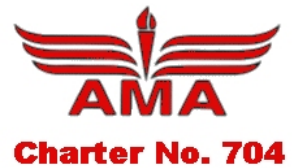




# The Tailwind



JANUARY

*DON LEWIS, EDITOR*

2016

*President:* Lynn Perkes    *Vice-President:* Bill Pruner  
*Treasurer:* Lynn Perkes    *Secretary:* Don Lewis  
*Safety Officer:* Carl Tackett,    *Instructors:* Lynn Perkes, Bill Pruner

**Next Meeting on Thursday, January 21 - Be There!**

*Be sure to check out the website at [www.fly-hrcc.org](http://www.fly-hrcc.org)*

# Happy New Year!

## MEETING MINUTES



The November meeting was called to order at 7:07 PM by L. Perkes. (There was no December meeting.)

Attendees: L. Perkes, D. Lewis, B. Pruner, C. Tackett, S. Stewart

L. Perkes presented the Treasurer's Report. D. Lewis moved to accept; seconded by C. Tackett; passed unanimously.

The October meeting minutes were published in the November Tailwind. D. Lewis moved to accept as published; seconded by C. Tackett; passed unanimously.

### Old Business

- C. Tackett suggested that we tape the field area off instead of renting the shelter for our events. C. Tackett turned the suggestion into a motion; D. Lewis seconded; passed unanimously. D. Lewis will notify the Parks Department of our event dates, but no shelter will be reserved.
- Trailer repair is still waiting for Bob to have time to work on it.
- MTRCCA swap meet was successful.

### New Business

- MTRCCA generated proceeds to each club of \$444.64 for 2015.
- Nominations for 2016 officers were made. Only one nomination was made for each position. Nominees were elected by acclamation. Officers are the same as for 2015.
- D. Lewis moved that there be no meeting in December; C. Tackett seconded; passed unanimously.
- D. Lewis moved that the Numb Thumbs member appreciation event be held on January 16; C. Tackett seconded; passed unanimously.
- D. Lewis moved to have the spring event on May 21 and the fall event on October 22; B. Pruner seconded; passed unanimously.

D. Lewis moved to adjourn at 7:40 PM; C. Tackett seconded; passed unanimously.

## TREASURER'S REPORT



Opening balance	\$ 755.14
Income	346.50
Expenses	<u>(254.28)</u>
Closing balance	<u>\$ 847.36</u>

## STORING LITHIUM FOR LONGEVITY

By Greg Covey

From *Amp'd* on RC Universe

Although new market trends are lowering prices, most of us consider the cost of Lithium batteries to be a significant part of



our electric flight setup. If we had been previously flying with glow or gas engines, suddenly paying for fuel "up front" can be a real paradigm shift. When we buy a battery pack, we are essentially paying for hundreds of flights all at once.

Batteries are perishable products that start deteriorating right from the moment they leave the factory. Much like cars and computers, our flight packs lose value after they are purchased, even if we don't use them. As our batteries lose capacity over time, or from abuse, we start to realize that it is important to maximize our investment.

As I prepare for a long cold winter here in upstate, NY, my focus in this month's issue of AMP'D is to show some simple preventive measures that anyone can apply to slow the aging process of Lithium packs, especially during the off-season months when they may not even be used.

### *Storing LiPo packs*

The Battery University states that the recommended storage temperature for most batteries is 15°C (59°F). While lead-acid batteries must always be kept at full charge, nickel and lithium-based chemistries should be stored at 40% state of charge. This level minimizes age-related capacity loss, yet keeps the battery in operating condition even with some self-discharge.

While capacity loss during a battery's life cannot be eliminated, following a few simple guidelines will minimize the loss of capacity:

- Keep batteries in a cool and dry storage area. Refrigeration is recommended but freezers should be avoided. When refrigerated, the battery should be placed in a plastic bag to protect against condensation
- Do not fully charge lithium and nickel-based batteries before storage. Keep them partially charged and apply a full charge before use. Store lithium-ion at about 40% state-of-charge (3.75-3.80V/cell open terminal). Lead-acid batteries must be stored fully charged.
- Do not store lithium-ion fully depleted. If empty, charge for about 30 minutes (at a 1 x Capacity rate) before storage. Self-discharge on a depleted battery may cause damage and prevent a recharge.
- Do not stockpile lithium-ion batteries; avoid buying dated stock, even if offered at a reduced price. Observe the manufacturing date, if available.



The best possible capacity retention for Li-Pos is obtained when you store them about half-charged and keep them cold around 0° (C) or 32° (F). This results in approximately 2% loss of capacity per year. The next best is a 4% loss per year when stored half-charged at 25° (C) or 75° (F).

