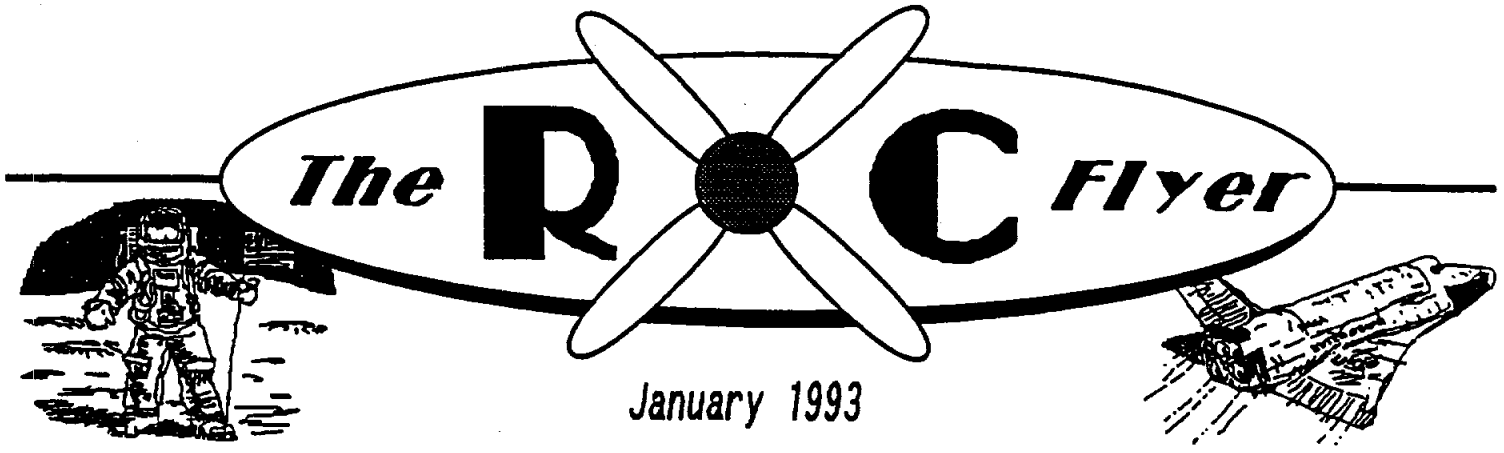



The News Letter of the Manned Space Center Radio Control Club

# President's Corner

David Tadlock

Happy New Year! May the wind always be mild and down the runway, your frequency's clear, and the strip dry.

This is a time when head colds and the sniffles keep us away from those cold mornings at the field. There has been a few good flying days. It was sure nice to see another biplane flying in December. John and Eric Simmons brought their new Ace biplane out to fly. After a bit of balancing with some borrowed weight, the bird made a successful voyage into the sky and back down again in fine condition. What makes our club great is not only a nice place to fly but a great bunch of guys who like to help you get through the awkward first flights. Guys who are willing to teach you how to make smoother landings or lend a fellow flyer weights and a glow plug. What keeps it going is that the people return the stuff the next time they see you at the field or club meeting. You are a fine bunch of flyers and it is a joy to fly with you.

Last Saturday morning at the field, once again I missed a friend, Dave Thomasson. I missed seeing that tall frame rocking back and forth as he walked the long walk out to our field. I missed hearing the advice to the young and the not so young pilots. Dave helped me with the first flight of my first plane. He helped with engine adjustments. He helped with joystick holding techniques. He helped. We will miss you in '93.

# Words From The VP

Ed Copeland

Well, the Christmas party was great, and I am not allowed to eat again until Easter. What was that hot stuff again? Wow! I finally got to the point where I just circled the table to look.

**Next Meeting**
**This Thursday**
**January 14th**
**7:30 PM**
**Clear Lake Park Building**

'Tis the season to be building. I hope everyone has something on the board, plastic model, rubber powered, 10 foot B-17, or something. Sometimes I think that it is a mistake to take on these big projects that take two years to get in the air and are never really finished, when there are so many airplanes to build. It is nice to have a season for building, but I have been taking the first 1 or 2 months just to repair planes from the last flying season, and then improving on what I didn't crash. Now and then I develop that urge to experiment, and recently I have been thinking about the possibility of an RC airplane that is

*(continued on Page 2)*

# Minutes from the December 1992 Meeting

Resha Hill - Secretary

The December meeting was replaced with a club Christmas party. There are no minutes to report except to say everyone had a great time at the party, HO HO HO!

