

RC MODELER

THE LEADING MAGAZINE FOR RADIO CONTROL • APRIL 1967 • 50¢

SA

Vic Husak's Magnificent
KING ALTAIR



Special GALLOPING GHOST Issue
Plus Owen Kampen's HOOSIER HOT SHOT
for the Midwest - RCM Air Races

A few words about me.

I am Electronic Engineer and this is my day job.

From tender age two things attracted my interest and I managed to have them in my life.

The first was electricity and the second the bluesky.

I've found the model airplanes hobby in October 1973.

I love the wooden structures from scratch airplanes and boats also.

I started collecting plans, articles, books and anything else that could help the hobby of many years ago and have created a very large personal collection of them.

Since 2004 I became involved with the digitization and restoration of them and started to share the plans from public domain with my fellow modelers.

Now after all this experience I have decided to digitize, to clean and to re publish in digital edition and free of all issues RC Modeler magazine from 1963 to 2005 and others books and magazines.

Certainly this will be a very long, difficult and tedious task but I believe with the help of all of you I will finish it in a short time.

I apologize in advance because my English is poor. It is not my mother language because I am Greek. I wish all of you who choose to collect and read this my work good enjoyment and enjoy your buildings.

My name is Elijah Efthimiopoulos. (H.E)
My nickname Hlsat.

My country is Greece, and the my city is Xanthi.



Λίγα λόγια για μένα.

Είμαι Μηχανικός Ηλεκτρονικός και αυτό είναι το αληθινό μου επάγγελμα εργασίας.

Από μικρός δυο πράγματα μου κέντρισαν το ενδιαφέρον και ασχολήθηκα με αυτά.

Πρώτον ο ηλεκτρισμός και δεύτερον το απέραντο γαλάζιο του ουρανού και ο αέρας αυτού.

Το χόμπι του αερομοντελισμού το πρωτογνώρισα τον Οκτώβριο του 1973.

Μου αρέσουν οι ξύλινες κατασκευές αεροπλάνων και σκαφών από το μηδέν.

Ξεκίνησα να συλλέγω σχέδια, άρθρα, βιβλία και ότι άλλο μπορούσε να με βοηθήσει στο χόμπι από τα πολύ παλιά χρόνια.

Έχω δημιουργήσει μια πολύ μεγάλη προσωπική συλλογή από αυτά.

Από το 2004 άρχισα να ασχολούμαι με την ψηφιοποίηση τους, τον καθαρισμό τους αλλά και να τα μοιράζομαι μαζί σας αφού τα δημοσιοποιώ στο διαδίκτυο (όσα από αυτά επιτρέπεται λόγω των πνευματικών δικαιωμάτων τους).

Σήμερα μετά από όλη αυτήν την εμπειρία που έχω αποκτήσει, αποφάσισα να ψηφιοποιήσω, να καθαρίσω και να ξαναδημοσιεύσω σε ψηφιακή έκδοση και ελεύθερα όλα τα τεύχη του περιοδικού RC Modeler από το 1963 μέχρι το 2005 και κάποια άλλα βιβλία και περιοδικά.

Σίγουρα είναι μια πολύ μεγάλη, δύσκολη και επίπονη εργασία αλλά πιστεύω με την βοήθεια όλων σας να την τελειώσω σε ένα καλό αλλά μεγάλο χρονικό διάστημα.

Ζητώ συγγνώμη εκ των προτέρων γιατί τα Αγγλικά μου είναι φτωχά.

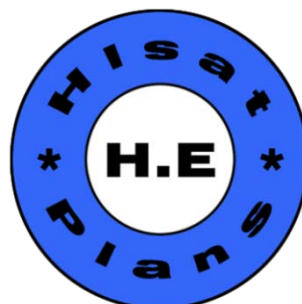
Δεν είναι η μητρική μου γλώσσα γιατί είμαι Έλληνας.

Εύχομαι σε όλους εσάς που θα επιλέξετε να τα συλλέξετε και να τα διαβάσετε αυτήν την εργασία μου καλή απόλαυση και καλές κατασκευές.

Το όνομα μου είναι Ηλίας Ευθυμιόπουλος. (H.E)

Το ψευδώνυμο μου Hlsat.

Η χώρα μου η Ελλάδα και η πολη μου η Ξάνθη.



RCM Magazine Editing and Resampling.

Work Done:

- 1) Advertisements removed.
- 2) Plans building plane removed and hyperlinked.
- 3) Articles building plane removed and hyperlinked.
- 4) Pages reordered.
- 5) Topics list added.

Now you can read these great issues and find the plans and building articles on multiple sites on the internet.

All Plans can be found here:

Hlsat Blog RCModeler Free Plans and Articles.

<http://www.rcgroups.com/forums/showthread.php?t=2354459>

AeroFred Gallery Free Plans.

<http://aerofred.com/index.php>

Hip Pocket Aeronautics Gallery Free Plans.

http://www.hippocketaeronautics.com/hpa_plans/index.php

James Hatton Blog Free Plans and Articles.

<http://pulling-gz.blogspot.gr/?view=flipcard>

Vintage & Old-Timer RCM Free Plans.

<http://www.rcgroups.com/forums/showthread.php?t=2233857>

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Thanks Elijah from Greece.

RADIO CONTROL MODELER

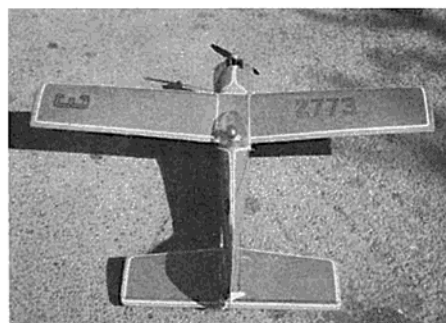
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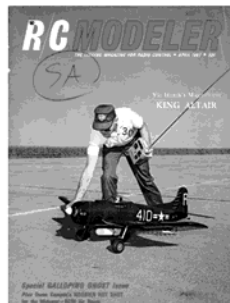
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COVER

Claude McCullough with his scale Martin AM-1 Mauler. "Able Mabel" to be featured in forthcoming RCM book "The Challenge of R/C Scale."

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Although organized aeromodeling comprises a small percentage of total flying activity, RCM, never-the-less is acutely aware of its vital role and function . . . and has — and will continue — to express views intended to aid that organized effort. Critical comment and reaction, we believe, has its place, but this has not — nor will — diminish our desire to encourage and recommend AMA membership to achieve meaningful growth of activity surrounding model aviation. For this reason we suggest all readers will find the following editorial by Jerry Kleinburg of more than passing interest. . . .

