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DEAR RCM:

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Is It Time To Change The Rules?

I would like to get in my two bits on the Class I rules that you discussed briefly in your editorial. I am sure that most of the experts and regular contest flyers are happy with the rules as they are, but I do not think that beginners and junior contestants are being encouraged to get into RC by this change — the "use anything you like" philosophy in the Rudder Only class. How many juniors or beginners do you know that would have a chance in trying to build and fly a model with servos on engine and rudder? First of all, the expense of the equipment will keep most from even trying, and even if they do, they would not have the experience necessary to successfully complete the project. The indications are already being seen that model building is going to become an "old man's" hobby unless something is done to interest our juniors in building and flying. Discouraging them from entering contests is, of course, no help at all.

I would like to suggest that perhaps something similar to the old single channel rudder only class would be a big help. This could, perhaps, be put in place of Class II as we now have it. There seems to be little interest in the class anyway. The equipment needed would be minimized and beginners would not be discouraged from entering the contest due to the knowledge that they would have to compete with fully proportional rudder, trim engine systems. There would then be a logical progression to the more complicated systems such as our present Class I and III. Perhaps we should retain Class II and add a single channel escapement operated rudder class. I don't know (the answer), but if something is not done soon, we are going to eventually have to find contest sites that are suitable for wheel chairs!

Daniel Meyer
 Irving Electronics Co.
 San Antonio, Texas

You're right, Dan. And in answering our own question, it is time to change the rules. In less than two weeks, we have received over two hundred letters from every part of the country on this subject of the current rules. Although there are many changes the RC'er would like to see, the most urgent and critical phase lies in this problem of Class I, and the inability of the newcomer to compete due to the expense and complexities of the equipment being used. Two articles on this subject — one by Dr. David Lien, and the other by Ken Willard — appear in this issue. Ken's article was originally submitted some time ago to one of the other major model publications, but was rejected as "too controversial." A further discussion of this problem also appears in the Editor's Memo this month.

Rudder Only

Your magazine is the best publication in the R/C field — not only is the content excellent but it is one of the very few that is written on an adult level. I'd like to see an article on advanced rudder only by someone like Russell Preston or Bernard Williams. From what I understand, they employ rather unconventional trim set-ups for RQ, and using a lowly escapement, they have beaten rudder only modelers using multi or proportional equipment.

E. L. Breeden III
 Norfolk, Virginia

You rubbed the magic lamp... see the article in this issue by Nat's Champ Bernie Williams. And there's nothing "lowly" about the escapement — some of the best flying we've ever seen was done with escapements.

YES.....

by Robert Lien, M.D.

Radio control competitive flying has recently been under fire from a number of sources. In spite of a growing number of individuals willing to invest in expensive multi-channel and proportional equipment, many officials and thoughtful non-officials are concerned about the relatively few who compete regularly. During the past several seasons of contest flying the author has given much critical thought to this problem, with this article being the end-result. The suggestions made here are not intended to be a final answer. This must rest with you, the active RC flyer. I do intend that these suggestions stimulate some constructive thought on the matter.

For many of us the sport of RC flying takes the place of other, better known avocations including golf, fish-

ing, boating, etc. It is my feeling that this is an adult pastime. To be sure, the younger set is enthusiastically welcomed when interest is shown. This is also true of golf, fishing and the rest, I believe. Competitive RC flying, as presently carried out, is done within a framework of rules which are rather juvenile in theory, and quite inadequate in scope.

Our greatest difficulty lies in one primary area — in no other major sport are amateurs required to compete on an equal basis numerically with professionals. Let me turn to my ex-inamorata golf, for a more specific example. Golf tournaments are usually successes from the participant's viewpoint for one reason, and one reason only — he is allowed to compete on an equal basis by means of a workable handicap system.

Please do not misunderstand the previous paragraph. I am not taking either of the current viewpoints for or against professionalism. I am a professional in my own field and an

amateur in RC. This stand I do take — it is time to update and revamp our presently available scales of ability, namely Novice and Expert. This is most important if we are to again make contest flying as popular with RCers as the golf tournament is with the golfer. If we hope to rekindle interest in competitive flying, we must set up good qualitative yardsticks to measure individual abilities. This, to me means a system of handicapping which is simple, yet flexible and useful across the country.

We have recently noted an unusual trend, potentially a very damaging trend in RC competition. This concerns a number of individuals of better-than-the-average ability who have been competing in Class III for a number of years. These people have recently been entering Class I and Class II competition. The reason? — several years of competing on a completely equal (no handicap) basis with the experts has crushed their hopes of attaining enough proficiency to ever

Is It Time To Change The Rules?

YES.....

by Ken Willard

Pity the R/C Contest Rules Committee — This intrepid band of R/C contest board members has to receive, digest, evaluate, select, reject, revise, combine, resubmit, review, and finally decide what recommended changes — if any — are to be made in the official rules governing sanctioned AMA radio controlled model aircraft competition. Then the poor devils will have to spend the rest of the year — maybe the rest of their lives — either defending their decisions or hiding from the outraged R/C'ers whose proposals they rejected!

My heart goes out to them. So much so, in fact, that I have given much thought to the almost insurmountable problems which they face. Even more — I have talked with many prominent, near prominent and ob-

scure but ardent R/C fliers. Out of these thoughts and discussions have emerged some facts and opinions which merit consideration when the question of rule changes is to be answered.

However, let's take one thing at a time, and in this treatise, let's consider only the question of classes for R/C pattern competition. Maynard Hill and John Worth have already published some well thought out ideas regarding qualifying for competition, and a method of scoring to encourage the "builder of the model" rule.

Historically, the development of R/C classes results from a sincere desire on the part of the AMA Contest Board to fill the needs of the R/C modelers at the time the rules are drawn up. There is no need to review all the changes — a couple of high spots will do.

There was only one class at the beginning—if you could get your model airborne, call out a turn, make it, and land, you were near the top. Every-

body was a beginner. The sport needed encouragement.

Then, as radio equipment improved, the "experts" began to emerge. Multi-channel took over. But there were still beginners, and to continue their encouragement, two classes were established — single and multi-channel, for "beginners" and "experts" in principle.

Next, some "tinkerers" began to figure out ways of getting more control action out of "single channel" equipment than merely flopping a rudder back and forth. So, to encourage this new development, continue to encourage "beginners", and still provide the unlimited development of multi-channel equipment, three classes were established.

Meanwhile, some disturbing factors began to upset the careful reasoning behind the rules. Radio circuitry and transistor developments led to control systems which cannot be accurately defined as to "channels", or "interacting", etc. And so many experts were

win a contest. This is of course very good for the Class I and II events, but unless a measure of ability is also applied here, what is the next step? Again, I wish to emphasize I have no quarrel with the experts — they have worked mightily and well to attain this status. I sincerely hope their numbers increase tremendously. My only quarrel is with a system which forces a good man to switch to currently less competitive areas of endeavor in order to gain a measure of competitive satisfaction. Is it not much better to have some type of handicap system by which this man is allowed a better chance to compete successfully?

In the past, perhaps, the Novice and Expert designations were reasonably sufficient, but we must plan for a workable handicap system in the future. As new individuals are attracted to the sport, we must give them ample incentive for entering and enjoying competitive flying.

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finding ways of loop-holing the rudder only and intermediate classes that they no longer served the original purposes for which they were intended.

The crowning achievement occurred at the 1962 Nationals — a contestant actually **degraded** the capabilities of multi-channel equipment so that it would qualify for the Class II competition! Ingenius? Yes. But useful, in the sense that it furthers the development of R/C equipment? I doubt it. So do a lot of other modelers, if all the hue and cry for new class rules was any indication. Finally, it's time we took a long hard look at the philosophy behind "encouraging the beginner".

In the first place, a **beginner hasn't a chance in today's competition — either local or national — unless he is competing with other beginners.**

The other fact is that radio equipment is so good today that many be-

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Cover: Cliff Weirick and Willie Smith with winning Candy and Torero designs at Buckeye meet. Both ships are top national contenders and were RCM features. Photo by Dale Willoughby.

EDITOR'S Memo

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Reader Service

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ANOTHER MONTH, and the hue and cry concerning the current RC rules, and contest organization and participation has reached a tumultuous roar. Since the publication of our contest questionnaire in the February issue, we have received, read, and compiled statistics from so many returns and letters that it almost staggers the imagination.

Are the current AMA/RC rules obsolete? Is it time to reorganize national and international radio control competition? The answer to both questions is an overwhelming and almost unanimous yes!

And the time is now. Before we commence a presentation of your suggestions, let's examine the problem. First of all, radio control is a hobby — and a competitive sport, such as golf, that encompasses within its structure a program of local, national, and international competition among its participants and devotees. The hobby itself is a part of a whole — model aviation in general. Unlike other forms of model aviation, however, the emphasis in R/C is split between the electronics aspects, and the aerodynamic or "flying" phase of the sport. Supposedly, the electronics equipment we use is for the sole purpose of **controlling** a model aircraft **in flight**. Paradoxically, as we continue to progress in the necessary development of better and more reliable equipment for the purpose of increasing our time and proficiency **in the air**, we lose sight of this very goal — and the emphasis on the **equipment itself** becomes more and more pronounced. This is somewhat analogous to a free-flight enthusiast spending all his time developing the perfect timer and dethermalizer without considering the free-flight ship itself, and to the sacrificing of time in the air. We are grateful for the electronics technician and his contribution to the "state of the art," but no matter how you slice it, this hobby is still primarily concerned with **flying** model planes. With the emphasis on equipment — with our current rules allowing no distinction between the sophisticated and the less exotic and simpler gear — with expert contest fliers competing against the novice — with simple escapements pitted against full-house multi rigs in Class I — with no national handicap system based on past performance — it is little wonder that the average RC'er feels that it is hardly worth the effort to enter competition, whether local or national. It is also little wonder that contest participation is rapidly dropping off — that the beginner has no outlet to expend his competitive feelings. The potential beginner — so vital to our hobby — is turning to other sports. Nearly everyone feels the need, in varying degrees, to compete with his fellow enthusiast in a sport of his choice. Too, the majority of us would like to win, but doesn't mind losing, if our winning or losing is based on our own individual building and flying skill — not merely on our ability to purchase the most expensive control systems!

Let's look at golf, as an example. The Sunday golfer would be quick to admire Ben Hogan for his prominence and ability in the sport — few of us, however, would care to compete with him on an equal footing without some form of handicap. Look at any other sport around us — each has its individual competitive categories based on the equipment, and performance potential of that

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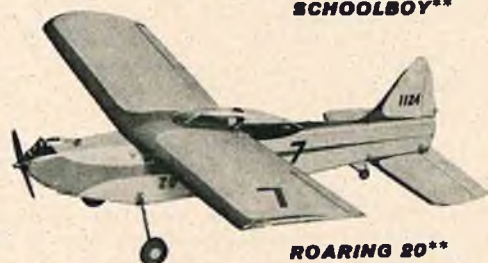
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AMA

The Academy of Model Aeronautics, official governing body for model aeronautics in the U.S., American modelling representative to the Federation Aeronautique Internationale, a Division of the National Aeronautic Association, representing over 20,000 air-minded members from 8 to 80, announces the following:

Effective February 1, 1964, the AMA Executive Council officially approved significant changes in the top officer positions of the Academy.

1. John Worth, 1963 President, who was re-elected for 1964, is now Executive Director. Thus the gap left by former Director, Russ Nichols' departure last June 30th is now filled. Worth's Presidency had featured a special Finance Committee supervised operation to oversee HQ affairs pending resumption of the Executive Director position. Operating part-time during February while changing residence from Hampton, Va. to Washington, D.C. area, Worth will initiate full time duty on March 1st. The new Executive Director has left NASA at Langley Field, Virginia, after 22 years of Federal Civil Service, for the AMA position.

2. Frank Ehling, Technical Director and Acting Executive Director during the last half of '63, resumes normal duties March 1st. Credited by Worth and the Finance Committee for keeping AMA HQ operating effectively under difficult conditions, Ehling has expressed great satisfaction with the new developments. Ehling came to AMA HQ several years ago to help with a few problems, found himself last year holding the whole operation together, is anxious to get back to several projects interrupted in '63, without the pressures of administrative demands.

3. Maynard L. Hill, 1963 Vice-President of AMA District IV (Maryland, Delaware, Virginia, North Carolina), re-elected to the same position for 1964-65, was selected by the AMA Executive Council as the new President, to complete the unexpired portion of Worth's term (to December 31, 1964). Hill, a John Hopkins Applied Physics Lab Engineer, is also current holder of the World Altitude Record for Radio-Controlled models, having topped the former Russian record of 7,480 Ft. by a flight on July 5, 1963 to 13,320 Ft.

4. Robert A. Ward, of Portsmouth, Virginia, was selected by the Council to assume Hill's former Vice-President position. Ward was the Dist. IV runner-up in the AMA general election held in late 1963.



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Contest Calendar

June 13-14 6th Annual Regatta Skippers R/C, Lyons, Ill.
July 4-5 15th Annual IMPBA Regatta, St. Louis, Mo.
July 25-26 3rd Annual Regatta Minute Breakers, Lombard, Illinois

An Open Letter from the President:

A great change has taken place — the organization and the services of the IMPBA have taken on a new form. Mert Mischnick, former Vice President in charge of R/C has replaced James E. Dunham, whose resignation was effective March 1, 1964. Until the election of a new president, the address of all IMPBA business is: 2405 South 19th Avenue, Broadview, Illinois 60155.

The duties of the officers and the Board of Directors have been rearranged, and have been more clearly defined.

Many of you have been called upon, or may be called upon, to contribute your talents in the interest of the IMPBA. The purpose of this is to reduce the load on any one man, and distribute the work in many small parcels, so that each individual will have an opportunity to do a good job in the least amount of time, and without interfering with his home life or his modeling activities. I am a modeler myself, and I understand that it

is much more important to go out and run the boats rather than stay home and work. There is, however, a deep feeling of satisfaction to know that you have made a significant contribution to the sport.

I invite your inspection of this magazine — notice the print, the quality of the paper, the choice of copy, and the presentation of the material. The members of the Roostertail Committee and I feel that this is the best possible solution to the problem of communication among members. Copies of the magazine will be mailed to your home every month. I feel that professional publication and commercial practices provide the best guarantee of regular delivery of a monthly publication. Instead of a bi-monthly publication, the new monthly Roostertail provides up-to-the-minute news, allows contest calendars to be useful, and keeps the membership informed of the latest in contest rules, results, and new world records.

Note to Contest Directors: Get your schedules in now! First of the month is deadline for material to be

printed.

The contest Rules Book will be sent free to all new members, and a new revised rule book will be sent to all members when the revision is complete. Any member may request assistance in contest procedure at any time. We will gladly answer all questions which may arise from the rule book, or which may not appear to be covered by the rules. World record applications will be included with contest sanctions. If you intend to establish a record, it must be done at a sanctioned regatta under the conditions established by the Rules of Competition. World record certificates will be awarded to any one who establishes a new world's record in any event, any class, or any hull type, classified in the Rules of Competition.

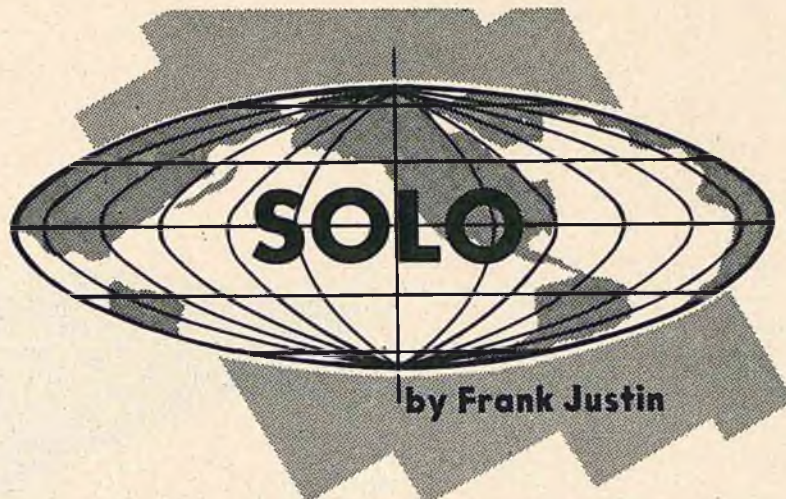
Several new departments have been established in the organization. Technical help may be had for the asking, and this assistance is from some of the most skilled modelers in the world.

A world wide directory service is now maintained to enable individuals to contact other members by locality — a service mighty nice to the lone wolf who doesn't realize that there is another model boating enthusiast only a few miles away. This also provides for cross-country relations between modelers on vacation or business trips. Simply write to the IMPBA for the local club or for the individual members nearest the place you plan to be. We will provide this information to make your vacation or business trip much more enjoyable for you and your new-found friend. To the brother of the model boat fraternity, no more introduction is necessary than "I am a boat modeler," to start a conversation that can last for hours, and a friendship that can last for years.

Why not take advantage of our fellowship and many services? Join the IMPBA today. Fill out the attached application for membership and send it to the address indicated. Check whether you have a subscription to R/C Modeler, as your current subscription will then be extended for an additional twelve month period.

The Family Plan is new. It is designed for the husband and wife, the father and son, or any combination in the same household who are interested

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Your roving reporter received an invitation from Howard Bonner this month to watch his new proportional system in action. Howard has made prototypes of his new equipment available to eight Southern California flyers in order to get the valuable testing data necessary for all new equipment. The demonstrations took place at Sepulveda Basin's L.A. Model Airport with Nate Rambo, Bob Doell, Al Doig, Willie Smith, and Cliff Weirick, wringing out the prototypes, and each using a different type of ship. The results showed the system to be smooth and solid, with each flyer making several completely successful flights.

There are several features about the new Bonner Proportional which I like very much. Number one is the small-size transmitter with not-so-small-sized output — one watt to be exact. The mechanical layout of the transmitter is excellent with workmanship and finish coming up to the usual high Bonner standards. The production models with permanent tooling should be even better. All controls are well placed, easy to use, and very smooth handling.

The Bonner receiver is slightly larger than a standard Bonner Transmite servo. A modular-decked version might fit some ships better, although no complaints were heard from the test pilots packing it into their ships. All systems utilized Bonner Transmite servos with appropriate closed loop amplifiers. Howard is planning a new concurrent with the introduction of his proportional equipment. I, for one, will be pleased to see this come about — we've been long overdue for an improvement in servos.

Several months will pass before this equipment becomes available and then it will be through the same dealer channels Bonner has used for the sale of his escapements and servos. In other words, no direct sales will be made — if you're interested, get in touch with your hobby dealer. Let me say, in passing, that there is one feature of the Bonner proportional that the scale boys will like — it is not limited in its operation to four servos. The new Bonner rig will handle **eight** — yes, that's right, eight servos! In addition to the normal three axis of flight and motor control, you can have a trimmable servo for, well... let's see... flaps, dive brakes, mixture, gear retraction or canopy raising, sky writing, bomb dropping, and, I suppose, even a self-destruct mechanism in case it falls into the hands of a Space Control owner!