*(VP form Page 1)*

breakaway so as to be crash survivable to at least some extent. Imagine a separable nose pod containing the engine, tank and throttle servo, attached at such an angle that for an unpleasant attitude at landing, the entire nose section separates with minimum damage. The same is already done with wings and aluminum-strap landing gears. But if I should build the prototype, I would then want to prove the concept, which would put me in the peculiar position of deliberately having to crash an airplane!

You have probably noticed the recent proliferation of ARF models, including giant scale. Some are expensive but others are reasonably inexpensive and are available in almost any degree of completion. Houston has more than one source of prebuilt RC airplanes that can be seen at various big bird gatherings. Please let me know if there is any interest in having one of these builders entertain at one of our meetings.

On the subject of entertainment, we will have Dave Gilbert visit with us in January to speak on old timer model aircraft. He is a builder, flyer and acknowledged expert in this area. I am looking forward to this. If any of you have old timer airplanes, bring them along for all of us to enjoy. I will bring some plans I have collected along the way and perhaps an antique engine or two. We will be able to see some old time free-flight, U-control and RC airplanes, engines (with those strange looking spark ignition systems), plans, collector magazines, etc. Please bring anything relating to this that is of interest to you, so that we all may enjoy it.

The R/C Flyer

*EDITOR*
**Jerry Hajek**
*ASSEMBLY AND POSTING*
**Daniel Hamala**

## THIS MONTH'S ARTICLES

**Prop Sizing - Parley Banks (GCRC)**
**Prop Loading Chart - Dean Umbarger**
Articles and want ads can be submitted to Jerry Hajek,466-4722 or on 5.25" or 3.5" floppies in ASCII,

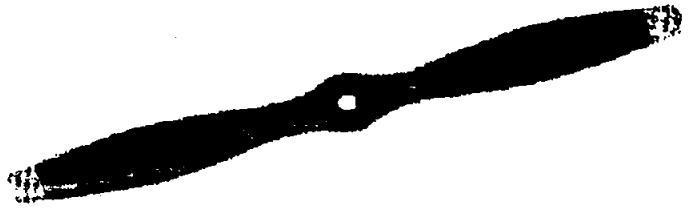
Building, flying and reading about old timer model aircraft constitutes the archive in which we document and maintain the history of powered model aircraft. The fact that these aircraft do not look or fly very much like the full scale airplanes of today is due to the fact that they originally flew with absolutely no control, and were, therefore, required to be intrinsically stable both under power and when gliding. The natural result is that they are among the most graceful aircraft in the air. Also, they represent some aviation pioneering in that the high polyhedral wings and the lifting horizontal stabilizers are not normally seen in their full scale counterparts. First came free-flight, probably in the early nineteen thirties, or even twenties, followed by tether aircraft in the mid thirties, then G-line and U-control in the late thirties. RC got its start in the late thirties but was not generally available until the early fifties. Then, after '45 the trend was toward U-control and more emphasis on scale (which usually implied control line). Those early spark ignition engines were a great deal more complicated than today's glow engines, and yet the world of model aircraft in the early days was a world dominated by young people (I must have been an infant when I got into this). Flying old timers is an organized aero sport and enjoys wide interest today. I am looking forward to the presentation on this subject. Please pass on any suggestions you have for other areas of interest for entertainment.

*(continued on Page 3)*

(VP from Page 2)


I was reading in "Warbirds" magazine about the flight testing of a restored P-47 Thunderbolt. In comparing the Thunderbolt to the P-51 Mustang the pilot mentioned that the Mustang required about 20 pounds stick pressure per g in a pitch maneuver. I can imagine how a pilot must have felt when, six hours of bomber-escort flying already completed, he is suddenly engaged in combat with well-rested Gerry - a dogfight in which our pilot may have to perform a slick four-g evasive maneuver, graceful perhaps to watch, but which nonetheless requires a full eighty pounds of stick pressure! I had never thought of air combat as being particularly athletic. The stick force required for a max roll maneuver is also considerable. An F-16 requires practically no pressure on a side mounted stick which, in the original models, did not move, being instrumented with strain gauges and responding to a light pressure in one direction or another. But of course the F-16 has aero surfaces that are completely hydraulically driven, whereas the P-51 had manual control.