ALTHOUGH a general expression of satisfaction may be expected over Cliff Weirick's recent AMA election victory in view of his margin, it's fair to say there have been some post-election comments indicating feelings of a contrary nature. This, of course, is to be expected. It's also interesting to note that some comment felt it was wrong for the modeling press to become involved in the controversy attendant to the election, whatever results the balloting produced. In the January 1967 Rapid City "Prop Busters" newsletter we read, *"With this (election) maybe Don Dewey will throw away his poison pen and give us some more of those fine editorials of a constructive nature that we have grown to expect from him. Personally, I have heard enough gouges at AMA for one year."*

At this point, Clark Besancon — who wrote this item — or you, gentle reader, may expect to be treated to a defense of Don Dewey, or perhaps to an explanation of the broad array of criticism that has befallen AMA of late. In both instances however, some disappointment or surprise may be experienced since the purpose in quoting Clark is somewhat removed from any ordinary argumentative undertaking or election analysis. Besides, any defense of Mr. Dewey — if need be — is well within the capable

scope of his own rather muscular pen. As for rehashing AMA indiscretions, this is best left to the record of last year's public discussion found in RCM's pages (as well as in other magazines) where it may readily be used for historical reference as time goes by. Instead, the frank comment of the Rapid City newsletter may be useful in helping to look to the future. By by-passing the immediate surface reflections and reading its depth perhaps a message may be gleaned that will help in arriving at a more universally acceptable position.

Roughly, Clark suggests peace and serenity now that the election is over. "Now that Cliff has won," he seems to say, "let the fussing stop so things can get back to normal." While this may seem reasonable, reality keeps insisting that a lone individual — no matter what his title may be — cannot single-handedly wrestle with the administrative and operational creation we ambiguously refer to as AMA! As much as it would be a lot more pleasant to concentrate fully upon building and flying while someone knocks himself out for us, common sense and experience loudly insist that an acceptable record of progress and growth and general satisfaction can only come from broad support and understanding from all the membership. Such response could, in turn, lead to an enlightened leadership, providing workable programs aimed at long range results — not just the short range day-to-day variety. In case you're wondering where the "enlightenment" comes from for AMA leadership, it comes from each of us giving tangible support, which means not only our money, but more importantly, our ideas and wisdom. For it is this last, representing a valuable reservoir of knowledge and experience, that will bring forth the vigor and drive capable of propelling AMA into a position of effectively providing meaningful activity now, and assuring a future of useful inspiration and service to those we hope will follow us.

AMA has been characterized for years as a well-intentioned but bumbling enterprise that "one day" would come into its own — to achieve broad acceptance and, in turn, provide leadership in creating stimulating activity which would assure continued growth and usefulness of the organization. Somehow that dream stayed a dream and the bumbling along became largely an accepted way of life to those who remained within AMA. To be sure, grumblings occurred from time to time but this subsided generally with a few rules changes. When a genuine crisis came along, eyes were averted, while an

emergency squad cleaned the situation up to a point where we could meander on once again in bankrupt dignity. As it is now, AMA continues to exist strong enough to reflect its dreams . . . but too weak to make them come true!

To demonstrate how we try to move forward by crippling ourselves, consider the latest action currently causing adverse reaction. The National Executive Council, in an attempt to weed out inactive CD's (a good thought), penalized all CD's in the process (a bad result). A decision (generally, a good action) to charge CD's \$10 for their membership was enacted late one night at the Chicago Nats (a bad time and place for clear, unhurried thinking and decisions). Although active CD's would end up paying the normal \$6 dues (a good idea since some clubs think CD's deserve a break and pay their dues), they would have to go through a qualifying action to get their \$4 refunded (a bad way because it's complicated). . . . And so it goes — but let's review the whole proposition again considering we honestly wanted to **only** weed out inactive CD's. A simple announcement that CD renewals for 1968 and subsequent years would require qualification in the **previous** year by CD'ing a contest — **or other qualifying valuable service** — would have achieved the weeding out and could very well have encouraged added activity by issuing the warning in time to avoid losing the rating — and number.

However, let's assume the NEC decision was based also on raising revenues because that's what it appears to be. By looking at the question fully as a fund raising attempt the NEC would then logically examine the feasibility of the scheme. How much money would be raised? For what purpose would the money be allocated? This year? Future years? What would the impact be on CD's? On the number of contests? What of flight line coordinators and the effort to establish judges as recognized officials — would the proposition dampen enthusiasm in these areas? What other revenue alternatives are there? The purpose of this self-examination would be to not only reveal the feasibility of the proposal but to firmly establish the goal of the move in the minds of those making the decision. The point here, is that although the stated primary purpose of the move was to weed out deadwood, a price tag element was actually introduced to sell prestige in the process — at 4 bucks a throw! Under such a set of conditions it was easy to rationalize

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EDITOR'S MEMO

(Continued from Page 5)

into a decision that night in Chicago — that is, act on the deadwood issue but hope for a dollar bounty as a side bonus to make it somewhat palatable. This is the way to make things sticky — and to have them become compounded further by acting without “building a public,” that is, obtaining the opinions and reactions of a fair section of those to be effected so that an “enlightened” position could be formed. By disregarding such facts of life or political reality, AMA apologists find their hands full, not only with this latest boomerang but an accumulation of miscues stemming from well-meaning, but arbitrary or short-sighted, actions. It's an awkward position that's bound to continue until some of the basic elements of management and public organization are accepted and practiced.

Other areas of difficulty may be anticipated. No crystal ball is required to forecast dissatisfaction with the pattern rules that may emerge in 1967 — whatever they may be. Distrust and disgust will be the chief reasons. The amazing, unparalleled revelation in Bill Northrop's column in the February 1967 Model Airplane News that R/C rules proposals are not distributed for CB action in a timely and systematic manner, and that some proposals have actually “gathered dust” awaiting action is bound to be received with a lot more than cool asstance of Contest Board members. Considering Bill is a CB member it's to his credit that he has spoken up because he recognizes that membership participation cannot be expected where follow-through by officials is seriously remiss. Distrust, rooted in the untidy rules machinery situation, will not vanish quickly even if reforms were made immediately. Jerry Nelson, who is taking over as the new R/C CB chairman has an imposing challenge facing him that will take careful planning and a good deal of work by all CB members to remedy the current dilemma. Not only are changes overdue, but a plethora of proposals has dammed up which will further complicate matters for the affable new chairman.

Inflation — it's a fact of life presently. Will AMA be faced with a need for a general dues increase to consider in 1967? The perpetual “deficit” — what will happen to it in 1967? “It,” incidentally, has a vague ring in describing a financial condition such as a deficit. Hopefully, Gordon Gabbert, AMA treasurer, may have specifics in this matter to reveal under the new president. He has worked diligently to bring forth a worthwhile financial plan that could serve as a track and foundation under future AMA operation. But new dynamic treatment is needed here also.

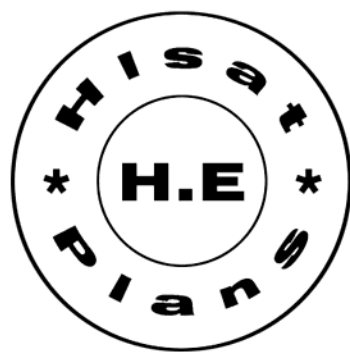
Perhaps multi-year memberships could be offered to remove AMA finances from a hand-to-mouth, year-by-year existence that chokes development.