After watching the Bonner factory team perform (not really, but all those red hars remind one of the pit activity of a Ferrari racing team), we motored over to San Gabriel in time to see Phil Kraft fly a Taurus and a Kwik-Fli on his proportional system with excellent results. I guess proportional is here to stay. The only thing I can't decide is how to steal \$600 out of the family budget! There is no need to be honest and tell Her what it's for — this will only mean a like amount spent for a fur coat. I could explain that the hobby has a therapeutic benefit for tired businessmen and it keeps me out of the taverns, but she points out that with my income I certainly can't be a businessman and that

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Cessna®

182

SKYLANE



by Dale Willoughby



First Of Several Magnificent RC
Scale Ships To Be Featured In RCM
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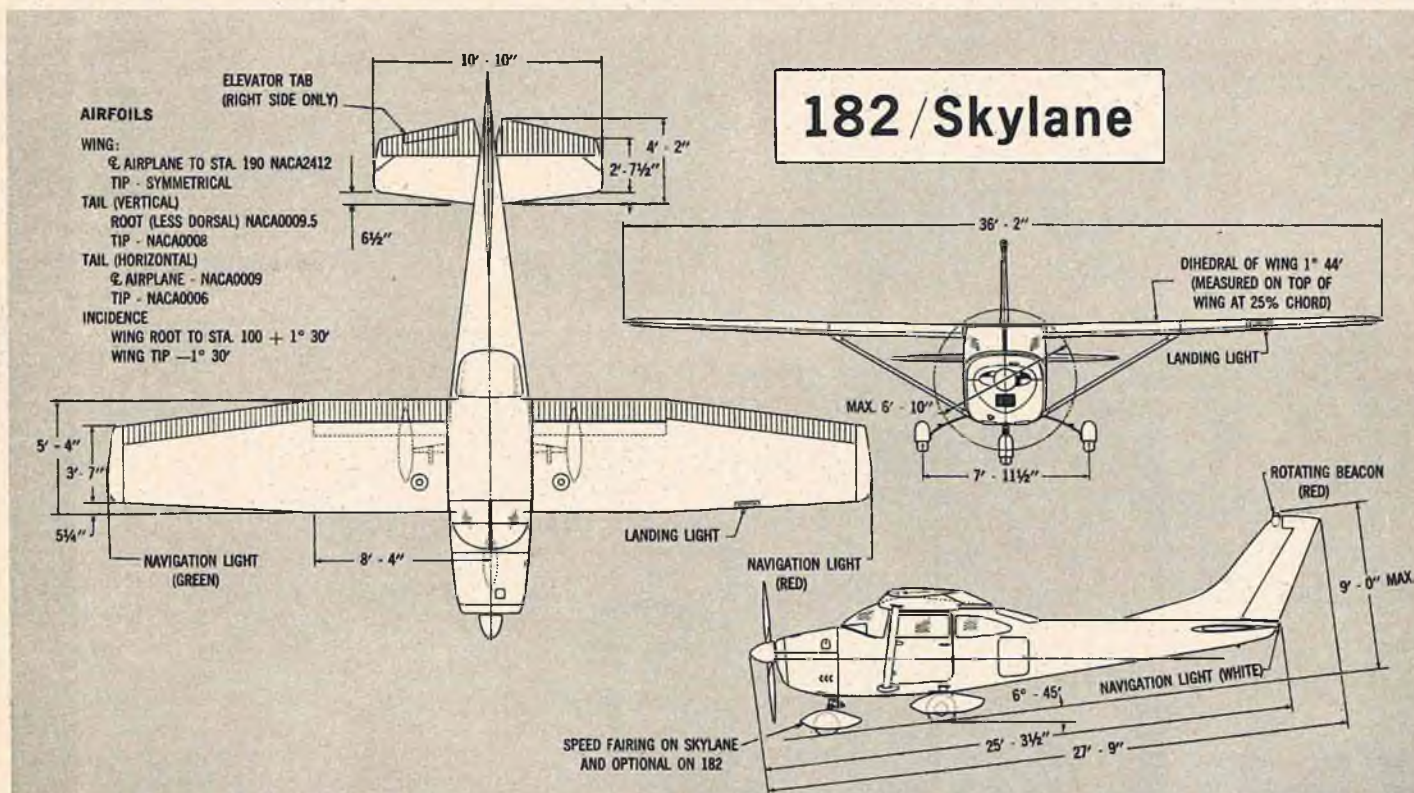


Cessna®

182/SKYLANE

PRIOR TO 1962, four thousand, five hundred and ninety Cessna 182/Skylane aircraft were built by the Cessna Aircraft Company, Wichita, Kansas. Then came a new model of the Skylane (the deluxe version of the 182) with a new fuselage, glass all around giving 360° vision, flight-sweep tail, and a very attractive color scheme. On my way to the bluff where I had been slope soaring gliders, I passed the Orange County airport and saw a, then new 1962 model in blue and white. One look, and I was convinced that there was an aircraft with lots of room in the newly designed fuselage — room for almost any amount of radio gear!

Wheel pants (now called wheel speed fairings) added to the well proven single leaf main landing gear and nose wheel made this a very attractive airplane to duplicate. Due to the fact that large scale control models always seem to look nice and impressive I chose the scale of 2"=1'. In February 1962, Torbet Aircraft provided some full color



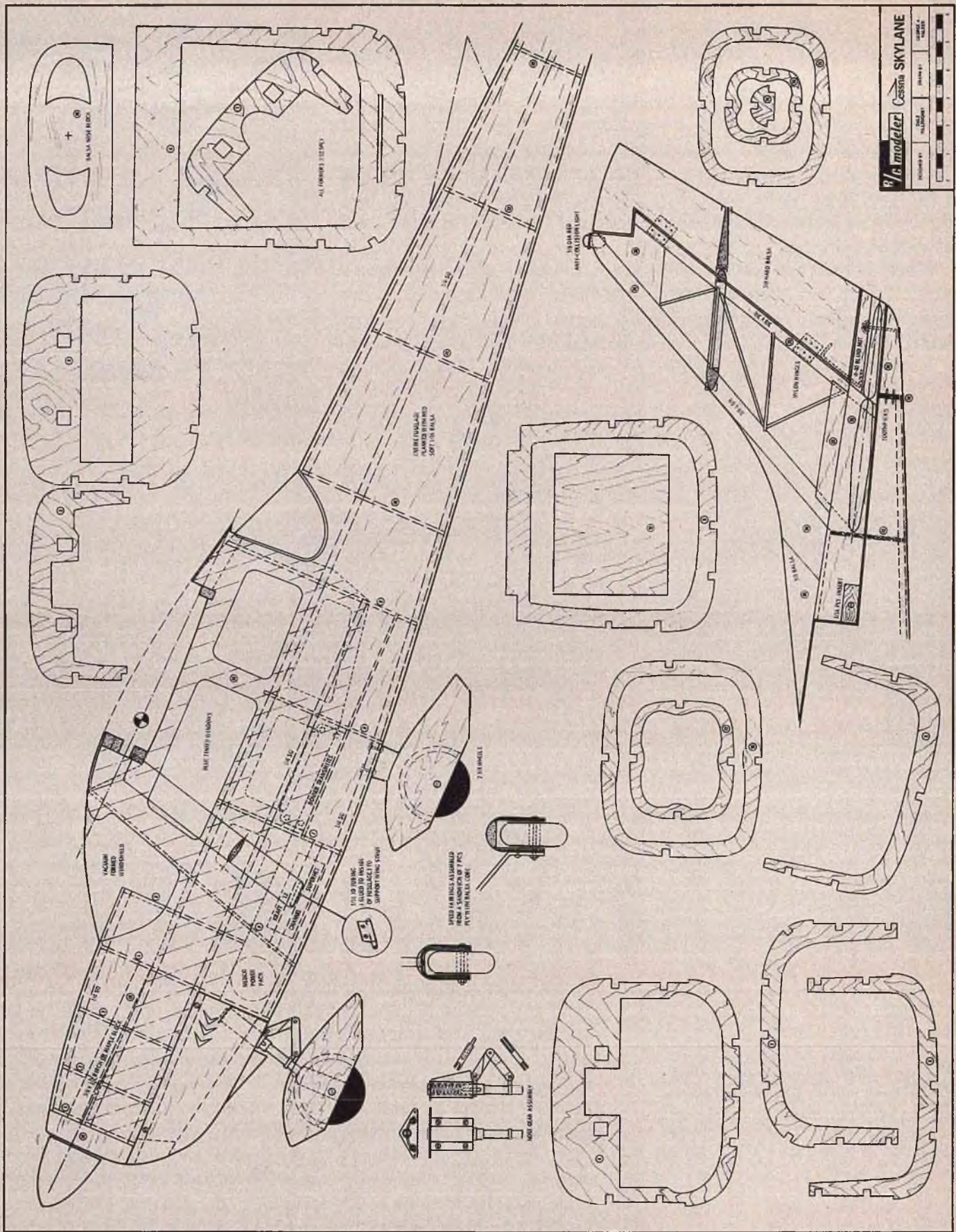
Above lt: Miss Reggie Pierce, RCM's March-April cover girl, with full-size Cessna 182 and Dale's RC prototype.

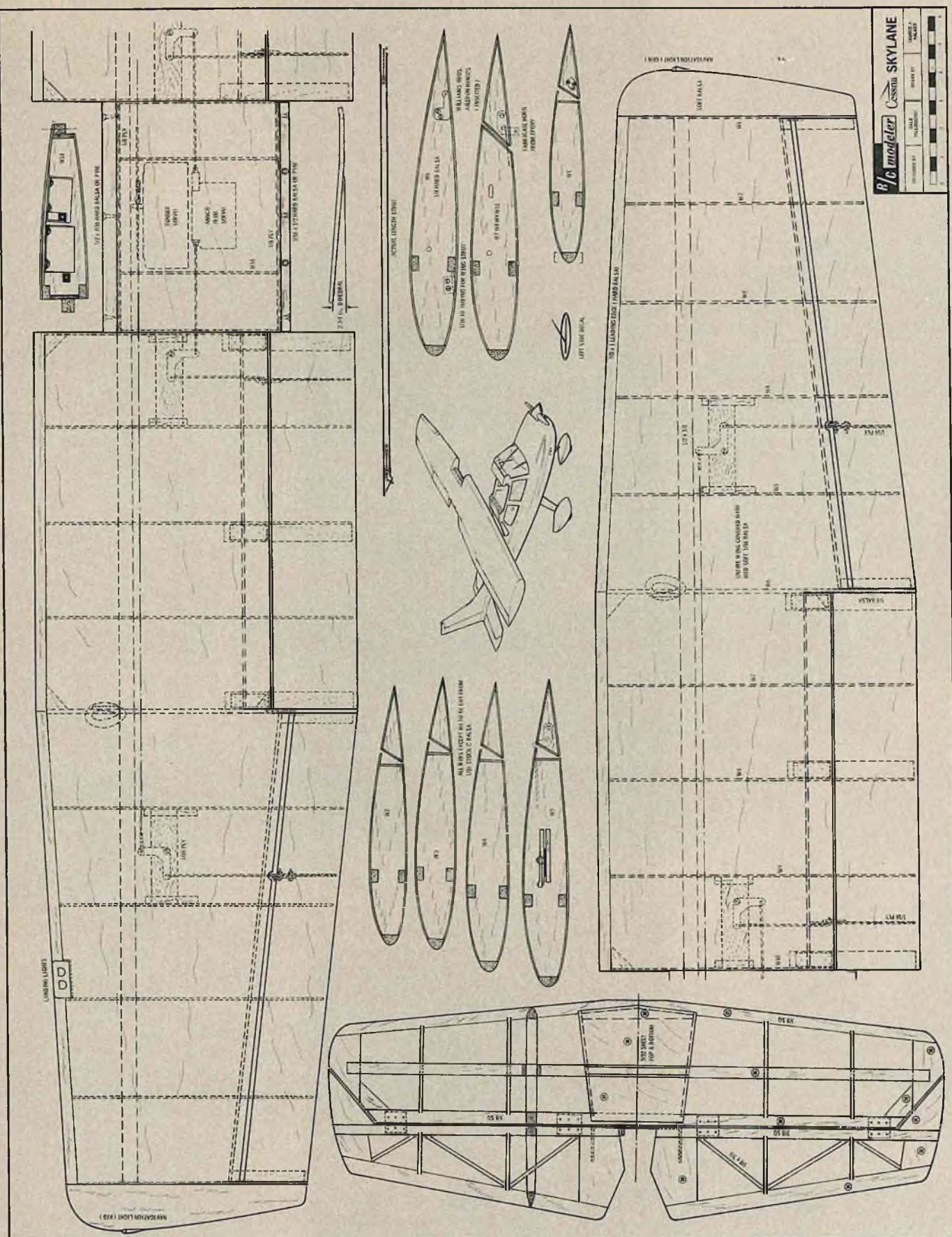
brochures and a blue-and-white Skylane for photographing. I went away with 24 detailed shots of this ship from all angles. While in Japan my last time, and in association with Masahiro Kato, the design and construction of two prototypes was completed, then test flown using a new Orbit 10 superhet furnished by Bob Dunham. Since that time I have received a number of requests for the plans to this ship, and decided to have them published by R/C Modeler.

A number of improvements have been made to this model since the original was test flown. Modifications include exact scale flying surfaces plus the addition of flaps, lights, and full sheeted wings to simulate the metal covering. Inasmuch as this scale model is not for the beginner, I will forego a step-by-step construction article but by following the numbered sequence of the parts the average model builder should experience no difficulty in building this beautiful model. Of

(Continued on Page 41)

**BOLD BEAUTY,
EXCITING ELEGANCE**







The first step along the road to becoming a good Rudder-Only flyer is in selecting the right airplane. A large ship with approximately 66" wingspan is recommended as the larger craft with heavier wing loadings handle better in the wind and are easier for both the pilot and the judges to see. I achieve a heavy wing loading in my modified Live-Wire Cruiser by adding ballast in the form of extra batteries. You will find that a heavy ship does not buffet around in the wind and settles quickly on low engine speeds for faster touch-and-go landings, an important factor with only nine minutes flight time. I also prefer a plane with a long tail moment (the distance from wing to stab), and non-lifting type stabilizers such as utilized on my Cruiser, for it is not only easier to trim for wind conditions, but makes smoother turns and more precise loops.

Another important consideration in contest ships for Class I is their ground-handling features. This is where the right kind of landing gear is important. I personally prefer a two-wheel, wide-spaced, torsion-type gear over the more popular trike gear. The wide-spaced undercarriage, in conjunction with the long tail moment, tends to prevent the plane from ground looping. Along with this, I normally use a rubber tired tailwheel which is permanently locked rather than free-wheeling, in order to prevent unwanted turning tendencies. This assists in keeping the plane from ground looping, as mentioned, but also helps the ship brake to a stop for Proto Taxi. I let the air out of my Veco wheels so that they remain soft, preventing unwanted bounces on landing.

I find, that for Class I, the flat-bottom airfoils are better than the semi-symmetrical type, as the latter tends to hold the inverted position of a loop too long. The flat bottom section allows the nose to drop instantly, making for rounder loops.

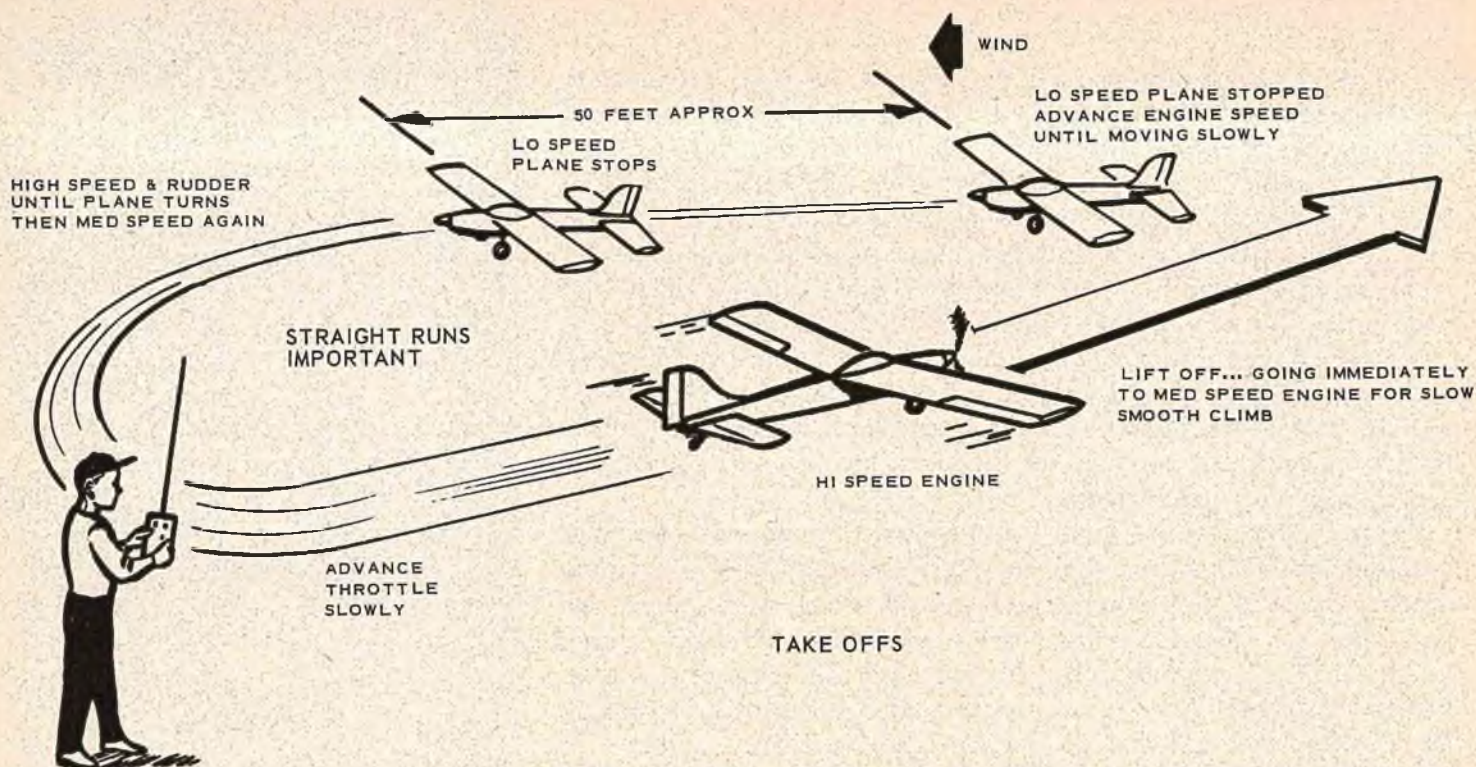
Two more important features of contest flying are good wind penetration, and of course, good looping. The former can be achieved by trimming your heavy wing-loaded airplane for a fast "dead-stick" glide. Good looping tendencies can be acquired by using a K&B .35 R/C type engine with approximately 7 degrees *upthrust* — repeat, *upthrust*, not downthrust!

Now that your Class I ship has been built and properly trimmed, you are ready for the flight pattern. The first Rudder Only maneuver is the Proto Taxi. Starting from a "braked" position, I slowly open the throttle until my plane is moving slowly along the ground, bringing it to a stop at approximately fifty feet by a combination of retarding the throttle and the braked tail wheel, as previously mentioned. To effect the 180° turn, open your throttle and hold full right rudder until the plane begins to turn. Immediately decrease the throttle to full idle to stop the turn, bringing you into position for takeoff. Slowly advance the throttle until the plane clears the ground, then decrease again to maintain long straight climb. Bring your ship into position for the straight and level flight maneuver. When it reaches a position approximately five hundred feet upwind, you are ready for your Procedure Turn. This is achieved by a smooth even 90° turn to the left, followed immediately by an equally smooth 270° turn to the right. Concentrate on reaching the same point as when you started the procedure turn. Now, on your straight flight back, concentrate on crossing exactly over the top of your transmitter. This brings you into position for the Figure Eight. The most important part of this maneuver is in keeping both halves of the Eight equal in size, while

How to Stunt

R U D D E R O N L Y

by Bernie Williams



Former Class I Nat's Champ Outlines Blueprint For Successful RO

crossing directly over the top of your transmitter, as shown in your AMA manual.

Now for the Touch-And-Go landing. Whether or not you attempt this step should be decided in advance and predicated on prevailing wind conditions. At best, it is risky, for failing the Touch-and-Go cancels your flight entirely, and you must decide whether the few extra points are worth the added risk. If you decide to attempt it anyway, put your plane on the correct heading and decrease the throttle, judging your descent so that the plane will land as near the center of the circle as possible. When the wheels are about to touch down, decrease engine to full idle, allowing the ship to touch and roll. After achieving this, increase your throttle slowly to attain a smooth takeoff again.

