Fort Worth Thunderbirds Radio Control Association Inc.

The Pilot's Log

Issue 4456, January 2019

Next club meeting: January 28th, 2019, 7:00 pm, Buffalo West Restaurant, 7101 Camp Bowie Blvd

Presidents Corner: ***by James Meadows***

Greetings Thunderbirds,

First let me welcome you to a new year. It started with a great event on the 1st Jan 2019 at our traditional Black Eye Pea event. The weather was cold for sure, but everyone who wanted to fly got a flight or two without getting frost bite. Had several, first time attendees and a few guests. Food was plentiful, delicious, and as is the hope will bring us all good luck in 2019. I want to thank the club officers for hosting it. There are plenty of events coming up in the next year so check out our website's events page and your schedule and let's have some good times at the field. It's not too late to add events or suggest events for the 2019 flying season.

Speaking of events, The SAE is right around the corner in March. This event, will take the entire club, and more to make successful. This event provides a significant amount of exposure, for the club and Thunderbird Field to local, state, national and international, modelers, corporations, and elected officials. This exposure gives us the chance to show the positive side of model aviation, and the many benefits and technological advances that have or perhaps will be a result of model Aviation. We have some significant challenges this year. WE NEED YOUR HELP. Please contact a club officer or Bill Lake, to volunteer with this event. There are plenty of jobs to do! From grounds cleanup, parking, aircraft inspections etc. the list is long. Please if you can give us any of your time, it would be greatly appreciated.

Our cleanup up of the North end of the field has been weathered out several times this month. To wet, raining or like this weekend, bitterly cold, and extremely windy. The latest makeup date is for 26 Jan 2019. Until that time, if you're at the field, take 20 minutes or so before or after your flights, and when safe to do so, walk down to the debris area, move a few pieces of wood to a pile or pickup the numerous bottles, cans, or other trash. Anything helps and will make the future cleanup easier.

Several members have also provided material items to the club. Big shout out of thanks to Jim Perkins who donated a Spektrum DXE4 and DXE6 radio system to the clubs Training program. Our Training program continues to grow and attract new and returning flyers, this donation will further that cause and reduce the wear and tear our instructor owned radios.

Programs and projects for 2019 cover a wide range of issues, so I encourage each member to review, suggest and participate in getting them discussed, and

completed. Heading up this year is our lease. This is the year for renewal, which is exciting and a bit scary all at the same time. Several discussions centered last year about expansion to include a concrete helipad/line control area, with pilot area. Most recently it has been suggested that we request a 10-year lease as opposed to the current five-year plan. The board wants to hear from you! This will be a topic of discussion during our January 28 members meeting. Let there be Light! The board will be asking members to approve the installation of lights in the pits and some outdoor spot lights near the shed. Estimated cost is $500.00 for materials and the labor will be self-help. Each pit area will be lit, with a centralized timer allowing the light to be turned on, but then turn off automatically after 20 minutes or so. This will allow the early or late fliers some illumination, and still be good stewards of our electrical resources.

Thanks to each of you for choosing to be Thunderbird. On Behalf of the board, I want to wish each of you and your families the best for 2019

Vice Presidents Corner: *by Rob Lowe*

Happy New Year Thunderbirds! I hope this finds you warm but getting to fly a lot. As we start a new year, please mark your calendars now to help out at the SAE event this spring (see James' President Article above for details). WE NEED EVERYONE TO HELP OUT!

Another item we need your input on is topics for our monthly meetings. This last year, you provided great ideas and subjects you wanted to hear or learn about. We had a full year of great meetings as a result of your feedback. Please drop me a note at vicepresident@fwthunderbirds.org with topics for a speaker, a specific speaker or hobby related items you'd like to learn more about. For example, one item in the queue for this year is a "How To" session on covering a wood frame airplane (monocot, etc.). Nothing is off limits at this point, give us your ideas and suggestions. Let us hear from you!

Here's a teaser for this month's meeting - you can't miss this one! Our mystery speaker will detail an amazing flying career and let us in on some insider stories from the cockpits of some of the coolest planes to ever fly, as well as corporate and government perspectives of building, buying and flying aircraft into the future. It's going to be a great night.

With the lapse in funding for the Federal Government, it has slowed any work on next steps for un-manned aerial systems/vehicles (UAS/UAV) in the FAA. Most of the staff folks are furloughed. However, it's still a good time to keep up with the AMA government relations page and to stay in touch with your elected representatives and let them know your thoughts on RC flight, remote identification, the 400ft limit and integration into the National Airspace System (NAS). You'll recall with the authorization passed last year for the FAA, congress wrote into law a number of things AMA has lobbied for but also some things that are different than the past. FAA has issued direction that RC planes continue to operate as before the new authorization until they work through how to implement congress' intent and specifics in the law. AMA continues to advocate for us, but your voice is needed. Please be an informed user of the NAS, reach out and be heard.

