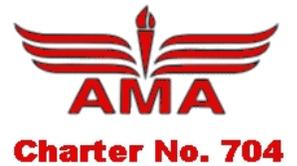




The Tailwind



FEBRUARY

DON LEWIS, EDITOR

2016

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

Next Meeting on Friday, February 18 - Be There!

Be sure to check out the website at www.fly-hrcc.org

MEETING MINUTES

L. Perkes called the meeting to order at 7:03 PM.



Attendees: D. Lewis, L. Perkes, B. Pruner

- The November minutes were published in the January Tailwind. D. Lewis moved to accept as published; B. Pruner seconded; passed unanimously.
- L. Perkes presented the Treasurer's report as detailed below. D. Lewis moved to accept; B. Pruner seconded; passed unanimously.

Old Business

- Don Sims joined the club at the Numb Thumbs – welcome to the club!
- Trailer repair is still pending Bob getting time to make the repairs.
- Mower cover is worn out. L. Perkes moved that we purchase a new cover; D. Lewis seconded; passed unanimously.
- D. Lewis to confirm event dates with Parks Department.

New Business

- Field mods were reviewed:
 - Fencing (need length of fabric on hand)
 - Pilot fences
 - Large scale starting poles
 - Rules sign
 - Instruction announcement sign

- Need to roll field in early March
- Need to treat field for grubs & moles
- The car show display was discussed. Tabled for further consideration as to frequency.
- L. Perkes requested a volunteer to be the club's primary representative for the MTRCCA meetings. D. Lewis volunteered to attend whenever he can and notify L. Perkes when he is unable to attend due to business travel.
- D. Lewis will remind everyone in the next meeting announcement about renewal dues.
- There being no further business, D. Lewis moved to adjourn at 7:45 PM; seconded by B. Pruner; passed unanimously.

TREASURER'S REPORT



Opening balance	\$ 847.36
Income	471.61
Expenses	<u>(133.66)</u>
Closing balance	<u>\$ 1,185.31</u>

DIHEDRAL: HOW MUCH IS ENOUGH?

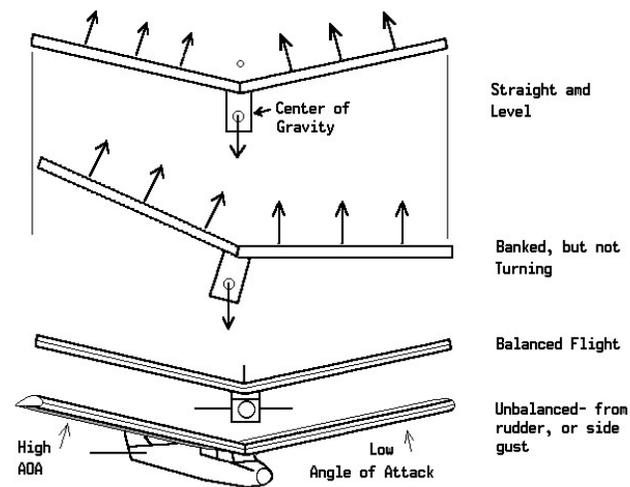
By Clay Ramskill

Like most things in the aerodynamic world, the answer to the above question is- "it depends". It depends on what you want from your plane; how maneuverable or how stable you wish it to be in the rolling axis, whether or not you desire the plane to

roll when you deflect the rudder, whether or not you wish the plane to tend to self right when its upset from wings level.

In general, the more dihedral an aircraft has, the more it will tend to self-right to wings level when upset from straight and level flight. This little bit of roll stability makes the plane easier to fly because the pilot doesn't have to be constantly fighting to maintain wings level. Note the top two drawings in the figure - once we are no longer level, the lower wing is effectively a bit longer, and the lift forces on the lower wing are pointed more straight up. Also, since the figure shows a high wing plane, the CG of the plane is offset toward the high wing. All these situations tend to force the plane back to a wings level condition initially, before the plane begins turning or skidding sideways.

