pieces are stops for the blind nut or the elevator mounts. The nested pieces also provide the clamping force for the nylon screw heads. Make sure they are glued in well.

If you have any questions, please email me at cadamsEG@spieltek.com and I will be happy to clarify and update the description. ■





# The Annual Christmas and Gift-giving List

*RC Soaring Digest* Columnists and Readers

## Ed Anderson

VP, Long Island Silent Flyers
<http://www.lisf.org>

• A 2.4 GHz module and receiver for your sailplane radio: <http://www.horizonhobby.com/RC/Default.aspx>, Radios drop-down, Spektrum on the right. Prices vary.

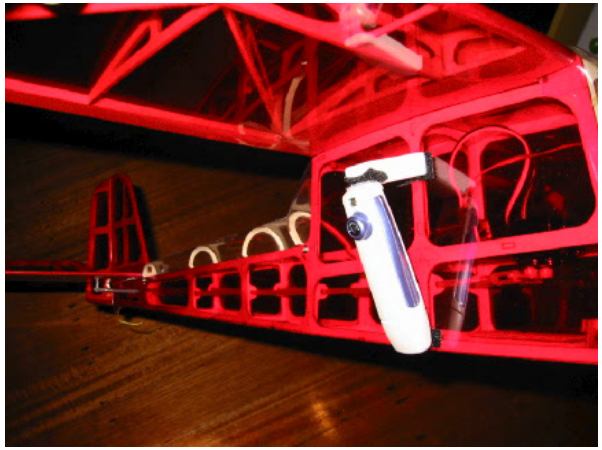
• A battery monitor/plane finder: <http://www.skykingrcproducts.com/accessories/lostmodel/lost_rc_model_alarm.html> $20

• A sturdy 50 foot Hastings fiberglass pole to help with those “off field” landings (collapses to roughly 54" and tells you how high in the tree you landed): <http://www.benmeadows.com/store/Surveying_Engineering_Mapping/Rangefinders/+-47848/10407/>. $535


Above: The Spektrum AR7000 receiver and the Spektrum DM9 transmitter module. Once you have a 2.4 GHz transmitter module, you can choose a receiver with the number of channels and overall size/weight to match your needs.

Middle: The battery monitor/plane finder from Sky KIng RC Products. The quarter is reproduced here at actual size.

Right: The collapsible 50' Hastings fiberglass pole for retrieving treed models.



The e-DVR 5 in 1, a small lightweight video camera suitable for positioning on small aircraft.

## Tim Lennon

• An e-DVR 5 in 1, a small digital video recorder, small enough to mount to a model. And it produces a pretty good result! VGA 640 x 480 @ 30fps, brightness and exposure correction, automatic white balance, built-in LiPoly battery, rechargeable from your computer USB port. You can find a spot on just about any plane where it can be attached without too much trouble. The only place I can find them for sale is at Gorilla Bob's Shack <http://www.gorillabobsshack.com/catalog/product_info.php?products_id=96>. $89.99

Here is a link to a video I took with my e-DVR....<http://www.youtube.com/watch?v=qxJPYszs3CA>

102" span Multiplex Cularis.

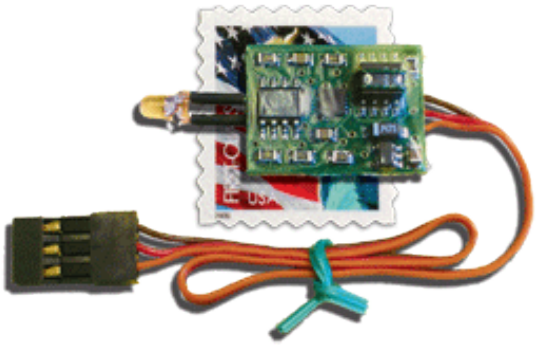
## Tom H. Nagel

• Multiplex Cularis, a 2.6 meter 6-servo foamy with a brushless motor, so I don't need to lug the winch. Available as a glider suitable for hi-start, winch or aerotow, or with optional brushless electric power system. Ailerons, flaps, full flying stab. <http://www.multiplexusa.com/models/ParkFliers/Cularis.htm> and <http://www.rcuniverse.com/magazine/newproduct.cfm?product_id=1933> $198 for the glider version.


JR DX-7 transmitter (stocking full of receivers not shown).