For winter storage of Li-Pos in upstate NY, my garage stays around the freezing temperatures for most of the "building" season. The remaining task is to get my packs at around the half-charged voltage and I accomplish this in several ways. Once the pack is around half charge, I usually place a 50% circle sticker on it so that I remember which packs were done. The packs are then sealed in plastic bags, with as much air squeezed out as possible to reduce condensation, and placed in a box to be stored in the garage.

### *Discharging Packs for Storage*

When discharging my packs for off-season storage, I first organize the packs in various cell counts, capacities, and discharge rating. My larger more expensive packs get first attention and I seldom

discharge packs that are smaller than 1500mAh. Once the packs are sorted, there are a number of ways to discharge them to 50%. Although discharging packs does not have the potential for hazard associated with over-charging, it is important to stay nearby and not let your packs get discharged below 3v per cell for an extended period.

One way to get my packs at the half-charge voltage of 3.8v/cell is to charge them after my last flight to only half way. Some chargers currently on the market display a fuel gauge to help make this process easier. Once the pack is at 50% fuel level, you stop the charge. The FMA Direct Cellpro Product Line of chargers, like the 4s shown on the left, have a built-in STORE feature that automatically stops the charge at 50%. This is a great feature to help automate your battery storage process.

### *Summary*

Unlike NiCad and NiMH packs, LiPo batteries can be stored for several months without significantly losing charge. However, if storing for long periods, you can minimize the loss of capacity by discharging the battery to 40% or 50% and keep it refrigerated but not frozen. By sealing the packs in plastic bags during cold storage, you can eliminate condensation from forming that could damage the pack.

This month's issue of AMP'D we learned that the best possible capacity retention for Li-Pos is obtained when you store them about half-charged and keep them cold but not frozen. This simple process is not hazardous and results in only about 2% loss of pack capacity per year and is a great way to maximize your investment in electric flight.

Remember to keep a few packs handy for some fun in the snow! Let the packs warm to room temperature overnight and then charge them up. Keep them warm until you are ready to fly for best performance.

*For the complete article, go to:*

[http://www.rcuniverse.com/magazine/article\\_display.cfm?article\\_id=1183](http://www.rcuniverse.com/magazine/article_display.cfm?article_id=1183)

## **ELECTRIC MOTORS 101**

*by Vic Walton*

If you're like me, you sometimes use technology that you just don't know that much about. Take electric motors—how do they work really? I knew it had to do with magnets and electromagnets, and something about brushes, but I hadn't taken the time to figure out how they all worked together.

And now we have “brushless” motors—how do they work? So I did a little reading and have shamelessly cobbled together this primer from various Internet sources.

In a typical “brushed” DC motor, there are permanent magnets on the outside and a spinning armature on the inside. The permanent magnets are stationary, so they are called the stator. The armature rotates, so it is called the rotor. Clever, eh? Picture a big horseshoe magnet. Now take a big nail and drill through the middle cross-wise, and put a wire through the hole; now the nail can spin head-over-heels. Wrap some wire around it, and then attach it to a battery. You have an electromagnet right?

Now this particular arrangement isn't that useful; the nail just sits there. Of course, if you were to reverse the current, it would flip around, right? And if you were really clever and fast, you could reverse the current again, just as the nail was flipping, and it would flip back. This is what the brushes in a brushed motor do. They make contact with terminals on the rotor (called the commutator) and as it spins, at just the right spot they break contact and reconnect on the other side, causing the electric field to reverse, spinning the motor around another half-turn (or one-third turn, since most electric motors have three coils for efficiency). The horseshoe magnet is your stator, the nail the rotor.

This setup works and is simple and cheap to manufacture, but it has limitations because of the need for the brushes to press against the commutator:

- It creates friction.

- At higher speeds, brushes have increasing difficulty in maintaining contact. They may bounce off the irregularities in the commutator surface, creating sparks. This limits the maximum speed of the machine.
- The current density per unit area of the brushes limits the output of the motor.
- The imperfect electric contact also causes electrical noise. Brushes eventually wear out and require replacement, and the commutator itself is subject to wear and maintenance.
- Having the electromagnet in the center of the motor makes it harder to cool.

So in comes the brushless DC motor. In this design, you put the permanent magnets on the rotor and you move the electromagnetic to the stator. Think about that. The electromagnets are on the stator—they are stationary. That's a problem because now you need something even cleverer than a commutator and brushes to flip the polarity of the current at the right moment. This very clever thing is the microcontroller in your ESC.