But the conditions described above won't last long. Also note that we now have the lift forces on the higher wing pushing sideways; this will cause the plane to skid sideways, turn, or both. Assuming no



corrections from the pilot, what now happens is largely dependent upon the size of the rudder/fin combination! If the fin/rudder area is just right, the skid continues just enough for the dihedral effect of the wing to return us to wings level. Too much area in the fin/rudder, and we turn without skidding. Centripetal force from the turn negates all the self-righting effects, and we fly in balanced flight, but in an ever increasing wing and nose-down spiral - this is called spiral instability. Too little fin/rudder area, and the skid continues even as we pass wings level, resulting in over correction, and the plane rolls and

skids, oscillating like a drunken sailor - this is called Dutch roll.

Although the above discussion is more important to glider and free-flight pilots, it brings us to look at how dihedral affects a plane in skidding flight - and the good and bad sides of the dihedral effect. Note in the figure what happens to a plane with dihedral when in a skid, or unbalanced flight. This condition can occur with the pilots deflection of the rudder, or when a wind gust hits the plane from the side. The large discrepancy in angle of attack between the two wings causes the plane to roll away from the direction of the skid.

The dihedral effect is beneficial in self righting, gives us roll coupling with rudder application, and unfortunately, also gives us roll away from a side wind gust. Incidentally, sweeping a wing back also gives us dihedral effect - with about 5 degrees of sweep being equivalent to 1 degree of dihedral.

While roll coupling is essential to a trainer with no ailerons, its not good for aerobatic and combat aircraft. Most acrobatic and pattern models will have no dihedral. Military planes, with swept wings for speed, often use negative dihedral to counter the dihedral effects from the wing sweep - the Harrier, A7 Corsair, and C5 transport come to mind.

And while trainers usually have quite a bit of dihedral, and are wonderfully stable in normal flight, we've all seen them turn vicious in a gusty crosswind, during take off and landing, and even while taxiing on the field.

How much dihedral is enough?? For most of us, then, the answer is - Only enough to give us the roll stability we need, commensurate with our flying skills!

HOW TO BUILD A CARBON FIBER SPAR

by Composite Structures Technology

The performance in many model classes has reached the point that wooden spars and other components can not carry the loads generated by the models or the launching techniques. Over the years many designs have been tried to build an extremely

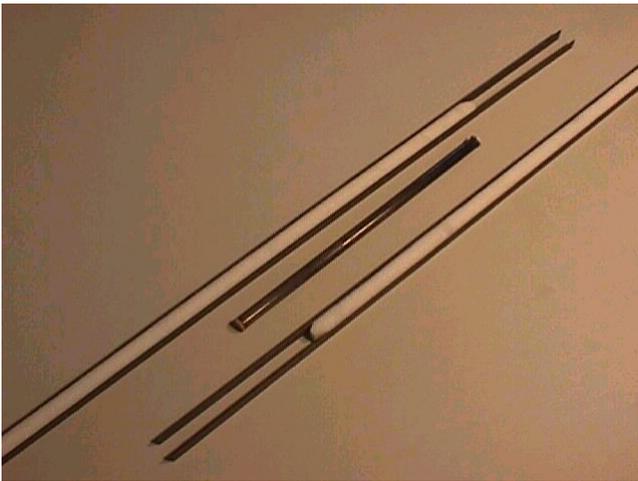
strong wing spar. This design borrows many proven ideas from others to achieve the best possible strength and stiffness with a reasonable construction time, and no need for elaborate tooling.

The spar is constructed using single tapered unidirectional carbon laminate strips for the upper and lower spar caps and Rohacell 71 for the spar core. The upper cap on this spar intended for a winch launched glider is .060" thick tapering to .014" at 48" from the root, and the lower cap is .030" thick tapering to .014". The width of the spar for this model is .5".



A simple jig is needed to align the parts with the correct dihedral angle. The jig is cut from a scrap of lumber then clamped to a flat work bench. The core has been cut away at the root of the spar where the joiner rod tube will be located.

It is hard to see in the picture but a layer of plastic film was placed over the jig before the spar was pressed into the slot in the jig. This protects the jig and table from the gluing process that will follow.