Contests — the main stimulant to AMA's existence, continue to remain as an unorganized question mark despite many organizations within AMA who have competently demonstrated continuity of operation for years. Each season untold energies are expended in “coordinating” contests that result in no directly useful national purpose or pattern. The Nationals, themselves, remain in doubt due to a lack of long range direction. For instance, location of the 1968 affair originally set for Dallas is unannounced and hanging fire due to undisclosed problems. Sponsorship by the Air Force — a distinct possibility if appropriate studies could be initiated — would enhance the competition picture and help provide a solution to the growing R/C activity. Incidentally, it's this rapid growth that appears to make R/C incompatible with other aeromodeling forms and brings on the urgent need to resolve differences while the situation may still lend itself to remedial action. Meandering on, hoping for the best is certain to bring on a divisive condition that could rip apart the traditional fabric of AMA.

As much as the foregoing areas — requiring earnest attention — seem sufficient to tax any organization's patience and perseverance, there is still another where a virtual vacuum exists . . . and thereby creates the frustrating overall situation in the first place! Communication is the general way this area is usually described but reference here encompasses more than the usual announcements and informational effort distributed to the membership. The question may well be asked as to the last time any NEC member addressed up to the task of public discussion of AMA affairs. Not just “progress” reports in the middle of an election campaign, but a consequential effort to present a creative work to elicit and build response and rapport as well as to further the “enlightenment” process mentioned earlier. Ample opportunity exists for presentations of such work in the modeling press and the opportunity continues to expand for broad personal contact as more and more conferences and trade shows become a permanent part of the R/C scene. A need to broaden the number of interests covered at such affairs lends itself to including discussions necessary for formation of successful policy making and operational action. As an example, the forthcoming DC/RC Symposium, slated for May 20 and 21, would appear to offer an excellent forum for some sort of review of AMA long range plans and thinking. Maynard Hill's release regarding the yearly symposium indicates that the well known

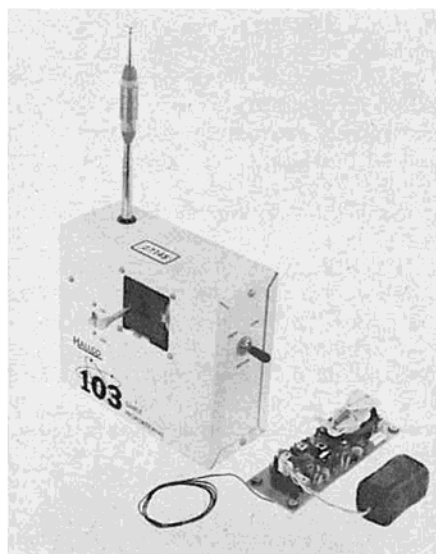
Washington, D. C. club desires presentations on topics other than the usual R/C technical papers. It seems natural for this, as well as other popular gatherings, to become focal points for major AMA addresses — all that's needed is NEC recognition of the value of such effort followed by appropriate action to fill this long absent basic necessity. The resulting “drawing together” would do much to further AMA's future and could greatly alleviate current disaffections. . . .

In these paragraphs a summary of some of the tasks facing the members and officers of the AMA has been attempted. By no means is this a full development of our problems but instead, what is hoped is a start to a dialogue that may lead to a full interchange of thinking and expression that must characterize an organization such as ours to undergird its existence. Further, it is hoped its presentation here will not be construed as a “gouge” of any nature. Rather, allow it as a step in the intellectual communication process believed needed to link all members and the executive functions of AMA, and presented to invite and stimulate broad response in modeling statesmanship — AMA's unexplored frontier. . . .



SHOWCASE '67

One of the newest releases in the rapidly growing pulse proportional field is from the Hall Company, 420 E. Water St., P. O. Box 38158, Urbana, Ohio 43078. The Halco 103 is a complete galloping ghost system for a price of \$134.50. A Rand LR-3 actuator is used, and is built into the superhet receiver, both electrically and mechanically, saving both space and the necessity for a dual power supply. The best features of all



single channel systems—a high frequency audio sub-carrier with a receiver tone filter, a compact superhet receiver, a high power silicon transmitter, an integral power switch and charging jack, and a minimum of loose wires—all were engineered into the Halco 103 system as basic design requirements. Total airborne weight is 7 ounces. The size for mounting the receiver/actuator is 1.85" x 5.4", with an overall height of 1.8". The power pack is 1.2" x 1.2" x 2.1". Available from the Hall Company. For further information, Circle #1 on the Reader Service Card.

Tatone Products, 1275 Geneva Avenue, San Francisco, California 94112, has made available a packaged pair of Wing Hold Downs, consisting of two aluminum brackets and two 1/4-20 x 1" nylon screws. This combination has been found to be simpler, stronger, and more easily attached than any similar type unit now on the market, according to the manufacturer. The brackets are simply bolted to a bulkhead or to the sides of the ship, while the nylon screws anchor the trailing edge of the wing to the brackets. The nylon screws are much neater than the usual rubber bands, will withstand the most violent maneuvers yet will shear in the event of a crackup. Price of the wing hold downs are \$1.49 per pair including all mounting screws and nuts. Extra 1/4-20 x 1" nylon screws are 49c per pair. Tested, approved and recommended by RCM. For further information, Circle #2 on the Reader Service Card.

Core-Grip, manufactured by Advanced Model Products, 47 Walnut Street, Millis, Massachusetts 02054, is a strong, lightweight, waterproof, and easy-to-use contact adhesive developed specifically for adhering sheet balsa or other materials to styrofoam

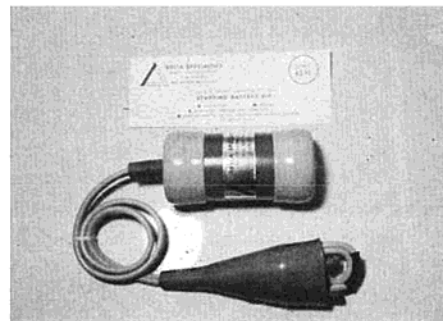
wing cores. Unlike conventional contact cements, Gore-Grip will not attack foam. Excellent also for cross grain laminations of fuselage doublers, etc. Dries ready to use in 10-20 minutes and leaves no gummy unsandable residue or overspray. Can be removed from unwanted surfaces simply by rubbing since Core-Grip will adhere only to another Core-Gripped surface. No critical time limit, and surfaces can be joined up to 48 hours after application. Adds less than one ounce to a multi size wing. Used and endorsed by leading model builders, Core Grip was used on Cliff Weirick's FAI winning Candy which utilized a foam core wing. Core-Grip is available from leading dealers and distributors or postpaid direct if locally unobtainable. \$2.50 per pint; \$3.95 per quart. Tested, approved, and recommended by RCM. For further information, Circle #3 on the Reader Service Card.