Lastly, we have A LOT of debris to clean up at our field. As James mentions above, we have been outsmarted by Mother Nature a few weekends, but are planning for Sat Jan 26 to try again. We need your help anytime you are at the field and especially on the 26th to clean up. Clear your calendar now to come out and get the field into shape so you can fly safely.

I hope to see you at the field soon. Here's my virtual "low pass" salute to you Thunderbirds!

<u>January 2019 Meeting:</u> ***by Mike Schroeder***

Plan to attend our January meeting. If you're in the market for a warbird a 'new in box' Hanger 9 Corsair will be auctioned off to a lucky club member. All proceeds go to our club's treasury. See you there and bring your wallet.

<u>Treasurer Report:</u> ***by Chris Berardi***

<u>2019 Official Notice</u>: Many institutions we are involved with, such as our bank, require published notifications. This is one such notification; in this case the 2019 Board of Directors. Your board is unchanged from last year:

POSITION	BOARD MEMBER	CONTACT EMAIL
President	James Meadows	president@fwthunderbirds.org
Vice President	Rob Lowe	vicepresident@fwthunderbirds.org
Secretary	Mike Schroeder	secretary@fwthunderbirds.org
Treasurer	Chris Berardi	treasurer@fwthunderbirds.org
Safety Officer	Ed Kettler	safetycoordinator@fwthunderbirds.org

I would also like to mention that *Thunderbird of the Year* was awarded to our very own president, James Meadows! Well done and highly deserving this award he is.

Note: Any member of the board and indeed the web master and forum manager can be reached via links on the club web site.

<u>Social Media</u>

If you would like to sell something, make an announcement, or have a question about your equipment then use our club forum or Face Book page. A link to our forum is on the web site home page and the club can easily be found using the Face Book search bar.

Another change we have been working on is in how we communicate with the membership. We are working on implementing improved management of our e-mailing list and the format of those emails with the online tool, "Mail Chimp." This application tracks subscribers and un-subscribe requests so that your privacy is respected. Furthermore, new members will be asked specifically to "Opt-In" to receiving email related to their membership in the club. What we will not be doing is using email to send announcements, such as items for sale, through club email. That way, you know that if you get something from the club it is worth reading and pertains directly to your interest in club sponsored activities only.

We hope you agree with these changes - if you have other ideas for continuous improvement, use the contact information above and let the board know. It's your club and we are here to make it better.

Tchotchkes and More

Were you lucky enough to attend the Christmas Party on December, 8th? If not, you missed a really good time and less importantly, some keepsakes actually worth keeping. Everyone attending received our new Thunderbird coffee cup. Luckily, we still have some left over and these are for sale at $10 each. They will be available at the club meeting on Monday, January 28th at Buffalo West Steak House. Or you can give me a call/email and make arrangements to get your mug.

We also have two styles of hat available - a grey mesh and a solid red. Both are good looking and functional - Hats are $13 cash and $14 PayPal. Lastly, we have club shirts that are custom ordered. If you have already ordered but have not received it, please contact me to make arrangements for pick-up. Shirts cost between $35 and $40 depending on size and quantity ordered. Contact me with your orders.

Membership Renewals 2019: In my experience, the renewal rate for December and January is at the highest I remember. Already we have 152 club members including Life, Individual, Family and Gift subscriptions. This bodes well for the club especially given the events needing member support such as the field clean-up and the SAE Aero Design contest. More importantly, the field lease will be renewed at the end of the year and the greater membership we have, the easier time we'll have in paying the lease fee. Like anything else, it seems the Corps of Engineers is potentially looking to increase the fee in a pattern already applied to other clubs on corps property.

What is the easiest way to renew?