The upper cap is twice as thick as the lower cap because carbon fiber like all fibrous materials will carry about twice as much stress in tension as in compression. The spar height will be the full airfoil thickness less a small thickness of filler for final fairing. The Rohacell core is cut then sanded to the exact height needed allowing .015" for an outer carbon sleeve. The caps are glued to the core with thick CA glue.

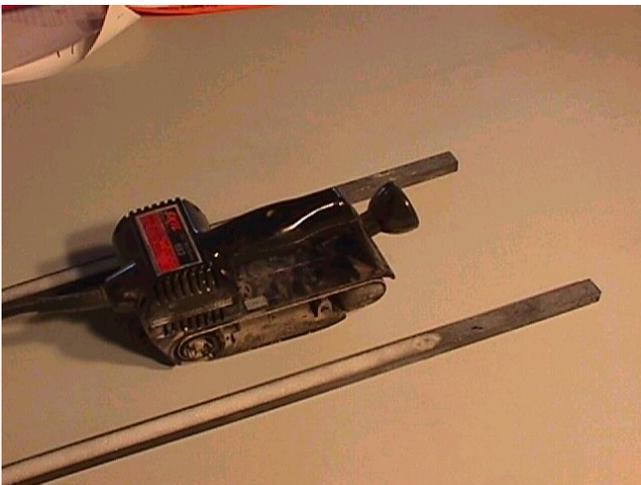
The wing joiner will be a straight carbon rod. An appropriate sized tube will be built into the spar. Note that the ends of the tube have been closed with a small bit of balsa and CA glue.



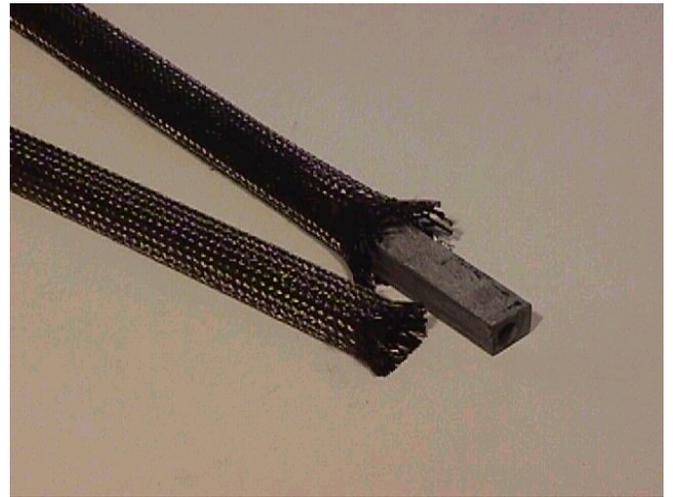
Mix up two or three ounces of West System Epoxy and add Chopped Carbon Fiber to the epoxy. This will make a thick stringy paste.



With the jig and spar held in place fill the cavity at the spar root about half full of the paste. Then press the wing joiner tube in to the middle of the spar, aligning it carefully. Then fill up the remainder of the cavity with the mixture. Be sure there is no air trapped in the cavity, it is OK to over fill it a little.



The next day after the epoxy has cured remove the spar from the jig, and sand away the excess carbon and epoxy. This is a job that calls for power tools. Be very careful when sanding near the Rohacell it will sand very easily and you don't want to remove any Rohacell. Next saw the spar in half, and hand sand the rest of the spar to smooth up any rough edges.



Slide a carbon braided sleeve over the spar. On this spar I used a .5" diameter sleeve made from 3 k tow. As you push the sleeve over the spar the diameter will grow to allow it to slide over the spar but the length will be reduced. Be sure you have more length than you think you will need for the part. When the sleeve is in place tack one end with CA glue and pull the sleeve toward the other end to shrink it to the spar then tack the other end with CA glue. It is a very good idea to close the open end of the wing joiner tube with a small bit of tacky bag sealant this will keep epoxy out of the tube when you glue the carbon braid to the spar.



