Fort Worth Thunderbirds Radio Control Association Inc.

The Pilot's Log

Issue 4464, September 2019

Next club meeting: September 23rd, 2019, 7:00pm, Buffalo West Restaurant 7101 Camp Bowie Blvd

Presidents Corner: *by James Meadows*

No report this month. See you at the September meeting.

Vice Presidents Corner: *by Rob Lowe*

No report this month. See you at the September meeting.

August 2019 Meeting Minutes: *by Mike Schroeder*

Meeting starts at 7:00pm

Welcome by James Meadow: New member Jack Womak. Welcome to the Thunderbirds RC club. Jack we look forward to seeing you at the field.

Recap of events

Float Fly: August 4, 2019 start at 9:00am. CD was Woody. We are under the new rules with the LAANC system so we could not start any earlier than 9:00am. It took a lot of effort among the Thunderbirds, CD/Board, and FAA to make this happen using the new LAANC system. There were 26 pilots and we had great weather for flying at Lake Worth at Camp Joy Park. The food was really good. Thanks Woody for your hard work.

NATS Award: Sam Corlett competed in the Advance Class in helicopters at the NATS and won First Place. Well done Sam and congrats for the award.

Future Events: Nothing at Thunderbird field for September

Alliance Airshow: October 18-20 with a static display and flight simulation stations. Volunteers needed along with an event manager. Possible face to face meeting of up to 45,000 people.

Show and Tell

Gary James: Showed us his Mouse racer with a Cox .049 engine, top speed around 45 to 55 mph. Gary also displayed a 1/4 - 40 with a Dub Quickie-Jett engine which are traveling around 205 mph on control line. They race at Samell-Garland Park in east Dallas.

James Meadow: Displayed an old Futaba radio that he is donating if somebody wants and could convert to 2.4GHz for fun.

Officer Reports

Safety Report **- Ed Kettler: Show of hands who read his newsletter article about saving the RC hobby. We need to contact our congress person to let them know about how we feel on all the new rules. Facebook had a drone with a flame thrower on it killing wasp nest and saying it was okay to do. We need to stay in the flying boundaries of our field. No safety issues as of this time to report.**

Treasury Report **- Chris Berardi: Several new members, current membership is 204. Porta can cost has gone up twenty dollars and we are looking at other companies prices.**

Warbird was a big deposit and Woody gave Chris deposit for the Float Fly tonight.

Our current checking and saving balance are in good standing.

Secretary Report **- Mike Schroeder: Motion by Bill Lake to defer the reading of the minutes, second by Tom Blakeney. Thanks guys. Show of hands in favor and all in favor. Motion passed.**

Vice President Report **- Rob Lowe: If you have any suggestions for a topic for a speaker presentation please let Rob know.**

Old Business

Thank you from Texas Wings for the donation last month
Thank you from FW Air Museum for the donation

Trainers: We were able to buy one trainer but there is a shortage of the planes out there. Thanks for supporting new students by allotting funds

Youth Group: We have a youth group that wants to use our field for a training event of rockets. It will be on a Sunday morning and when we get the date we will let you know. Tom Blakeney volunteered to help out and Mike Schroeder will also assist.

Scout Group: Another youth group is requesting similar activities for a rocket shoot for their Aviation badge. Will let you know date and time.

New Business

FAA on Testing all RC pilots**: Link in July newsletter to provide feedback as to how we would like to take the test for the FAA. All UAS pilots are to be licensed. Please respond to the FAA request of information.**
Rob gave us a rundown of how the rules take place and we should give our input. There is currently a push by law enforcement to have Remote ID installed on all UAS. Yes we fall into the UAS classification which stands for Unmanned Aircraft System.