- **Pay via PayPal**
  1. **PayPal provides me with the contact information you already have. Your membership details will be sent to the person and address listed in your account.**
  2. **A transaction record of your payment is automatically produced for both you and me.**
  3. **I still take checks and credit cards. Checks will be deposited via a mobile app and credit cards are processed via PayPal.**

Use your Club ID number

1. **Your club ID number is a three digit number that ties your information to a record in my database. This allows your membership to be updated without manual intervention greatly reducing errors.**
2. **Your club ID number will be mailed to you in the welcome letter; it is also printed on your club badge.**
3. **Family members have the same three digit number as the primary member but are designated with a suffix such as "-2" or "-4." When those family members reach 18 years of age they will require a full individual membership with their own three digit club ID.**

Welcome Letter

1. **When you renew, you will receive a welcome letter confirming your club ID and contact information plus two membership decals and your gate key.**
2. **There is a separate metal badge that will be provided to you at the field or club meeting.**
3. **New members receive a club badge.**

Here is the latest membership count for January, 2019. This is approximately 72% of the membership present in December, 2018.

Membership Type	Count
Individual	126
Family	10
Associate	3
Life	11
Service	2
TOTAL	152

That's it for this month. See you at the field.

Safety: *by Ed Kettler*

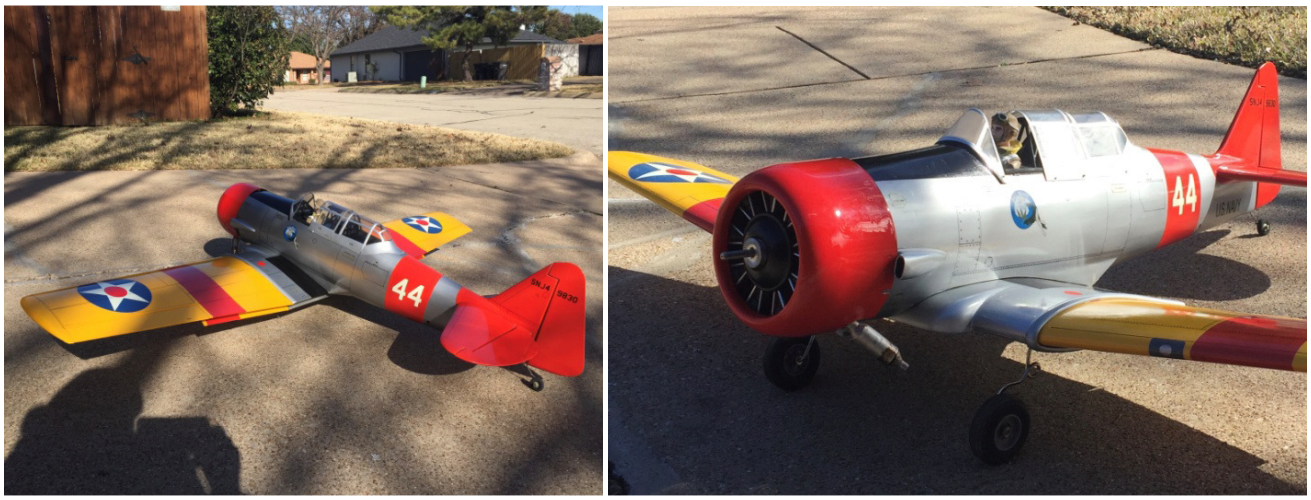
It's cold outside!
We are now well into winter with some days in and around freezing. Most of the AMA members in the northern reaches are huddled in their workshops building and repairing planes, but we fortunate inhabitants of the Sun Belt have many good flying days. On those bad days, we sometimes experience the cousin of Dumb Thumbs ... Numb Thumbs. Flying with gloves is one approach, but there are also Transmitter Gloves that encase the transmitter and your hands. Young Sam Corlett had one at the Black Eyed Pea event and I can say that it looked like a great idea. They are not that expensive, either, from $11-22 on Amazon. They would also be useful on those drippy days to keep your transmitter dry.

The other thing to watch for is your battery life and output during the winter. According to Battery University, all batteries have an optimum service life at 20C/68F. If the temperature is raised to 30C/86F, the cycle life drops by 20%, and by 40% at 40C/104F and then 50% at 45C/113F. In cold weather, most batteries are at 50% at -20C/-4F, and can have significant discharge rate limitations. In some articles I have read in RC magazines, RC pilots have used a variety of approaches to keeping the batteries warm, including leaving them a warm car until needed, placing them in your coat and other warm places, and one guy put them in a cooler with a hand warmer pack. You should be extra aware of potential problems during flight from battery problems, especially if the batteries are several years old. Something's don't get better with age. Plan on shorter flights on your electric planes, for example.

Black Eye Pea Fly-in

First Float Flight and float flyer of the 2019 season.

Member's Projects



Woody's Top Flight AT-6 he acquired from Ken. Took the T-6 out of storage to refurbish/update it for the up-coming flying season. The T-6 is powered by an OS-91 four stroke with on-board glow. Guess Woody hasn't completely gone to the "Dark Side" (electrics) yet.