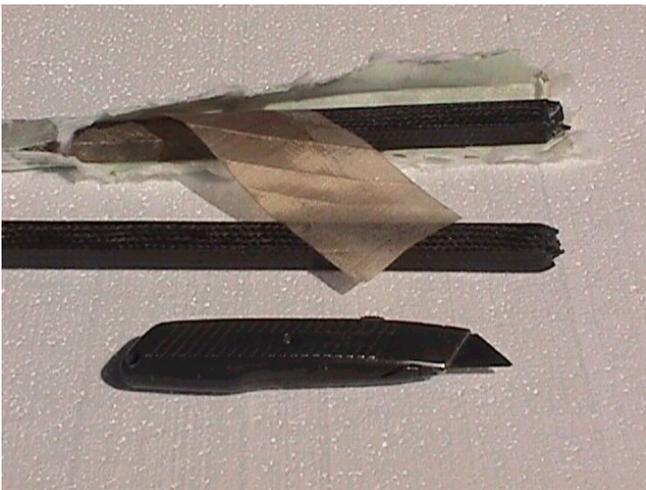
Make up a vacuum bag long enough for the spars, cover the work bench with some plastic film, and don't forget your rubber gloves this next step is very messy.

Mix up about five ounces of slow curing West Systems Epoxy. Liberally coat the carbon braid on the spar with a very wet coat of epoxy, Don't worry

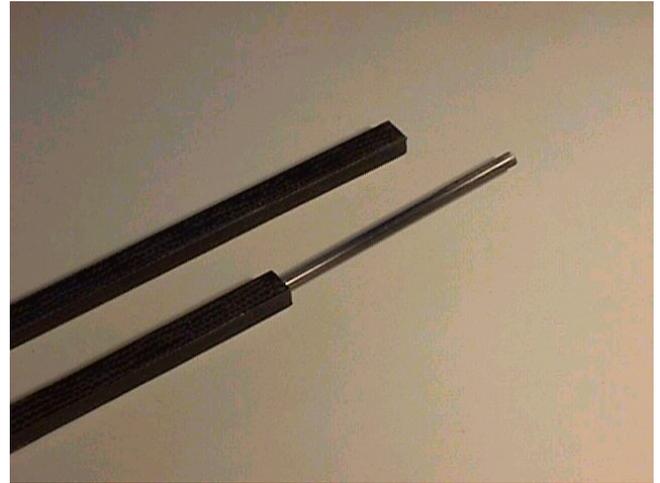
about excess epoxy. Next wrap the spar with a 2" wide strip of Teflon Coated Glass peel ply. This is done as a helical wrap starting off the end of the spar with a bit of masking tape to hold the end in place. Be sure to cover the spar completely. Then repeat the wrap with a 2" strip of thick breather fabric.



Put the spars in the vacuum bag with a small strip of breather material folded over the end of the vacuum line and running to the end of both spars. Set the vacuum to the maximum value and set the bag aside until the next day.



The next day before the epoxy is rock hard open up the bag and use a sharp knife to cut away the breather fabric. The breather will cut like leather, but cut carefully so the spar is not damaged. Peel off the breather followed by the Teflon Coated Glass layers.



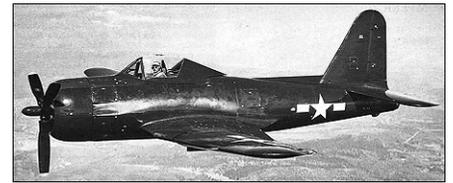
Only a little trimming on the ends of the spar is needed to complete the spar. Ready for installation in your next super strong wing.

CELEBRATING FLIGHT

Ryan FR-1 Fireball

From the Virtual Aircraft Museum

In December 1942, nine US aircraft manufacturers received a



Request for Proposals from the Bureau of Aeronautics for a single-seat shipboard fighter combining piston engine and turbojet, the former to be the main power source and the latter to provide boost in climb and combat. The Ryan Model 28, designed by Benjamin T Salmon and William T Immenschuh, was selected as winning contender by the Bureau and three prototypes were ordered on 11 February 1943 as XFR-1s. A low-wing, cantilever

monoplane of classic design, the XFR-1 was the first carrier aircraft



designed from the outset to use a laminar-flow aerofoil and the first US Navy aircraft to have an entirely flush-riveted exterior and metal-skinned movable control surfaces. Power was provided by a 1,350hp Wright R-1820-72W Cyclone nine-cylinder air-cooled radial and, in the rear fuselage, a 726kg General

