



# The Fly Paper

**September 2008**  
**A.M.A. Chapter # 3723**

**News Letter**  
**I.M.A.A. Chapter # 480**

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## **Meeting Minutes September 3, 2008**

*Art Ratley, Secretary*

The September 2008 meeting of the Rio Grande RC Flyers was called to order at 7:00 P.M. by our club president Bill Robinson. There were approximately 20 people present at Rudy's Bar-B-Q restaurant in Pharr.

The minutes from the August meeting were accepted as published in the Newsletter.

Roger Bell reported that the field had been mowed twice in the last month, and there was \$1255.00 balance in the Treasury. He also reported on the gift to the Phillip Bennack family for their hospitality at the recent visit to the Auxiliary field. Tickets were passed out to the members for the drawing.

Rick Martinez reported no safety issues, but suggested that you might exercise extreme caution and concentration when flying close to the ground in windy conditions.

Old business: The annual tri-club fun fly on August 23rd hosted by the SMASH club of Harlingen at the Rio Hondo field was a great success. The Rio Grande RC Flyers was awarded the George Haynes Trophy as the winner. Those representing the RGRC Flyers were: Bill Robinson, Roger Bell, Bob Barry, John Bearden, Mark Self, and Phil Johnson. Special recognition was given to Bob Barry and John Bearden for their fantastic piloting skills and to Phil Johnson for his expertise on spotting the wind currents for the climb and glide event. A motion was made and approved to fund the engraving of the Trophy. The next tri-club fun fly will be hosted by the Rio Grande RC Flyers.

## **October Meeting Notice**

**The October meeting  
will be held on Wednesday  
October 1st at  
7:00 PM. The meeting  
will be at Rudy's restau-  
rant, located at 209 W.  
Nolana In Pharr.  
The club usually arrives  
at 6 PM for dinner with  
the meeting beginning  
at 7 PM.**



New business: Bill mentioned that the Frequency Board at the field needed some work. Art Brock and Gene Horr volunteered to help with the upgrade. He also reminded the club of the October 5th and 6th R.H. Rice Memorial Fly-in to be held in Kingsbury, Texas. Information is posted on the web-site. Rick talked about the great prizes to be awarded. Several members were interested in attending.

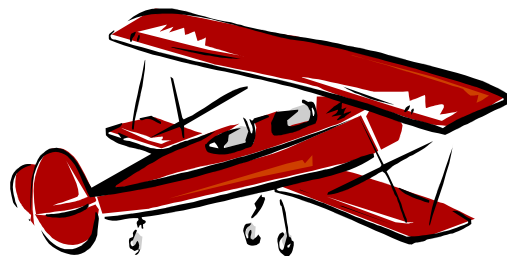
The October 12th Club fun fly will feature a Fast and Slow flight competition. One timed pass over the field from one end of the runway to the other end of the runway as fast as you can go, and a second pass as slow as you can go.

Randy moved, Roger seconded that November 2nd be set as the date for the next visit to Bennack field. Motion carried.

The Annual Fun fly set for November 23rd, will feature, Fun, Food, and Flying with the club picking up the tab for this special day. Side dishes, desserts, etc; welcome.

Cousin Joe Mann was introduced by David as a special guest. The Tejas Grand opening of the Art Brock Memorial field is scheduled for October 18th. in San Juan.

The meeting was adjourned at 7:25 P.M. October meeting is scheduled for the same location.



## **From the San Gabriel Valley Radio Control League, South El Monte, California 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 re-

verse 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 more clever 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. A happy situation 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 Pruis and uses it in an airplane.

## The Big Free Raffle

Every Monthly meeting you attend you will receive a ticket for a chance to win a Spektrum DX7 radio. The Radio will be awarded at the December 2008 meeting.



## Club Shirts & Custom Items

The club has contracted with EmbroidMe for club related graphics and Logos. You can take your shirts to the store and they will embroider them for you. It takes about a week.

### Price List :

- Option 1 Large logo on back Name on right chest \$23.00
- Option 2 Opt1 + Small logo on Left Chest \$30.00
- Option 3 Opt 1 & 2 + American & Texas flags 1 on each sleeve \$40.00



### EmbroidMe-McAllen

Phone: 956-683-8006 Fax: 956-683-8306

E-Mail: [mcallentx@embroidme.com](mailto:mcallentx@embroidme.com)

Website: [www.embroidme-mcallentx.com](http://www.embroidme-mcallentx.com)

2706 N. 10th St. McAllen, TX 78501



## For Sale

**80 inch AT6 Texan**, Includes all servos (6) , Robart retracts, and Saito 180. \$850. Bill Robinson [webmaster@rgflyers.org](mailto:webmaster@rgflyers.org) or (956) 664-9539



**Rio Grande**



**R/C Flyers**

**Annual  
Fly, Food & Fun  
Fly-in  
Sunday November 23**

Where: Rio Grande Flyer Field—Bell Farms Property  
Penitas TX.

When: Sunday November 23  
10 AM Flying Starts  
4 PM Dinner

Aircraft restrictions—None

Flying demonstrations—None

Dinner—Registered Flyers and 1

Guest Included in Landing Fee

Covered Dishes & Desserts Welcome

Bring your own beverages.

Public Address system — Talk Louder

Spectators: This is a non-advertised event no spectators are expected  
to attend.

Contacts : Roger Bell 686-4297 Bill Robinson 687-4624