Corps Master Plan Revision**: James Meadow, Ed Kettler and Mike Schroeder attend the corps Benbrook Lake meeting. The last Master Plan was done in 1972 and the lifespan on the plan is for twenty five years. The corps is currently working on all their plans nationwide. They are asking for our comments and corps contact information was handed out at the meeting. Please put positive suggestions on the form. Bathroom, Training facilities, RV hook up.**

1. **We are getting a new Lake manager on September 3.**

2. **We also met the Benbrook mayor and city council men and talked about possibilities for our club and the city.**

3. **We learned that we need to market the club better to let people know what we do and the benefits of having the Thunderbird club.**

Announcement **- Tom Blakeney: Richardson RC Club is having a SWAP meet that has 180 tables already sold out.**

Auction - **for a Tucano ARF plane for $90. Tom Mullen is the proud new owner, Thanks Tom.**

Meeting ended at 8:15pm

Members in Attendance

Brian Lowe
James Meadow
Ken Knotts
Sam Corlett
Stephen Carr
Tom Blakeney
Robyn Blakeney
Larry Fuller
Jack Womak
Gary James
Aaron McMorris
Gary A Cummings
Ed Furche
Woody Lake
Ian Warning
Mel Wells
Garry Rife
Ed Moskal
Tracy Kobs
Ed Kettler
Tom Mullen
Tom Benke
Pete Dubin
Johnny Hunt
Gary Alphin
Bill Lake
Greg Hutchins
Paul Mayhan
Jennifer Mayhan
Kenneth Killgo
Chris Berardi
Tab Bowland
Phil Mitchell
Mike Schroeder

Treasurer Report: ***by Chris Beardy***

Membership Type	Count
Individual	167
Family	17
Associate	6
Life	12
Service	2
TOTAL	**204**

Safety: ***by Ed Kittler***

Pulling Out My Crystal Ball

One of the major challenges in the National Airspace System (NAS) is how to integrate small unmanned aerial systems (SUAS) like RC aircraft up to 55 pounds, as well as larger vehicles. A key tenet of airspace safety is "see and avoid" which works for manned flight, but is difficult once our aircraft are thrown into the mix. One of the new technologies that are required for manned aircraft is ADS-B, which I have installed on my Nanchang. There are two sides to ADS-B: In and Out. Out is mandatory by January 2020 for the majority of the military and civilian fleet; In is optional.

What the ADS-B Out does is broadcast my position and vectors based on a precision GPS and pressure altitude to a ground station, where it is integrated with other data points, and rebroadcast to receivers (ADS-B In) to provide traffic and weather information in the cockpit. I have a tablet display in my cockpit, and I can see relative traffic position (+/- 100s of feet altitude, position, vectors and threat). Surprisingly, the modules I use are built into my wingtip lights, and are pretty easy to install, and cost about $2200. There are other methods that are cheaper as well as much more expensive, plus I got strobes in the deal. These are made by uAvionix, who also builds SUAS ADS-B products. One of the founders of uAvionix is Paul Beard, a key contributor at Spektrum RC.

So, where is this going for RC pilots? At some point, the FAA is going to issue rules that require us to have an ADS-B out beacon on our models. The challenge for the FAA is that if every drone had to broadcast, it could overload the ADS-B ground stations, so they may have to roll it out in phases based on a risk management profile. The price point has to come down, and it will, and the ability to integrate flight control autopilots into RC receivers is maturing rapidly. The pingRX ADS-B In receiver weight 5 grams and runs at flight pack voltages, now costs $250. With a telemetry integration, the RC pilot could get an audible warning that a manned aircraft was within x miles bearing y degrees and altitude, alerting the pilot to a possible conflict. More advanced integration would allow the autopilot to perform predictive threat analysis and maneuver to avoid the manned aircraft.

There may be other solutions, where we can tie into the FAA Low Altitude Authorization and Notification Capability (LAANC) that Rob Lowe has talked about, and provide a general notice that the field is active, and feed ADS-B. Lots of options in that approach, but lengthy process to get to an answer.