Electric I-16 (later re-designated J31) turbojet. Proposed armament consisted of four 12.7mm machine guns with provision for a 454kg bomb under port inboard wing panel. Other features were hydraulically-folding outer wings and a tricycle undercarriage. A contract for 100 production FR-1s was placed on 2 December 1943, the first XFR-1 flying seven months later, on 25 June 1944, with only the piston engine installed. The turbojet was added a few days later. Initial flight tests led to the major redesign and enlargement of the vertical tail and lowering of the horizontal tail. On 31 January 1945, by which time a number of series FR-1s had been completed and were under test, a contract was placed for 600 FR-2s which were to differ in having the R-1820-74W engine of 1,500hp with water injection. In the event, neither the FR-2 nor the XFR-3 was to be built, the latter being intended to mate the 907kg General Electric I-20 turbojet with the -74W piston engine. The XFR-4, on the other hand, entered flight test in November 1944. Utilizing the 19th FR-1 production airframe, this replaced the J31-GE-3 turbojet with a 1542kg Westinghouse J34-WE-22, discarded the wing root intakes of the FR-1 in favor of flush inlets in the sides of the forward fuselage, and had the aft fuselage extended by 20cm. It was found, however, that the thrust of the J34 was too great to permit efficient use of both engines and the XFR-4 program was discontinued accordingly.

Take-off weight	11651 lb
Empty weight	7690 lb
Wingspan	39 ft 12 in
Length	32 ft 4 in
Height	13 ft 11 in
Wing area	274.91 sq ft
Max. speed	426 mph
Range	1030 miles

EDITORIAL

Winter Flying?



Winter flying, contrary to popular belief, is not an oxymoron. Yes, you might need to bundle up against the cold and you might need to return to your vehicle periodically to warm up, but you CAN fly when it is cold.

Reading the magazines and online sites made me realize that, with the popularity of ARF's, there were now a lot of people in the hobby who don't spend the winter building land fill fodder for the next summer – they buy it ready to crash. It dawned on me that they may not be fully involved in the hobby during the winter months and could, God forbid, loose some interest in this wonderful and fascinating pastime. How can we help maintain the level of enthusiasm we had during the warmer months during the dark, cold drudgery of winter?

Now before you guys from up north start in on me, I agree that our winters here in middle Tennessee are very mild compared to the winters up there (which is why we southerners have doubts as to the sanity of anyone living up there on purpose). Fly in the winter anyway! It doesn't have to be above 65° for an airplane to fly. Yes, the colder it gets the harder it is to get a glow engine to run well, but most of our winter is above 45° and a glow engine will perform very well. And if you have a gasoline powered engine or an electric motor in your plane, your only excuse is the inability of your plane's human controller to perform in colder weather.

Another idea is something that might get some of the guys who consider gluing two wing halves together as having built a model to get interested in



Deliveries of the FR-1 to the US Navy began in March 1945,

the Fireballs equipping one squadron (VF-66) and

completing carrier qualification in May (aboard the USS Ranger). After VJ-Day, the 34 FR-1s remaining to be delivered were cancelled, together with all 600 FR-2s. On 18 October 1945, VF-66 was de-commissioned and its FR-1s transferred to VF-41 (redesignated VF-1E on 15 November 1946) which continued to fly them until mid- July 1947. Only 17 of the 66 FR-1s built saw squadron usage, the remainder being assigned for various test programmes.

Specifications:

actually turning a pile of wood into a flying beauty. When you are building a plane, invite someone who is new to building (whether new to the hobby or not) over to watch, help, or keep you company. With proper exposure they might just catch to building disease!

The point is that this hobby can be enjoyed during the colder months. With respect to the hobby, you don't have to hibernate if you don't build. There are plenty of opportunities to fly and to talk about the hobby. Don't let one pass you by without taking advantage of it.

That's my opinion - it oughta' be yours! 😊

LETTERS TO THE EDITOR

Need to get something off your chest? Want to solve all of the club/s problems? Write a letter! 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, or just give them to me at a club meeting.