You are now ready for your stunt maneuvers. It is important to maintain an easy viewing position to aid the judges in their scoring. The first maneuver, the Wing Over, is achieved by decreasing throttle to full idle. As soon as the nose begins to drop, increase the throttle to full bore until the plane is climbing steeply. When

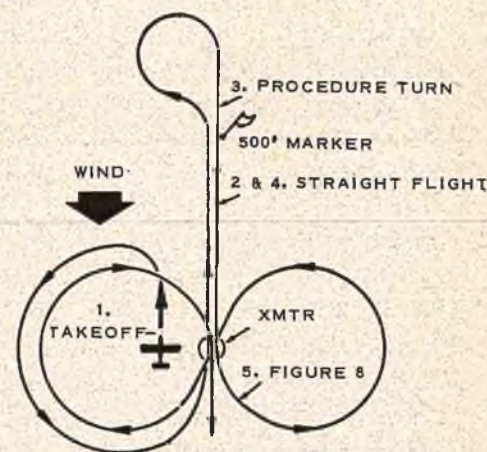
the ship reaches the top of the climb, or stall point, hit full right rudder, turning 180°, followed immediately by decreasing the throttle to idle, allowing the plane to recover on its own.

The next five maneuvers are: (1) Three Horizontal Rolls (2) Immelmann Turn (3) Three Inside Loops (4) Cuban Eight (5) Rolling Eight. All five are done on high speed engine. To start these maneuvers, hold full rudder until the plane spins down, building up the proper speed, then letting the rudder neutralize. You will find that with the proper amount of upthrust in your engine, your ship will do all of these looping type maneuvers with complete ease.

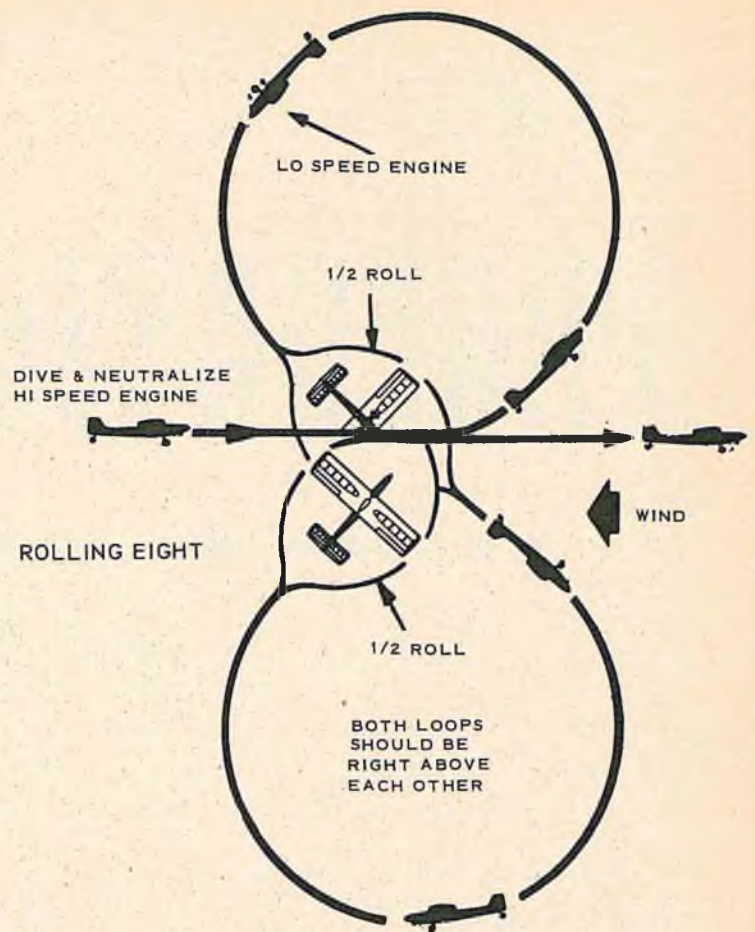
A special note is in order for the three horizontal rolls. If the day is quite windy, I always do my rolls upwind. The reason for this is to save time, as it takes too long to work your plane the necessary upwing distance for doing all three rolls, and you will find that by doing your three rolls into the wind, you will be in a good position for the next maneuver.

After the Rolling Eight, the next maneuver is the Tail Slide. This is accomplished by heading the plane

into the wind at medium throttle. Make one right turn to dive and let the plane recover on a down wind heading. If you have the right engine speed, the plane will climb steeply, as in the wingover. When it reaches the top of the climb, reduce the throttle to low — if you had enough climb, and you steered your plane straight, it should slide. This is not a "luck" maneuver as most fliers will try to



PRECISION AMA PATTERN
(INCLUDES 360 DEG OVER TRANSMITTER...
PATTERN DONE ON MED SPEED ENGINE TO
MAINTAIN SAME ALTITUDE)



Author checks his modified Live Wire Cruiser prior to takeoff.

Bernie commences the Proto Taxi. Note engine upthrust and long tail wheel gear.

tell you. Once you learn the proper engine speed and technique, you will find that you can perform the Tail Slide quite consistently.

The next maneuver is the Traffic Pattern Approach. This one is passed off too lightly by most flyers, and consequently, they do it poorly, getting fewer points. To rack up the maximum points for this maneuver, it is very important to know your glide angle on low speed engine. After you have determined this, get your plane to the proper altitude so that when you are on the landing approach, the craft will land in the 100 foot circle. Make sure that you maintain your starting altitude through all your turns, keeping these turns as smooth as possible. After the turn to the approach, keep the descent smooth and free from corrections in your attempt to hit the circle. If you see you are going to miss it, let it go, for it is far

(Continued on Page 44)



SIMPLE PROPORTIONAL

PART II
by Ted Strader

Second of three parts on simplified proportional control for Class II.

Taking first things first... my thanks to the editorial staff of R/C Modeler for asking us to sit in this month and talk about one of our favorite aspects of our favorite hobby — Galloping Ghost.

G-G has been with us for more than a decade, and in much the same form as it originally appeared. Over the years it has been nurtured by a hard core of tinkerers and experimenters who are singularly fascinated by ideas that are just a bit toward left field. Most of us have tried desperately to improve the original concept with somewhat limited success... for the fact remains that the original idea — mathematically and mechanically — was pretty nearly complete from the start.

A logical question from the galleries at this point would be — “If this is such a nearly perfect idea, why has it taken so long to catch on?” First, it is not a perfect idea... it still remains somewhat a tinkerer’s art... though part of the reason for recent successes in the area of Galloping Ghost has taken it out of the realm of only a tinkerer’s possibility and helped make it palatable to a greater number of modelers.

G-G, to be executed successfully, depends upon a near perfect balance between transmitter, pulser, receiver, actuator, tail coupling, and plane. With more emphasis on pulser, receiver, actuator, and coupling than on the transmitter and the plane, strangely enough! It has been the

improvements, of late, in the area of receivers and pulsers which have really helped modelers achieve tangible successes in this form of R/C.

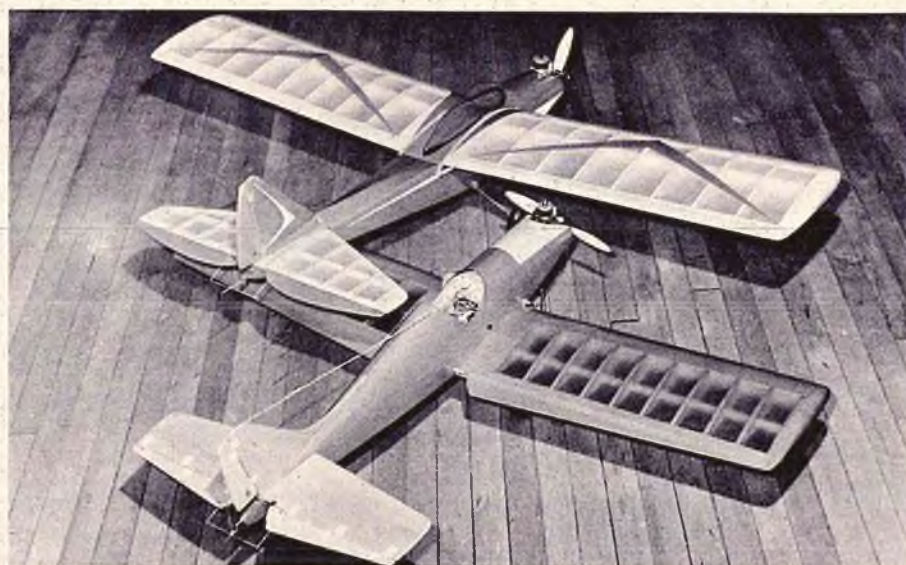
Let’s discuss the main components, one by one:

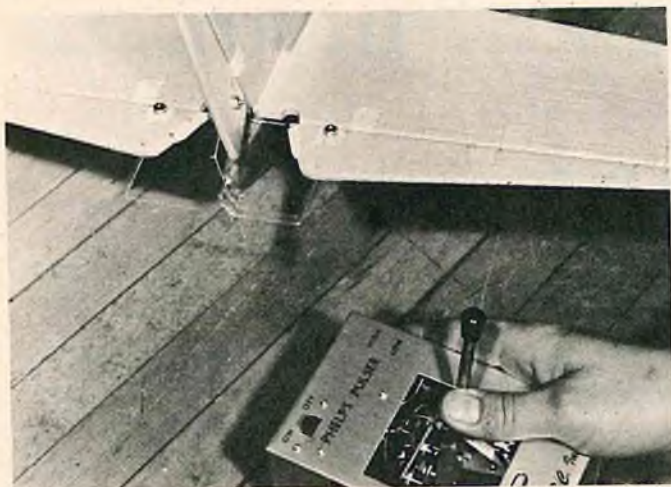
Transmitter: As long as it’s stable, most of today’s transmitters can be depended upon to do an adequate pulsing job when pressed into service.

Pulser: This has long been one of the areas of weakness... though not as long as the newly interested modeler might imagine. In the beginning, we were all hard pressed for a suitable “coder” which would run the range necessary to transform a heterogeneous group of parts into a smooth working team.

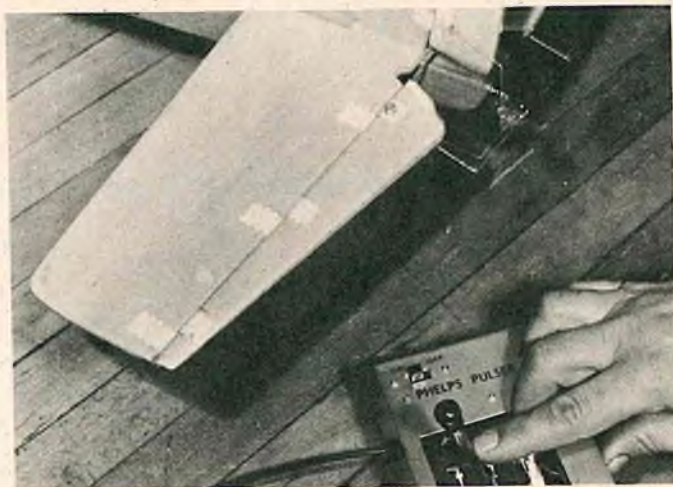
In order to do the job, the pulser had to be able to hammer out ON and OFF pulses of varying lengths — and be expected to maintain specific length ratios while also giving various rate changes simultaneously. Pulse length was not too hard for most. However, when it came time to devise a workable rate change addition, we all had our lumps.

The more electronically adept tackled the two tube multivibrators with reasonable success. Others, like





Right control: Rudder can definitely be seen in right attitude. Elevator is at neutral.



Left control: Elevator making approximately same neutral deflection up and down. Rudder is at extreme left.

myself, went at it from a mechanical angle... with everything from fly-ball governors attached to old relay points to rheostats coupled directly to the stick. A great many of these ideas worked well for the individual, but could not be counted on when tossed into the open arena, due in most part to the amount of initial tinkering necessary to get each idea working correctly. As a result, many modelers tried and found the early pulse concepts wanting—wanting more reliable components.

Both methods of varying pulse length and pulse rate exist today. The early tube-type multivibrators have given way to more reliable transistor circuits such as Ace R/C's newest Phelps Pulser. Our original ideas of varying pulse rate by using a rheostat

(variable potentiometer) to increase or decrease the speed of an electric motor as it wiped a contact across a half-contact board (for pulse length) were presented several years ago. This was the impetus needed to stimulate several modelers and manufacturers into action. Two of the most widely used mechanical dual pulsers are the Glass City and the Ace-Baisden kit. There may be others we're not aware of... but the ones mentioned have been used by this writer... so at least in this area we feel justified in saying—they work.

This completes the first unit necessary for successful G-G... a reliable transmitter-pulser combo.

Receiver: Now that we have a whole flood of pulse information streaming from the transmitter, we

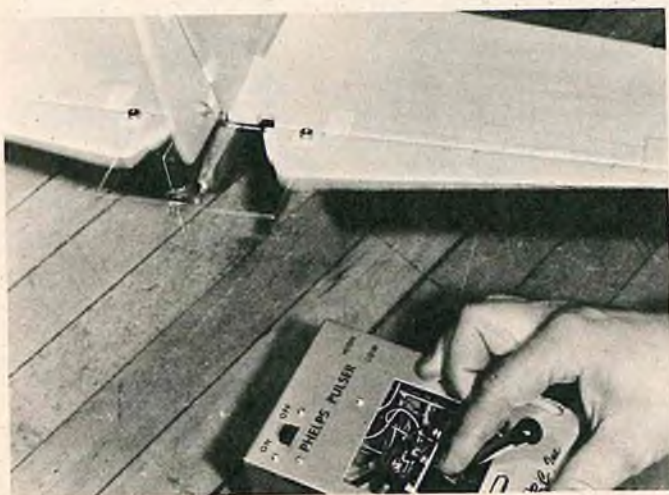
have to have something to intercept it completely and be able to transform it into the kind of ON-OFF language the actuator understands.

Most receivers available today will receive all of this information faithfully and even close a relay accurately in harmony with the information being received. The biggest clinker comes from "electrical noise" produced by electric motors used in G-G actuators.

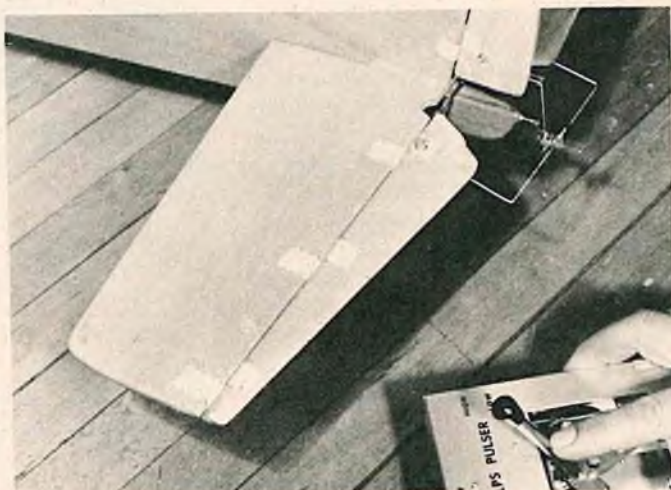
Not all receivers are affected. A great many will reject the electrical noise from an electric motor as if it never existed. On the other hand, another receiver of the same model and manufacture may not be as tolerant. The happy note is that in just about every case, these "noises" can be fil-

(Continued on Page 53)

Up Control: Rudder neutral and elevator in up position.



Down control neutral rudder and down elevator.



WEIRICK, SMITH, BROOKE SWEEP BUCKEYE REGIONALS

Proportional Dominates 1964 Southwestern Regionals

Hospitality was the word for the radio control of the 14th Annual Southwestern Regional Model Airplane Championships held at Buckeye Airport, Arizona on Washington's Birthday weekend. This meet was an AMA sanctioned affair, with the Phoenix Model Airplane Club sponsoring and conducting the free-flight portion, the Air-Zona Model Airplane Club handling the U-Control events, and the Arizona Radio Control Society (ARCS) running the R/C flight line.

Although a bit cold and with a storm front passing through, the contest began promptly at 8:00 A.M., and by the time the Pattern event contestants had made their qualifying flights, the wind subsided and allowed the 3:00 P.M. Pylon event to be flown in near perfect weather. It was under these conditions that Rob Kelly of Denver, Colorado, established a new Junior Pylon Record of 1:52.2.

Event Director Bob Kimbro answered the questions and made the decisions, while Bill Roseberry and Sam Okuma efficiently kept things moving. Generally speaking, the three flight circles kept full. The ARCS, under the guidance of Air Force Captain Rex O'Connor, had obtained U.S.A.F. pilots, stationed at nearby Luke AFB, to serve as judges. Watching the scores come in after the flights, it was evident that they had been adequately briefed on the Stunt pattern and the method of scoring. Only one adverse comment was heard about the judging, and that was when Doc Brooke executed what some believed to be a perfect tail slide, and received a "1" from one judge and a "5" from the other. This type of error was the exception, rather than the rule. And when the competition grew the hottest toward the end of Sunday's flying, and those contestants who knew they had been bested were watching, unbiased judging was of the utmost im-



Six proportional rigs at Phoenix. L to R, back row: Frank Hoover, Phil Kraft, Bob Dunham. Front row: Don Mathis, Cliff Weirick (for Bonner). The transmitters are deliberately mixed up — try and match the manufacturer to the rig.



Cliff Weirick and Willie Smith — top two at Buckeye. Both ships were RCM features.



First place Scale winner Loren Tregallas. 7 lb. P-63 built from Sterling kit. Orbit 10 on REMAT. KB .45

portance. First, second and third places in Class III alternated among the top multi flyers with the entire issue in doubt right up until flying ended. Cliff Weirick, using a fibreglass fuselage on his 'Candy,' (RCM Nov. 1963), took first with 198.5 points, Willie Smith with his 'Torero,' (RCM Dec. 1963) placed second with 195.5 points, while the current World R/C Champion, Ralph Brooke with a newly designed fuselage placed Third with 195 points. The perennial Class II winner, Don Crow, again took first in that category, while Mark Parsons and Jess Wright, both of Albuquerque took second and third, respectively. First in Class I was Robert Angus, second was Walt Staff, and third was Benjamin Herman.

A very well detailed P-63 King Cobra, flown by Loren Tregallas, placed a high first with 4617 points to beat out Eddie Morgan's 1/3 scale Piper Cub for second in Scale. This Cub flies so realistically with the twin

Jack Butler of Salt Lake City flies to contests in a Cessna 310D — maybe this is the reason for the tip tanks, Jack?



Rob Kelly established Junior AMA Pylon record at meet as "Sidewinder" topped out at 1:52.5. Cox .15, Orbit on EA.

McCoy engine, that from a distance, it looks and sounds like the full-size craft.

Zel Ritchie, with a different delta than his Nat's winning model, also placed first with a time of 1:07.9 in Pylon, Tom Winters came in second with 1:08.3 minutes, while the scale winner Loren Tregallas placed 3rd with 1:09.3.

I mentioned hospitality in my first paragraph... the ARCS invited all of the R/C contestants (and others) to attend the prime roast dinner and social which was held at the Luke AFB Officers Club. While waiting for this buffet style dinner, Ralph Brooke showed his color movies and gave a running commentary on the 1963 R/C Internat's. At dinner, the atmosphere was so congenial that the contestants felt they were among old friends — a wonderful way in which to get acquainted with those who fly RC as their chosen sport.

Eddie "Man Man" Morgan had everyone flipping over the four Mac 60's in his 9' Cub! Truth was that only two cylinders had pistons in them. Second in scale.



THE KRAFT PROPORTIONAL

First in a series of basic introductions to the new proportional systems.

This is the first of a series of introductory articles describing the operational principles of the new proportional systems. The material contained herein is presented in answer to numerous requests for general information on current proportional developments, and is based on the latest available data. Unless otherwise stated, these are general descriptive articles only, and are not intended to be product evaluations, or endorsements.

The production proportional system, developed and manufactured by Kraft Custom Radio, has had over five thousand test flights since its conception in 1962. Although based on digital logic techniques, the term "digital," as applied to proportional systems, does not indicate the actual method of supplying information. In reality, there are probably no true digital systems, although the old reliable reed system might be considered to be digital. The term is used, however, to describe systems which used digital techniques in transmitting, decoding, and applying the proportional information.