What it does is sense the position of the rotor (utilizing something called the EMF feedback through the main phase connections, which I have decided I don't need to understand) to switch the field rapidly at just the right moment to pull the permanent magnets on the stator around at the RPM that you have requested. This system has all sorts of advantages:

- There is no sparking and much less electrical noise. Happy situations for our radios, particularly as the motors get bigger.
- There are no brushes to wear out.
- With the electromagnets on the stator, they are easier to cool.
- You can have a lot of electromagnets on the stator for more precise control.
- The timing of the pulses sent to the electromagnets on the stator can very precisely adjust the speed of the motor.

So that's how it works. But one more thing: what's an inrunner and what's an outrunner?

An inrunner is a brushless motor with the permanent magnets rotating inside the

electromagnets; in an outrunner this situation is reversed, with the permanent magnets on the casing of the motor and the windings of the electromagnets inside. Outrunner motors generally have some torque, but spin somewhat slower. This makes them better for spinning large propellers, which our airplanes need. Inrunner motors spin a lot faster but with less torque; this means that in order to get the same torque, you have to put the inrunner in a gearbox, adding weight, complexity, and most importantly, cost. However, if you can afford it, this is the most efficient setup for any given size motor.

By the way, airplanes aren't the only things that use brushless motors. Computer hard drives, CD drives, and hybrid cars are some of the other uses. It's only a matter of time before someone takes the brushless motor out of a Prius and uses it in an airplane.

## THE VERY FIRST R/C PLANE

*A True Story*



Charles Hampson Grant made his first model aircraft in 1908 at the age of 14. The following year he progressed to a man-carrying hang-glider with a wingspan of 13 feet, on which he flew successfully after launching himself off the sloping roof of the family home. Further research with

models led to a larger, biplane hang-glider that had ailerons and an under cambered wing section. With this machine, Grant made flights of over 400 feet at altitudes of 25 feet.



Model building continued in parallel with

this full size activity, and he won a contest in 1911 with an A-frame pusher that equaled the existing endurance record. During 1912, in New York City, Grant won several long-distance events. He had specialized in directional flight control and won because his airplanes would fly distances of 2,200

feet or more whilst those of other competitors were prone to wander.

After the War, Grant started a business selling completely assembled model aircraft. The enterprise was successful, but the financial backers did not pay the agreed royalties and the venture was abandoned. Later in the decade, a second attempt at mass marketing, involving an all aluminum aircraft called the "Silver Arrow", came to grief as a result of the Great Depression.

Grant took over as editor of Model Airplane News in 1932 and boosted the circulation from 21,000 to over 300,000 by the time he handed over the reins in 1943. He wrote many articles, often using variations of the Cloud Tramp as examples and test beds, and promoted the formation of model flying clubs. His book, "Model Airplane Design", was also published during this period.

Charles Hampson Grant continued to produce new ideas in both model and full size aviation for the rest of his working life and variations on his flap designs and airfoils are still in use today. He died in 1986.

## CELEBRATING FLIGHT

### Piper Pa 38 Tomahawk

By Julie K. Boatman

A lot of pilots met their first Tomahawk during primary



training. But it looks more like a time machine than a run-of-the-mill trainer, with its double doors and bubble view. And this is one time machine that almost anyone can afford - for less than the price of a convertible; a pilot can expand precious weekends by spending more time at a destination and less time getting there.

When the original Piper Aircraft Corporation first conceived a new trainer in the mid-1970s, the company polled CFIs to determine what traits this

airplane should have. The Tomahawk delivers what these special customers ordered: an airplane that provides honest response to pilot inputs, a comfortable cabin with great visibility, and big-airplane-style handling. Cockpit layout is geared for safety, with the fuel selector front and centre on the console.

Flight instructors we spoke to feel strongly that the Tomahawk does what Piper intended. "It's the best primary trainer ever built" says Jim Tafta of Richmond Flight Centre in West Kingston, Rhode Island. "The student is well trained, and they can't get away with some of the things they can in other trainers." The feedback is overwhelmingly positive, with one caveat: This airplane, though a trainer, still demands proper training of its pilots from a qualified instructor. Those with the training have flown the Tomahawk for thousands of hours without incident.

### Flight characteristics



Pilots need special training because of the way the airplane was designed to stall and spin.

The wing design, the same basic section as on the Beech Skipper, was a cutting-edge airfoil - the NASA-generated GA (W)-1 - in the late 1970s. On the Tomahawk airframe, the wing produces aggressive stall characteristics suitable for teaching primary students about stall recognition and recovery. However, that design led to a higher incidence of stall/spin accidents, perhaps because the airplane cannot simply fly itself out of a spin like other trainers - it wasn't meant to, so that students would learn proper control inputs. This is one airplane where it pays to know the territory.