The Stinger is a new product just announced by Don Brown of Dee Bee Electronics, West Lams Road, Pitman, N. J. 08071. The Stinger is an "almost ready to fly" multi type aircraft with a span of 66", an all-up weight with radio of 6 1/2-7 pounds, a total wing area of 676 square inches with a 17% semi-symmetrical section. Wing panels are swept back 12 1/2 degrees. The fuselage, tail cone, and all surface tips are made of a tough, rigid, vacuum formed plastic. The same material, in thinner sheets, covers the foam cored wing, stab, and fin. The material is rigid enough not to require spars in the wing, and minor impacts do not show since the skin pops back into shape. Wooden rudder, elevators, and ailerons are covered with an adhesive backed plastic. Hardwood and ply are used inside the fuselage in the engine and radio areas, and the firewall is sealed to the fuselage shell, preventing fuel seepage into the radio compartment. All surfaces have notches ready cut for hinge material provided. All landing gears are provided, as well as control horns, the latter located internally.

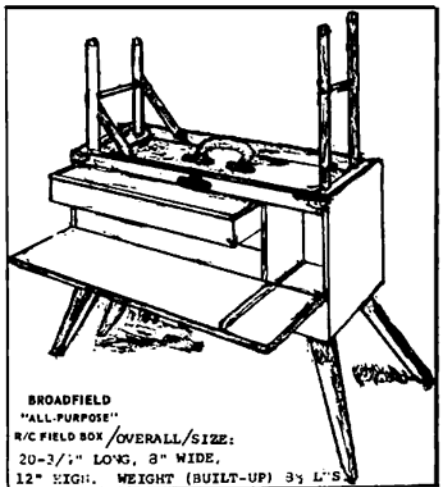
All Stingers are currently being shipped in white with tips and tail cone in remand. As demand dictates, colored fuselages will follow. Price is \$49.95, factory direct only. Shipping by bus or UPS is extra. C.O.D. orders are accepted if accompanied by a check or money order for \$10 or more. For further information, Circle #4 on the Reader Service Card.



Delta Specialties, P.O. Box 754, Bridgeton, Missouri 63042, has produced the SB4AK Starting Battery Kit, which is a kit version of their popular nickel cadmium starting battery. The SB4AK combines convenience, rechargeability, freedom from corrosion, and complete insulation protection from shorting while being carried in the tool box or pocket. The heavy duty strain relieved power cord minimizes voltage loss between the battery and the glow plug. The 4.0 amp hour nickel cadmium battery will supply over 90 minutes of glow plug heating to the 2.5 ampere K&B RC glow plug, as an example. Modelers may also purchase the SB4AK less battery and use their own 2.0 to 4.0 ampere hour cell. See Delta Specialties ad in March RCM for battery chargers and additional information. Assembly time is less than 5 minutes. Price: SB4AK less battery, \$2.95; SB4AK with 4.0 ah battery, \$9.95; SB4A with 4.0 ah battery assembled \$12.95. Assembled, tested, approved, and recommended by RCM. For further information, Circle #5 on the Reader Service Card.



The newest Field Supply Box from the originator of the Broadfield R/C Field Box is the J-8 Kit or J-8-B built-up field box. This new unit features several improvements in kit construction and better interior arrangement. Drop leaf side cover with catch and stop-hinges. Ample storage space for RC gear and fuel in two separate compartments, plus one large drawer for average supply of tools and hardware items. Also included in each kit is oversized, reusable plastic (7 compartment) parts box. The new Broadfield unit is sturdier, standing on four basswood legs which fold in bottom. Hold-A-Plane Dowel Brackets support model waist high, then flip down in recessed box top when not in use. Plastic carry handle, nickel plated fittings, nails, glue, etc. Plywood precision-cut panels in this lightweight (8 1/2 pounds) completely pre-fab kit. Size: 20 3/4" x 8" x 12" high. J-8 Kit is priced at \$15.95. J-8-B Built-up is \$28.95. Order from Broadfield Air Models, 56 Cutler Drive, Ashland, Massachusetts 01721. For further information, Circle #6 on the Reader Service Card.

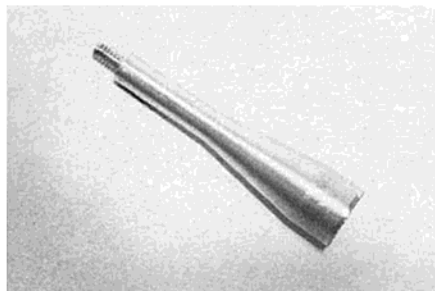


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SHOWCASE '67

(Continued from Page 7)

It had to come! We, at RCM, are currently sporting our new "Curse You Red Baron" sweatshirts which are offered by Hobby Lobby International, 2604 Franklin Road, Nashville, Tenn. The sweatshirts come in sizes Small (34-36), Medium (38-40), and Large (42-44), and Extra Large (46-48). Colors are random assorted, so no selection is offered. Postpaid price is \$4.50. Actually, this is a not-too-impractical item for the RC'er since it's a good quality and warm sweatshirt. The appearance of this sweatshirt on the market ought to have everybody scrambling to build Sopwith Camels for a new RC combat event! Also from Hobby Lobby is a series of extremely well made control sticks to replace the CitizenShip AP and DP proportional units, Bonner stick, and Kraft open face stick. We have tested these units at RCM and approve and recommend them for use. We are currently using a set on our PSC proportional system and CitizenShip DP system. For further information, Circle #7 on the Reader Service Card.



Nemo Hobby Distributors, 4720-22 Peck Rd., North El Monte, California 91732, has released their fiberglass pushrod stock for distribution to hobby dealers. These three foot lengths of hollow fiberglass tubing make the finest RC pushrods we have yet seen, and will retail for 65c per length or 3 for \$1.90 from your local hobby dealer. Pushrods made from this material are absolutely true, centered, lightweight, and stronger than any comparable material. Tested, approved, and recommended by RCM. For further information, Circle #8 on the Reader Service Card.

Orbit Electronics, 11601 Annabel Ave., Garden Grove, California, will release two new digital proportional systems in the Spring of 1967. Both will be available in the 72 Mc frequencies as will all other current Orbit systems. The 3-6 Digital is a three channel, six function system for the sports flier, Class II competitor, high performance glider, and racing sail or power boat. The 2-4 is a two channel, four function digital system that will be welcomed by Class I rudder-only and slope soaring fliers. High torque servos will make the 2-4 perfect for high performance power boat fans as well as sailing enthusiasts and RC car modelers. Both systems will incorporate the latest solid-state Orbit circuitry; small lightweight, vinyl-clad transmitters, and new superhet receiver. For further information, Circle #9 on the Reader Service Card.

Hobbypoxy Products, a division of Pettit Paint Company, has announced a unique line of model building materials. Known as 'Easy-Does-It' supplies, they include a new type of molding cloth for use with Hobbypoxy epoxy glue, a specially designed glue spreading knife, scraping

blade, as well as custom dipped balloons designed for the 'Easy-Does-It' FORM method.