Corsair Build: *by Woody*

The Motion 1400mm (73") "Birdcage: Corsair arrived this past Friday. About 1 hour after starting assembly the Corsair was assembled with the exception of the electronics setup. Considering the size of this airplane I'm impressed with the pre planning that went into its development. Five major components; fuselage, two piece wing, horizontal and vertical stab. This is a real beauty from the three bladed prop to the retractable tail wheel.
Requires a 6 cell 4000 to 5000 mAh battery. Planning to install a gyro as well. Huge prop!
Looking forward to first flight.

1/3-scale Stormbird Flies Again: ***by Debra Cleghorn Executive editor Model Airplane News***

Ali Machinchy recently took his Me-262 jet out of storage to fly at the RAF Jets event at Abingdon field in the U. K. and we're glad he did! Ali tells us, "The wing joiner is actually a steel section." The design and build of the model was done by an experienced engineer with decades of experience in very large model designs. The fact that this model is over 8 years old and has had many hundred of flights is testimony to the design. Although I do still look in amazement how such a small looking joiner carries the loads!"

Getting Started with E-Power: *by Gerry Yarrish*

Today, our hobby is enjoying a literal "Golden Age" of RC electric flight. The amount of quality motors, batteries, controllers and connectors is just about limitless as are the types and sizes of airplanes you can fly with E-power.

Even though there are plenty of plug n play packages out there where you get everything needed in one box, the newcomer can find it difficult get started. Whether you are a beginner or an experienced RC pilot, if you've never experienced an airplane with clean, quiet electric power, there are some basics you need to know to be successful. Let's get started.

Today, there are all types and sizes of electric powered models, take your pick.

The first thing that you need to understand with electric airplanes is you have to look at the entire power system as a whole. One that will work together for maximum power and efficiency for the plane you are flying. Coupled with that, you have to understand how much power will be needed to fly your plane safely. Whether you're flying a lightweight micro indoor flyer

or a large 3D aerobatic plane, its performance is based on the amount of power it develops relative to its ready to fly weight. If you get an ARF model airplane, then everything will be included and you're good to go, but if you are putting your plane together with separate airframe and power system components, then you have to know what will work together.

From trainers to sport planes, gliders and electric ducted fan jets, the choices are endless.

Power

Electric motors, propellers and battery packs along with a suitable electronic speed controller make up your power system. But you have to use the correct combinations of equipment for your system to operate properly. To determine the power of your model's power system, you need to measure the voltage and current while the motor is running. The three important parts of the power formula are amps (A), volts (V), and watts (W). Before we talk about selecting power systems, we need to understand some very basic things about electric power.

Picking the proper electric motor and propeller is a very important first step.

Watt* is the unit of electric power in the same way that horsepower is used to express power for an internal combustion engines. You produce a certain number of watts by moving electricity through a device that converts it to power. Movement of electricity through a power system is described by the term *ampere* (amp), and the force that causes it to move is the *volt*. The basic relationship between these units with the equation Watts = Volts x Amps (W=VxA). An important thing for modelers to understand is that you can produce watts by using a lot of volts and just a few amps or you can use a small amount of voltage and lots of amps. It all works together. What this means is you can use a small amount of battery voltage and a large propeller diameter/pitch size or a larger battery voltage and a smaller propeller depending on the requirements of your model. To properly power our models we can use a simple rule called the *"Watts per Pound Rule".

Watts per Pound

This categorization is a loose, flexible way to estimate the amount of power needed for a specific size airplane while giving the performance required for safe flight. The rule is really just a guideline to determine how many Watts of power are needed per pound of airplane weight and is expressed as W/lb.

- **50W/lb. or less: Very lightweight micro RC and slow flyers.**
- **50–75W/lb: Sport powered sailplanes and gliders, basic trainers, lightweight scale planes, Vintage RC and RC Assist Free Flight designs.**
- **75–100W/lb: Basic sport flyers, intermediate aerobatics, scale, low-wing designs, and medium size warbirds.**
- **100–150W/lb: Advanced aerobatics, pattern flying, 3D planes, larger warbirds, and EDF jets.**
- **150–200 plus W/lb: Unlimited 3D aerobatics, warbirds, and large jets.**

Fast Fact: 746 watts = 1 horsepower

Batteries and Charging

Having a quality multi-type battery charger is an important part of the electric modeler's workshop.