The Tomahawk controls have a heavier feel, as they were designed to mimic those of a much larger

airplane. In addition, the T-tail delivers reduced elevator control response at low airspeeds - and this is actually reflected in the accident reports to a larger degree than stall/spin issues. During the takeoff roll, the elevator becomes effective at around 35 KIAS. If the pilot has been impatient and is holding greater back-pressure in an attempt to raise the nose before this point, the airplane will over-rotate. The same effect reverses on landing, "especially when a headwind shears off"; according to Adam Harris, director of maintenance at East Coast Aero Club at Hanscom Field in Bedford, Mass., who has owned four Tomahawks over the years. These are simply attributes of an airplane that doesn't fit the standard mould, Harris points out. "We rent them to people with 10 hours and they always come back."

In fact, if you're looking for an airplane to provide a steppingstone to a larger aircraft, the Tomahawk makes a sound choice. You face an easier transition in the long run because of these big-airplane characteristics.

### Cross-country flier

The Tomahawk is roomier than you might think, and taller pilots feel more comfortable in this airplane than in a Cessna 152.



Ventilation is also better than average, with automobile-style vents blowing cool air at altitude on summer days. The cabin is wider by several inches than other two-seat airplanes, so you needn't be intimate with your passengers.

The airplane's greatest utility is as a day-tripper. Paul Diette of Mansfield, Mass. bought his 1982 Tomahawk II for trips around New England with his wife - trips that take less than three hours and only require light bags. The airplane has proven perfect for the mission: Places like Martha's Vineyard and Bar Harbour, Maine, are reachable in half the driving time.

Usable fuel is 30 gallons, and during cruise Diette figures he burns between six and seven gallons per hour. He typically flight plans a true airspeed of 105 knots. Endurance is about 3.5 hours with an hour reserve - with full fuel you can carry roughly 325 additional pounds of pilot, passenger, and baggage, based on the empty weight of a reasonably equipped Tomahawk (around 1165 pounds). It goes over gross quickly (it is a two-seat aircraft, after all), but because of the size of the cargo area, light-but-bulky items, such as an Adirondack chair that Diette flew home after a successful shopping trip, can be handled.

### Model history

Just fewer than 2500 Tomahawks were produced in model years 1978 to 1980, with the most units produced from 1978 to 1979. Aftermarket kits for the rear wing spar, vertical fin attach plate, and rudder hinge were developed to address several AD's (airworthiness directives) that were issued soon after these models hit the ramp. In 1981 and 1982, the Tomahawk and Tomahawk II were made with many of the ADs taken care of at the factory.

These later models are preferable, as the installation of AD kits in the field was accomplished with varying degrees of accuracy. Aircraft with these field ADs may exhibit divergent flight characteristics from the standard Tomahawk



because of what are considered vague installation instructions from Piper, according to several A&Ps we spoke to. Of course, as the gods of economics would deviously demand, fewer of the later models were produced as steeply rising interest rates and a soft economy helped send new aircraft sales to the basement in the early 1980s. Annual production runs during 1980 to 1982 were less than 200 aircraft

a year - not even one-quarter the yearly production of Tomahawks in 1978/79. It's no surprise that prices steadily increase with model year, from \$16,000 for a 1978 model to \$18,500 for a 1982.

Original Tomahawks rolled off the line with basic VFR instrumentation. The so-called "Special Training Package No. 1" gave the airplane gyros, external and internal lighting, dual brakes, one (then) King nav/com and transponder, an ELT, and a heated pitot tube - for a total price of \$19,730. Strangely enough, the same airplane (with a radio upgrade or two along the course of 20 years in service) costs about the same, not adjusting for inflation, as it did in 1979.

### **That wing**

One thing for prospective buyers to keep in mind: The Tomahawk wing has a lifetime fatigue limit of 11000 hours. Some long-in-the-tooth airframes have nearly that many hours after years on school flight lines. Currently, a set of used wings from an otherwise toasted Tomahawk is the one recourse. There is talk of pursuing a life extension of the wing.

## **EDITORIAL**

### **Improvements**

Improvements to the field are on the agenda for this spring! We have had some on our list since last year and would like to get to them this year. We could use any help anyone can provide.

When we reconfigured the fences, we had some fencing left over. We would like to use this to extend the existing fencing in both directions. We will measure what we have left, and determine how many posts we'll need to install. We will need volunteers to take turns digging post holes and pounding posts into the ground.

We have some pilot protection fences designed and the parts made. These will need 4 post holes per pilot station (12 holes) about 2 feet deep each.

We are also going to install a set of padded poles for bracing large planes during starting. We have the posts and padding. Another couple of post holes will have to be dug.

We are also putting together a new rules sign and integrating a bulletin board with it. 2 more post holes needed.

We want to make a sign to hang under our field sign announcing our training program. If anyone has the templates for routing letters and numbers, we have some ideas what we would like to do.