Helpful Hint of the Month - If you have ever done any scratch building, or designed a part, you may have searched for some way to stick the pattern to the wood long enough to cut the part, with the idea that it would be nice to be able to get the paper off the wood in the end. I have tried rubber cement, 'Kid Stick' and several other things. Then I found out that the adhesive used by 3M on Post-It note paper is available in a spray can at the art shop. It is called "3M Spray Mount Artist's Adhesive". It is repositionable so that it is easily removable, and it doesn't shrink or wrinkle the paper. I have been preparing my patterns with "Krylon Crystal Clear" no. 1301 or 1303 for better water proofing and general strength; however, that is optional. Just spray the 3M on lightly and it works great.



# DENSITY ALTITUDE VERSUS PROP SIZE

*The following was written by Parley Banks of Gulf Cost RC based on his own research and test data. With his permission I am printing this interesting article in our newsletter.*

DENSITY ALTITUDE is the equivalent altitude of an air mass based on its density. The higher we go, (high density altitude) the less dense the air becomes. This is one reason full size aircraft often have variable pitch props. As they fly higher in less dense air, the pitch of the prop is increased to maintain the same effectiveness that the prop would have in denser air at lower altitude. Any thing that displaces air such as moisture (humidity), increases the density altitude. High temperatures also increase the density altitude because the air molecules are further apart at high temperatures.

On the Gulf coast, we often have high humidity and temperatures. Thus even though

*(continued on Page 4)*

*(Prop Size from Page 4)*
we are at low altitude, our flying conditions are those of a higher density altitude. Since our engines need air to run efficiently our high density altitude reduces engine efficiency. If our engines ran on water (moisture), high humidity would increase efficiency. Since our engines need air to run efficiently and moisture displaces air, moisture (humidity) decreases efficiency. I have done some measuring of engine output under different humidity conditions and have found that we can gain as much as a pound of thrust on a .60 engine on low humidity days compared to high humidity days having the same temperature.

How does this effect prop size? Remember earlier I mentioned that full size aircraft increased prop pitch to make- up for high density altitude. We can do much the same by changing our prop diameter and/or pitch. Full size aircraft vary their pitch several degrees according to density altitude conditions. If we increase the pitch on our prop we will see an increase in the amount of air the prop moves, but we will also see a higher forward speed as the increased pitch takes effect. This increases the flying speed for our model. This is not always desirable. Our other option is to increase prop diameter. (This is not a readily viable option for full size aircraft due to cost of full size props.) If we increase our prop DIAMETER we will move more air even though we keep the same degree of pitch. We may need to back off a few rpms on the needle valve, but we will see a higher power output with out as much of an increase in speed as we would if we went to a higher pitch. (Today's engines have more torque at lower rpms so don't let a small rpm decrease worry you.) Over the past two years I have done a lot of experimenting with this and have found the following engine/prop combinations to be optimum for overall general performance on 2 cycle engines using 10 percent nitro fuel in our area.

| ENGINE | PROP |
|---|---|
| .35-.40 | 10x6, 11x5 |
| .45-.46 | 10x7, 11x6 |
| .50 | 11x6, 12x5, 12x6 |
| .60 | 12x7, 13x8, 14x5 |
| .74-.80 | 13x6, 14x5, 14x6 |

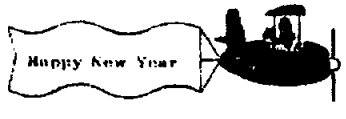
Running a 10x6 prop on a .45 size engine under high density altitude conditions will result in less power then a 11x6 prop will put out under the same conditions. Remember, increasing diameter while maintaining the same pitch will not cause as much of an increase in speed as just changing the pitch will. Try it. You may be surprised at how much more power your engine really has!!

# POWER VERSUS SPEED

Small full size aircraft often use fixed pitch propellers just as we do on our models. The reason for this is mainly the cost of variable pitch propellers versus fixed pitch props. There are basically two categories of fixed pitch propellers which are considered by owners. They are Cruise propellers and Climb propellers. By understanding the difference between these two categories, we can better decide what propeller will best met our individual performance needs for our models.