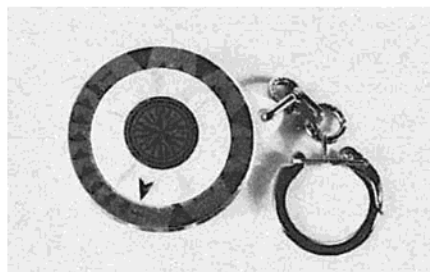
'Easy-Does-It' cloth is non-toxic, easy to cut with ordinary scissors, does not leave small thread slivers to irritate the skin. Readily formed around complex shapes, it is lighter than fiberglass, yet retains exceptional strength. It 'wets' fast with Hobbypoxy glue and is easy to work with regular model tools. It is especially recommended for forming cowls, wheel pants, wing tips, and for reinforcing fuselages at points of heavy stress or wear.

The 'Easy-Does-It' glue knife is designed to mix, apply, and spread glue on open surfaces and in fillets and crevices. The scraping blades are scientifically honed for scraping Hobbypoxy glue to a satin smooth finish.

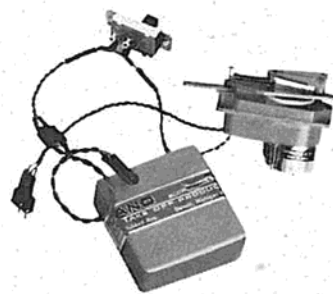
All 'Easy-Does-It' supplies and materials are available in hobby and model shops. Full information, featuring step-by-step photos, on the 'Easy-Does-It' methods is available free from Hobbypoxy Products, Division of Pettit Paint Company, 507 Main Street, Belleville, New Jersey. For further information, Circle #10 on the Reader Service Card.

Micro-Avionics Inc., 530 S. Mountain Ave., Ontario, Calif., 91762, has announced their complete new line of proportional equipment for 1967. Several new and exciting developments have been released by Micro, including an outstanding new boat system, designed exclusively for the Power and Sail fraternity. For further information on the new line, Circle #11 on the Reader Service Card.

The Charles F. Alshuler Company, 7026 N. Lake Drive, Milwaukee, Wisconsin 53217, sent us a sample of their Memotimer. This is an excellent item which resembles a small pocket watch, complete with chain and snap ring, which counts the minutes for you. Simply set the imported Swiss timer mechanism to count off the desired minutes, from 5 to 60, and a buzzer will notify you when the pre-set time has elapsed. Excellent as a reminder of how much time you have left on an engine run, etc. Timers are available gift packed individually in colored Lucite boxes to match the timer color. Special designs such as club emblems can be inserted in the center of the Memotimer, and if desired, a message can be placed on the back. The Memotimer is 1½" in diameter and weighs less than 1 ounce. Tested, approved, and recommended by RCM. Dealer and distributor inquiries invited. For further information, Circle #12 on the Reader Service Card.

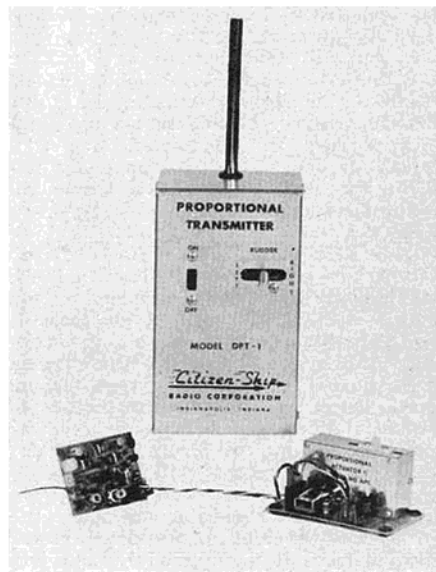


Rand Manufacturing Co., Inc., 8909 Hubbell Avenue, Detroit, Michigan 48228, has produced the long-awaited GG Pak. This is a pre-wired unit that includes a Rand LR-3 actuator, wiring harness, and single nickel cadmium battery supply, and designed for use with relayless receivers! Now, relays can be simply removed from your present receiver, and the unit wired directly to the GG Pak, thus eliminating one of the most troublesome spots in GG



operation. Priced at \$39.90, the Rand GG Pak is certain to become one of the most sought after items in the pulse proportional field. For further information, Circle #13 on the Reader Service Card.

Citizen-Ship Radio Corporation, 810 East 64th Street, Indianapolis, Indiana 46220 has announced their line of proportional equipment for 1967. Included are their 5 channel digital systems on both 27 mc and 72-76 frequencies. The DP system for Citizens Band frequencies is \$374.95, while the DP-72 system, produced under Citizen-Ship's recently obtained F.C.C. Type Acceptance for 72-76 mc, is \$399.95. Also available is the DP-3 system, a 3 channel digital system for \$274.95. The DP-372 will be available for \$299.95 as soon as F.C.C. Type Acceptance is received for this unit. The DP-1 system is a digital proportional system available for \$99.95. For information on the complete Citizen-Ship line, Circle #14 on the Reader Service Card.



More-Craft Product Co., 567 Darwin Blvd., Edison Rahway P.O., New Jersey 07065, has announced their new line of quality wood R/C accessories. The first is their R/C Field Box, the kit model which retails for \$22.95 (model FB-1), and the built-up version (model FB-2) at \$39.95. A Tote Box lists for \$7.95 in kit form (TB-1) and \$12.95 in the built-up version. A wing rack is also available for \$4.95. Tested, approved and recommended by RCM. For further information, Circle #15 on the Reader Service Card.

KITS & PIECES

BERNIE MURPHY



JUST hung up the phone, after a long enjoyable conversation with Lou Proctor. Lou, in case you have forgotten is Snoopy's benefactor, having supplied him with a new ANTIC, after the "Red Baron" had succeeded in shooting away all of his Sopwith Camels.

A year has passed since our Antic was "born" and we were curious just what Lou might have in mind for the future. Although still undecided, Lou promised that the next one would be another vintage ship, a fact that is bound to excite anyone that has built an Antic (RCM Kits & Pieces, Mar.-Apr.-May '65).

The Antic in retrospect has proved to be one of if not the most enjoyable ship we have ever had the pleasure of building and flying. The ship has been flown over three hundred flights, and has been flown by my six year old son Don — a real tribute to its flying characteristics (this is the only ship he has mastered alone!).

At present, we are anxiously awaiting a set of Lou's Rebel plans which we will tell you about next month.

Ed Thompson, RCM's somewhat unhinged technical editor will undoubtedly invoke the Curse of the Radio Fairy upon us for what is about to follow. As you are probably aware, Ed has developed a persecution complex, simply because we received a kit at Christmas a year ago, while he got only a card from Fearless Leader. To add to his misery, every member of RCM's staff received a gold and blue RCM shirt, complete with names, but no Ed! This Christmas we received another kit, Das Ugly Stik, and two cards — sorry Ed. It's okay though, they don't allow gold shirts where he's going anyway.