Finally, if you have been out to the field lately, we need to repair the mole damage to the field and try to prevent future damage. We need to roll the field and spread some grub worm killer to try to discourage moles from invading the runway.

Anyone who would like to contribute a little elbow grease and time to help with these improvements and maintenance items will be greatly appreciated!

*That's my opinion - it oughta' be yours! ☺*

## **LETTERS TO THE EDITOR**

*I welcome anyone (member or not) to submit an opinion in writing so long as it is civil in its expression (I reserve the right to make that determination). You can email your letters to the editor to me at [Don\\_Lewis@comcast.net](mailto:Don_Lewis@comcast.net), or just give them to me at a club meeting.*

## **NOVICE NUANCES**

### **Balsa Filler**

Don't buy filler from the catalogs, go to Wal-mart, Lowe's, or Home Depot and get "lightweight spackling paste" - it's cheap and comes in a large container. When it starts to dry up, just add a little water and stir with a popsicle stick until you get your desired consistency.

### **Sandbag Weights**



For some great weights that conform to many different shapes, fill zipper lock bags with sand. The freezer bags are best as they are thicker and won't puncture as easily. You can vary the amount of sand you put in the bag to make it more or less flexible. These will provide a consistent pressure across the area covered by the sandbag. You can probably make a lifetime supply for under \$15.

## WHY DIDN'T I THINK OF THAT?

### Binding a Spektrum Receiver without a Binding Plug

By Jason Cole

If you're like me, you probably have Spektrum Bind Plugs all over the place. Does it seem like you can never find one when you need it? Well here's a simple solution that will allow you to bind a receiver without the Bind Plug. All the Bind Plug does is short out the signal and negative pins on the receiver to put it into bind mode. You can accomplish the same task by using a pair of pliers to touch the signal and negative pins on the receiver while you power it up. This has saved me from having to take the "Ride of Shame" home from the flying field.

### Easy-Starting Wing Bolts

After you cut a plastic wing bolt stick it in one of those cheap plastic pencil sharpeners and give it a beveled tip. This makes it much easier to insert the bolt and cleans up the end threads.

## NEW PRODUCT!

### ElectriFly Nieuport XI EP ARF

The ElectriFly Nieuport XI EP ARF is bound to impress with its coaming and windshield for the cockpit, a painted pilot figure complete with jaunty fabric scarf, authentically detailed Lewis gun on the top wing, replica rotary engine in the nose and a striking, MonoKote® trim scheme on every



surface! The Nieuport comes out of the box with most hardware and accessories already installed so it's ready for first flight in just 4-6 hours. And because it has a compact 35.5" wingspan, the Nieuport is a natural for small fields and grab-and-go flying opportunities!



- In addition to the cockpit coaming, factory-painted windshield and pilot figure, other scale touches include an inspection plate and carb tubes.
- The tail skid appears to be lashed in place with bungee cord, just like the original. And there's no vertical fin; the entire surface pivots for powerful rudder response.
- Both aileron and elevator control surfaces are prehinged to reduce assembly time.
- The replica rotary engine hides the motor and requires only the time it takes to drive two screws. Magnets align and securely hold the cowl in place, yet release quickly for battery changes.

Molded in amazing detail, the wing-mounted machine gun, mounts in pre-drilled holes with a few drops of CA. The retail price for this model is \$149.99.



The Nieuport comes out of the box with finishing done and most hardware and accessories already installed. It's ready for first flights in just 4-6 hours.





The prebuilt motor box streamlines motor installation. It's light, strong and a perfect fit for the recommended RimFire™ 400 brushless outrunner.



The wing-mounted machine gun adds convincing detail and welcome ease. It's molded in amazing detail, and mounts in predrilled holes with a few drops of CA.



The replica rotary engine hides the motor, requires only the time it takes to drive two screws. The cowl requires even less; magnets align it and hold it securely, yet release quickly and easily for pack changes.



Scale touches on the fuselage include an inspection plate and carb tubes. Cockpit coaming is already installed; other details to add include a factory-painted windshield as well as a painted pilot bust, complete to the material for a dashing scarf.



The tail skid appears to be lashed in place with rope, just as it was on the original. And there's no vertical fin; the entire surface pivots for powerful rudder response.



Both aileron and elevator control surfaces are pre-hinged to slash assembly time.



The Nieuport is bound to impress, no matter where you look! Details include coaming and a windshield for the cockpit, a painted pilot figure complete with a jaunty fabric scarf, an authentically detailed Lewis gun on the top wing, replica rotary engine in the nose and a striking, 4-color MonoKote® trim scheme on every surface! With the Nieuport, “finishing” consists of applying a single decal!