There are many possible digital methods of proportional control. One involves turning the RF carrier on and off and utilizing the length of both OFF and ON times in sequence to provide the proportional information. Similar results can be obtained by turning the RF carrier on and off in short duration spikes which reference to each other. Another system transmits these carrier off spikes to form reference pulses on a fixed time basis. Pulses are transmitted between the reference pulses and the information pulse, when decoded, produces the proportional output.

These digital systems have one thing in common. They do not utilize

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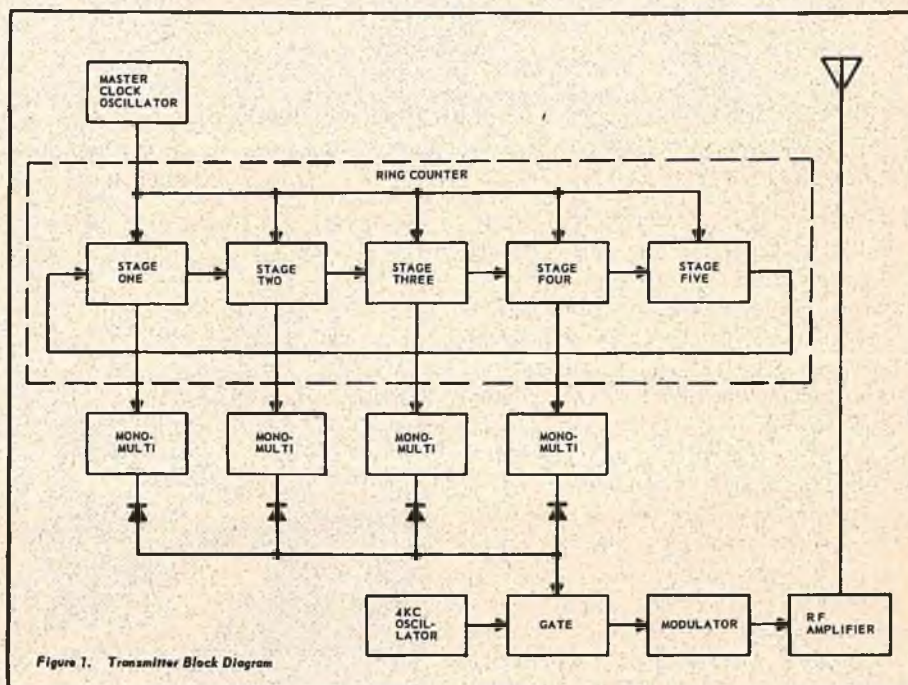


Figure 1. Transmitter Block Diagram

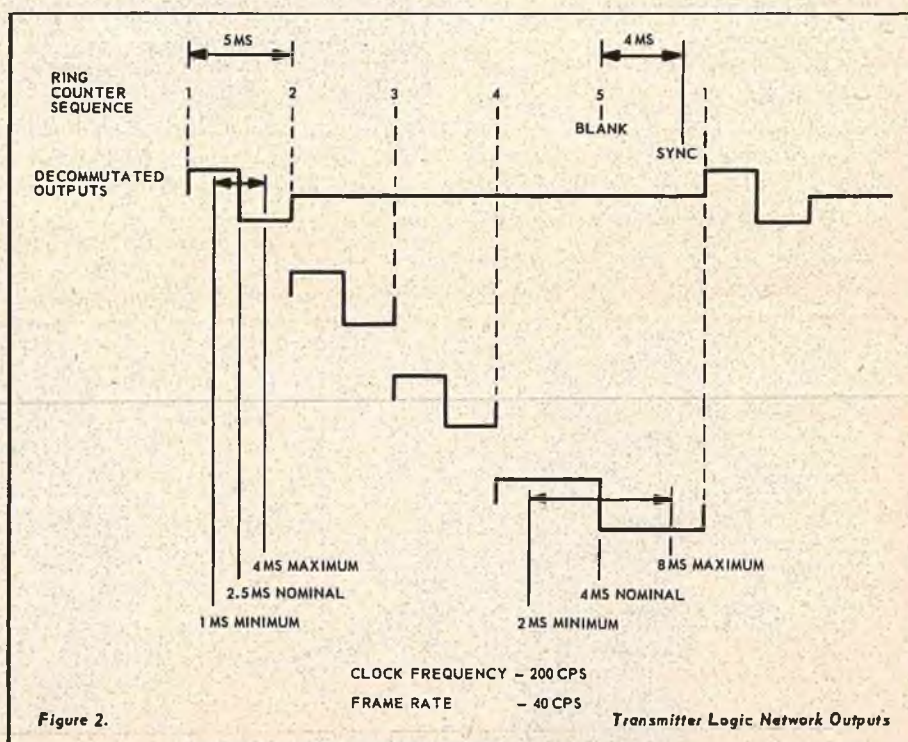


Figure 2.

CLOCK FREQUENCY - 200 CPS
FRAME RATE - 40 CPS

Transmitter Logic Network Outputs

TOLEDO

Weak Signals Host World's Largest R/C Conference

The 10th Annual Mid-Winter R/C Conference, sponsored by the Weak Signals Club of Toledo, Ohio, and held in the Champion Spark Plug Company hangar at the Toledo Express Airport, February 29th through March 1st, turned out to be the largest radio control show ever held. Over seventeen hundred modelers, coming from every portion of the United States plus Canada and England, attended the two day R/C spectacular. Thirty-five major equipment, kit, and accessory manufacturers were in attendance to meet with the individual hobbyists, obtain their ideas and viewpoints, and demonstrate their new and forthcoming equipment.

Headquarters motel for the registrants was the Howard Johnson Motor Lodge, where on Friday evening, arriving guests were treated to complimentary cocktails during an initial and informal get-together. The following morning, the 10th Annual Conference officially opened. Following luncheon, Maynard Hill spoke on the AMA Altitude Record. This was followed by a brave attempt on the part of "Pappy" deBolt to complete the scheduled flight demonstrations despite the 35 degree temperature and gusty winds in the 25 to 35 knot class! The balance of the afternoon centered around

Left: Capt. C. Winters beautiful multi; World Engines Controlaire display and friend; largest plane at the Conference — uses O&R Compact; Dave Berg at Magna-Jig display. Right: A portion of the general display area; the Dee Bee Quadruplex superhet; Citizen-Ship exhibit; Jack Levine from Lee's Hobbies.





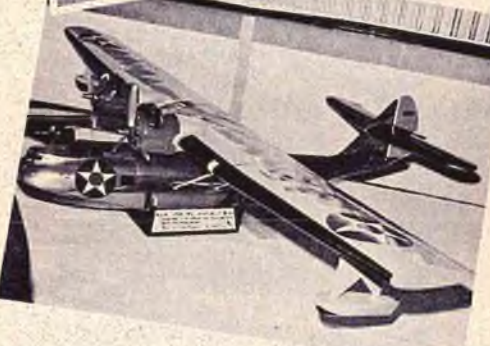
the scheduled speakers — Harry Sampy on "Multi Proportional Equipment, Present and Future"; John Worth on "AMA R/C Rules and National Qualifications"; and a discussion about "FAI International RC Competition" by U.S. Team members Ed Kazmirski and Jerry Nelson along with Team Captain Bob Dunham.

One of the most successful and well-liked phases of the Conference in past years has been the annual auction. This year, in order to ease the load on this event, a "Trading Post" was established for the benefit of individual modelers with gear to swap or sell. The auction itself commenced promptly at seven and proved to be a complete sell-out.

The following Sunday mornings activities began with a panel discussion designed to answer questions on a variety of subjects concerned with the hobby. At Noon, entry in the model competition was formally closed as officials judging began. When completed, judges announced the winners in all categories and the awards were presented, including the first Annual R/C Modeler Magazine Editor's Trophy for Best Finish. In addition, a check for \$682 was presented to Ed Lorenz for the AMA/FCC Fund, the result of a raffle held for this purpose.

The photographs of the Toledo Conference will give you some idea of the phenomenal growth of our hobby and its associated industries, as evidenced by the scope and magnitude of this event. An excellent program, skillfully presented by the Weak Signals Club of Toledo with the cooperation of the Champion Spark Plug Company.

Left: Carl Goldberg with Skylark models; Ed Izzo accepting trophy for best new idea in RC construction (styrofoam wings); the Gazelle, winning Class II design by J. Skebo; new Sterling rudder only proportional and Mambo Special; lineup of trophy winners. Right: J. Fielding's winning Hammerhead with RCM Editor's Trophy on left and Weak Signals trophy on right; portion of crowd braving the cold, 30 knot winds to watch flying demo; beautiful PBV-4 by Bob Fabian; winning Class I design by Ted Rohweder; "the proportional touch."



SHOWCASE '64



An excellent razor plane from Wiloughby Enterprises.

The popular Dee Bee Quadruplex distributed by Lee's.



Those items mentioned in the Showcase '64 section that have been tested and/or evaluated by the R/C Modeler Consumer Research Department can be identified by the product rating assigned to it. All ratings are based on a comparison of the item under consideration to a set of standards, established by RCM, designed to evaluate the item in terms of performance, price, and comparison to other similar items in the same price range and general category. Those items not evaluated by RCM will be so noted. Review subjects are selected by RCM for their general interest, and have either been provided by the manufacturer for this purpose, or purchased by RCM from an independent source. No preference is given to any manufacturer or advertiser. Rating code: ●●●●●Excellent; ●●●●Better than average; ●●●Average; ●●Fair; ●Poor; ○ Not evaluated.

Ultra Miniature Toggle Switch

●●●●●From Alco, an ultra-miniature toggle switch measuring $\frac{1}{2}$ " x $\frac{3}{8}$ " x $\frac{1}{4}$ " and rated at 5 amp @ 115 VAC and capable of carrying a 100% overload. All contacts terminals and moving parts are solid silver, not just silver plated. Insulating resistance is over 1000 megohm @ 500 VDC; voltage breakdown over 1000 volts

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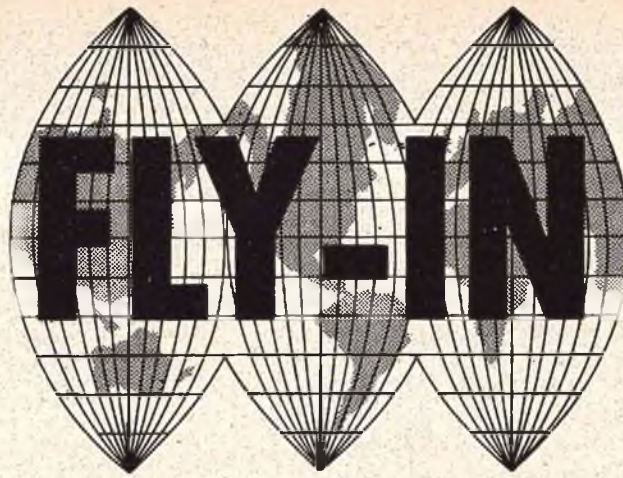
The Controlaire 5 prior to assembly.



RCM's assembled Controlaire 5 relayless receiver.

Latest catalog from AHC.





HEART OF AMERICA REGIONALS SLATED FOR AUGUST 15-16

KANSAS CITY, Mo. — The first Heart of America Contest, held near Kansas City, Missouri last year, will be superseded by an event of outstanding size, and should serve to attract RC fans from even a greater area than the successful event of 1963.

Carl Lindsey, CD for the Heart of America Meet, announced that with the cooperation of last year's sponsor, Ace RC/Grid Leaks, the first annual Mid-America Regional Championships, under the sponsorship of the Kansas City Aero Club would be held on August 15 and 16, 1964, at the Richards-Gebaur Air Base.

Bill Ong, President of the Aero Club, is also president of the NAA, parent organization of the AMA, and the group has gone all out to assure an outstanding event that is sure to attract the top R/C fliers, not only from the Midwest, but from all over the nation.

A total of six events are planned, and include Class I, II, III, Open Pylon, Scale, and an unannounced Special. The judges will be selected from among members of the Kansas City Aero Club and from accomplished RC fliers in the area.

Six flight lines will be utilized with adequate personnel on

hand so that judges will be available in sufficient quantity to hold continuous flying from the six sites. Flying sites will be assigned by frequencies, with one for the 50-54 mc slot, and the remaining five for the superhet 27 mc frequencies. This will allow simultaneous flying on all six circles.

In addition to five trophies for the first five places in each of the six categories to be of merchandise prizes which will be furnished by the model industry. Present plans also call for the top prize in each of the six categories to be offered some choice radio control gear, including the possibility of some of the best proportional rigs currently available. The latter is still in the nebulous stage but will be tied down in the near future.

The Air Force Thunderbirds will be a prime attraction, with this portion of the program conducted on the field a distance away from the six RC flying sites. There will be no shutdown of contest activities during these demonstrations.

For further details of this forthcoming and outstanding event, contact Carl Lindsey, 1505 B Street, Blue Springs, Missouri. Advance registration is mandatory.

Weirick, Candy win Shoot-Out

LOS ANGELES, Calif. — Cliff Weirick, flying his well-known Candy design (RCM Nov. '63) and using the new Bonner Proportional system, flew to the winners circle in the recent LARKS Shoot-Out at Los Angeles Model Airport. Bob Doell, also employing the Bonner system, took

second, while Zel Ritchie and his Space Control captured third. Fourth place runner-up was Jerry Nelson and a Kraft proportional unit, and fifth, Nate Rambo, employing the Bonner rig. The meet was a joint effort of the Valley Fliers, Orange County Radio Control League, and the LARKS.

Forestry Service Uses RC for Fire Fighting

RIVERSIDE, Calif. — According to an article and accompanying photographs in the Los Angeles Times, the U.S. Forestry Service has pressed radio controlled models into service as a result of research efforts to cut forest and brush fire losses and to save the lives of firefighters endangered by erratic weather conditions. Electromechanical equipment in the models record atmospheric

pressures, temperatures, and humidity at altitudes ranging up to ten thousand feet above sea level. These factors enable the Forestry Department to determine the behavior patterns of the wind, and enable firefighters to anticipate problems of control during fires, and to further determine what course of action should be followed. Designated the LAR P-12, the cost per model is \$3,500.

LIDS FIFTH ANNUAL JUNE 6-7

LONG ISLAND, N.Y. — The Long Island Drone Society's Fifth Annual R/C contest (AMA Sanction #15) is slated for June 6-7. Among the many judges available at the meet will be Ed Kazmirski (Top Flite engineer), Don Brown (Dee Bee Engineering Co.), Harold deBolt (R/C Manufacturer), and Leon Shulman (R/C Manufacturers Representative). These top men will not compete, but may fly exhibition, if time permits. A newly acquired magnificent flying site at Mitchell AFB, with concrete runways properly marked off, and acres of obstruction-free improved land immediately adjacent to it, now sets the site for a fascinating two days of highly competitive and action-packed flying. The multi event has been divided into two cate-

gories for Novice and Expert to give all contestants an opportunity to compete on equal footing. Expert class is defined as "anyone who has placed first, second, or third in the multi category of any AMA sanctioned contest." Other events include Class II, Class I, Scale, and Pylon. Two flight lines will be used — one for the 27 mc frequencies and one for the six meter spots.

"Zippy," the famous TV chimpanzee (who now flies multi, we understand!) will be on hand as part of the entertainment program. Motel reservations are available for out-of-town contestants. For full particulars, send a large, self-addressed stamped envelope to: Long Island Drone Society, P.O. Box 51, East Meadow, L.I., N.Y.

NCRCS ORGANIZES INTERCLUB

ACTIVITIES

OAKLAND, Calif. — The Northern California Radio Control Society, representing over four hundred Northern California RC'ers from seven different clubs, held their Fourth Annual Meeting at the home of NCRCS Chairman Jerry Nelson. In addition to formulating a list of organized interclub activities for the months ahead it was agreed that AMA rules would be used for all Open contests, plus an official encouragement for all member clubs to participate in the AMA and the possibility of an

Academy membership requirement for all participating clubs in 1965. With the recent formulation of the Southern California Radio Control Society, it will be interesting to watch for the spark of rivalry between North and South — something along the lines of the longstanding and friendly Los Angeles-San Francisco feud perhaps? A North-South contest between the two organizations might prove to the start of one of the largest Annual meets in the country.

ARCS EIGHTH AAA SET FOR JULY 5

PITTSBURGH, Pa. — The Eighth Annual Triple A RC Contest, sponsored by the Greater Pittsburgh ARCS has been granted AMA Sanction #110 for July 5th. To be held at Hillmans Model Airport from 9:00 A.M. to 6:30 P.M., events scheduled are Junior, Senior and Open Class I; Junior, Senior, and Open Class II, and Novice and Expert Class III. Contest Director Ralph Pinnetti announces that the flying field is paved, refreshments will be available, and there are adequate motel facilities nearby for out-of-town contestants. Entry fee is \$2.00. Full information may be obtained from Contest Coordinator Ralph Dillinger, 324 Logan Road, Bethel Park, Pennsylvania.

FLYING CIRCUITS RC MEET JUNE 21

FORT WAYNE, Indiana — The Flying Circuits, Inc. announce an R/C Contest for Class I, II, and III, to be held at Smith Municipal Airport, Fort Wayne, on Sunday June 21, 1964. The AMA sanctioned meet will have trophies to third place and merchandise for fourth place. Advance registration is \$1.50 with full details from: Paul Scherer, 3703 Dover Drive, Ft. Wayne, Indiana.

W.F. STAFF FLIES 23 YEAR OLD BERKELEY BUCCANEER AS RC SHIP

SALT LAKE CITY, Utah— The two photos of Walt Staff and his Berkeley Buccaneer were taken twenty-three years and eleven hundred flights apart, for what may be the all-time longevity record for a single model! Walt, a member of the Utah State Aeromodelers built the 'Big Buc' in March 1937, the date of the first photograph. At that time it was powered by a Brown Jr. mill swinging a hand-carved 14-8 prop at 10,000 RPM. During the years from 1937 to 1959, Walt made over one thousand flights with this king size free-flyer. In the latter part of '59, Staff installed a single channel radio in the Buccaneer, and by the time of the second photo in 1960, had racked up over seventy-five controlled flights. Although in need of minor repairs, the twenty-three year old bird is still capable of winging its way over the Great Salt Lake.

An interesting sidelight is that the silk used to cover the Buc was taken from casket lining material purchased from a casket maker, inasmuch as model silk was unavailable in the '30's. The original M&M air wheels are still being used and in good shape after all these years.



11TH LONDON MEET RE-SCHEDULED

LONDON, Canada — Due to conflicting dates with neighboring American contests, the 11th Annual International R/C Contest for Novice and Expert Multi Only, has been re-scheduled to June 13-14. Previously published dates were June 20-21. Anyone may enter Expert class with Novice entry limited to those contestants that have not won more than three first, second, or third places in three separate and previous contests. AMA-MAAC rules will prevail with the total two highest flight scores determining final standing. For further information, contact CD George Rodgers, 184 Brampton Rd., London, Ontario, Canada.

CENTREVILLE CADETS FOURTH ANNUAL

ST. LOUIS, Mo. — The Centreville Cadets R/C Club is planning their Fourth Annual AA R/C Contest to be held on June 6-7 under AMA Sanction 108. Further details are not yet available for publication, but interested fliers may write to Harold D. Bedwell, 200 Optimist Drive, Belleville, Illinois.

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CONTEST CALENDAR

All RC clubs are invited to submit their contest schedules for publication. Calendar items must be received by R/C Modeler's editorial office, P.O. Box 487, Sierra Madre, California, 45 days prior to publication.

APRIL

- 25-26 Turlock Aero Robots Fly-In. Turlock, Calif.
- 26 RC Pylon Open. Utah State Aeromodelers. N. Hess, 1779 Kensington Ave., Salt Lake City, Utah.