Compared to the NiMH and NiCad (nickel metal hydride and nickel-cadmium) battery packs we used just a few years ago, the new generation of lithium Polymer (LiPo) battery packs (often referred to as Li-poly) have totally altered our definitions for power and flight duration. Where the older types of batteries offered 1.2 volts per cell, (1V under load), LiPo cells offer a nominal voltage 3.7V per cell and provide much larger capacities along with an impressive weight saving. More voltage, more capacity, and lighter wing loadings have really improved our airplane's flight performance.

C-Ratings

LiPo batteries must be charged carefully and with chargers designed specifically for LiPo battery packs. Though there are many new Lithium battery packs on the market with extreme charge and discharge ratings,

for the best longevity of your packs you should use a 1C charge rate. (1 times the capacity of the battery) Example: 3.3A for a 3300mAh battery capacity.

LiPo battery packs are the most common used today. It is important to pick the correct one for your model's power system.

As with most things in RC, extremely high performance RC LiPo batteries with very large capacity ratings have become very popular. Some of these high performance packs have very high charge and discharge ratings up to 5 to 15C charge rates and 45C (continuous) and 90C (burst) discharge ratings.

<u>Safety Warning:</u> Because of their internal chemistry, extreme care is required when using and operating LiPo battery packs. Overcharging a LiPo battery can cause the pack to burst, vent violently, and can cause the pack to catch fire. As for over discharging, most ESCs allow you to set a low voltage cutoff or use the default which varies by manufacturer. 3.0v is the absolute minimum anyone should use as allowing LiPo cells to go below this voltage will damage them. As with any high-energy electrical equipment and battery packs you should always carefully follow the manufacturer's instructions for proper use.

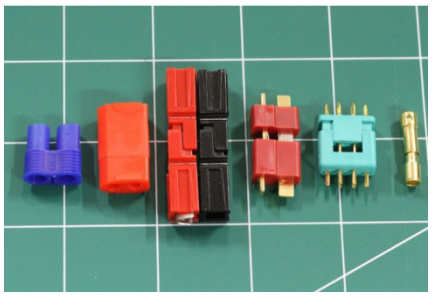
<u>Fast Facts: LiPo Packs</u>

- **Unlike other types of batteries, lithium polymer batteries can be stored for one to two months without significantly losing charge.**
- **Lithium batteries should not be trickle charged**
- **Typical maximum and minimum voltage for LiPo cells should be 4.23V and 3.0V volts per cell respectively.**

Another battery type of battery used today is the LiFe or A123 (3.3V per cell). Also referred to as Lithium Iron, these are relatively safer than LiPo cells and are often used for powering RC receivers.

<u>Connectors</u>

Like airplanes, battery connectors come in several styles and ratings.



Connectors are an important element in any electric power system, and you'll find them in between motors and ESCs and between the ESC and the battery pack. The most important thing to remember is to use the proper size connector for the battery and power system being used. Most of the battery manufacturers today include connectors already attached to the power leads or at least include them in an accessory bag. Using a low quality connector or one that's too small increases resistance in the wiring and this translates to heat and lose of power. As a rule, you should use as few connectors as you can to maximize efficiency. Many experienced modelers will eliminate the connectors between the motor and ESC by soldering the power leads directly together.

Adaptor cables help you manage your battery charger. Most brand name electric equipment has its own brand and type of connector. You will need to use the matching type to charge your battery packs. You can however, simplify your life by switching all of your battery and ESC connectors to a generic one. This will then allow you to mix and match battery packs between airplanes and you can use the same charger to service your battery packs. If the charger has the proper settings to match your packs. Most common are Deans Ultra T-configured connectors and Anderson Powerpole (APP) (also referred to as Sermos connectors). The Deans require soldering and some heat shrink tubing, while the APP connectors can be soldered or crimped onto the power leads with a special crimping tool.

<u>Glossary:</u>

Ampere (Amp): The standard unit of electric current. The current produced by a pressure of one volt in a circuit having a resistance of one ohm.

Battery Eliminator Circuit (BEC): – A circuitry that allows the battery that runs the motor to also power the receiver and the servos. This is often built into the ESC

Brushed Motor: The traditional type of electric motor where brushes make contact between the rotor and the stator. The touching of the brushes essentially creates the timing and current to make the motor spin correctly.

Brushless Motor: Type of electric motor used in RC electric aircraft. Brushless motors are much more powerful than traditional brushed motors, and are commonly used in electric aerobatic aircraft. They can be inrunner or outrunner motors.

Current: The flow rate of electrical energy. Measured in Amps

Capacity: Is a measure of how long you can draw a specified current from a battery. It is measure in Amp Hours (Ah), or more commonly for the scale of equipment used for electric flight, mill-Amp Hours (mAh).