### SPECIFICATIONS

**Stock Number:** GPMA1146

**Wingspan:** 36.5 in (900 mm)

**Wing Area:** 314 in<sup>2</sup> (20.3 dm<sup>2</sup>)

**Weight:** 21.9 – 23.1 oz (620 – 650 g)

**Wing Loading:** 10.0 – 10.6 oz/ft<sup>2</sup> (31 – 32 g/dm<sup>2</sup>)

**Length:** 28 in (710 mm)

**Requires:** 4-channel radio w/4 micro servos, 28-30-950 outrunner brushless motor, 25A brushless ESC (min.) & 11.1V, 1600mAh LiPo battery.

### Product Recommendations:

Please note: all recommendations were the best choices available at the time this product was released. For additional choices, consult the instruction manual or your local hobby dealer.

### Recommended Products

#### Futaba 7-channel radio

**FUTM0414** (4) Futaba® S3114 Micro Servos

**GPMG4560** ElectriFly™ RimFire™ 400

Outrunner Brushless Motor

**GPM1820** ElectriFly Silver Series 25A Brushless ESC

**GPMP0719** ElectriFly BP Series 11.1V 1600mAh Balanced 20C LiPo Battery

**GPMQ6660** ElectriFly 10x4.5 Power Flow™

Slow-Flyer Electric Prop

**GPMQ4959** ElectriFly 3mm to 5mm Prop Adapter

**GPM3122** Great Planes 3.5 mm Male/2.5 mm Female Bullet Adapter

### Recommended Options

**FUTL7627** Futaba 617FS 7-Channel 2.4GHz

FASST™ Receiver

**GPM3155** ElectriFly Triton™ EQ AC/DC

Equalizing Charger, Discharger & Cycler

**GPMP0511** ElectriFly Power Series 11.1V

1500mAh Balanced 25C LiPo Battery

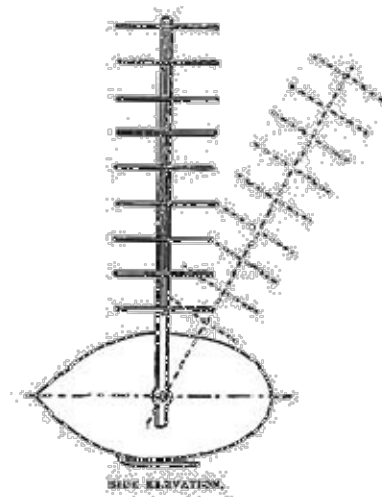
## PIONEERS OF FLIGHT

### Charles Renard (1847 – 1905)

*From Century-of-Flight.net*

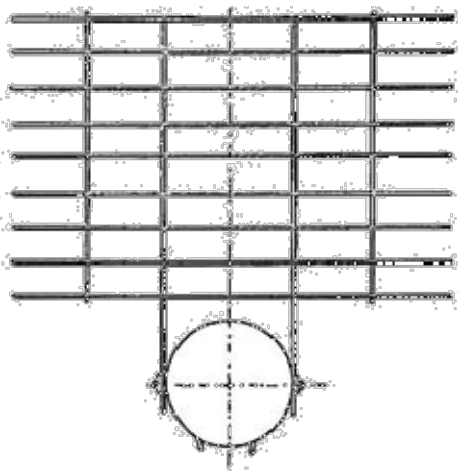
At the Paris Exposition of 1889, Commandant Renard, of the French Aeronautical Department, exhibited, in connection with the dirigible war balloon "La France," an apparatus which he had designed some years before (1873) as embodying his conception of a flying machine, and which he termed a "dirigible parachute."

This is shown in fig. 64, and consists in an oviform body, to which is pivoted a couple of standards carrying a series of narrow and long superposed flat blades, intended to sustain the machine when gliding downward through the air.



The dotted lines in the side view indicate the maximum angle of inclination which it was

proposed to give to this similitude of a Venetian blind, and it is evident that by setting it at the proper angle, and dropping the apparatus from a balloon, it can be made to travel back against the wind a considerable distance, and also that it ma' be steered laterally by the addition of a rudder. Beneath the body a sort of skate will be noticed, probably intended to glide over the ground in alighting, or in obtaining initial velocity to rise should a motor be applied; but the French War Department is reticent concerning its experiments in aerial navigation, and the writer has been unable to gather any information concerning the working of this apparatus.



It will be noted that Commandant Renard proposed to equip this machine with flat blades, thus conforming to the predilection in favour of plane surfaces exhibited by most of the experimenters with aeroplanes already noticed except Captain Le Bris and M. Goupil who took a different view as to the best shapes to employ. In point of fact, as already intimated, those who have succeeded in the air, the true experts in gliding, the soaring birds, do not perform their evolutions with plane surfaces. Their wings are more or less convex on top and concave beneath, and are warped surfaces of complicated outlines. It is true that in many cases they do not differ greatly from planes, and the mind of man so strongly tends to the simplification of complicated shapes, that most inventors have assumed that the effect on the air will be practically the same.