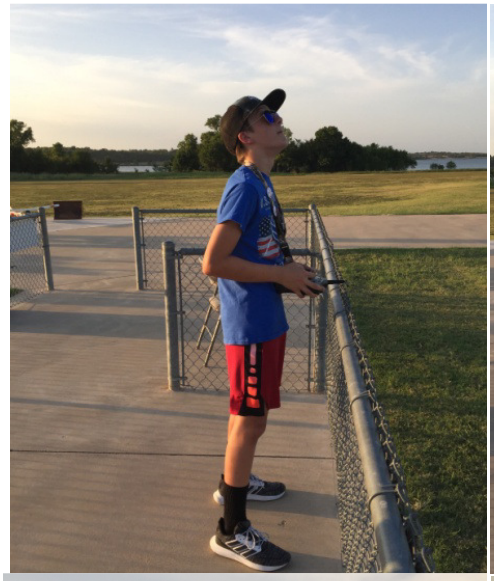
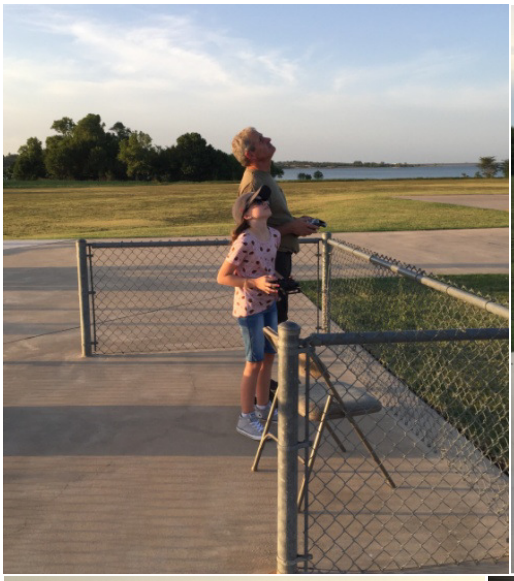
On the other side of the equation, I'd like to see AMA fields on my sectional charts. I have flown over and near Thunderbird Field, and even knowing that there was an event it was very hard to see our model aircraft in flight. Having a potential hazard marked on a chart, just like skydiving and antennas are, would help me avoid the hazard, because they are very hard to see.

As I put the cover back on my crystal ball, stay watchful on the AMA Government Relations site and other outlets. There are external forces out there shaping our hobby, and we need to be watchful and active.

Blue skies
Ed

Training

Our training program continues to be a success as evident by the following photos. Despite some very hot blustery afternoons the students continue to visit with us.
Some students have even brought friends to get them interested in our hobby. Come join our instructors for a great afternoon of flying and tall stories "There I was……"




…and after all the hard work, time for some refreshments.

Propeller Basics: ***byArticle in Sailplane and Electric Modeler Magazine***

The majority of powered model airplanes use a propeller as part of their power system, and electric models are no exception. Some models use a ducted fan to simulate jet flight, and some even use propane or kerosene powered turbines (real jet engines). There are also a very few models that use flapping wings as a source of motive power (known as ornithopters). However, propellers are still the most efficient way to power a model.

What Does a Propeller Do?

In short, a propeller moves air. It converts the torque of its power source (a motor or engine) into thrust, and the rotational speed (rpm) into linear speed. The combination of an electric motor and a propeller turns current (Amps) into thrust and voltage into speed.

There are two values that express the most important characteristics of all propellers: diameter and pitch. The diameter is really the diameter of the circle in which the propeller rotates. This corresponds to twice the distance from the center of the propeller hub to the tip of one blade (for a propeller with an even number of blades, that's just the distance from tip to opposite tip).

Slicing the end off of a propeller blade reveals an airfoil just like that found on a wing. Different propellers use different airfoils. Some modern electric flight propellers have under cambered airfoils. This glow propeller has a flat-bottomed airfoil.

The *pitch* is a measure of how far the propeller would move forwards in one revolution if it were treated as a screw and screwed into some solid material.