NOVICE NUANCES

Protect Your Building Table and Plans

To maintain the perfect surface of both your building table and the kit plans, a protective material must be taped to the surface. Waxed paper, "Saran Wrap" or other non-absorbing material can be used, or you can buy Plan Protector from Great Planes. This material is the same as the removable backing found on rolls of MonoKote and glues will not stick to its surface. Placing the plans underneath the clear wrapping solves two problems - protecting the plans AND the board.

Properly Installing Hinges

The CA hinges that are included in many ARF kits do a fine job of supporting the control surfaces. They are usually chemically treated to encourage the CA to wick to all parts of the hinge and provide good adhesion, but this process can be helped along by drilling a small hole (3/32 inch) in the center of

each hinge slot. This gap above and below the hinge will allow the CA to penetrate all the way to the back of the hinge.

WHY DIDN'T I THINK OF THAT?

Clean Your Iron

From the Tingalpa Transmitter in Australia

Have you used iron-on film and had the color pigment stick to the iron and bleed to another section leaving streaks and marks on the second color (red on white, for instance)? Solution: Heat the iron, put some salt on any sheet of paper and rub the iron over the salt. PRESTO! Iron face back in pristine condition.

Reduce the Splintering

From the Windy Flyer newsletter, Downers Grove, Illinois

When drilling a hole in balsa, the wood has a tendency to splinter out and make a nasty mess where the drill bit exits. Drip a few drops of thin Hot Stuff around the exit area of the drill bit and let it cure. You can now drill a hole and the wood will hold together much better. It may still splinter out some, but not nearly as much. This method also works great when drilling wing hold-down holes on built-up wings.

NEW PRODUCT!

eRC Micro Spitfire RTF

eRC, a brand exclusive to Hobby Lobby, has announced an addition to its micro warbirds line.



With a 14-1/2" wingspan, 13" length, 35 sq. in. wing area, 1.1 oz. flying weight, and ready to fly the eRC Spitfire is the first RTF spitfire in the micro class. Ready to fly right out of the box. Comes with 2 flight batteries to keep you flying. The transmitter is a 2.4 GHz 4-channel radio. The Spitfire is completely built and decorated in authentic Royal

Air Force colors and includes a pre-installed geared, brushed motor, receiver and proportional servos.

Model can be flown indoors or outdoors in calm winds. Designed with the sport flyer in mind - pilots will enjoy the stable flight characteristics, durability, and great scale details. Landing gear are removable, airplane can be flown with or without it. Use the included display stand to showcase your WWII Fighter.

Micro RAF Spitfire Highlights:

- Comes with everything needed to fly, all in one box
- Realistic scale features include clear canopy, strut covers, and authentic graphics
- Includes 2 single-cell Lithium batteries that charge from transmitter
- 3-Channel control: throttle, ailerons and elevator
- Proportional servo controls for smooth, responsive flight
- Geared motor with plenty of power for ground take-offs
- Lightweight, durable foam construction
- For sport to intermediate pilots
- 8 to 10 minute flight times
- Display stand included
- Complete line of replacement parts available

Micro Spitfire Specs:

- **Wingspan:** 14-1/2"
- **Length:** 13"
- **Wing Area:** 35 sq. in.
- **Flying Weight:** 1.1 oz.

A P-51 Mustang is also available.

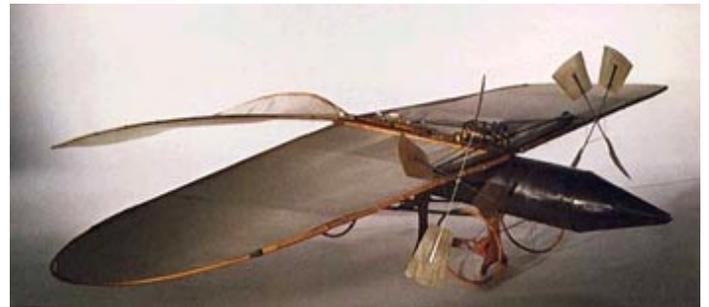
PIONEERS OF FLIGHT

Victor Tatin (1843 – 1913)