Electronic Speed Controller (ESC): The thing that controls how much current is given to the motor and hence how fast the motor runs. Often they have a BEC (see above) built in. There are two main types – brushless and brushed.

Horsepower (HP): A measure of the rate of work. 33,000 pounds lifted one foot in one minute, or 550 pounds lifted one foot in one second. Exactly 746 watts of electrical power equals one horsepower.

Inrunners: Get their name from the fact that their rotational core is contained within the motor's can, much like a standard ferrite motor. They run inside the can.

Li-Po: Stands for lithium-ion polymer battery. These are the most modern kind of battery pack being used in electric aircraft. They provide enormous amounts of power for their size, especially when used in conjunction with a brushless motor.

mAh (Milliamp Hour): A measure of a battery's total capacity. The higher the number, the more charge a battery can hold and usually, the longer a battery will last under a certain load.

NiCD: Abbreviation for nickel cadmium. They are a form of rechargeable battery cells used in radio control gear as well as motor battery packs. NiCDs are being used less and less these days, as NiMH and Li-Po batteries take over.

NiMH: Abbreviation for nickel metal hydride batteries, they are the successors to NiCDs with much better performance and up to 3 times the capacity for an equally sized battery. Only Li-Pos top NiMHs.

Outrunner: The other type of brushless motor, where the outer shell, or 'can', of the motor rotates with the shaft. The extra inertia produces more torque, so outrunners are more powerful than inrunners and rarely are geared.

Power: For electric models this is a product of voltage and amps and is measured in watts.

RPM (Revolutions Per Minute): The number of times an object completely rotates (360 degrees) in one minute

Voltage: A unit of electromotive force that, when applied to conductors, will produce current in the conductors. Voltage is also referred to as electrical pressure.

Watt: The amount of power required to maintain a current of 1 ampere at a pressure of one volt when the two are in phase with each other. One horsepower is equal to 746 watts. Watts are the product of volts and amps.

A power meter is a handy piece of equipment to have to check how your airplane power system is operating.

SAE

Please do your part in support of this year's SAE event. Well worth the effort to see these fledgling aeronautical engineers and their crafts from around the world.



THUNDERBIRD 2018 CALENDAR

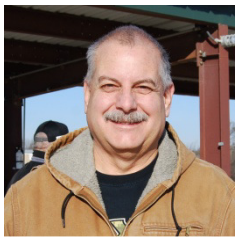
DATE	EVENT	POINT OF CONTACT
	Field Cleanup Day	**Club Members**
March 8-9	**SAE**	**Bill Lake**
April 6-7	**AMA Pattern**	**Chris Berardi/Sam Collette**
May 11	**Warbird**	**Ed Kettler**
July 4	**Club Picnic**	**Club Officers**
August 4	**Summer Float Fly**	**Woody Lake**
September 7	**Senior Pattern**	**Wichita Falls TX**
September 15	**Pylon Race**	**Golden Triangle**
September 21	**Senior Pattern**	**Valley Mills TX**
September 18-21	**B-17 Fly-In**	**Monaville TX**
October 12-13-14	**Alliance Airshow**	
October 5	**Senior Pattern**	**Gary Alphin**
October 19	**Texas Electric Expo**	**Tom Blakeney**
October 26-27	**Senior Pattern**	**Ken Knotts**
November	**Toys for Tots**	
December	**Club Christmas Party**	**Officers**

WWW.FWTHUNDERBIRDS.ORG

President: James Meadows E-Mail: jamslam1099@gmail.com	Vice President: Gary Cummings E-Mail: gary.a.cummings@sbcglobal.net	Secretary: Bill Lake E-Mail: wjl728@yahoo.com
Treasurer: Chris Berardi E-Mail: mikadopilot@gmail.com	Safety Officer: Mel Wells E-Mail: malekat@sbcglobal.net	Pilot's Log: Woody Lake E-Mail: at6pilot@att.net