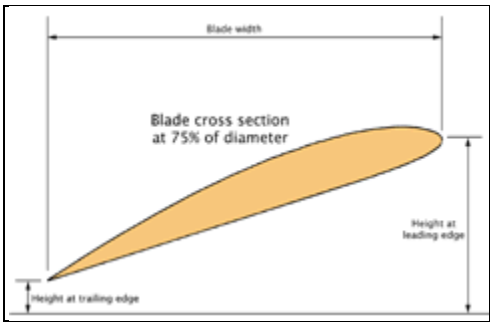
Although the measure of pitch treats the propeller as if it were a screw, one shouldn't think of it as an airscrew (the name of a certain model airplane prop manufacturer notwithstanding). It is really a rotating wing, and if you were to take a propeller and slice it across the blade, you'd see a typical airfoil cross-section.

The size of a propeller is usually expressed in the form *diameter* x *pitch*. For example, an 8×4 propeller has an 8 inch diameter and 4 inch pitch.

As a <u>very</u> rough approximation, the diameter of the propeller controls the thrust produced, and the pitch controls the speed of the air leaving the back of the propeller. In reality, pitch also affects thrust somewhat, but thinking of the two separately helps to envision how propeller changes will affect performance.

Measuring Pitch

Most propellers are labeled with their pitch and diameter, but it is possible to determine both given an unmarked prop. The diameter is straightforward to measure of course.



Measurements needed to determine the pitch of a propeller should be taken 3/4 of the way from the hub to the tip.

To measure the pitch, lay the propeller flat on a table, measure 75% of the way from the hub to the tip, and draw a line across the propeller blade. Measure the width of the blade at this point, along the surface of the table (i.e. the width of the blade's shadow if there were a light on the ceiling overhead). Next, measure the height of the front and the back of the blade, and compute the difference between these two to determine the height.

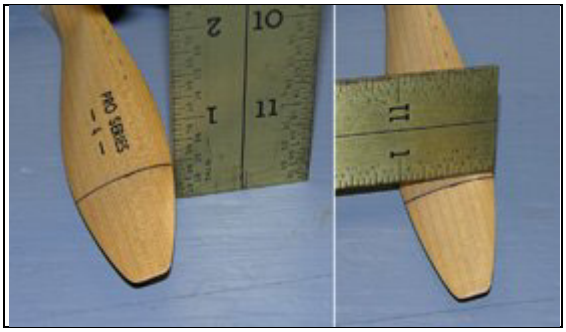
The pitch is then given by the formula:

pitch* = 2.36 *diameter height/width

There's nothing magical about the number 2.36; it's just 75% of π (pi), because we're measuring pitch at the 75% diameter mark.

The reason we measure pitch at 75% of the diameter is two-fold. Generally, the pitch of a propeller is not completely constant, varying somewhat from hub to tip to optimize it for the different linear speeds at each point along the blade. The pitch at 75% corresponds roughly to the average effective pitch of the propeller. Secondly, the propeller is sufficiently wide at 75% to allow one to

get reasonably accurate measurements of blade width and height.



Measuring the pitch of a propeller is easily done on a flat surface with an accurate ruler.

Power Requirements

Both pitch and diameter affect how much output power the motor must produce to turn the propeller at a given rpm. The following equation shows the relationship between motor output power (also called shaft power, or propeller input power), rpm, pitch, and diameter:

$$power = k\ rpm^3\ diameter^4\ pitch$$

The factor *k* depends on the units used to express power, pitch, and diameter, and also on characteristics of the propeller such as the airfoil it uses, its overall shape, thickness, and so on. For power in Watts, and diameter and pitch in inches, *k* is about 5.3×10^{-15} for an average model airplane propeller.

This formula tells us a number of things. First, it tells us that rpm is not directly proportional to power. Doubling the shaft power and keeping pitch and diameter the same will only increase rpm by a factor of 1.26 (the cube root of 2).