MAY

- 5 LARKS Pylon/Speed event. Mile Square, Santa Ana, Calif.
- 10 Harbord Slope Soaring Society FAI altitude record trials. Back Bay, Newport Harbor, Calif.
- 18-19 Florida State AA R/C Championships. AMA sanction. RCACF. Orlando, Florida, RCACF Field. CD Walt Schaonard, 2080 Sharon Road, Winter Park, Florida.
- 23-24 AA R/C contest. Tom Brett, 21718 Arrowhead, St. Clair Shores, Michigan. AMA sanction.
- 23-24 3rd Annual Cal-Western AAA. Sepulveda Model Airport, Los Angeles, Cal. Entry: \$2.00 Cal-Western AAA Model Airplane Meet, 2101 N. Maple St., Burbank, Calif.
- 24 5th Annual Invitational AA R/C Meet. Green Wood Lake Airport. AMA sanction. S. Gilbert Evans, 600 Beech Ave., Saddle Brook, N.J.
- 29-31 10th Annual RC/NC Invitational, Modelers Paradise, Monroe, N.C.
- 30-31 Fresno Radio Modelers Open, Fresno, Calif.
- 30-31 4th Annual RCEK Rudder. AMA sanction. John Kiewiet, 2322 Schippers Lane, Kalamazoo, Michigan.
- 30-31 AAA Navy Memphis Meet. NAS, Memphis, Aenn. AMA sanction. Dewey Wharton, 1617 Mary Drive, Memphis, Tenn.
- 31 Tri-Valley R/C Multi Contest. AMA sanction AA. James A. Hoffer, 217 E. Dayton St., South Bend, Indiana.

JUNE

- 6-7 Lincoln Sky Knights 5th Annual R/C Contest. Lincoln, Nebraska.
- 6-7 Centerville Cadets 4th Annual AA R/C Contest. Harold D. Bedwell, 200 Optimist Dr., Belleville, Illinois.
- 6-7 Long Island Drones 5th Annual R/C Contest. AMA sanction. Mitchell AFB. Long Shores Drones, P.O. Box #51, East Meadow, L.I., N.Y.
- 13-14 LARKS Open, Bakersfield, California.
- 13-14 Forest City Flyers 11th Annual R/C Contest. London, Canada. AMA-MAAC rules. C.D. George Rodgers, 184 Brompton Rd., London, Ontario, Canada.
- 14 St. Paul Radio Controllers Spring Contest, St. Paul, Minn.
- 14 Harbor Slope Soaring Society Pylon Race. Back Bay, Newport Harbor, Cal.
- 14 R/C AMA Pattern Handicap. Utah State Aeromodelers. N. Hess, 1779 Kensington Avenue, Salt Lake City, Utah. AMA sanction.
- 21 Flying Circuits R/C Contest. Smith Municipal Airport, Ft. Wayne, Indiana. AMA sanction. Entry: \$1.50 Paul Scherer, 3703 Dover Drive, Ft. Wayne.
- 28 AMA Fun-Fly. Saginaw Valley R/C Club. Saginaw, Michigan. G. Gill, 1981 Ribble Road, Saginaw, Michigan.

JULY

- 5 Eighth Annual AAA R/C Contest. AMA sanction. Greater Pittsburgh ARCS. Entry: \$2.00 Hillman's Model Airport. Ralph Dillinger, 324 Logan Rd., Bethel Park, Pennsylvania.
- 12 Flying Knights 1st Annual R/C Meet. AMA Class A sanction. Hamburg, N.Y.

AUGUST

- 9 RC AMA Pattern, Scale, Pylon. Utah State Aeromodelers. AMA sanction. N. Hess, 1779 Kensington Ave., Salt Lake City, Utah.
- 15-16 Heart of America R/C Contest. Richards-Gebaur AFB, Kansas City, Mo. Carl Lindsey, 1505 B Street, Blue Springs, Mo.

SHOWCASE '64

(Continued from Page 31)

@ 60 cycles; moisture resistance over 8 megohms after 48 hours at temperatures of 40° C and humidity of 95%; heat resistance, one hour @ 140° C; life cycle well over 80,000 on-off actions; case material, black phenol resin. Simultaneous action on DPDT. Price on 1-24 units is as follows: SPDT: \$1.65; DPDT: \$2.15. Quantity discounts available. **Circle # 1 on the Reader Service Card.**

Controlaire 5 Relayless Receiver Kit

●●● Distributed by Lee's Hobby Industries, Inc., the Controlaire 5 relayless superregen all-transistor 3 volt tone receiver kit is a good buy at \$7.95. Rated as average insofar as overall sophistication of design is concerned, this little unit could also be rated as excellent when compared to the price. The RCM photographs show the unit before and after construction. Construction time was forty-two minutes and it worked right off the bench with only slight tuning adjustments to the Kraft single transmitter. Instructions accompanying the kit were well detailed and should provide no difficulty whatsoever. The receiver requires a tone modulated signal from 500 to 1000 CPS. The unit is temperature compensated to operate between 0° and 130° F. Better than average noise rejection qualities were noted. Strong transmitted signals directly adjacent to the receiver did not result in any swamping characteristics. Capacitors are iei; transistors employed were: (1) SESCO 155-T1, (1) GE 2N508, (1) Texas Instrument GC4008, (1) Sylvania 2N229. Antenna coil is prewound and is supplied mounted on the PC board. The printed circuit board, itself, is somewhat thinner than we prefer, but no difficulty was experienced in cracking or in lifting of the copper clad elements. **Circle #2 on the Reader Service Card.**

(Continued on Page 62)



REGATTA

Western Boatmen Assault WAM Records in San Diego

Saturday and Sunday, February 22-23rd, marked the 4th Annual Midwinter Open Contest sponsored by the San Diego Argonauts R/C Model Boat Club. Held on Vacation Island at the Mission Bay Model Yacht Pond, seventy five entrants representing seven boat clubs, competed for the hardware in six categories. Registered entrants traveled to San Diego from points as far distant as Northern California and Arizona.

Saturday's trials were devoted to attempts on existing WAM records, utilizing a 1/16th mile straightaway course and an extremely accurate all-electronic timing system developed by Contest Director Wesley Hunt. Runs were a composite average of two trials, both upwind and downwind through the traps, with speeds carried out to four decimal points in MPH. The final results showed no existing records being broken, with the best time two-tenths of a second away from the current WAM record-holding run.

Sunday's Electric Precision and Gas Precision were run over a set course with the gates or sets of buoys three feet apart, except for the three buoys in the slalom being six feet apart. Contestants were penalized for striking the buoys or missing the gates, and were not allowed to deviate more than 90° away from course. Precision Electric was won by Carl Borchert of the Argonauts (250 points), second place by Bill Young of the Bakersfield Blue Dolphins (200 points), and third by Jim Gale of the Modelcers (150

points). Precision Gas was bested by Dick Carey of the Pirates with a top score of 220 points and a time of 1:59.76. Jim Gale was second with 220 points and a slightly higher time of 2:07.54. Bob McCallister, representing the San Francisco Model Yacht Club captured third honors with a score of 190 and a time of 1:32.90.

The Speed Obstacle Event was a high speed maneuvering course to demonstrate both the boat and operator's ability to turn both left and right at high speed. Bob McCallister (SFMYC) led the trio to a 46.81 win over Jim Gale's 49.55 and J. C. Henry's (Argonauts) 68.34.

The Three Lap Speed events for Class A (40 displacement and under) was run around the outside of the buoys against the clock, and again, Jim Gale ended up in first position with a time of 92.66. Ed Keedy of the SCMPB&YA was second with 101.81, and J. C. Henry was third with 119.25.

The Three Lap Speed Trials for Class B (40 displacement and over) was topped by Bob McCallister (SFMYC) with a time of 85.73. Jack Krohn (Modelcers) with two entries took both second and third with times of 87.38 and 103.11, respectively.

Affiliated with the Aquatic Division of the San Diego Park and Recreation Dept., the San Diego Argonauts are blessed with a beautiful model boat site, surrounded by an excellent recreation area and several Mission Bay luxury motels. Griff Parker, Commodore of the Argonauts, Wesley Hunt,

CD, and Ed Hendricks, Assistant were responsible for coordinating the meet.

Western Council of Model Boating

The Western Council of Model Boating has been formed, encompassing all major boat clubs in California, according to Bill Young, Purser. President-Elect is Bob McCallister of the Model Yacht Club of San Francisco, with the VP position held by Bob Plumley from the Los Angeles Pirates. In a letter to RCM, Young stated that the West Coast clubs have chosen to go WAM instead of IMPBMA because of the outstanding insurance program of the former group. The Association is quite interested, however, in R/C boat activities throughout the world, and would welcome any form of international championships that could be run off using IMPBMA and WAM and any other interested organization.

The WCMB calendar for the coming year is as follows:

May 30-31: Pirates Contest at Los Angeles, California.

July 19: Silver State Model Club Contest at Reno, Nevada.

Sept. 5-6: San Francisco Model Yacht Club contest at San Francisco, Calif.

Oct. 4-5: Western Council Championships. Location to be announced.

R/Cers interested in the WCMB can contact William C. Young, Purser, at 4800 Morro Drive, Bakersfield, California.



Long shot of the pits at 4th Annual.



Bob Gregory (Pirates) and Miss Aloha.



Wesley Hunt's unique electronic timing device.



Griff and Billy Parker (Argonauts).



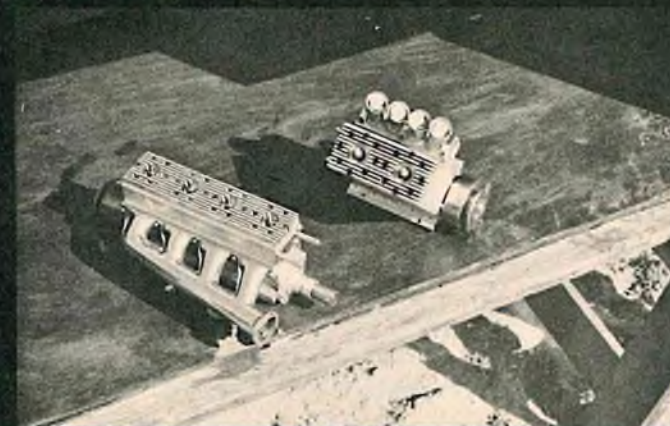
J. C. Henry's (Argonauts) fast hydro.



A cabin cruiser rounds the buoys.



Two members of the Blue Dolphins at the pits.



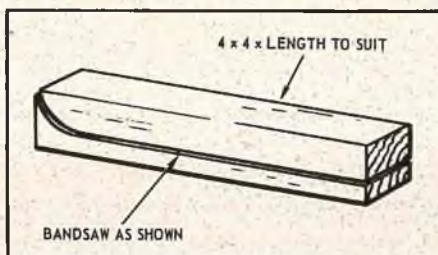
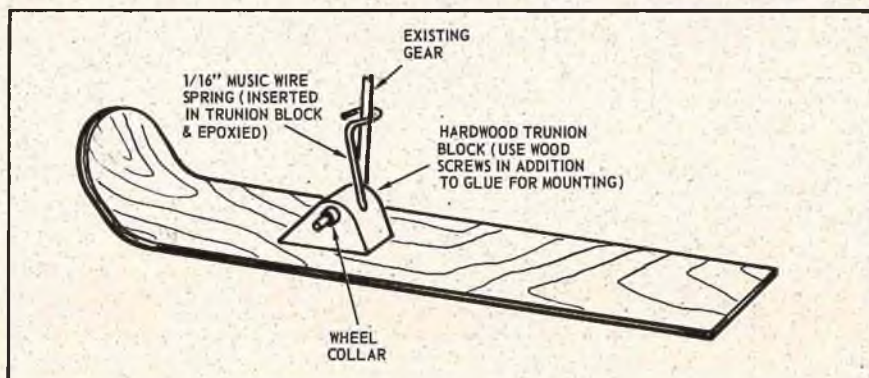
Beautiful twin and four cylinder mills by Del Parks.

HINTS & KINKS

SKIS FOR R/C

Many modelers have asked for a practical and workable ski for winter R/C flying. One of the most widely used is this excellent Peoria design. This unit has been flown for about five years, with a major portion of the development attributable to Bill Heger. The most important item to watch is that the ski be flown at a positive angle of attack — approximately ten degrees. Construction of the mold is started by sawing a length of four by four, as illustrated. After the mold is ready, take two pieces of 1/32" Finnish plywood roughed to approximate size, and coat one side of one piece with Elmer's glue (or epoxy), then sandwich both pieces between the two halves of the forming mold. Make sure that the two plywood pieces are directly adjacent to each other, then clamp securely. After the blank is dry, remove it from the form, round the leading edge, sand, then attach the hardwood trunion block and spring. For trike-gear ships, ski size should be about 3" x 12", and for conventional undercarriage, about 3" x 15". After completing the skis, coat them several times with clear dope. When in use, keep the bottom well waxed.

—Peoria R/C Modelers

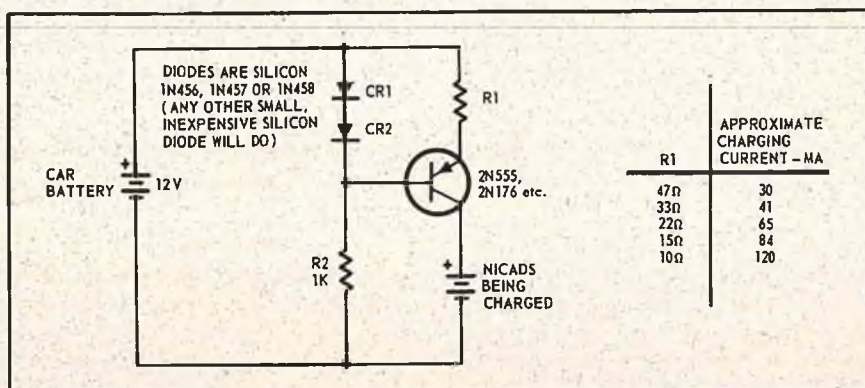


PORTABLE NICAD CHARGER

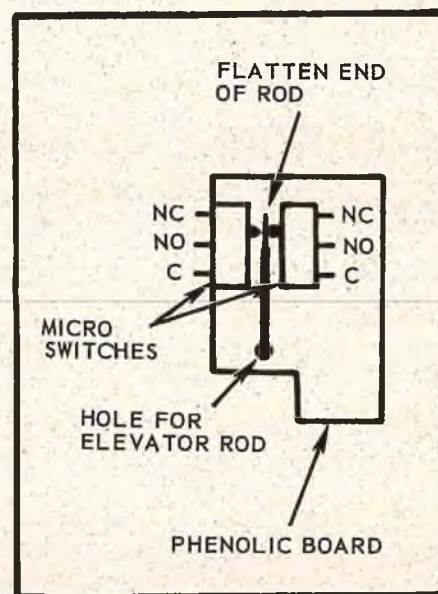
The following circuit is for a small portable constant current charger for NiCads. It is designed to use a 12 volt car battery as a source of charging current, although it can be powered by any DC supply of approximately 10-15V. The charging current is independent of the number of NiCads in series, within reasonable limits. Utilizing a car battery for power, it can charge six or seven NiCads in series. The transistor is any cheap medium power PNP unit as the 2N176, 2N555, etc. The 1 watt resistor "R" adjusts the charging current, and its value depends slightly on the diodes and transistors used, and primarily on the desired

charging current. The experimental unit constructed gave the currents shown in the table for the listed "R's." The "R" used should be adjusted after construction. For charging currents under 100 ma, the transistor should not need a heat-sink, but if extended to higher currents, it is recommended that another diode or two be added in the string along with heat-sinking the transistor by mounting it on a piece of sheet metal. Remember that the transistor collector contact is the case, and that not all cars have the same battery terminal grounded.

—from the MARCS Sparks



Bill Woodard's method of triggering a Duramite servo for up-elevator from a Vari-Comp escapement via a micro switch (RCM Feb. '64) started some experimentation with a four position Babcock hyper-compound escapement. The escapement is rigged in the standard manner except that the elevator torque rod is cut short at the back end of the escapement and bent back toward the rubber hook. The end of the rod is flattened and mounted between two micro switches that are hooked to one battery and an Annco servo. The two switches can be mounted on a piece of phenolic, then epoxied to the escapement itself. Make sure the epoxy does not foul up the idler gear and governor. The phenolic board is also used to support the end of the elevator arm. This system provides right and left



(Continued on Page 55)

182/Skylane

(Continued from Page 17)

course, the high wing design requires careful selection of balsa and plywood, as strength is a necessity around the cabin area due to the extensive use of glass. For this reason, good 5-ply, 3/32" thick spruce plywood was used for all formers and cabin bracing. I highly recommend the use of white glue, which gives a tough resilient joint that will dry in 20-25 minutes on a warm day. Balsa is then used to fill in, plank, and round out the contours of this scale model.

When cutting out formers #1 through #14 from 3/32" plywood and using this as a guide, cutting was simplified. In removing the center of the former, cut exactly on the line — do not allow any more for "strength" as it will add unwanted weight. Make sure, however, that the notches are cut sufficiently deep so that the rock-hard 1/4" square balsa which serves as a crutch does not protrude. Cut two doublers from 1/8" ply (#15) and, using Weldwood Presto-Set glue, apply cement generously, then rubber-band these parts to the fuselage, using a T-square for alignment. Select the motor you intend to use and space the hardwood mounts accordingly. I used an OS .49 R/C for scale appearing flights, although choice of a motor should be governed by the amount of extras you intend to include and the degree of finish you desire.

The main landing gear mount (#17), cut from 1/8" plywood, fits snugly between bulkheads #7 and #8 and rests on three 1/4" square bottom stringers, held down with two pieces of 1/4" square glued to #7 and #8 by the width of the fuselage. Notice that former "6 has an elongated slot. My receiver was contact cemented to a piece of sturdy foam rubber, then cemented to 1/8" plywood. One end of this assembly is inserted into the slot and two wood screws used to hold the opposite end in place. Later, when I repaired and



The model or the real thing? Only a few details reveal that this is the author's prototype.

renovated the fuselage and built a second ship for passengers (one a blonde named Midge), a Kraft Custom 10 receiver and Medco power pack was rolled in sponge, bound with a rubber band, and stuck beneath the floor board that the seats rested upon. The servos are installed flat.

Completely shape the nose, then cut the engine hatch out with a razor blade or sharpened hack-saw blade. With lots of room up front, I inverted the engine and installed the engine servo forward of the main bulkhead.

Now we come to a point where ingenuity is required — the duplication of the scale nose gear. A close look at the plans and photos will reveal a small diameter length of steel tubing

telescoping into a slightly larger length tube and compressing a spring. The wheel is held by a "U" shaped dural strut, fixed to the lower end of the nose strut. A small rubber band is employed to keep the assembly from hanging down more than 1 1/2", as a fast landing on rough ground can knock your gear off if it is extended too far. Of course, you can "dummy" this gear quite well by using a conventional nose gear and hiding the coil spring inside the fuselage, with a non-operating scissors.

When selecting wood for the straightforward and warp-free tail assembly, choose the balsa with care and keep it light! Notice that the tail assembly is fastened with screws (as is the wing), an innovation fast be-

Tail section detaches for accessibility.

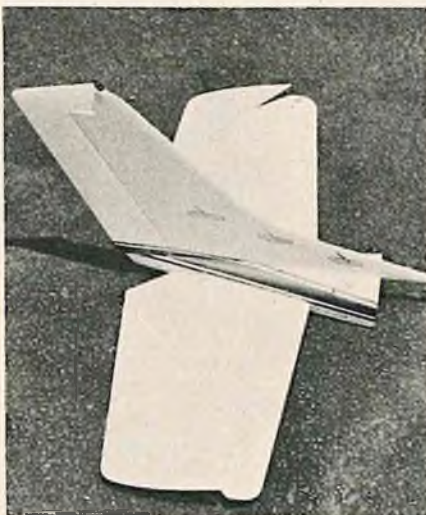


Photo shows removable cowling section.