Flight is possible with flat planes, as witness the butterfly, the dragon fly, and insects generally, but

such creatures are endowed with greater relative power, as already explained; and, moreover, the elasticity of their wings produces change of shape under action. In the case of the birds, although the outer ends of the feathers are elastic, yet the wing is stiffer as a whole, and the curved surfaces may prove more efficient than planes in obtaining support from the air.

## **SOMETIMES YOU JUST HAVE TO LAUGH...**

The barber's client looked depressed, so the barber told him, "cheer up. I knew a guy who owed \$5,000 he couldn't pay. He drove his vehicle to the edge of a cliff, where he sat for over an hour. A group of concerned citizens heard about his problem and passed a hat around. Relieved, the man pulled back from the cliff's edge."

"Incredible," said the client. "Who were these kind people?"

The barber replied, "The passengers on his bus."

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The Preacher said, "Anyone with needs to be prayed over, come forward, to the front at the altar." Leroy gets in line, and when it's his turn, the preacher asks: "Leroy, what do you want me to pray about for you?" Leroy replies: "Preacher, I need you to pray for my hearing." The preacher puts one finger in Leroy's ear, and he places the other hand on top of Leroy's head and prays and prays and prays, he prays a blue streak for Leroy.

After a few minutes, the Preacher removes his hands, stands back and asks, "Leroy, how is your hearing now?" Leroy says, "I don't know, Reverend, it ain't 'til next Wednesday!"

## **PRODUCT REVIEW:**

### **Futaba 8FG**

*By Chris Batcheller*

Futaba's new 8FG transmitter fills the gap between the 6 channel basic computer radios and the wiz-

bang top of the line 10, 12 and 14 channel radios. Its features and programming capabilities are closer to high-end transmitters at a price sport flyers can more easily afford. The 8FG has 8 proportional output channels and 2 additional channels which can be used in the programming.

The programming and menus are similar to the Futaba 12FG which RC Universe reviewed earlier. The 8FG also features ball-bearing sticks and when used with a high speed receiver (like the R6008HS), the combination gives the feeling that you are connected to the airplane. The 8FG also features a touchpad, similar to what you would find on a modern cell phone or music player.



The 8FG Transmitter is so full of features; there is no way to cover each and every one of them in this review. Instead, I am going to focus on the airplane related programming and the features that I think will be used by most pilots. The 8FG does have a ton of features for the helicopter and glider pilots, and I will highlight some of those in this review also.

## Specifications

- 8 proportional channels
- 2 digital switched channels
- Integrated FASST 2.4GHz design
- 2048 resolution
- SensorTouch? programming
- Airplane, heli & glider software
- 20-model internal memory
- Mode 1-4 selectable
- Direct access to timers, channel mode & model selection
- 2-touch access to system, linkage & model menus
- Compatible with 32MB to 2GB SD Memory Cards\*
- Assignable switches/functions
- 10-character user & model naming

- Model select, copy & reset
- Data transfer
- All-channel & battery fail-safes
- Sub-trims, servo reversing, dual rates, expo & EPA with limits
- Digital trims & memory, with step and % options
- 128 x 64 backlit LCD w/auto-off timer, normal/large timer
- Display options, adjustable contrast & brightness
- Servo cycle w/bar graph displays
- Model & system timers
- Trainer system w/channel/function options
- Sticks w/ball-bearing gimbals, length & tension adjustments

## Instructions

The instruction manual reads easily and covers all the features.

The manual could have better explained some of the programming terms. One example is in the FUNCTION menu, the manual never really explains what the difference is between the combination "COMB" and separate "SEPAR" modes.

It would be great if a quick example would be included when you might use each mode. On items like this, I usually figured out what the setting really did, or simply left it at the factory default. With all that said, the helicopter programming setting did include those extra explanation of terms and real world examples.



Futaba Manuals and Software Upgrades can be found at <http://2.4gigahertz.com/downloads/downloads.html>. At the time of this writing there were no firmware / software upgrades, but Futaba has released the 8FG File System Utility (zip) that would be used if or when they release upgrades.

## Model Storage

The 8FG uses an SD card to store extra models. In case you use up the 20 models that this radio can hold internally, you can insert up to a 2GB SD card. The SD Card format is a plus for many modelers over the more expensive CF memory cards.

The SD Card is inserted in the bottom of the radio next to the battery. The radio automatically detects a card that isn't formatted for the radio.