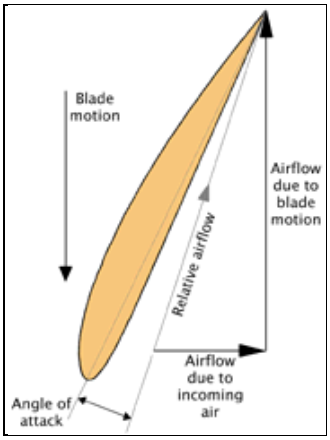
It also tells us that increasing the pitch slightly will increase the power requirements slightly, whereas a slight increase in diameter will result in a dramatic increase in power needed to maintain the same rpm. For example, going from a 10 inch propeller to an 11 inch propeller of the same pitch would require 1.46 times the power to maintain the same rpm (11/10 to the fourth power). Or, if the shaft power was kept the same, the rpm would drop to 88% of what it was (the reciprocal of the cube root of 1.46 from the previous result).

The fact that pitch affects power requirements only slightly is very important, because it means that we can make small changes in pitch to improve model performance without having to worry too much about increasing current. For example, if we have a model with a 10×7 prop that has good take-off and climb performance, but poor high-speed performance, we can switch to a 10×8 prop and only increase power required by about 14%. Assuming the motor is near its maximum efficiency point, current will also increase by about 14%, say from 25A to 29A. Larger changes in pitch should be accompanied by a slight reduction in diameter to keep the current levels reasonable.

In practice, changing from one propeller to another will change both the rpm and the power. This is because changing the load on a motor shaft will change the rpm, which will change the power required, which will change the rpm, and so on. The motor and propeller combination will find a new operating point at which the shaft power produced equals the propeller input power required. Next month, I'll talk about how motor output power is related to input voltage, current, and rpm, and how this can be mathematically connected to the propeller formula above to predict what will actually happen.

Airflow

As was mentioned earlier, a propeller is really a rotating wing, and as such, is subject to the same aerodynamic effects as a wing. As a propeller rotates, the blades meet the oncoming air. The angle at which this happens is a function of how fast the air is moving towards the propeller and how fast the propeller is turning. If the air were stationary, the angle of attack of a given section of the blade would be exactly equal to the blade angle at that point.



The relative angle of attack of the airflow to the propeller blade depends on the rotational speed of the blade, and the speed of the incoming air flow.

In reality, the air is not stationary, even if the plane is not moving, because the air accelerates before it reaches the propeller. As a result, from the blade's point of view, the air is meeting it at some relatively low angle, which is the blade's angle of attack.

Like any wing, a propeller blade can stall if the angle of attack is too high. This can happen with a very highly

pitched blade when moving at too low an airspeed. It is for this reason that high pitch propellers, like a 10×9 or 12×12 often exhibit poor performance at low airspeeds. A plane equipped with such a propeller will often exhibit poor launch or take-off performance, and then come alive once the model is up to speed.

Also like a wing, if the angle is too low, no lift will be produced. A low pitched propeller on a fast plane (for example, 8×3, 12×5, etc.) can get to the point where it produces no thrust (in a dive, when gravity is providing the force to keep the plane moving). In high speed level flight, thrust from such a propeller can drop too low to overcome drag long before the plane has reached its designed flying speed. According to Astroflight's Bob Boucher, such propellers should be relegated to stirring paint. Of course, this statement was made in the days before slow-flyer models, which often sport very large low pitch props.

For many aircraft, a good compromise is a propeller with a diameter to pitch ratio of about 3:2 or 4:3 (for example, 8×6, 9×6, 10×7, 11×8, 12×8, 12×9, and so on). Such a propeller will become unstalled at relatively low airspeeds (usually below the model's stall speed), and will remain efficient at relatively high flying speeds.

In many full scale aircraft, the propeller has in-flight adjustable pitch, so that it can have a low pitch for maximum take-off thrust, and a higher pitch for optimal cruising efficiency. Some small full-scale aircraft can be fitted with one of three different propellers depending on the need at the time: low pitch for getting heavy loads off the ground but slow cruising, standard for general use, or high pitch for light loads but fast cruising.