• A JR DX-7 transmitter and a stocking full of receivers of various sizes for all my planes. Seven channels, 20-model memory, and all programming functions are displayed on a large LCD screen. I haven't yet decided what frequency I want. <http://www.spektrumrc.com/Products/Default.aspx?ProdID=SPM2710> Transmitter, AR7000 receiver, and four digital servos (72 oz/in) $349.99

• Something else I need for Christmas, so that after I fly my Cularis out of sight with my new DX-7 I can find out how high it was... A Winged Shadow Systems



The How High altimeter from Winged Shadow Systems.

How High altimeter. This unit is accurate to within one foot, is smaller than a postage stamp, and weighs less than a dime. <http://www.wingedshadow.com/howhigh.html> $39.90

Our club flight surgeon, Doc Bell, recently used one of these to log his Easy Glider at 1800 AGL.

• Finally, this is the big item I want for Christmas. I am willing to share this with a few friends.

What I want Santa to bring to me, in flatland post-glacial central Ohio, is a small mountain. This mountain needs to be located somewhere south of downtown outside the outerbelt, so it won't interfere with current urban growth patterns. It doesn't need to be too tall, maybe just a couple of hundred feet; and it should be sort of plateau shaped, with a flat top and four sides that are each scooped out in a bowl shape so that we can fly prevailing winds from each of the cardinal points of the compass.

And if it wouldn't be too much trouble, a road to the top, so we can drive up. Gravel is OK. And a porta-potty and a snack bar with a beer license.

Oh yeah. No damn cell tower, either.

OK, that's about it for this year. Thanks a bunch, Santa.

## Mark Nankivil

• Winter is coming upon us and a little DVD action on a cold night will work for me. Last year I received the DVD "Lift Ticket" put out by Dave Reese of Reese Productions and thoroughly enjoyed watching it numerous times throughout the Winter. This year I am asking for "Lift Ticket to Norway" to help through the coming cold season. The movie trailer for this DVD was included on the "Lift Ticket" DVD and simply looks stunning. Check it out yourself at <http://www.reeseproductions.com>. "Lift Ticket to Norway" is scheduled for release just in time for Christmas.

• My friend Gene Trevino turned me on to the 71" span Multiplex EasyGlider set up for aerotowing two years ago at the JR Aerotow. You cannot beat having


Multiplex Easy Glider. At around $80, this 71" span sailplane provides very good performance in a "bounceable" package.

a model that is that durable and at the same time a very competent sailplane, with which to fly at an aerotow event, yet still be able to take it with you for sloping and thermal flat field flying. About $80

• On the electric side of things, the Multiplex Twister EDF and FunJET look to be a lot of fun and carry on from the very successful TwinJet and MicroJet models, both of which I have enjoyed immensely. Take a look at the FunJET and Twister at <http://www.multiplexusa.com>. FunJET $64.99,Twister $189.99

• My son, Jack, is getting a bit older and we see the chance to take him on some road trips next summer. I'm hoping to add a stop or two at slope sites while out on the road. It will be fun to bring

The North County Flying Machines Moth has a 48" span and is designed for high speed slope flying.

along a flying wing sloper such as the The Moth produced by North County Flying Machines (NCFM). This looks to be a really good all round type model that I can have fun with in a variety of flying conditions. Check out The Moth at <http://www.northcountyflyingmachines.com>.

• Don't forget the excellent Soaring Society of America's 2008 Soaring Calendar ($12.95). Take a look at the calendar at <http://store.ssa.org/>, and while you're there, check out the DVD "Gladiators of the Sky" for a look at full scale Gran Prix sailplane racing ($20.00).

• And now for something completely different - I'd like to take to the flying field next year the Quick Wing 20mm Twin from Radical RC. This looks to be a blast of model to build and fly and I just happen to have a couple of motors looking for just such an airframe to

The Quick Wing 20mm from Radical RC, fulfills your "need for speed."

call home. If a single is your thing, the Quick Wing may fill the bill <http://www.radicalrc.com/shop/?shop=1&cat=146&cart=764623>.

Merry Christmas to all of you, and may 2008 be filled with strong lift and satisfying flights!