Das Ugly Stik was designed by Phil Kraft as a quick building all around

fun ship. The kit, by Jensen Enterprises, 6226 Brightview Dr., Glendora, California 91740, features **ALL** hardware, formed dural gear, nose gear and the most beautifully finished balsa and plywood parts we have ever seen. The ship spans 60 inches with a total wing area of 720 square inches. Recommended engine size .45 to .60 (if you plan on a .60 we suggest an orange and black striped color scheme). Primarily a Class III design, the ship handles quite well as a Class II, with the ailerons either omitted or locked in place. The kit quality is every bit as good as that found in the Jensen kit of the Kwik Fli., although of simpler and quicker construction. Our kit arrived unscathed via the U.S. Mail (that's right Mail) during the peak of the holiday rush, a tribute to excellent packaging.

We followed the assembly instructions supplied to the letter (if all else fails, give this hint a try). First the wing spars and doublers were glued together producing a continuous spar. No cutting or trimming needed here. Plywood inserts for the control horns were glued into the rudder, elevator and ailerons. Again all parts completely shaped and fitted, no cutting. Since all parts fit so unusually well we will omit the no cutting or trimming notes, and instead only note areas where fitting is necessary. The fuselage sides are comprised of two pieces, as in the fin. These were glued together completing all of the primary assemblies prior to actual construction.

Bulkhead and servo rail positions were marked on the bottom sheets ($\frac{3}{16}$ plywood front and $\frac{3}{32}$ balsa rear). This step was simplified by the forethought of the manufacturer in printing extension lines on the top view of the plans, allowing the bulkheads to be located with the sheet covering the picture. The two bottom sheets were glued together and pinned to a flat board. Servo rails and all bulkheads were glued into place (Epoxy is called for on firewall — we chose to use Franklin Titebond throughout.)

While the fuselage skeleton dried, the stabilizer was glued together on another flat board, in the following manner — two $\frac{3}{16}$ bottom sheets, trailing edge spar, tips, and leading edge spar, all located flush to edge of sheet. Angled ribs are now glued in starting at each tip, and

working towards the center. The two in the center had to be cut to length — shucks!

If space permits, the wings can be built while the rest of it dries (plan ahead!). The easiest way to build the wing, is in one piece. A simple jig made up from two pieces of $\frac{3}{4}$ inch plywood (12" x 30") nailed down in the center and blocked up at the tips can be used, or a double Magna-Jig could be used. If not available, build one side at a time. The wing plans were cut and laid on the building board (a word of caution or clarification here — the plans show the **bottom** view of the wing panels, although the wing is constructed **top up** — simply ignore the markings and build the left panel over the platform marked "Bottom right" and vice-versa — the panels are identical, and the plans are used only for rib location).

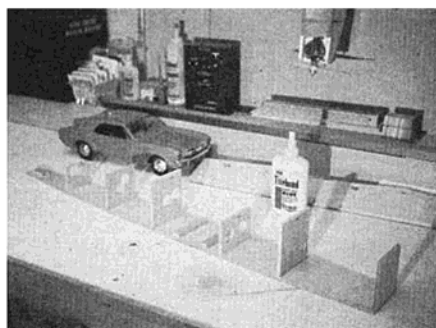
The bottom trailing edge sheets are pre-beveled at the dihedral joint. These overlap, and are glued together and pinned down to the jig. In order to fair into the wing tips, it is necessary to raise the front of the trailing edge sheet $\frac{3}{16}$ at the tip only. The bottom spar is laid in position and all ribs glued into place. The top spar is added along with the leading edge, top secondary spar, and top trailing edge sheet, in that order. The false leading edge ribs are now added, as are the tips. Addition of the tips requires trimming of the spars and leading edge flush with the end rib. Allow to dry thoroughly.

The instructions call for the top stabilizer sheets to be added at this point. Although the plans call for the stab to be added at the rear of the fuselage, we chose to leave it off until the fuselage had been completed. With the fuselage bottom still pinned down, the sides are added (a little water on the outside where the sides bend will help). Again Titebond was used at the firewall. Be sure that side with the pushrod cutout is on the left! Top decking was now glued on, again checking the pushrod cutout, completing the basic fuselage construction.

As soon as the wing framework had dried, it was removed from the board, and the bottom secondary spar and servo rails installed.

There she is, ready to cover and dope! Total construction time, 2-3 evenings. Total trimmings less than $\frac{1}{4}$ ounce of scrap! As we mentioned, the ship includes hardware. The only additions have been DuBro wheels, one wheel collar, Rand hinges and pushrod keepers, tank covering, radio and engine. (Williams push rods and clevises are included in the kit — the pushrod keepers were added by choice.)

(Continued on Page 10)



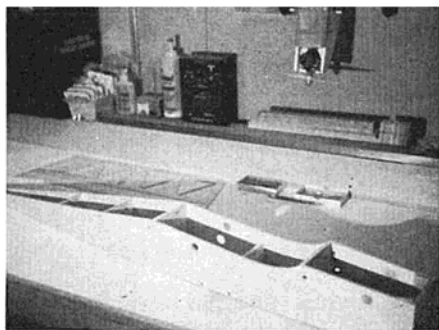
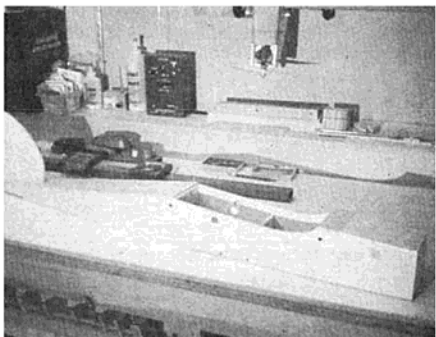
Fuselage bottom with bulkheads in place.

KITS & PIECES

(Continued from Page 9)

Das Ugly Stik is designed around the Kraft, PCS or systems using Kraft type servos. Other systems may require adjustment of servo rails. Also the pre-cut round openings in the bulkheads should be cut out to form one large opening.

As the name aptly states, Das Ugly Stik is no beauty, but it is cute, functional and fun. It can be docile, or a tiger depending on the engine and your abil-



Fuselage sides glued and pinned in place.

ities. At \$34.95 it is not cheap, but the quality, workmanship, completeness, and ease of construction make it well worth the price!

Rand Manufacturing Co. has announced their expansion into the accessory field. Rand's new line, the Rand Rack (designed for peg board display)

features several unique items: Aileron and Elevator horn bearings, hinges (4 sizes and types), Swing-in keepers, and the "Jimmy Bag."

The exciting part of the hinges is their shape. They are shaped to conform to the surface cross section, and are installed in a slot and slight recess in the surface edge. The shaped flange adds rigidity to the installation, as well as keeping glues or epoxies out of the hinge joint, and providing a seal to keep fuel out of the structure. The Rand hinges are "pin" type hinges, provid-



Stab construction. Mustang is Testor R/C Ready-To-Run.