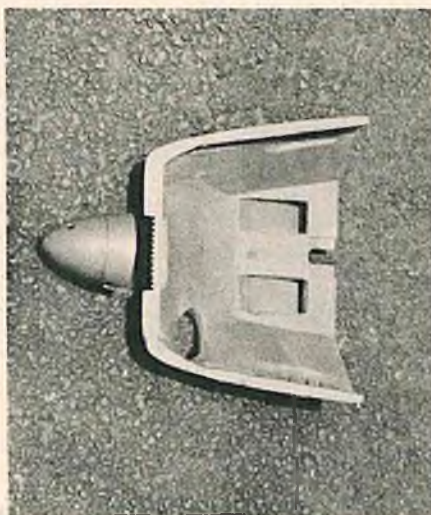




Photo from Cessna Aircraft Corp. illustrates clean, forward sweep of 182/Skyline.

coming popular with the West Coast-ers. In addition to the fact that there are no rubber bands to cut and mar the finish, this feature should contribute to more scale points at contests. Again, all the parts are numbered. The soft hollowed block #26 cannot be shaped until the fuselage is completely planked and sanded. This block is also split lengthwise to accommodate the stab. Shape the airfoil, sand **all** bumps out, then apply a light second coat of cement and set aside to dry in a jig made of books or magazines. I recommend lightweight silk for covering the fuselage and a good grade for the wings. Use at least three coats of sanding sealer, cutting it back every time in order to save weight. Then apply two coats of thinned dope, sanding it smooth with 600 wet-or-dry and water.

Tatone Scale Instruments were used in the cockpit and located in exactly the same position as the instrument panel on the full scale aircraft. I sat in the back seat of the Cessna Skylane and shot the instrument panel, then enlarged it to scale size. The correct size right and left decal for the fin is also included on the plans. Mine were drawn on "Briskit paper" with Pactra enamels, then the backing re-

moved and the gummy side pressed against the desired surface.

I mentioned my passengers... Ken and Midge dolls from Mattel. Ken was too long to fit the cabin, so 2" was cut from his midsection, then he was fiberglassed together again, a la Ben Casey. I wanted to dress him in suitable flight clothing, but settled for sailing clothes instead. Double up their legs, wrap rubber bands around them to hold in position and put in the freezer. In a couple of hours, place them in the plane on seats cut from foam rubber, and they will fit exactly.

The wing is straightforward, conventional construction with selected sheet stock for duplication of the metal skin. Prior to sheeting the top surface, install the wiring for the lights, hinges for the ailerons and flaps, and wire both servos. The plans show rock-hard balsa for the center section mid-spar tongue-and-groove section and the trailing edge spar. More strength will be gained, however, by using a length of Sig spruce and a liberal application of white glue. Because of the large scale area in the flaps, quite a bit more down trim will

(Continued on Page 48)



Above the clouds — factory view shows aft section for scale details.

KRAFT PROPORTIONAL

(Continued from Page 28)

an audio subcarrier (tone) to transmit information. This is a distinct advantage from the standpoint of simplicity and smoothness. One disadvantage, however, is that these same systems have less discrimination against outside interference. The Kraft system utilizes a pulsed 4KC audio subcarrier to transmit the proportional information. The subcarrier, itself, does not contribute any information, but the filter circuit in the receiver will pass only a 4KC signal. Consequently, the system is highly resistant to interference and noise.

Referring to the transmitter Block Diagram (Fig. 1), the master clock oscillator is a highly stable emitter coupled multivibrator which oscillates at a 200 CPS rate. The pulses from the clock advance the ring counter one stage at a time. Consequently, the synchronizing pulses from the ring counter stages appear at a 40 CPS rate. These pulses fire a mono-multi-vibrator (one shot) who's timing

period is controlled by potentiometers connected to the control and trim sticks of the transmitter. The timing period of the one shot is applied to a gate, which allows the 4KC signal to pass to the modulator for this timing period. Fig. 2 clearly illustrates the sequence and timing periods of the one shots.

The modulated output of the transmitter is illustrated in Fig. 3. Great care was taken in the design of the modulator and 4KC oscillator to insure perfect sine-wave modulation at 80%. This provides "splatter free" transmitter operation eliminating interference to other R/C units on adjacent frequencies.

Input power to the RF final is .7 watts. The antenna is a base loaded 54" whip. Transmitter is completely transistorized.

Figure 4 is the Block Diagram of the receiver logic network. The super-

heterodyne receiver employs a forward AGC RF amplifier, mixer, two IF stages, crystal oscillator, detector, and AGC amplifier. Three AGC loops are used to provide a flat output under wide variations of signal strength.

The detected output from the receiver is applied to an amplifier and limiter which keeps the signal output at a constant level. The 4KC tuned switch detects the pulsed 4KC subcarrier and applies the resulting square wave pulses to the pulse omission detector and gates. Flip flops 1 and 2 are synchronized to open the gates in order, and in the manner indicated in the logic table. When the gate is open, the proper pulse is passed to the switch, which turns on for a positive time equal to the transmitted 4KC pulse. The negative going trailing edge of the square wave switch output fires a one shot, which provides the negative part of the signal to the servo. The one shot also applies a signal to the flip flop which closes the preceding gate and opens the next gate. The next signal pulse turns off the one shot completing the cycle of information applied to that servo. When the positive and negative pulses, applied to the integrating network of the servos, are equal in length, the input is at ground potential or servo neutral. When a negative or positive imbalance exists, the servo runs until this error signal voltage is cancelled by the feedback voltage.

There is no possibility of interaction between controls in this system. It is completely free from drift, simple to set up, and requires no further adjustment or maintenance. All switching and/or gating is via transistors or diodes. The design is considerably complicated by the 4KC subcarrier. The interference protection provided

(Continued on Page 54)

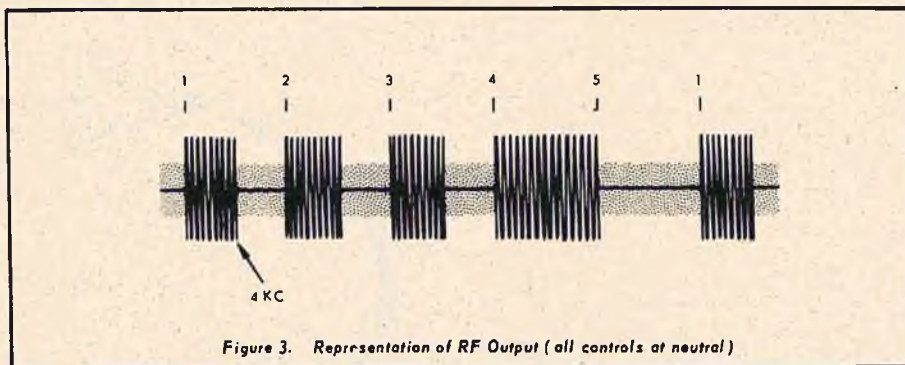
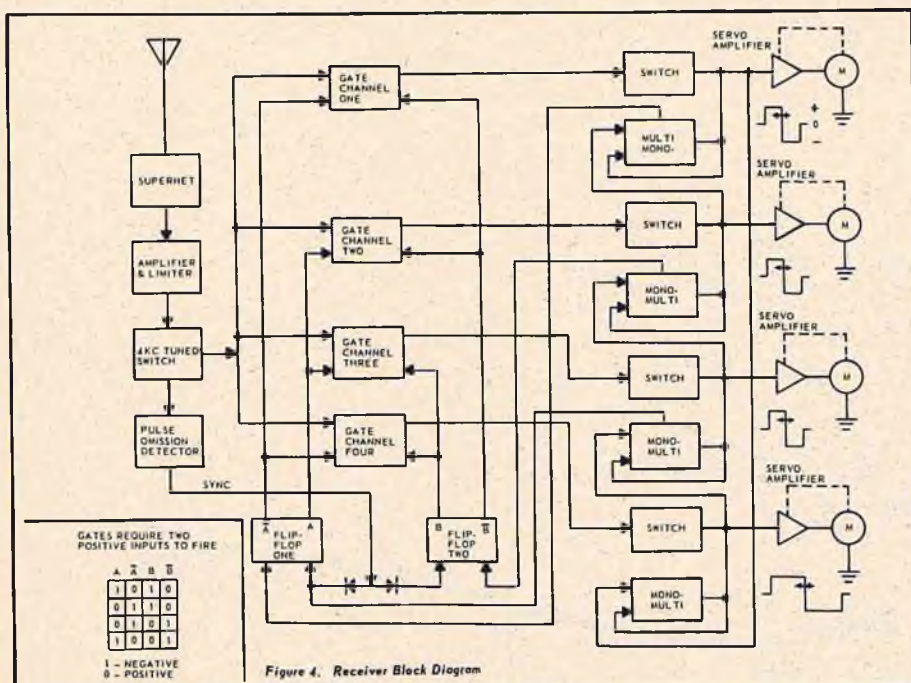


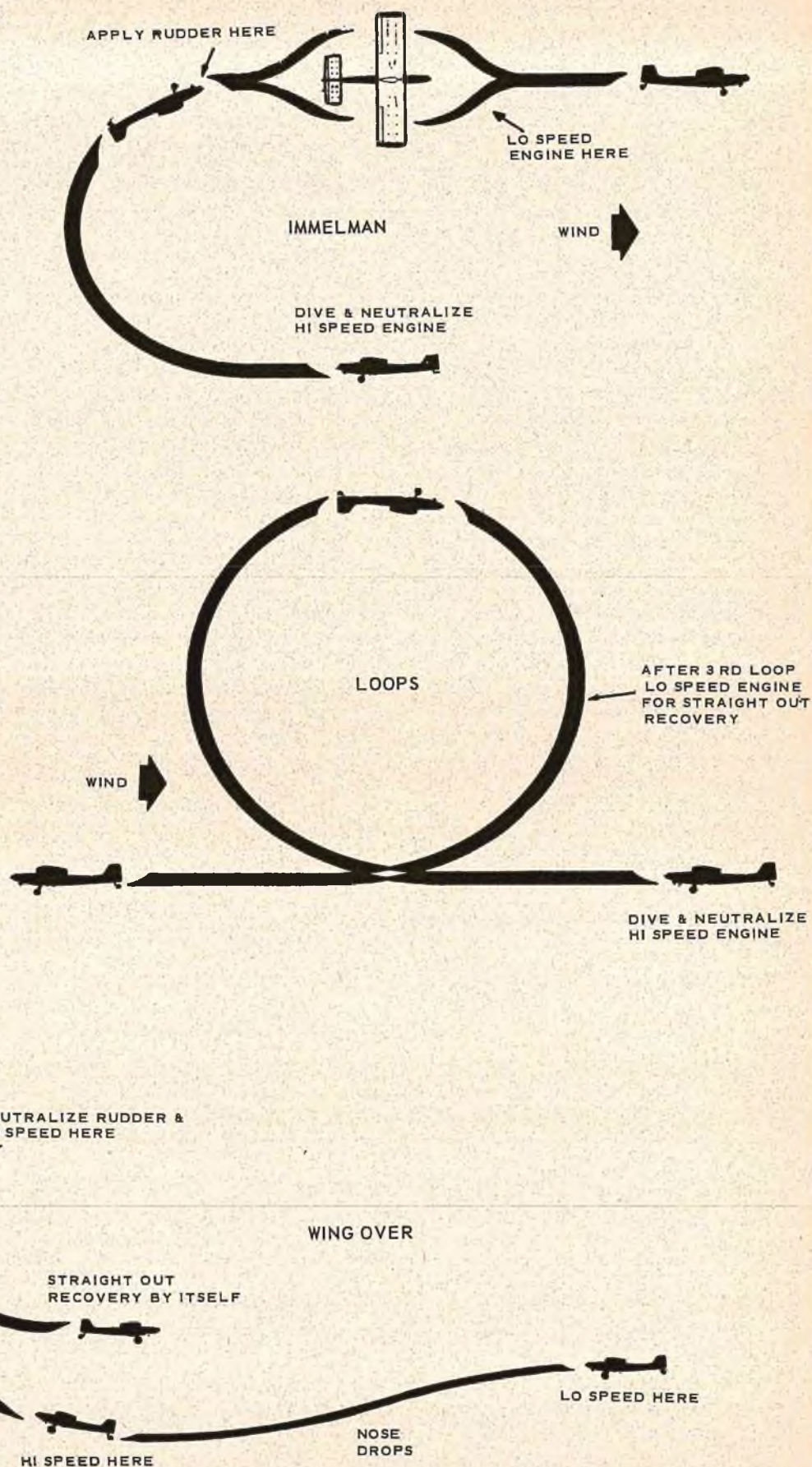
Figure 3. Representation of RF Output (all controls at neutral)

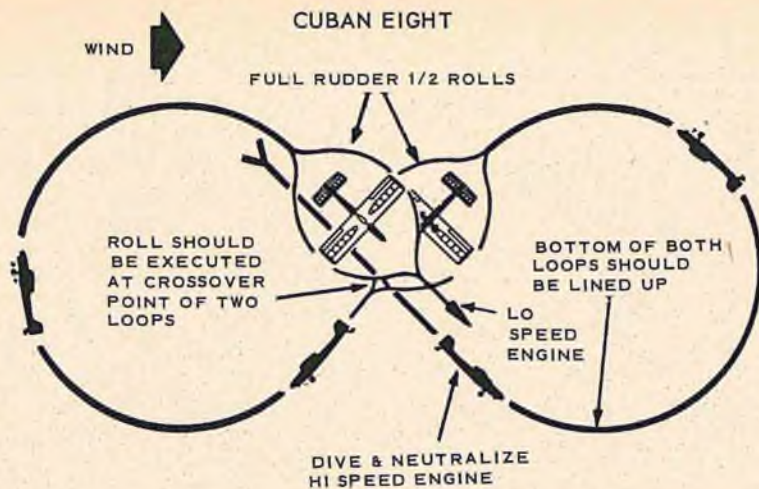


HOW TO STUNT R.O.

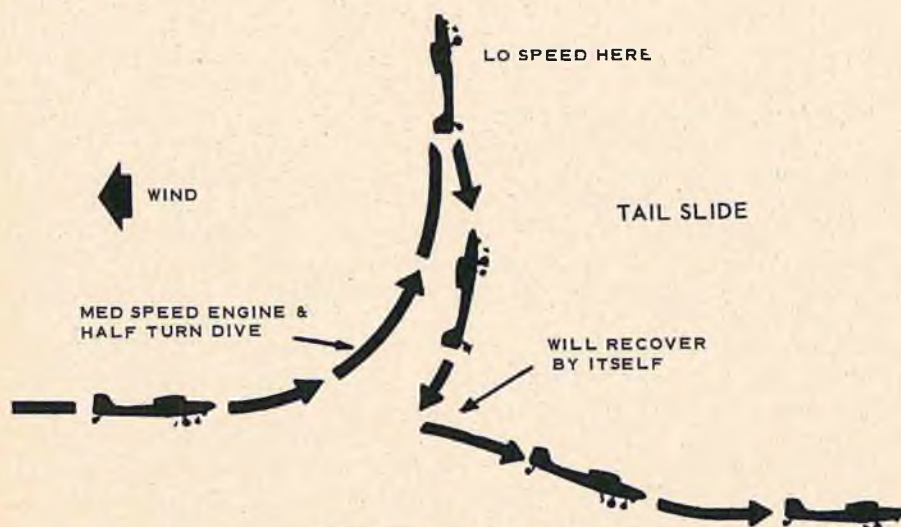
(Continued from Page 23)

more important to make a perfect landing and not hit the spot, as so many fliers fail to do in making that last minute turn. Don't forget — if you hit the prop, you are finished as far as the taxi return is concerned, as with today's rules the taxi return is worth just as many points as three loops or any other maneuver. If you have a plane with a long tail moment like the Cruiser, and with the tail wheel locked as previously mentioned, the taxi, or Proto Return should be quite easy and a good "point-maker." To taxi your plane, try to keep the ground speed as low as you can to aid you in keeping the plane under full control. I always speed the engine up just a little if I need to turn the plane, but as soon as you have your heading to the spot, slow the motor down once again.





The end of a perfect flight — Bernie Williams brings the Cruiser in for a dead stick landing.



(Continued on Page 57)

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KEN WILLARD

(Continued from Page 7)

ginners start right out with multi-channel equipment. It's really easier to fly a model, controlled by rudder and motor speed only, using four channels and servos, than it is to use a push button and escapements. The only advantages of escapements are lower cost and lighter weight. But — and this is important — there are many thousands of "single channel, rudder-only" R/C flyers, and some provision has to be made for them.

So much for the confusing but pertinent factors which have led to the always present feeling that "it's time for a change in the classes of R/C competition."

Nobody wants to change the R/C classes just for the sake of change, but unless the changes truly result in an improvement, it's better to leave things as they are. And boy, this is where the fun begins. There seem to be as many ideas as there are modelers.

One way to go about developing new classes is to establish certain criteria. Let's list them:

1. The class should serve a purpose.
2. It should be immediately recognizable.
3. It should allow free and untrammelled development in propulsion, guidance, aerodynamic design and construction of radio controlled model aircraft.
4. It should qualify as a model aircraft classification within the definitive limits of the governing body, preferably the FAI, with the AMA as the United States recognized representative thereof.

How do the present classes stack up?

Class III meets the requirements, but some clarification of wording is required. One lawyer has offered the opinion that under the present wording, simultaneous proportional or servo operation is illegal!

Class II is questionable in its purpose. There is good reason for

continuing Class I at local meets, but I'm not sure that it belongs in national competition. The nationals should have the very best, both in flying and in equipment as well as pilots. And no matter how good a man is with rudder only equipment, anyone who has seen the Nats will agree that, compared to the multi jobs, the very best rudder flying results in walloping flight maneuvers. But, if the majority of R/C modelers want it, then they should have it in some form.

If you look at the current R/C classes, you'll find that they do not meet all of the requirements for a completely useful classification. Three classes are currently used — single axis, two axes, and three axes. What purpose is served? I supposed it can be argued that different flight skills are required — or perhaps that it is some form of "progression" in complexity. Both reasons are vulnerable. Why become proficient in two axis control only because the other is denied to you? And as for complexity, we've already seen examples of more complex two axis systems (TTPW) than three axis controls.

Next, how do you define axis control? When you mechanically move the rudder on its hinge line (must it be vertical?), you introduce the aerodynamic effect of the simultaneous equations of motion in three axes — the airplane yaws (vertical axis), banks (lateral axis), and noses down (horizontal axis).

Thirdly, does this type of classification allow freedom of development? Electronically, perhaps, but certainly not aerodynamically. The axis restriction is an aerodynamic limitation, just as a limitation on number of channels — or servos — or circuitry — would be an electronic drawback.

So if you're going to permit carte blanche in the radio gear, shouldn't you also permit full development in aerodynamics? After all, the airplane designers have just as much right to freedom of design as the radio equipment designers. Incidentally, going back briefly, there is a rationale here for single channel, rudder only, jobs. The single channel limits the electronic designer, and the rudder only requirement limits the airplane designer, so at least there is an equality established in the limitation.

If you review the other proposals—

limited surfaces, limited channels, or whatever, they all have shortcomings of one sort or another.

So what is the answer? The obvious solution, in principle, is to select the proposal, or those elements of several proposals, which come closest to meeting the criteria. Reducing the principle to practice isn't so easy.

At the risk of being presumptuous, I'd like to offer a suggested classification for R/C competition in AMA local and national contests.

Class R — Restricted to single channel, rudder only.

Class I — Models with engine displacement .09 or less.

Class II — Models with engine displacement .09 to .19.

Class III — Models with engine displacement .19 to .61, and conforming to FAI definitions.


In addition to the Class R, another suggestion is offered to encourage newcomers. Two categories for contestants at local meets are established, one for the beginner and one for the experienced flyers. Appropriate designations are desirable. "Novice" and "expert" have been used, but the term "novice" is not entirely descriptive — nor, for that matter, is expert. I would suggest that, since the newcomer has progressed far enough to enter any competition, he really can be considered a radio control pilot — so let's call this class the "sport pilot" class.

Once a contestant has won a sanctioned AMA local meet in the "sport pilot" category, in Class R or any one power class, he then graduates to "contest pilot" and must thereafter compete in the contest pilot category.