## Cool Features

*Trainer Mixing:* If you do any sort of instructing or are learning to fly, the trainer setting is one of the coolest things that this radio does.

The trainer menu can be set so the radio acts like a standard buddy box. You can assign the trainer switch to any of the switches on the radio. In my case I have it set to the large left toggle switch (SF). I like this switch because it is not a momentary switch like most other transmitters. That way my finger doesn't go numb when I have a student that is doing well. Of course if you long for the momentary switch for those new pilots, you can assign the trainer function to the other tall switch (SH) on the other side of the radio.

Now onto the cool trainer stuff. The Futaba 8FG also has a MIX function. This allows the 8FG to act like a dual set of controls. Normally when you flip the trainer switch, all control is lost from the instructor's transmitter. Turning the MIX on gives you dual controls, just like the full scale airplanes! When the student is going left, and you think they should go right, just push the stick.

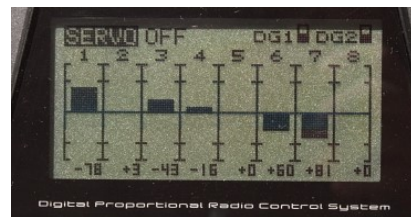
The instructor commands will be mixed into the students ones. That being said, if the student gives the airplane a hard left and you give hard right, the ailerons will go to neutral. At this point it would be a good idea to call "my airplane", flip the switch and take back total control, but if you are working on a particular maneuver, you can help a student out in a way you couldn't in the past.

Another cool part about the MIX is how you can set the percentage of MIX. This limits the students control throws proportionally. You can also select which channels map between the instructor and student. If the instructor wants to fly on Mode 2 and the student wants to fly on Mode 1, the 8FG will let you both have your preference.

To access the trainer settings, select the SYSTEM menu and select TRAINER.

### *Servo Monitor*

*Chart:* Futaba has included a servo signal position chart which shows you in graphical form what signal



the radio is sending to each servo and the two digital channels. This same function is normally included on the more expensive radios and is a nice addition to the 8FG.

It comes in handy when programming a new airplane. If mixing functions are turned on, the radio will graphically show you what it is mixing on the various mixed channels.

The coolest part is that you can select NEUTRAL - that will lock all the servos in the neutral position. You can also select MOVING, and that will actually cycle all the servos at the same time. This can be very useful when testing servos and when installing them in an airplane. As you can imagine, the Servo Monitor makes programming much easier.

To access the Servo Position Chart, select the LINKAGE menu then SERVO.

*Setting Cross Trims:* While not a standard menu option, setting the radio with "cross trims" can help you in a pinch, especially when flying an airplane for the first time or after major changes. "Cross Trim" simply means that you program the aileron trim to the side with the rudder stick and the elevator trim to the side with the throttle stick. The throttle and rudder trims are programmed to the aileron and elevator stick side. This lets you keep

your thumb / fingers on the ailerons and elevator stick while your *other* hand can operate the trims.

The 8FG will let you program each model differently, so you could program one airplane like this and the other models in memory different. If you set your transmitter like this, just remember that you did. I like setting this up, but I've found it easier to set all my models like this, just so I don't forget which trim does what.

To set "Cross Trims", access the LINKAGE menu and select FUNCTION.

### Summary

I think Futaba has a winner on their hands here! This is one radio that will be able to grow with you, even if you are just starting out, or if you have more than a few airplanes. With this radio you can fly airplanes, gliders and helicopters of all sizes. The 8FG fits a nice market niche between the basic computer radio radios like the 6EX and 7C and the more complex (and expensive) 10, 12 and 14 channel radios. The 8FG has a lot of the features of the more expensive radios, like the ball-bearing sticks, high speed data stream and programming that is very similar to the 10C and 12FG radios.

I liked some of the programming features enough that I made a section for "Cool Features" above. These included things like the ability to mix instructor and student signals when training, the easy to use timers, servo monitor chart and snap roll switch.

I really enjoyed flying the Futaba 8FG radio. Between its silky smooth sticks and fast response time, this radio will make you feel connected to your plane, glider or helicopter. It has enough programming and mixing to let you tweak your plane all flying season. When you are at the field, it

is easy to switch between models, and the radio feels great in your hands.

For the complete review and videos, go to:  
[http://www.rcuniverse.com/magazine/article\\_display.cfm?article\\_id=1184](http://www.rcuniverse.com/magazine/article_display.cfm?article_id=1184)

## THE LIGHTER SIDE OF R/C



## YOU MIGHT BE AN R/C MODELER IF...

*By Bill Atkins, Byron, GA*

- ...Your doctor tells you that you have prop whip elbow.
- ...You got your wife a plane kit for Mother's Day.