Three or More Blades

Most model propellers have only two blades because a two bladed propeller is generally more efficient than a larger propeller that produces the same thrust and air speed. A common misconception is that this is due to the blades operating in each others' wakes, but this is only a small factor. Remember that the air in which the propeller is turning is moving away from the back of the propeller, so the wake from each blade will move backwards too, leaving clean air for the next blade to bite into. A reasonably pitched propeller would have to have a large number of blades before they start interfering with each others' air.

That being said however, a multi-bladed prop does have more induced drag caused by tip vortices (air spilling over the blade tips, just like wingtip vortices on a wing), because there are more tips. So, overall efficiency is lower, in much the same way that a biplane (even one without struts and bracing wires) is less efficient than a monoplane with the same wing area. A multi-bladed prop often has a larger total blade surface area than the equivalent larger two-bladed prop, further reducing efficiency (due to parasite drag).

For best performance, reduced noise, and increased motor life, all propellers should be balanced before use. I use a Top Flite magnetic balancer, which due to its nearly frictionless bearings; will show even the slightest imbalance.

Multi-bladed propellers do have the ability to turn power into thrust and airspeed in less space than a larger two-bladed prop though, which makes them advantageous when ground clearance is an issue (or fuselage clearance for wing or pylon mounted propellers).

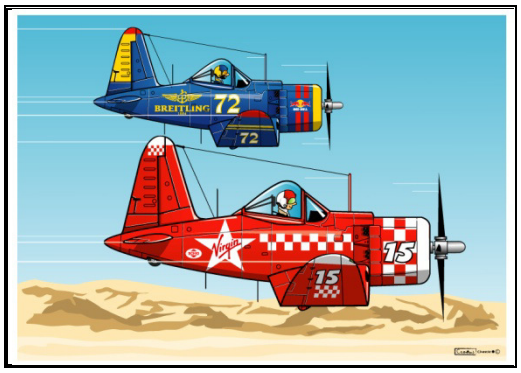
THUNDERBIRD 2019 CALENDAR

DATE	EVENT	POINT OF CONTACT
September 18-21	**B-17 Fly-In**	**Monaville TX**
September 21	**Senior Pattern**	**Valley Mills TX**
October 5	**Senior Pattern**	**Gary Alphin**

October 12-13-14	**Alliance Airshow**	
October 26-27	**Senior Pattern**	**Ken Knotts**
November 3	**Float Fly**	**Mel Wells**
November 9	**Texas Electric Expo**	**Tom Blakeney**
November	**Toys for Tots**	
December	**Club Christmas Party**	**Officers**

Texas 2019 RACING SCHEDULE (as of 3/28/19)

DATE	LOCATION	HOST CLUB	EVENTS
April 6	Georgetown	GAMA	C40/EF-1
April 20	Waco	HOTMAC	C40/EF-1
April 27-28	Kansas City	KCRC	424 / 426
May 19	Austin	HCAM	EF-1
June 1	Fred French Field	Fred	C40/EF-1
Sept 21-22	Wichita	HSF	Q-40
Oct 6	Austin	HCAM	EF-1
Oct 19	Waco	HOTMAC	C40/EF-1
Nov 2	Georgetown	GAMA	C40/EF-1