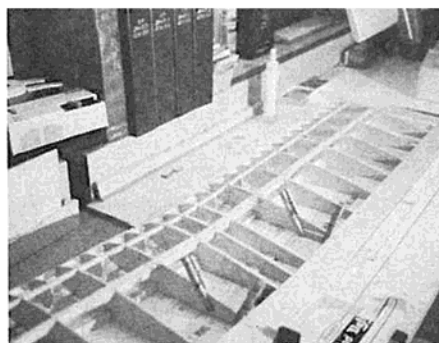
ing the smoothest surface hinge, with the least amount of friction. Once you try them, we think you would rather switch. Four types are available, three for neutral axis (pin centered) for rudder, elevator and strip type ailerons of various thicknesses, and one top edge hinge for scale or built-in ailerons.

We used these hinges on our Ugly Stik. All surfaces proved to be at least as free as the figure 8 sewn hinge and in appearance second to none. Since the hinges are of the pin type, they can be completely installed prior to covering and finishing. Simply remove the pins to separate the surfaces for finishing.

The horn bearing makes a simple, neat, strong installation, and eliminates a common point of metal to metal contact.

The key to the Rand keeper is in the name "Swing-in keeper." Bend the pushrod first (I like that!), insert, swing-in and snap. This keeper does not require excessive bending or springing, it can easily be snapped on or off with one hand. The clevis type design provides the proper guide for the pushrod wire, preventing the bend from binding in the hole. We strongly recommend the use of non-adjustable pushrods when using push-pull output servos with adjustable ends. The use of adjustable clevises can allow the pushrod to rotate,

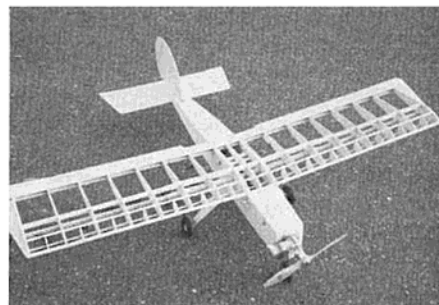
Framed-up wing. Note scalloped ailerons in background.



unscrewing either the servo fitting or the clevis. Result — disaster! Swing-in keepers have been used on both ends of our pushrods.

Rand's "Jimmy bag" was designed by Jim Northmore, hence the name; and is simply a soft, washable, flannel, drawstring bag. The bag is designed as a transmitter covering to protect against dirt and scratches etc. This is a terrific idea, especially in the sawdust factory, but please remove bag before flying!

In the electronics department, Rand is about to announce their GG Pak, for relayless galloping ghost. This will be a complete unit including batteries, electronic circuits, actuator and wiring harness with plugs. More on this one later. Price \$39.90.



Das Ugly Stik by Jensen

A couple of new additions to our workshop. First, a pair of precision sanders from Delta Specialties, Box 754 Bridgeton, Missouri 63042. One is 42 inches long (\$8.95) and the other is 14 inches (\$3.95). The sanders are made of extruded aluminum, each with two sanding surfaces, one coarse and one fine. The solid backing allows no gouge sanding of surfaces of varying densities such as plywood and balsa combinations. The longer sander is ideal for trueing and smoothing wings and sheeting edges, while the 14 inch one is mighty handy for smaller work. A must in every R/C aircraft factory.

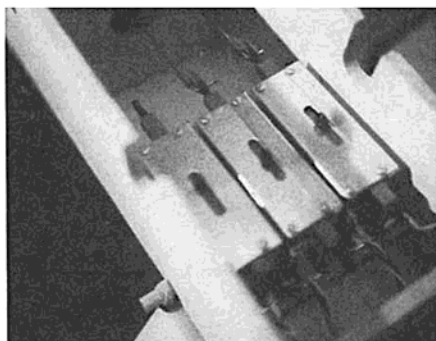
The second item is the Microflame miniature torch set, marketed by Hobby Lobby International, 2604 Franklin Rd., Nashville, Tennessee 37204. The Microflame Torch is a completely self con-

(Continued on Page 11)

KITS & PIECES

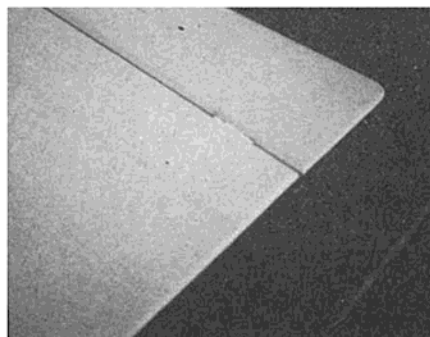
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tained unit producing a 5000° F pin point flame. The torch's small size makes it particularly suited to the modeler giving capabilities of welding, brazing and silver soldering. Our first test was to weld a cracked engine crankcase — a complete success! The Microflame Torch will cut through $\frac{5}{32}$ inch music wire, and will even weld music wire! The torch is a well built commercial unit used by industry. Every shop should have one.

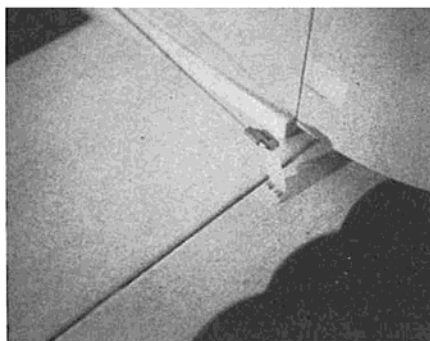


Rand keepers on servo installation.

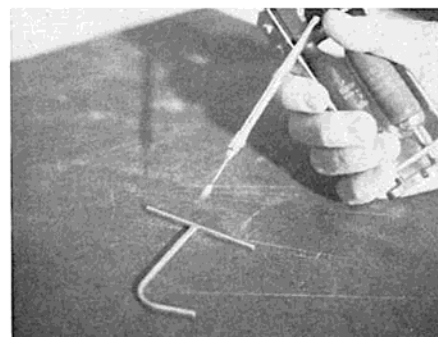
Rand hinge installation . . . very neat!



Rand "swinging" keeper. Note Rand hinge on stab.



Microflame Torch. . . . Note small size of flame! Hot!



The Microflame Torch set comes complete with three flame tips, extra gaskets, butane and oxygen cylinders and instructions, \$19.95. A low temperature soldering tip to allow soldering with lead alloy solders is available at \$3.95. Replacement oxygen and butane cylinders are always available (usually two oxygen needed per butane), as are silver solder sticks.

The sweatshirt pictured in our mast-head photo (complete with "Our Hero," Snoopy) is also available from Hobby Lobby at a cost of \$4.50. These shirts are well made, and quite warm. Just the ticket for these brisk spring days.

Several other new items include Testor's ready to fly (this one is) R/C Skyhawk and also their R/C Ford Mustang. A full report on these next month. Also for next month the Posi Tract retractable gear from Wing Manufacturing (a quality, molded unit, retailing at \$9.95 each!).

We have run out of space for this month, but before we take leave, a request. In order to relieve Ed Thompson's complexes, please send all of your old shirts directly to him, 5321 Diablo Dr., Sacramento, California, do not send them to me, I have enough already.