Club Officers 2019

Pres: **James Meadows**



VP: **Rob Lowe**

Sec: **Mike Schroeder**

Safety: **Ed Kettler**

Treas**: Chris Berardi**

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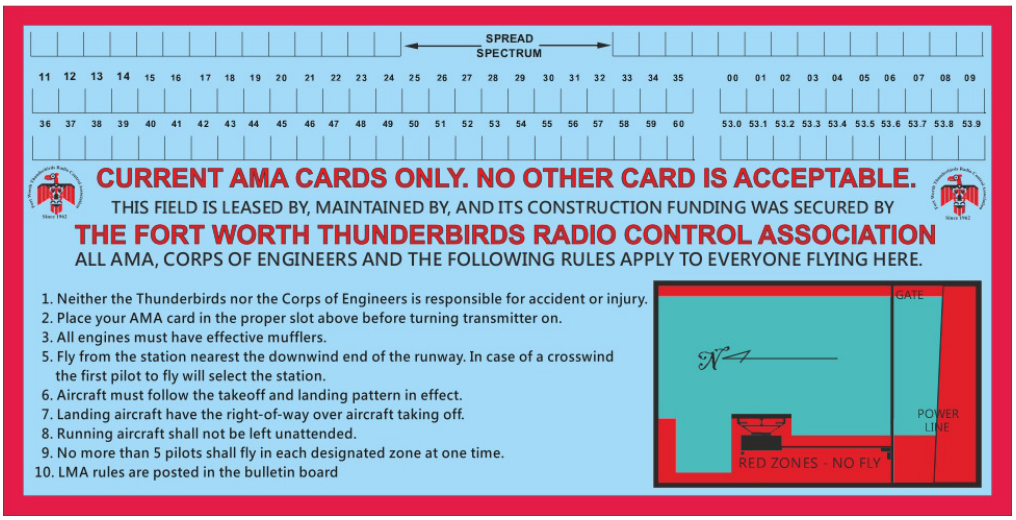
8808 Camp Bowie Blvd. Fort Worth TX 76116
jtshobby@yahoo.com

Project #	*Proposed Project*	*Summary of Project*	*TYPE*	*EXPENSE*	*POC*	*Status*	*Notes*
1	HELIPAD	10X10 Concrete flush with ground, Could be Self help or contracted	Self /Contract	$1,000.00	Officers	APROVED 2016-17	Will require new Lease /or wait for expiration of 2018 Lease to negotiate Less $$
2	Line control Area	Develop area for line control modelers	Self /Contract	$1,000.00	Officers	APROVED 2017	wait for expiration ofLease
3	Shed Update	Cross Ventilation fan	Contract				Suggest to member ship for Purchase Purchase
4	Larger shed/addon	Larger shed to store more stuff	self/contract				Will require new Lease /or wait for expiration of 2018 Lease to negotiate Less $$
5	Enclose some of the covered shelter area	utilizing rollup doors that can be pulled down when needed	Self /Contract	$Unknown			
6	Extend current runway	More stopping distance for models	contract	$ Unknown			Lease Renewel/cost
7	Tree Removal	Remove trees at approach end of runways. Requires root removal and new plantings	Contract	$15-$20,0000		IN WORK	requires Corp Approval will request Corp permission and requirements
8	Solar power lights in PIT Area	Allow for some visibility	Self /Contract	$400.00	james Meadows	testing in Aug	
9	Weather Station , with wind velocity	post on web site for real field condtion s	Self	$$	Chris Berardi		
10	Taller Flag Pole	the old one needs replaced	Self /Contract	$500.00	Mike Schroeder	Getting Pricing	
11	Quad GATES	Members Request	SELF	$$	UNK		used in Heli,quadand CL area