To qualify for the AMA National R/C pattern competition, the member must first have demonstrated his competence by winning some points in a sanctioned AMA local meets in the contest pilot category during the preceding year, as suggested by Maynard Hill. This requirement will have two beneficial effects. First, it will encourage participation in local meets. Second, it will assure that only the top contestants in the country enter the R/C nationals, thereby improving the overall quality of flying in this event, and also keeping the total number of contestants from becoming unnecessarily larger due to unrestricted entrance requirements. There are those who will contend that "the Nats

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should be for everybody" but anyone who competed in the last two years will tell you that it's getting to the point where it's hardly worth it to travel several hundred — or thousand miles and then only get in two flights — or three. This situation, unless some prior qualification such as is suggested is required, will get worse in 1964 and thereafter. Other sports require qualifying for the national championship, so with its rapid growth, R/C should follow their example.

Now let's review the suggested classes to see how they measure up to the criteria.

Purpose:

Class I will require smaller models, easier and cheaper to build, fly and repair. It will encourage more engine development for R/C in the smaller displacement class, which is sorely needed. It will encourage further miniaturization of guidance and control equipment. This equipment might be more expensive, but the newcomer isn't frightened off by the necessity

for building the "big beauty".

Class II, with its higher power, permits installation of heavier and potentially more sophisticated gear. A progressive step for the guy who wants to eventually go into the virtually unlimited Class III. True, some fellows may want to specialize in Class I, or II, or III, but the progressive feature is there in any case.

Class III's purpose is just as at present, an unlimited class for the guys who want both the biggest and the best.

Class R serves the beginner and the sport modeler of limited time and funds with a means of competing without spending more time and money than he can devote to the hobby.

Recognizability:

What could be easier than for the Contest Director to look at the engine and recognize the class? To prevent cheating — if necessary, engines of winners could be miked after the meet.

(Continued on Page 52)

Something New in R-C

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CESSNA

(Continued from Page 42)

be necessary, limiting the throw to 30°. The landing and anti-collision lights are from an HO gauge railroad layout, but General Electric has sub-miniature bulbs in both 3 and 6 volt ratings. Wing struts are shown actual length, but do not bind the top wire to the strut until the wing is finished and properly installed. For streamline fillets, I used "Green Stuff," a heavy green lacquer-based compound, manufactured by Rinshed-Manson Company (R-M #74 Putty) with plants in Detroit, Michigan; Anaheim, California; and Windsor, Ontario, Canada. This material is primarily sold for repairing dents in car fenders and other types of body work. It has very little shrinkage and is easily molded with a wet finger. In order to achieve a good fillet, I cut four pieces of .005" aluminum larger than the required area, drilled a hold for the 1/16" wire to pass through, slipped it over the wire abutting the end of each strut, and inserted the strut wire into the 1/16" I.D. brass tubing. I then traced the outline of the fillet on the sheet aluminum for contour, removed the sheet, and cut to the line with a pair of scissors. With a piece of heavy bond paper I masked off the area, so as not to overrun the aluminum, then applied a medium thick coat of "Green Stuff." When dry, it was

sanded to a nice round contour, doped twice, then sprayed.

To stimulate the corrugated metal stiffeners used on the flaps and ailerons, I took a piece of 1/4" pine, drilled a 1/16" hole about 1/2" from the end, and filed it into a diamond shape with a square Swiss pattern file. This allowed the 1/16" square balsa to pass snugly through the hole. I then forced a thin, double-edged razor blade down so that it would split the 1/16" square balsa exactly in half, making an isosceles triangle. It was then an easy matter to push a strip of balsa through the hole, grasp the two cut pieces on the other side of the razor blade and pull — neatly stripping all the balsa needed in about twenty minutes. The job of attaching it, however, is a different matter! I had counted the number of stiffeners on each surface and found there were nineteen on the elevator and thirty-five on the aileron and flap. So I took my trusty old metric scale, and by division, found that they were spaced 12 mm apart (roughly 17/32"). To save sanding, I merely touched each end of the balsa with heavy dope then taped them down with Scotch Tape (see photo). When dry, the tape was removed, and two coats of sanding sealer applied, sanding with 400 grit between coats. You will find that this holds the strips down quite well.

The canopy was blown from butyrate sheet in Japan. If you have difficulty making this windshield, write to me in care of R/C Modeler and I will try to furnish the blown windshield at a nominal cost.

The final finish was a combination of Aero Gloss aluminum mixed with

Corsair Blue, to match the colors in the Cessna brochure. White Fuller Plast was the base color, then the blue was applied. When fully dry (72 hours), a top coat of clear gloss Fuller Plast was added. While the directions are quite complete, a word of caution is in order about this type of paint—don't mix more than needed, use a 300 thinner, and when spraying cover with a wet coat, but **do not** let the paint run. If it should run, quickly wipe it once with a thinner soaked rag, let dry, then cut back with 400 or 600 sandpaper and repaint.

Let the finish dry at least twenty-four hours, then rub down and polish with a good rubbing compound. And don't quit in the middle of the job! Fuller Plast can be buffed to a gloss comparable to fiberglass finishes. Jim Jensen, a fellow member of the Radio Control League of Orange County, said that Fuller's new Jet Skin was superior to Plast in ease of application and toughness — might be worth a try.

As for flying, only the normal precautions are necessary—fully charged power pack, receiver checked, vibration check-out... and don't try a tail-slide on the first flight! This model has scale flying surfaces and therefore will not be a floater! Just remember, with flaps and trim, it can be greased onto the runway every time.

If you get stuck on details, may I suggest that you phone your local Cessna dealer, explain your predicament, show him a copy of the magazine, and perhaps he will even give you a "check ride" in addition to providing a good detailed rundown on the Cessna Skylane. There are no structural changes in the 1963 Skylane/182 models, just a different color scheme. As yet, I haven't seen any data on the newer '64 models. The Skylane prototype for this article was recently modified to include a parachutist, or "sky-diver" much like the one on the TV program "Ripcord." I found that a scale jumper was hard to throw out of the door, even with a mousetrap rigged for such. With the increased interest in flying off water, this Skylane will soon sport those scale floats that have been gathering dust in my garage. Details for this modification will be furnished by writing to me in care of this magazine.

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ROBERT M. LIEN, M.D.

(Continued from Page 7)

The time is close at hand, and I hope I do not sound too much like a curbstone prophet of doom, when some rational and practical device must be employed to re-infuse interest in competition. Several years ago most of the fun at a contest consisted in seeing what type of gear worked and what types did not work. Those of us who have been in the game awhile (14 years in my case) consider the renewing of old friendships ample reason to drive 300 miles to a contest. This is fine for us, but let me show you the other side of the coin. A friend of mine last year entered multi competition. He had come along the old route — escapement, to second-hand six, finally to a fine ten channel rig. He practiced diligently enough to win a

first place in Multi Novice at one of the meets. Thenceforward he has been competing as an expert, and I am certain you can guess the result — he is this year back in Class I, using his ten channel equipment. He is hoping to find competition of his own caliber by this move. A question as to whether this represents progress is not inappropriate at this point. Personally, I feel that if the equipment is being flown, and if my friend does find a competitive group at his level of proficiency, he is better off than going winless another year.

Some will scream trophy-monger I know. It is a basic human need that recognition be given for endeavor. Why else do we do anything, if not for approbation of our fellows? This is one of the tenets of personal satisfaction, whether we recognize it in our hobby or not.

This author has a proposal to make. I believe our sport has reached a level in its evolution where a system of individual handicap based on a nationwide yardstick must be developed. This is what makes or breaks any competi-


tive sport. I have alluded to golf several times because to me the principles involved are identical. Let us all fly in the same contest, by all means including the Nationals; but "stratify" us on the basis of a numerical index that will guarantee a continued interest in competitive flying.

The handicap system as I propose it is based on known performance in competition during the previous twelve month period ending with the contest in question. As with our golfer, personal honesty will play a part in allotting these handicaps. Unlike golf, the handicap allotted is more flexible and as foreseen, would change several times during the season, dependent upon the flyer's performance.

Contests would still be run as they are at present under current AMA sanction, utilizing the standard AMA two flight totals. A simple addition to the standard AMA entry form for each contest would allow rapid calculation of the individual handicaps for that particular contest. An alternative method would freeze the handicap for an entire year, but in either case the simple arithmetic remains the same. If desired, and if the contest budget permitted, contestants could be divided into "flights" depending on handicaps. If all contestants compete together in the major events (Class I, II, or III), the handicap is added to the individual scores.

The handicap as envisioned would apply to all classes of competition, excepting of course Scale and Pylon. It is felt that utilization of actual flight scores is the most reasonable basis for calculating the handicap of the individual for the contest in question. Contestants in all meets attended would receive a certified notice of the highest score attained at that particular contest. These individual standardized score cards, signed by the Contest Director would then be used at each successive contest for the calculation of individual handicaps. An average of the available scores is used as the basis for determining the handicap figure. A built-in stimulus to proffer these cards at registration is inherent in the system, since the absence of such data automatically would deny the individual a numerical handicap.

At the outset of the system, all contestants would of course start on an

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equal basis; following immediately the first contest entered, the individual flyer would possess a numerical handicap, dependent on the highest single flight score recorded. This handicap will vary during the season directly with the individual's performance in ensuing meets. During the course of the current contest, the numerical handicap assigned the contestant will be added to each official flight score at the completion of the flight. In this way no post-contest calculations are necessary.

As can be seen in the accompanying table, the maximum handicap awarded is set at ten points. This figure was not picked from the air, but has been subjected to statistical analysis and represents a value which avoids the possible consequences of an excessively high or low figure.

As an example of how the system works, let us take our backsliding semi-expert mentioned previously. Suppose at his first meet of the year he scores a high flight of 74 in Class III. This figure, tendered the CD of the next contest, will place him in the group flying with a handicap of five points. Statistically, this will place his probable chances of competing favorably with the non-handicap flyer in the range of 80%. Let us presume that he posts a high score, handicap of five included, of 84 at this meet. His next contest director will average these two scores, giving a figure of 79. This will decrease his handicap for this particular meet to 4 points. He will still be aided by the handicap points, but less so than before, in keeping with his overall improvement.

All that is necessary for calculation of the handicap is the previous high scores of contests attended during the preceding year. If such scores are not available, as foreseen at the outset, the first meet entered will serve to provide a handicap for successive contests. The handicap system figures will apply to Class II and III equally. Class I is provided with a different scale of values, in keeping with the generally lower scores attained here. As can be noted in the table of values, a Novice class is still provided. Individuals with no single contest score above 60 points in Class II and III, or above 40 points in Class I would fly in this event. No handicap system would be used in this category. A flight scoring above the

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minimum values presented would boost an individual in this group into Handicap Competition. The figures used have been selected as a practical level of competence, since it has been noted over the past several years that once these levels have been attained, the individual is performing in a reasonably consistent manner, and is ready for more serious competition.

There has recently been mention of the possibility of limiting RC competition at the Nationals. None of us look forward to this, of course. If this becomes fact, a file of those contestants in the various classes qualifying for Handicap Competition across the country could be maintained by the AMA offices. This listing could form the basis by which Nationals competition rolls would be filled, if this necessity for limiting entrants arises.

I do not presume to say that this proposal of a handicap system is fool-proof. I do not guarantee perfection in the concept, but I do feel that this proposal of a handicap system is fool-this important matter. Other indices of some importance have been neglected. For instance, length of time in

RC might have been equated with performance. Possibly the man who flies better after two years experience should have a higher number of handicap points available to him than the flier who is equally good, but has been at it 10 years. Type of radio gear utilized in the various classes has not been considered as a parameter. Simplicity with a measure of heretofore absent equality has been our major consideration. Further simplification would defeat the intended purpose, and increased complexity might unwieldiness. We earnestly invite your criticisms and comments in the hope that this or some similar solution to the problem might be found.

PROPOSED HANDICAP POINT VALUES

Class II and Class III		Class I	
Average of Prior Scores	Handicap Points	Average of Prior Scores	Handicap Points
90 and Above	0	65 and Above	0
80-90	2	60-65	2
75-80	4	55-60	4
70-75	5	50-55	5
65-70	8	45-50	8
60-65	10	40-45	10
Below 60	Novice	Below 40	Novice



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Special Edition Plans

BOX 48 MASSENA, NEW YORK

KEN WILLARD

(Continued from Page 47)

Receivers in Class R would require checking.

Free Development:

With no limitations on the radio gear, or on the aerodynamic design and control, both the radio men and the airplane designers have complete freedom. And the engine men can

develop their engines to their heart's content — in any displacement they choose. In Class R the limitations are equal in radio and surfaces — single channel and single surface, on purpose.

Qualify as a model:

Here, only the Class III is concerned. Displacements above .61 do not meet FAI limits. Weights in excess of 15# don't either — and this probably should be cut to 12#. And twin .45's actually give .90 cu. in. displacement. Some rulings are required here, or we'll be faced with a requirement for special licenses from the FAA. This situation already exists for certain large models in England.

So, this proposal comes pretty close to meeting all the criteria — and provides for beginners in today's R/C world as well. What do you think?

SOLO

(Continued from Page 13)

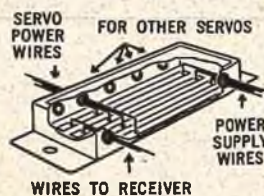
I drink at home. Oh well!

I personally have a Perigee that is the snap rollin'est ship I've ever seen. If anyone out there in model land can tell me the fix for this problem I would be grateful. I would guess that the tail stalls out first and directional control is lost. A good discussion of this problem may be worth a reprint. The ship has an OS Max .35 and ten channel reed gear. Its first flight was excellent with good roll and pitch control and no hunting around the pitch axis. After about five minutes of flight, I cut the power for slow flight, and as the speed diminished, she snap rolled. On another flight I was trying three consecutive loops, and at the top of the second one, it snap rolled out. During the last flight, I was on my approach and fed in too much aileron, and another snap roll left me cartwheeling down the strip. Result? A ding in the leading edge to repair.

How about some comments?

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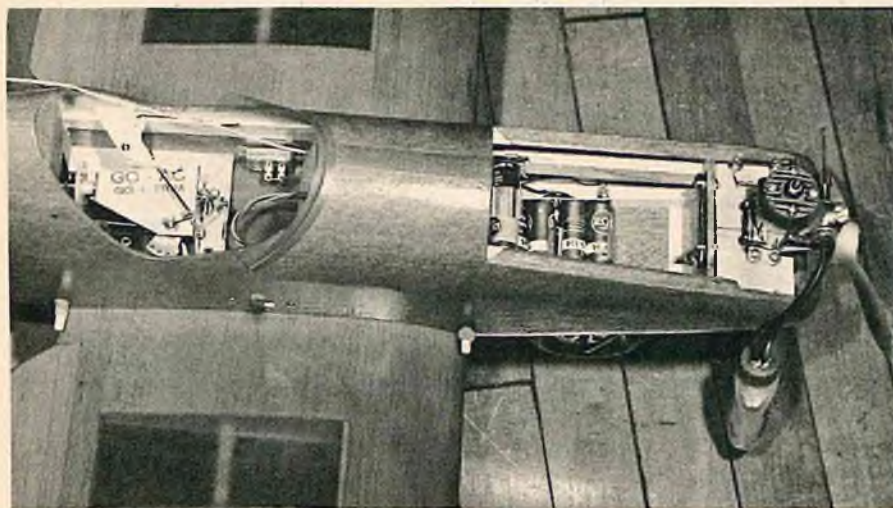
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ACCESSORIES

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Go-Wind with hatch removed to show throttle linkage. 4 pence cells for Go-Ac, 2 for receiver.

SIMPLE PROPORTIONAL

(Continued from Page 25)

tered out by the use of filter networks across the terminals of the electric motor if they do occur... if the modeler will take the time to try one or two and experiment. Another happy note is that because this form of pulse is fast becoming so popular, manufacturers are taking this into consideration in their new receiver models. There are many on the market today which have been designed with this in mind.

Actuators: The next step is an actuator to "decode" the information the receiver gleans from the "sender" on the ground. The prime requisite for this is not only the ability to do the job called for, but to do it reliably. The most important consideration here—providing you are only going for rudder and elevator control—is to select a motor that will pulse well and tie it to an accurate tail linkage and you're in business.

To explain — most D.C. motors familiar to modelers are instantly reversible when the polarity is reversed, via the relay. The idea is to get a fairly powerful motor with a small mass armature... one that doesn't build up too much inertia. As for the tail linkage... accuracy with no bind whatsoever is the key to success.

Once you get this much working successfully, you can branch out in many directions. Many stay just with the motor arrangement tied to the rudder and elevator. Others decide

they want to add engine control. This can take a couple of different forms. One method is to add a POD (Pulse Omission Detector) circuit which will trigger upon momentary cessation of transmitted signal, and in turn, operate either an escapement or secondary servo coupled to your engine throttle.

The other method for adding what amounts to a fifth and sixth control (high and low engine) is to employ a gadget such as the Go-Ac which mechanically moves the throttle on either full ON or full OFF signal.

...and, once you've decided upon the extent of the gadgetry you plan to use, you need a good solid ship to haul this stuff around.

Through the years I've seen and flown several different types of aircraft with good G-G results. If memory serves me correctly, the first attempts were made in my Southwind which was somewhat like having a tiger by the tail. Other worthy candidates have been a Whirlwind, Shiner, Strutz, and of course, the Go-Wind. Experience has shown, that while most any type can become a G-G ship, low wing and shoulder wing designs have an edge over wings in that they have less tendency to gallop in a steep climb (such as near the top of a loop). There are, of course, many, many designs by any number of designers which will make perfect candidates for your G-G efforts.

Now that we know what we need to get into the swing (or perhaps I should say gallop) of things, let's see

(Continued on Page 58)

BEWARE OF THE R-C BUG!

This "bug" lurks in your workshop and in the flying field. If you have ever attended a flying session or an RC contest you may have been bitten by its' deadly sting!

HOW TO COMBAT THE R-C BUG

The surest way to ward off this affliction is to try to compete in RC without the BEST equipment available and without the means to purchase a really good RC rig. In other words, if money is holding you back from your full share of RC fun, you have the perfect cure.

WHAT IF YOU ARE "INCURABLE"?

If you do have that surge in your blood, and yearn to fly with the best of them, with equipment of which you can be proud, we may be of help to you — we have been to thousands of others over the past four years. AERO-TROL Engineering was founded by modelers, to solve modelers problems! Dealing in RC items exclusively, we are the originators of the famous "Fly Now Pay Later" plan, and feature all major RC makers.

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GRID LEAKS is enjoying the biggest boom of subscribers in its 6 year history. This is appreciated, but it is also bringing requests from many of the new subscribers for back issues. In fact, the pressure has become so heavy that we are going back into Volume 3 and making a limited re-run of all of this volume. Some few numbers of Volume 2 also remain, but present plans do not call for a re-run. This is a one shot offer, and if you want back issues, send in your order now! They'll be sent to you just as quickly as they are off the press.

While the printing is a different style from the "NEW" GRID LEAKS, these copies do contain the same valuable material. Once this run is exhausted, there will probably not be any further re-runs. Limited quantities of Volume 2 are available. They are Nos. 6, 7, 8, 9 and 10.

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KRAFT PROPORTIONAL

(Continued from Page 43)

by the subcarrier, however, far outweighs its disadvantages.

The mechanical layout of the Kraft system is characterized by a fairly thin transmitter case, allowing easy access to the control sticks with the thumbs. The distance between the control sticks and the bottom of the case is such that the transmitter can be held against one's stomach while flying. The trim sticks are located for maximum convenience and the over-all balance of the output is excellent.

Control stick functions will be supplied in two optional layouts. One has the elevator and rudder function on the left hand stick, while the right hand stick has aileron and throttle. All functions, except throttle, are spring-loaded to neutral. The throttle control ratchets fore and aft on the aileron stick, allowing the engine speed to be changed without the necessity of removing the hands from other controls. The optional layout has the throttle and elevator controls interchanged so that rudder and throttle are on the left hand stick and aileron and elevator are on the right.

The transmitter battery pack consists of ten 500 mah rechargeable Ni-Cad cells to provide 12 volts. For serviceability, the cells are mounted flat on a phenolic plate which is attached to the inside front of the can. The charger for both receiver and transmitter battery packs is supplied separately in a metal can with suitable connecting plugs.