From Century-of-Flight.net

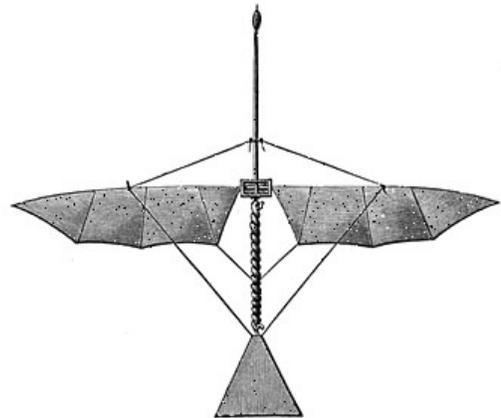
Frenchman, Victor Tatin became one of early aviation's most authoritative theorists.

He built a model in 1879 with a fuselage that acted as a tank for the compressed air that drove a small engine linked to two tractor propellers.

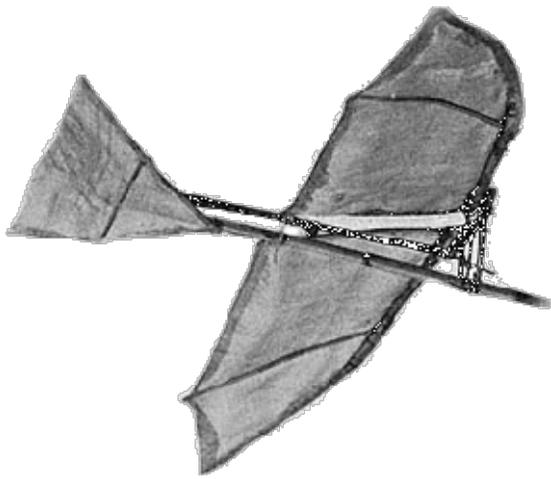


The model had a 75ins (1.9m) wingspan. It was attached to a pole, and flew in circles around the pole for some 49ft (15m).

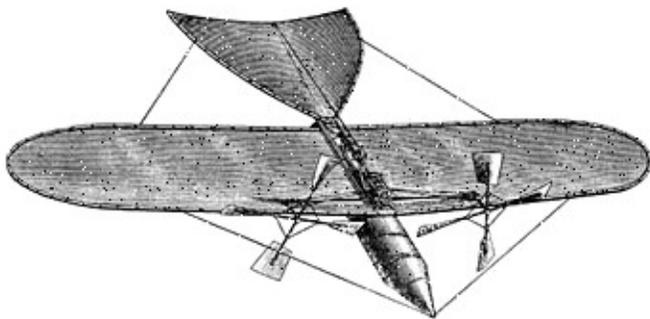
He first began with beating wings, and produced, in 1876; an artificial bird.



This was driven by twisted rubber; not only did M. Tatin find that the power required was unduly great, but he also found that this power could not be accurately measured, the torsion of indict-rubber being erratic and stretching unequally.



He constructed a large number of mechanical birds of all sizes and various weights; he tried many modifications and entire or partial reconstructions, and finally concluded, after spending a good deal of time and money, to take up the aeroplane type, to be driven by a reservoir of compressed air. With this his efforts were successful almost from the first, and he produced in 1879 the apparatus which was practically the first that had risen into the air by a preliminary run over the ground.



This machine consisted in a silk aeroplane, measuring 7.53 sq. ft. in surface, being 6.23 ft. across and 1.31 ft. wide, mounted in two halves at a very slight dihedral angle, on top of a steel tube with conical ends which contained the compressed air. This reservoir was 4 3/4 in. in diameter and 33 1/2 in. long, was tested to a pressure of 20 atmospheres, and worked generally at 7 atmospheres; its weight was only 1.54 lbs., and its cubical capacity 0.28 cu. ft.

SOMETIMES YOU JUST HAVE TO LAUGH...