Upper: Multiplex FunJET

Above: Multiplex Twister

## Bill and Bunny Kuhlman

• JT Models Radio Mitts are perfect for Winter flying. Introduced about ten years ago, the Radio Mitt has been proven to keep hands warm and transmitters protected from light rain and snow. Your transmitter slides into the Mitt from the top through a Velcro seal. There's a compartment for a non-reusable hand warmer for extremely cold weather, and

The Radio Mitt from JT Models. Shown in the photo is the Stand-Off which keeps the plastic window off your hands.

Richter RC's Weasel pro

A pin-vise. This one by Testors, #50629c.


A 4" magnetic parts tray.

the large window lets you easily see your computer radio LCD screen. <http://www.jtmodels.com/mitts.htm> $35 to $47, depending on options.

• The included picture shows the Radio Mitt with the new Stand-Off installed. The Stand-Off attaches to the transmitter neck strap fitting and keeps the plastic window from coming into contact with your hands. The Stand-Off will work with all "gloves" and "mitts" currently on the market. <http://www.jtmodels.com/stand.htm> $12.50

## Jerry Slates

• At the top of my Christmas list is a Full-Range 2.4 GHz Radio System. With that new radio system there should be a new model, right? Something like a "Weasel pro" from Richter RC <http://www.dream-flight.com/weaselpro.html>, or maybe a 1.5M Hush, 1.5M Falco, or a 2.5M Sierra from ArtHobby <http://www.arthobby.com>.

• If your slope flyer has to hike a bit from the parking lot to the flying ridge, and it's too far to carry a tool box, think about a "hip pack." A good one can hold a bottle of water, a few small tools, tape, etc., and it's easy to carry/wear. You will find one at any good sporting goods store or an outdoors/mountain shop. The Eagle Creek model shown here is $18.

The Eagle Creek hip pack. $18

• The Pin-Vise by Testors, #50629c. You can find it at almost any hobby shop. The Testors model comes with four interchangeable chucks, will hold from a pin to 2.5mm. Very handy to have.

• For that modeler who has lost a screw at one time or another, get him a 4" Magnetic Parts Tray. Costs about $4.00, at just about any tool shop or auto parts store.

And lastly, a suggestion from Jim Park, who says,

- "I'd like this ASG-29 for Christmas!!!"

OK, we're not sure Jim can get THIS ASG-29, but there are several models available from at least three sources. The full size ASG-29 is manufactured by Alexander Schleicher and is available with spans of 15 and 18 meters. A motorized version is also available. See <http://www.alexander-schleicher.de/produkte/asg29/asg29_main_e.htm>

- Icare has a scale model of the 18m version which has a span of 4.8m <http://www.icare-rc.com/asg29_18_48m.htm>. This model is from S2G, a Czech manufacturer. It's slightly smaller than the model in the above photo.
- Tangent Model Sport's ASG-29 has a span of 2.9 meters.
- Rosenthal Flugmodelle, France, has the 15 meter version in both 1:2 and 1:3 scale. The latter is shown in the above photo. <http://www.rosenthal-flugmodelle.com/asg29e.html>