The receiver is assembled on two printed circuit decks. One deck mounts on the bottom of the .051 aluminum can; the other mounts on a .051 aluminum subchassis. The cover is .025 aluminum. These units together form an extremely strong case.

The wiring cables to the servos and batteries, junction in the receiver, and plugs are prewired to the cables.

The receiver and reference voltage battery pack consists of six 225 mah

button cells. Four 500 mah cells furnish power to the servos. Receiver and servo batteries are housed in a single plastic case weighing 6½ ounces.

Manufacturer's specifications for the Kraft Proportional are as follows:

SPECIFICATIONS

RECEIVER: Single conversion crystal controlled superheterodyne with RF stage; has 6 transistors and 2 diodes.

Sensitivity: 5 microvolts for operation of gating circuitry.

Selectivity: -6 db at ± 5KC.

Logic Network: has 28 transistors and 34 diodes.

Can Size: Length 3-3/32"; Width 2-5/32"; Depth 1 5/8".

Weight: Complete with all plugs — 6.5 ounces.

Receiver and Servo Battery Pack: Contains 6 — 225 mah nickle cadmium cells and 4 — 500 mah nickle cadmium cells. Battery life between charging is approximately the same as that of the familiar 10 channel, 5 servo reed installation or over 2 hours. Weight — 6.5 ounces.

TRANSMITTER: RF section has two transistors. Input to RF final is .7 watts. Class B modulator has 4 transistors.

Logic Network: has 23 transistors and 11 diodes.

Antenna: 54" 5 section collapsible whip, base loaded.

Meter: reads battery voltage and relative RF output.

Batteries: 10 — 500 mah nickle cadmium cells.

Can size: Height 8 3/8"; Width 8 1/8"; Depth 2-7/16".

Weight: 3 3/4 lbs. complete.

Control Layout:

Standard: Elevator and rudder on left hand stick. Aileron and throttle on right hand stick.

Optional: Rudder and throttle on left hand stick, aileron and elevator on right hand stick.

All controls, including throttle, are individually trimmable by four trim sticks.

SERVO AND SERVO AMPLIFIER: 7 transistors, 2 diodes. DC type with output transistors operated at saturated switches. Amplifier is inherently self-neutralizing in absence of error signal. Centering accuracy is limited only by the servo gear train play.

Servo: Assembled from Bonner Duramite parts.

Thrust: 3 1/2 — 4 1/2 lbs.

Operating Temperature Range: Below 0° F to over 140° F without changes in performance characteristics or measurable drift in control positions.

FREQUENCIES AVAILABLE:

26.995 mc	52.950
27.045 mc	53.025
27.095 mc	53.100
27.145 mc	53.175
27.195 mc	53.250

Price: The price includes transmitter, receiver, servos, batteries, and battery charger. All plugs are wired and system comes ready for installation. \$599.95.

SHOWCASE '64

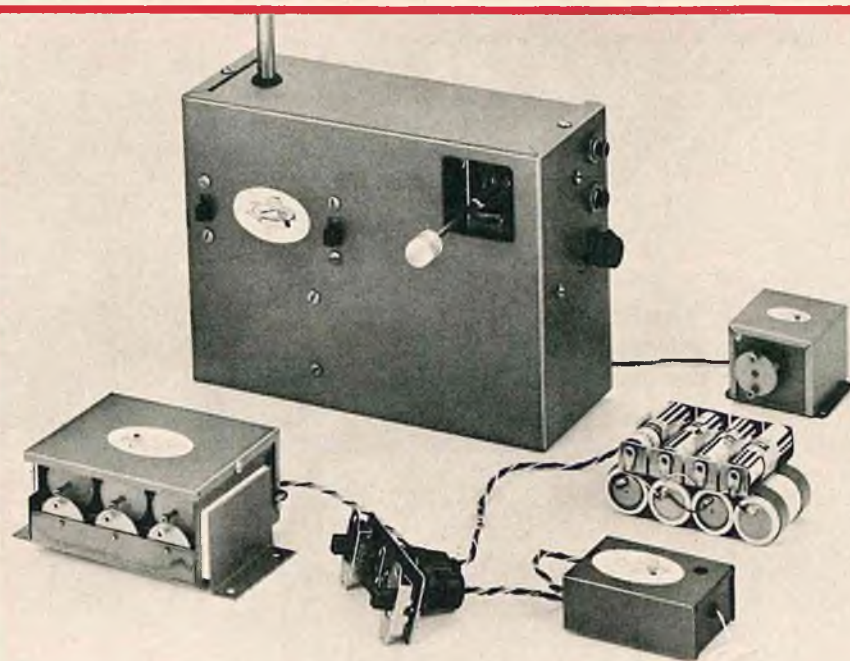
AHC Catalog Available

○ America's Hobby Center, one of the largest mail-order houses in the hobby industry, has released their new catalog supplements. The main catalog consists of 128 pages of hobby supplies, while the 33rd Anniversary Sale publication adds another 64 pages. An excellent catalog of almost every conceivable hobby and RC item. **Circle #3 on the Reader Service Card.**

Sampey & Co. Announces Time Payment Plan on Prop Rigs

○ Effective March 1, 1964, Sampey & Co. announced that the new Model 404-B proportional system is now in production. Identical to the Model 404 in all aspects, the new model B does incorporate a few added features such as elimination of the airborne power converter. This will permit the airborne system about five hours of flight time on one charge. Other features include changes in the servo to allow extremely long life under all conditions. These changes, along with increased production, have enabled Sampey & Company to reduce the prices on their record-holding proportional system.

Sampey also announces the organizing of a suitable nationwide credit plan with the General Electric Credit Corporation. This time payment plan is now available to all prospective purchasers of the Sampey proportional units and reflects the new and reduced price schedule. The Sampey model 404-B1 Basic System, consisting of the transmitter, superhet receiver, and four S-75 servos is priced at \$399.00, with \$79.00 down payment and \$10.97 per month. The 404-B2 Complete System, consisting of the above plus power junction, airborne power pack, and dual charger is priced at \$498.00 with \$98.00 down payment and \$26.22 per month. Package 404-B3, same as above but plus a preprogrammed motor control and pitch reversing switch is priced at \$525.00 with \$105.00



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A simple Dual Simultaneous Proportional Control System with new wobble-free servos with adequate servo power to fly most R.C. models + built-in fail safe feature. This is a pulse proportional system and a slight quiver of control surfaces is evident during operation. Basic set includes hi-power all transistor transmitter-mechanical pulser combination (Master Pulsmitter), + rudder, elevator, motor control servo pack (Master Multiplex), + heavy duty rechargeable servo battery pack (Master Battery Pack) + regen or superhet "Pulsmaster" receiver + battery charger + service kit. All wiring is complete — just install and fly. Built by "Glass City" with 10 years of proportional experience.

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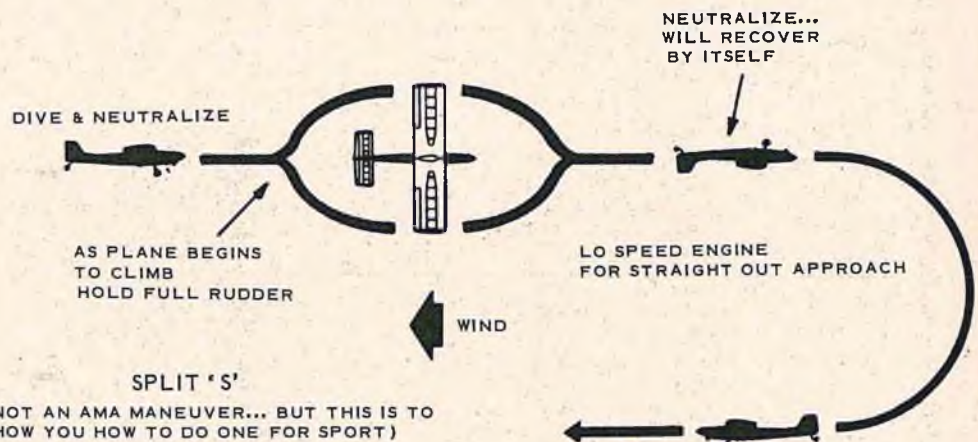
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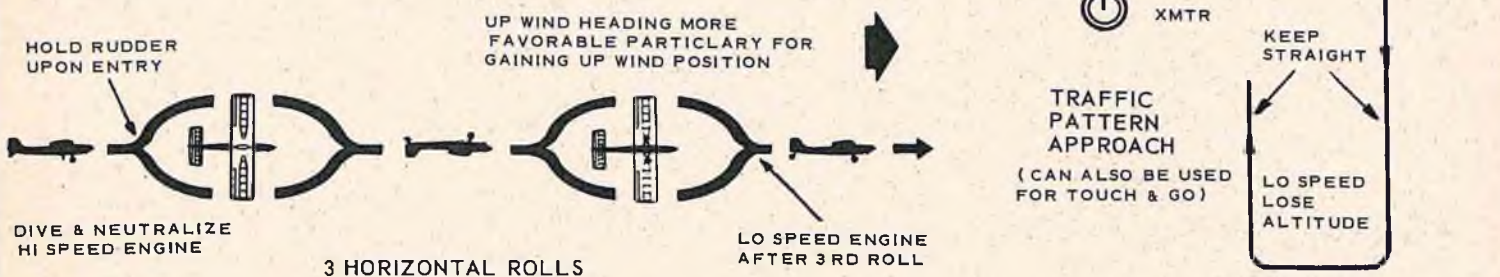
HOW TO STUNT R.O.



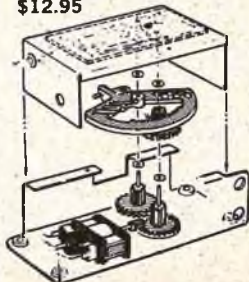
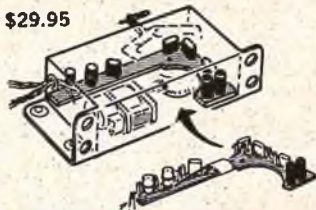
(Continued from Page 45)

This concludes the maneuvers. You probably noticed that I omitted the three spins. My reason for this is lack of time in the maneuvers, combined with the fact that my plane with its long tail moment and trimmed to fly a smooth pattern, will not spin anyway!

In closing, let me remind you that articles, diagrams, and words of advice are only the beginning, and that conscientious practice is, after all, the flyers greatest asset.



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The design and production of R/C actuators must be of high quality in order to prevent malfunctions and loss of control.

Another, less obvious requirement is to prevent drop-off of performance from wear during long-life usage. Otherwise periodic adjustments will have to be made in the system.

The exceptionally high quality of Bonner R/C actuators provides insurance, both against malfunctions and performance changes during long-life usage.

Bonner R/C products are sold by leading hobby shops throughout the world.

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CULVER CITY, CALIF.

SIMPLE PROPORTIONAL

(Continued from Page 53)

how this whole ball of wax works.

The secret to the entire system is the tie-in between the actuating device and the two control surfaces via the crank—and it's amount of travel. The working amount of crank travel is 270° beginning and ending 45° either side of vertical, or 0°.

Originally, and in many hookups used today, the modeler built in "hard" stops at either side of the top of the crank swing so the actuating sweep could not possibly go beyond 270°. This left a little tolerance for error in the control box — but very little!

The Go-Ac approach to G-G depends upon a smooth working pulse box because UP control has no stops on the crank, and therefore is arrived at by setting the slow pulse (SLOW for UP) at a frequency just high enough to stop the Go-Ac before it makes a complete revolution when going through either clockwise or counter-clockwise sweep. Once the low pulse rate has been set, the system is ready for operation and flight. We particularly prefer this arrangement... having used it since 1954... over an arrangement of hard stops because of its safety factor.

There have been many occasions when — usually because of our own carelessness — we've gone out of range, been caught flat-footed using old batteries or some other infraction where we should have known better. The Go-Ac would, in these cases, detect a malfunction, go into its neutral, and move the throttle to low speed, with a crash thereby averted. Conversely, had our system utilized hard stops, the control would have stopped at either a combination of LEFT-UP or RIGHT-UP and... POW!

It had been our original intent to work up a block diagram of ON and OFF pulses to help explain Galloping

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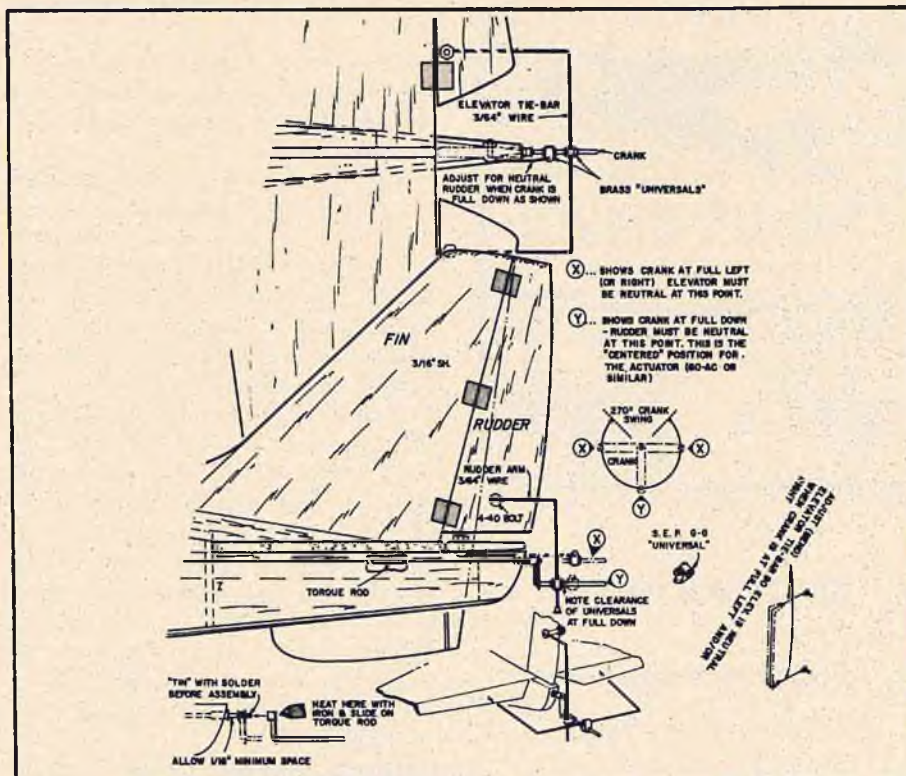
S.E.P. galloping ghost coupler kit eliminates several hours of tedious labor in forming control surface linkages.

Ghost. However, this has been abandoned in favor of a sequence of photos which, taken at a slow speed, show a Go-Ac Galloping Ghost system in actual operation. By studying the photos of each control and then referring from one to the other you can get a much clearer picture of the relationship between Rudder and Elevator during UP, DOWN, LEFT, and RIGHT.

In the series of four control shots, we have shown the Go-Wind using a standard Go-Ac servo for control and a standard SEP G-G Control Coupler kit on the control surfaces. An Ace Phelps Pulser is triggering an Ecktronics transmitter which is sending commands to an F&M Saturn receiver in the plane — and that's as heterogeneous a collection of parts as you could find!

There is one question which is usually asked by newcomers which we should answer at this point. — "How can you get any UP control when the crank never swings the elevator as high into UP as it does into DOWN?" ... and this is the secret which stumped everyone except the originators. The reason is because of the dwell time of the elevator in the UP position as it swings to its full UP, stops, and then returns toward DOWN. This lapse of time, however small, gives an up control without having to travel as far UP as DOWN.

I hope this little discussion has cleared up some of the mysteries of Galloping Ghost. I'm sure there is much I have forgotten. However, by using this as a guide, you will be able to progress right up to the point where you are perched precariously at the edge of the field with a screaming ship ready for launch. Check that system carefully, because you won't have much time to refer back to this article once you let loose of that tiger you're holding by the tail!



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EDITOR'S MEMO

(Continued from Page 10)

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based on his past performance in that sport.

These are characteristics of sporting competition that, in our hobby alone, are prominently conspicuous by their absence.

This then, is the problem. Here are the suggestions you have made, in editorial form, on how to solve this problem — the tabulated statistics representing the desires of a large percentage and cross-section of R/C enthusiasts in this country — sport and contest flier alike:

First of all, a thorough and thoughtful "overhaul" of current AMA/RC rules is mandatory. Two independent ideas, one by Ken Willard, and the other by Dr. Lien, appear in this issue. Whatever basic concept is eventually realized, the fact remains that there must be established (1) a Novice and Expert event in each class, and (2) a separate class for Single Channel, specifically **excluding** all multi channel equipment.

Hand in hand with the above should be a national AMA sanctioned handicap system, established on a local and regional basis and graduating upwards to the national level. For example, local clubs should establish and publicize more frequent AMA sanctioned meets. It is the obligation of the modeling press to assist in this publicity. An individual RC'er would be classed as a Novice until he had won a predetermined number of places in a specified number of sanctioned meets, at which time he would be classified as Expert. Local eliminations would provide sanctioned regional meets with the competitors from each local area based on the latter eliminations. In view of the continued growth of regional RC associations, comprised of member clubs from the area, regional events could possibly be sponsored by these associations. Eliminations from the regionals would provide the Nationals with the top fliers in the country — the only accurate way of running off competition for the American FAI internationals teams. The Nationals should not, nor was originally intended to be, a meet for beginners or novices, although a specific event, or events, could be established for this purpose. In all cases, the handicap system would prevail.

Insofar as contest procedures in gen-

eral are concerned, it is almost universally felt that the judges should be experienced RC fliers not competing in the events of the day. One or two "briefings" to non-fliers do not qualify an individual as an RC judge. Club, or local and regional contests, should be publicized well in advance. Class I and II winners should receive their share of plaudits from the modeling press instead of being shuffled aside to favor the Class III winners. To promote contest participation, local clubs should be encouraged to travel as a group, whenever possible, to contests within their geographical area. It is felt that a Novice and Single Channel class would stimulate more interest in competitive flying among those who formerly felt they could not compete against the more proficient fliers employing multi-channel equipment. Junior interest and participation would also be increased by the development of these classes.

To increase spectator interest and public relations, along with interesting prospective new members to the RC fraternity, novelty events such as the "limbo," carrier landings, balloon busting, etc., should be encouraged for local contests.

Insofar as the Nationals themselves are concerned, it was unanimously felt that Scale entries should definitely have their own time slot and not be shuffled in with other competition classes. It was also felt that well-qualified and trained judges, as mentioned before, be used. Improved communications between flyer and the frequency monitor should be established. The number of flights for the finals should be established prior to the time the finals commence. Everyone in the finals should be allowed an equal number of flights. All contestants should be provided with a briefing sheet so that they will know exactly what is going to happen, and when.

These, then, are the modifications and changes you have asked for in regard to the competitive portion of our hobby and sport. Whatever the final outcome, it is up to each and every one of us to voice our opinions. It is up to the AMA contest section to represent the majority voice and make the required alterations.

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THE ROOSTERTAIL

(Continued from Page 13)

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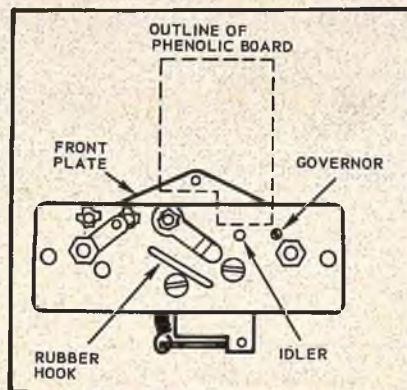
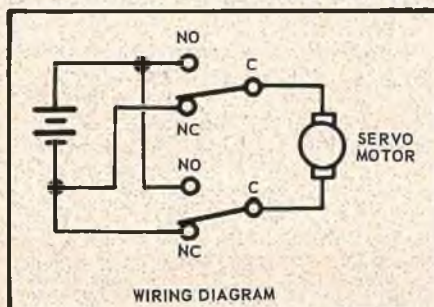
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