Larry (the Cable Guy) -isms

1. A day without sunshine is like night.
2. On the other hand, you have different fingers.
3. 42.7 percent of all statistics are made up on the spot.
4. 99 percent of lawyers give the rest a bad name.
5. Remember, half the people you know are below average.
6. He who laughs last, thinks slowest.
7. Depression is merely anger without enthusiasm.
8. The early bird may get the worm, but the second mouse gets the cheese in the trap.
9. Support bacteria. They're the only culture some people have.
10. A clear conscience is usually the sign of a bad memory.
11. Change is inevitable, except from vending machines.
12. If you think nobody cares, try missing a couple of payments.
13. How many of you believe in psycho-kinesis? Raise my hand.
14. OK, so what's the speed of dark?
15. When everything is coming your way, you're in the wrong lane.
16. Hard work pays off in the future. Laziness pays off now.
17. How much deeper would the ocean be without sponges?
18. Eagles may soar, but weasels don't get sucked into jet engines.
19. What happens if you get scared half to death, twice?
20. Why do psychics have to ask you for your name?
21. Inside every older person is a younger person wondering, "What the heck happened?"
22. Just remember -- if the world didn't suck, we would all fall off.
23. Light travels faster than sound. That's why some people appear bright until you hear them speak.
24. Life isn't like a box of chocolates . it's more like a jar of jalapenos. What you do today, might burn your rear end tomorrow.

PRODUCT REVIEW:

RealFlight Basic

By Mike Buzzeo

I started using simulators in the late 80's since the first "wire frame" sim was introduced. Its physics were revolutionary for its day, but the graphics were less than ideal. The airplanes and helicopters were displayed as a wire frame in a basic aircraft shape and the backgrounds were only a little better - but they worked! They gave the beginner a tool so they could practice flying regardless of the weather, or whether or not their instructor was available.

In recent years, several companies have introduced a new generation of flight simulators. I remember the first time I saw one. It was a few years back, when I walked into the main floor at the Toledo show and saw a big-screen TV showing what I mistook for a video of a model airplane flying. When I realized it was a simulator, I was blown away! The graphics were amazing and the physics were so true-to-life that it's as close to the real thing as you can get.



Since that time, there have been several upgrades, add-ons and new features added to these simulators, but I was getting a little concerned that the manufacturers were beginning to lose sight of the basic intent - to teach beginners how to fly.

So I was thrilled when I heard that RealFlight was coming out with a BASIC version of their popular product. RealFlight BASIC is just that. It utilizes the same physics and graphics as their high-end simulator, but they have removed some of the "frills" that the rookie just doesn't need (or doesn't need to pay for).

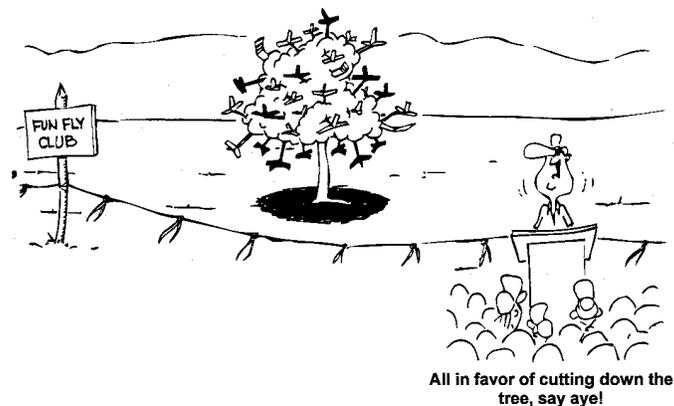
What it DOES have is six different flying sites (Including one indoor), forty seven different aircraft, and the ability to switch easily between them. You can also view an in-screen close up of

each model, change between low and high control rates and change the speed and direction of the wind. All-in-all, it has almost everything the beginner or advanced flier needs to practice at home at a much more affordable price.

RealFlight basic is an excellent way for the beginner to get a first-class simulator without having to fork out the added expense for features that won't be needed for a long time. The physics are as good as the full version of RealFlight as are the graphics.

For the complete review and videos, go to:
http://www.rcuniverse.com/magazine/article_display.cfm?article_id=1197

THE LIGHTER SIDE OF R/C



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

By Bill Atkins, Byron, GA

- ... You can cover a prize-winning plane with monocote but can't iron your shirts.
- ...Your friends have ever strung yellow "CRIME SCENE" tape around your plane.