Cruise propellers give an aircraft more speed. They have a higher pitch and smaller diameter. The higher pitch requires a higher speed for them to reach maximum effectiveness. Once they reach this part of the flight envelope they are able to maintain the higher speed. The disadvantage of cruise propellers for aircraft owners is slower acceleration, thus longer take off distances, and longer times to reach cruise altitudes. The advantages are, higher cruise speed once the plane has reached altitude, and more economical cruise for long distances.

Climb propellers give an aircraft more power. They have a lower pitch and larger diameter. The lower pitch achieves maximum effectiveness at lower speeds. The disadvantage of climb propellers is lower cruise speed and less economical cruise over long distances. The advantages are faster acceleration, thus shorter takeoff distances, and faster climb to altitude.



# PROPELLER LOADING ON ENGINE

## ENGINE LOADING= PROPELLER DIAMETER CUBED X PITCH

| PROP DIA INCHES | DIA CUBED D*D*D | PITCH | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 7 | 343 | 1,029 | 1,372 | 1,715 | 2,058 | 2,401 | 2,744 | 3,087 | 3,430 | 3,773 | |
| 8 | 512 | 1,536 | 2,048 | 2,560 | 3,072 | 3,584 | 4,096 | 4,658 | 5,120 | 5,632 | |
| 9 | 729 | 2,187 | 2,916 | 3,645 | 4,374 | 5,103 | 5,832 | 6,561 | 7,290 | 8,019 | 8,748 |
| 10 | 1,000 | 3,000 | 4,000 | 5,000 | 6,000 | 7,000 | 8,000 | 9,000 | 10,000 | 11,000 | 12,000 |
| 11 | 1,331 | 3,993 | 5,324 | 6,655 | 7,986 | 9,317 | 10,647 | 11,979 | 13,310 | 14,641 | 15,972 |
| 12 | 1,728 | | 6,912 | 8,640 | 10,368 | 12,096 | 13,824 | 15,552 | 17,280 | 19,008 | 20,736 |
| 13 | 2,197 | | | 10,985 | 13,182 | 15,397 | 17,576 | 19,773 | 21,970 | 24,167 | 26,364 |
| 14 | 2,744 | | | | 16,464 | 19,208 | 21,952 | 24,696 | 27,440 | 30,184 | 32,928 |
| 15 | 3,375 | | | | 20,250 | 23,625 | 27,000 | 30,375 | 33,750 | 37,125 | 40,500 |
| 16 | 4,096 | | | | 24,576 | 28,672 | 32,768 | 36,864 | 40,960 | 45,056 | 49,152 |
| 18 | 5,832 | | | | 34,992 | 40,824 | 46,656 | 52,488 | 58,320 | 64,152 | 69,984 |
| 20 | 8,000 | | | | 48,000 | 56,000 | 64,000 | 72,000 | 80,000 | 88,000 | 96,000 |
| 22 | 10,648 | | | | 63,888 | 74,536 | 85,184 | 95,832 | 106,480 | 117,128 | 127,776 |
| 24 | 13,824 | | | | 82,944 | 96,768 | 110,592 | 124,416 | 138,240 | 152,064 | 165,888 |

(1) FIND YOUR PROP DIAMETER IN THE FIRST VERTICAL COLUMN AND FOLLOW ACROSS TO THE PITCH OF YOUR PROP TO FIND THE RELATIVE LOADING FACTOR. THE LARGER THE NUMBER THE MORE LOAD THE PROP WILL PLACE ON YOUR ENGINE. IE: A 11/3 PROP WITH A LOAD FACTOR OF 3993 WILL LOAD THE ENGINE THE EXACT SAME AMOUNT AS A 10/4 WITH A LOAD FACTOR 4000.

(2) IF YOU WANT MORE R.P.M. GO TO A PROP WITH A LOWER LOAD FACTOR.

(3) IF YOU WANT MORE SPEED GO TO A PROP WITH A HIGHER PITCH.

(4) IF YOU WANT MORE ACCELLERATION/VERTICAL SPEED GO TO A PROP WITH LOWER PITCH.

Dean Umbarger

# The R/C Flyer

501 Regency
Deer Park, Texas 77089
(713) 476-5206

RESHA J. HILL
2305 RAMADA
HOUSTON, TEXAS 77062

January 1993

## Fuel for Sale

Jim Brock 334-1715
John Campo 488-7748
Charles Copeland 532-1570
Tas Crowson 474-9531
Don Fisher 474-9531(H) 483-2157(W)
Wayne Green 484-3151
Don White 488-3151

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