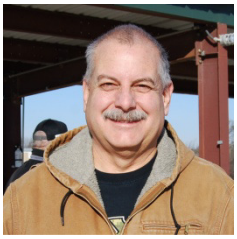


WWW.FWTHUNDERBIRDS.ORG

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

Club Officers 2019


Pres: **James Meadows**


VP: **Rob Lowe**


Sec: **Mike Schroeder**


Safety: **Ed Kettler**


Treas**: Chris Berardi**

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JT's Hobby Shop 817 244-6171
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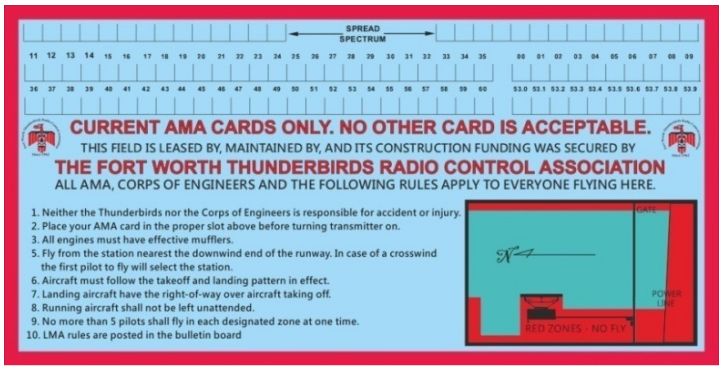
jtshobby@yahoo.com

Flying Field Rules



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

Proposed Projects

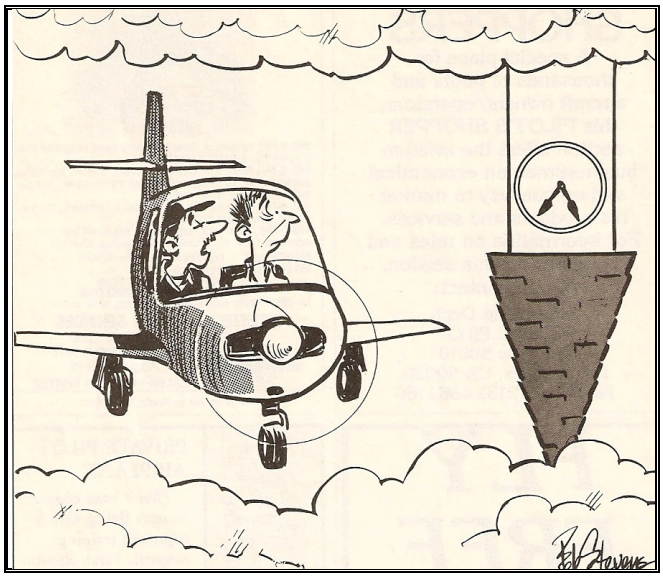
Project #	Proposed Project	Summary of Project	TYPE	EXPENSE	POC	Status	Notes
1	HELIPAD	10x10 Concrete flush with ground, Could be Self help or contracted	Self /Contract	$1,000.00	Officers	APROVED	Will require new Lease /or wait for expiration of 2018 Lease to negotiate Less $$
2	Line control Area	Develop area for line control modelers	Self /Contract	$1,000.00	Officers	APROVED 2017	wait for expiration ofLease
3	Shed Update	Cross Ventilation fan	Contract				Suggest to member ship for Purchase Purchase
4	Larger shed/addon	Larger shed to store more stuff	self/contract			DISCUSSION	Will require new Lease /or wait for expiration of 2018 Lease to negotiate
5	Enclose some of the covered shelter area	utilizing rollup doors that can be pulled down when needed	Self /Contract	$Unknown			Span is to large for standard doors
6	Extend current runway	More stopping distance for models	contract	$ Unknown			Lease Renewel/cost
7	Tree Removal	Remove trees at approach end of runways. Requires root removal and new plantings	Contract	$15-$20,0000		Denied by Corp	requires Corp Approval will request Corp permission and requirements
8	lights in PIT AreaLand spot on outside of shed	Allow for some visibility	Self /Contract		james Meadows	Approved	COMPLETED
10	Taller Flag Pole	the old one needs replaced	Self /Contract		Mike Schroeder	Approved	COMPLETED
11	Quad GATES	Members Request	SELF	$$	UNK		used in Heli,quadand CL area
~~12~~	~~TRACTOR~~	~~TRACTOR to allow field Mantenance~~		~~10K~~	~~ONK~~	~~Needs Dsicussion~~	~~Withdrawn~~

Some Blasts from the Past

2014 Civil Air Patrol Show n Tell

2014 Old Farts Four Stroke Fly-in

HUMOR



I think it's time to recheck your instruments