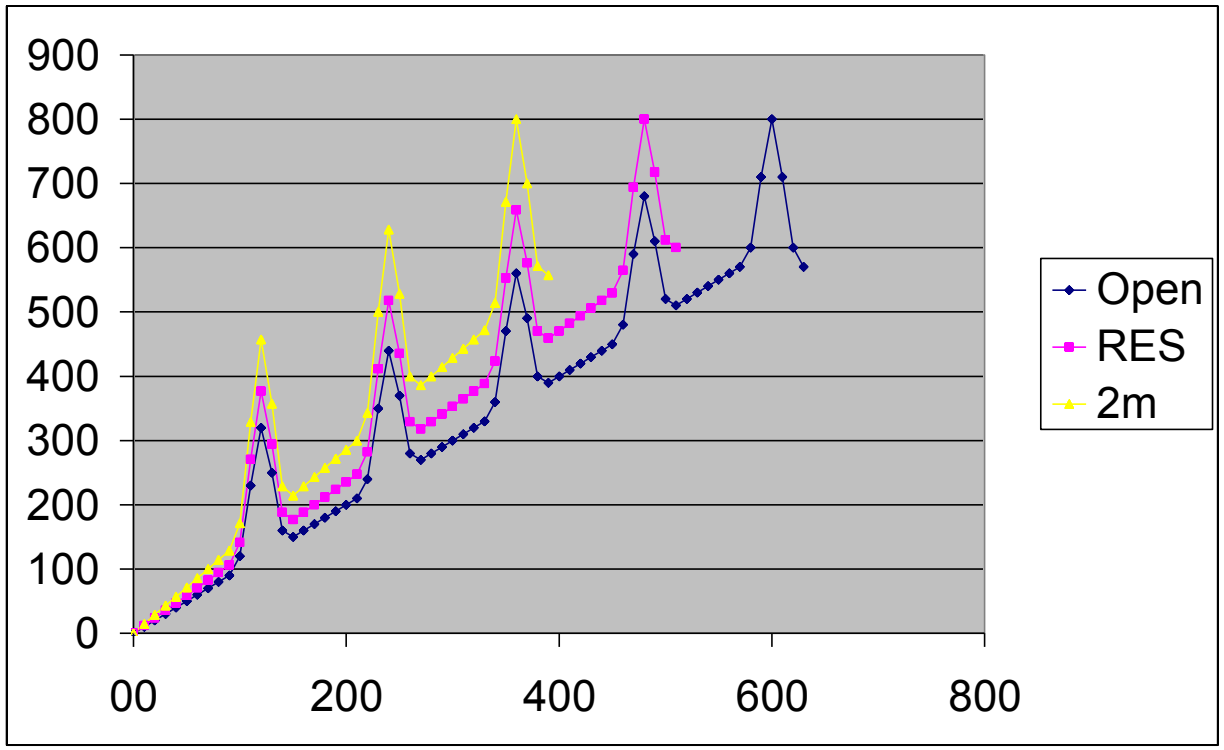
Good luck, Jim!

A couple of V-tails between flights at the 2006 Viking Race, captured by Michael Shellim with his Pentax *ist DS, ISO 200, 1/500 sec., f8, 113mm.

# Scoring for the Highveldt Thermal League #7
# Heidelberg, South Africa

Gert Nieuwoudt, gnieuwoudt@telkomsa.net

*A scoring system worthy of note*




Here's a graphical representation of the Sawtooth scoring table. There is a slight difference this year to make it even more interesting. The 2M models will have a six minute max and the RES models will have an eight minute max and the Open models will have a 10 minute max. The scores for 2m and RES will be normalized to the same max score as Open as can be seen on the graph. So it may be possible for a team with 2M models or RES or a mix of 2m/RES/Open to win the event.

How does the Sawtooth work? On the even minutes you will get a bonus. So you have to read the air and predict if you can stay up for another two minutes as you will lose big time if you land in between the even minutes. On top of that, you receive 200 points for a spot landing.

There is no matrixing and also no normalizing. You fly in a 12 minute working time fixed slot format. ■

# New Model Aircraft World Records

## *FAI has ratified the following Class F (Model Aircraft) records - 23.11.07:*

Claim number : 14784 — Date :11.08.2007
Sub-class :F5 Open (Aeroplane, Electric motor S (rechargeable sources of current))
Category: F5: Radio Controlled Flight — Type of record : N°174: Distance to goal and return
Course/location : Maardu (Estonia) - Rakvere (Estonia) — Performance : 159.36 km
Pilot : Jüri LAIDNA (Estonia) — Previous record : 144.53 km
(02.06.2006 - Thomas HAYS, USA)

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Claim number : 14800 — Date :09.09.2007
Sub-class :F3 Open (Glider)
Category: F3: Radio controlled flight — Type of record : N°160: Distance in a closed circuit
Course/location : Crimea (Ukraine) — Performance : 739.2 km
Pilot : Valery MYAKININ (Russia) — Previous record : 716.10 km
(23.07.1979 - Eduard SVOBODA, Czechoslovakia)

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FAI congratulates the pilot on this splendid achievement.

## *FAI has received the following Class F (Model Aircraft) record claim - 09.11.07:*

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Claim number : 14853 — Date :31.10.2007
Sub-class :F8 Open (Aeroplane, Electric motor S (rechargeable sources of current))
Category: F8: Autonomous Flight — Type of record : N°914: Duration
Course/location : Costa Mesa, CA (USA) — Performance : 35 min 11 sec
Pilot : Dale TOWER (USA) — Current record : no record set yet

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The details shown above are provisional. When all the evidence required has been received and checked, the exact figures will be established and the record ratified (if appropriate).