Academy of Model Aeronautics
National Model Aircraft Safety Code

Effective January 1, 2018

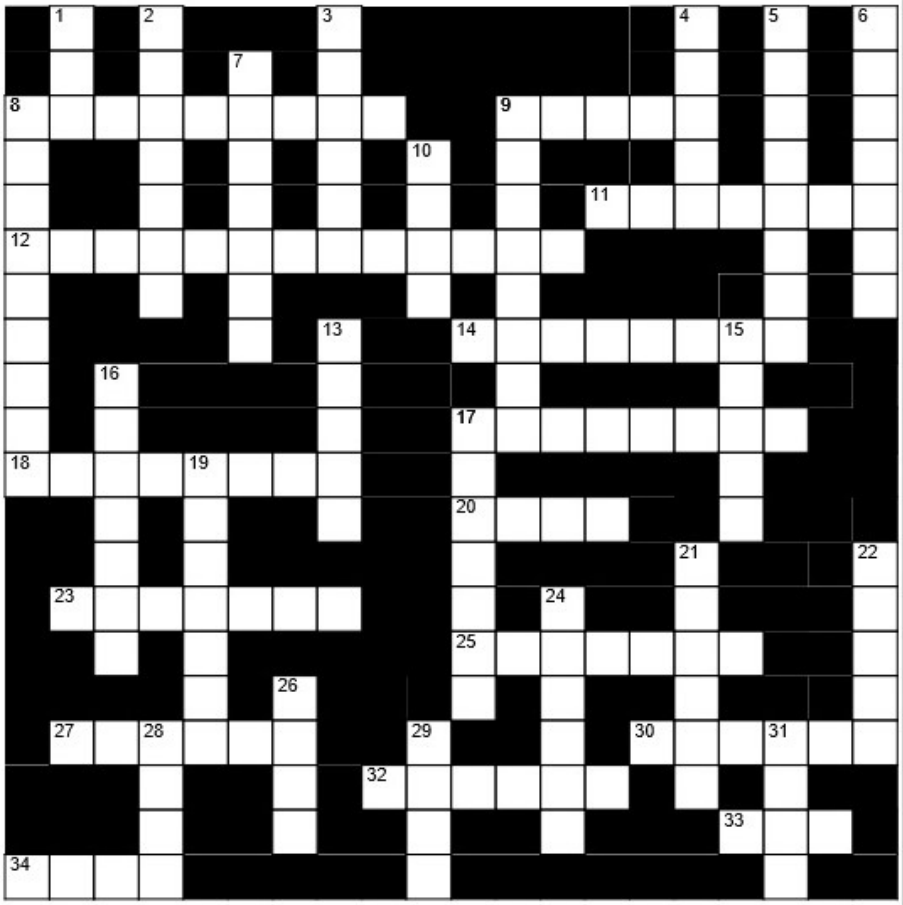
A model aircraft is a non-human-carrying device capable of sustained flight within visual line of sight of the pilot or spotter(s). It may not exceed limitations of this code and is intended exclusively for sport, recreation, education and/or competition. All model flights must be conducted in accordance with this safety code and related AMA guidelines, any additional rules specific to the flying site, as well as all applicable laws and regulations.

As an AMA member I agree:

- I will not fly a model aircraft in a careless or reckless manner.
- I will not interfere with and will yield the right of way to all human-carrying aircraft using AMA's *See and Avoid Guidance* and a spotter when appropriate.
- I will not operate any model aircraft while I am under the influence of alcohol or any drug that could adversely affect my ability to safely control the model.
- I will avoid flying directly over unprotected people, moving vehicles, and occupied structures.
- I will fly Free Flight (FF) and Control Line (CL) models in compliance with AMA's safety programming.
- I will maintain visual contact of an RC model aircraft without enhancement other than corrective lenses prescribed to me. When using an advanced flight system, such as an autopilot, or flying First-Person View (FPV), I will comply with AMA's Advanced Flight System programming.
- I will only fly models weighing more than 55 pounds, including fuel, if certified through AMA's Large Model Airplane Program.
- I will only fly a turbine-powered model aircraft in compliance with AMA's Gas Turbine Program.
- I will not fly a powered model outdoors closer than 25 feet to any individual, except for myself or my helper(s) located at the flightline, unless I am taking off and landing, or as otherwise provided in AMA's *Competition Regulation*.
- I will use an established safety line to separate all model aircraft operations from spectators and bystanders.

For a complete copy of AMA's Safety Handbook please visit:
www.modelaircraft.org/files/100.pdf

Crossword Puzzle Compliments Chris Berardi



Across

8. His principle states that an increase in the speed of a fluid occurs simultaneously with a decrease in pressure.
9. Exceed Angle of Attack.
11. Official AMA club recognition.
12. Instant glue.
14. Determines runway in use.
17. You can't drink this spirit.
18. Difference in incidence of a biplane's wing.
20. Angular rate sensor.
23. A type of warbird.
25. Your first r/c airplane.
27. Fuselage station structure.
30. NASA's second human space flight program.
32. Just one of these beans will kill you.
33. Pivot around the vertical axis.
34. Opposes thrust.

Down

1. You need 5 kills to be this.
2. Every successful flight ends with this.
3. Orville's brother.
4. This hardwood is extensively used in construction projects.
5. Aircraft controller.
6. Art Scholl's best friend.
7. US premier WWII fighter.
8. Kelly Johnson's baby.
9. R. J. Mitchel's baby.
10. Flying on your own.
13. You can never have enough of this.
15. One dimension of a wing.
16. Crew Station.
17. Source of high energy impulses for ignitions.
19. Powerful alkali metal.
21. Compression ignition engine.
22. Associated with the Dirty Birdy.
24. Peregrine.
26. Airscrew abreviation.
28. Some pistons have this.
29. Roman god of war.
31. Scale aerobatics club acronym.

http://www.vintageflyingmuseum.org/warbird-rides/