We would appreciate hearing from

you. Send along your ideas, comments, gripes, etc. Perhaps we can air a few of them. Bernie Murphy, 454 Gayle Dr., Linthicum, Md. 21090.

Now is the time to plan to attend the DCRC's tenth annual symposium on radio control. This year's Symposium will be held Saturday, May 20 and Sunday, May 21. Saturday's technical sessions will be held at the John Hopkins University Applied Physics Laboratory, near Laurel, Maryland, while Sunday's flying demonstrations, fun flying and family picnic will be held at the DCRC field nearby.

This year the evening banquet and festivities will be held at the Howard Johnson's Motor Lodge in Wheaton, Maryland (Symposium headquarters).

The scope of the Symposium has been broadened in order to make the program even more in tune with today's modeler. Papers expected include R/C Glider Design, Thermal Seeking, R/C Seaplanes, aerodynamic design (as applied to models), operational aspects of the new F&M servo, as well as papers on electronic designs.

For further information and reservations, contact John Patton, Rt. 5, Ridge Rd., Frederick, Maryland.

Now that the weather is beginning to turn nice again — See you back on the field!



YOU . . . AND R/C SAFETY!

By Larry Rosenberg

(Reprinted from the Valley Flyers Newsletter)

WELL gang, this position of editor does have some compensations at that. At least I am afforded the opportunity to air my pet peeves, and that I now propose to do.

For some time now I have been concerned over the safety regulations, or lack thereof, that exist at our flying field. This is to be the subject of this editorial.

To begin with, we are very fortunate indeed to have a flying site as fine as the Sepulveda Basin. Not only do we have an enormous area in which to fly, but we also have this site within the city limits and with fine access via the freeways. I wonder how many other clubs are fortunate enough to have a flying site that even approaches the basin in both size and accessibility. To be sure, the runways need resurfacing, and the parking lot and road need some work, but these are minor ills. Money can cure them.

Now just consider what you, the average R/C pilot would do if the basin were to be declared off-limits to RC'ers. There you would sit with your nice, shiny, \$600.00 toy airplane gathering dust. You could load up your car and make for one of the more distant flying sites, but you would probably spend more time driving than flying. Not a very appealing idea, is it?

The reason for the big build-up here about the basin is that I feel that unless something is done about safety regulations at the basin, we are sure to have a serious enough accident to make us lose it. I feel confident that none of us want that to happen.

This hobby of RC'ing is an adult hobby by virtue of cost alone. Why then cannot the flyers act a bit more adult and mature when pursuing this hobby? What makes a 30- to 40-year-old man act like a junior high school show-off when he is flying his toy? How confident can one really be when utilizing a control system (R/C) that by virtue of cost, complexity, and size, has no redundancy? If an elevator servo sticks in the down position over the spectators, there is no back-up system or servo to pull the ship out. This same condition applies to all control systems and functions. Don't misunderstand me, I am not knocking the equipment that we use today. I feel that most of the radio systems in use today are a marvel of design when price and low volume must be considered as design parameters. But we must acknowledge their limitations.

Consider the following for a moment or two; a 7-pound model airplane roar-

ing through the air at 60 mph has a kinetic energy of $K^e = \frac{1}{2}mV^2$, or about 842 ft.-lbs. This is quite a bit of energy. The .45 caliber slug out of an army automatic, well-known for its tremendous hitting power, yields only a puny 369 ft.-lbs. of energy by comparison. When it is noted that this kinetic energy varies directly as the square of the velocity, and that most of our hot stunt ships do more than 60 mph, the obvious results are frightening. Just try to imagine what this amount of energy could do if it were to be absorbed by the head of a spectator. Think of that the next time that you see someone pull a real grandstand maneuver over the crowd, or the next time you do it yourself.

I will be the first to admit that there is little that can be done to eliminate the inherent hazards of our hobby, but we can minimize the possibility of injuring someone by merely keeping our airplanes where the people "AIN'T."

To sum it up, I feel that we have a potentially hazardous situation existing at our field, but that the hazards can be minimized by the application of plain old common sense, with a little courtesy thrown in for good measure. I don't think that it would be a great hardship on any of us to do the majority of our flying out over the weeds and to keep the pit and spectator areas behind us. Nor would it hurt us to keep the low altitude, hi-speed passes, out away from the strip. The capital offense, so far as I am concerned, is the low altitude flying over the spectators. My own wife and two kids will not come out to the field any more because on their last trip out, my wife had to grab both kids and duck as a ship passed about 1 foot over their heads. At the time, they were behind the cables and in the spectator area, not on the strip itself. Things like this do not need to happen. When a radio malfunctions and a ship goes out of control, accidents can and will happen, but when it is just plain showboating, there is no place for it in our hobby.

Well, that's it for this month and I must admit that I have been a bit verbose, but I do have strong feelings concerning this matter. I have been building and flying model airplanes most of my life and I think that it is one of the finest hobbies there is. At the present time, Radio Control seems to be the ultimate in modeling, and I enjoy it immensely. I for one, would hate to see this phase of our hobby put in jeopardy and hope that you feel the same way about it.

KING ALTAIR

By Vic Husak



*King Altair features static aileron balances
... nose wheel brake plus individual
main wheel brakes driven by ailerons.*

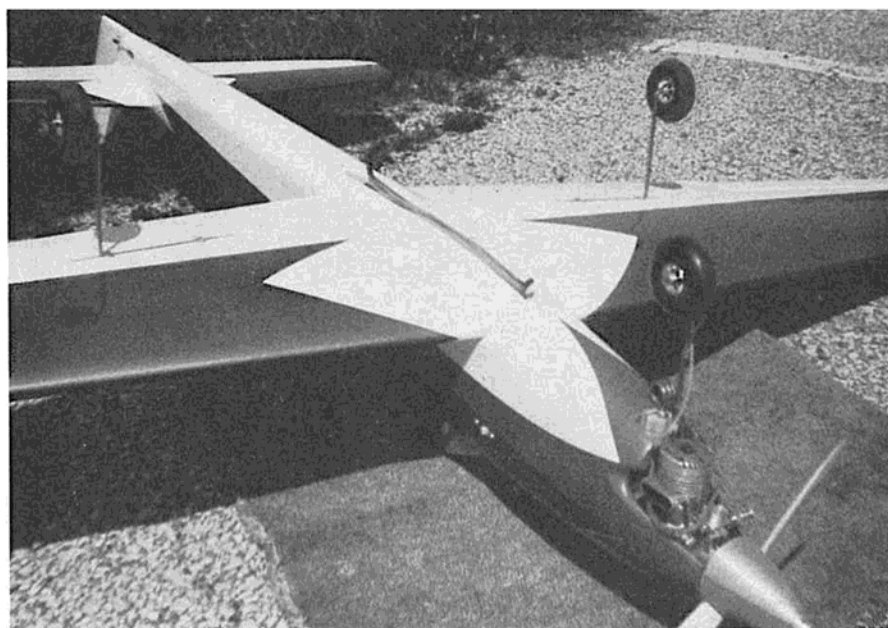
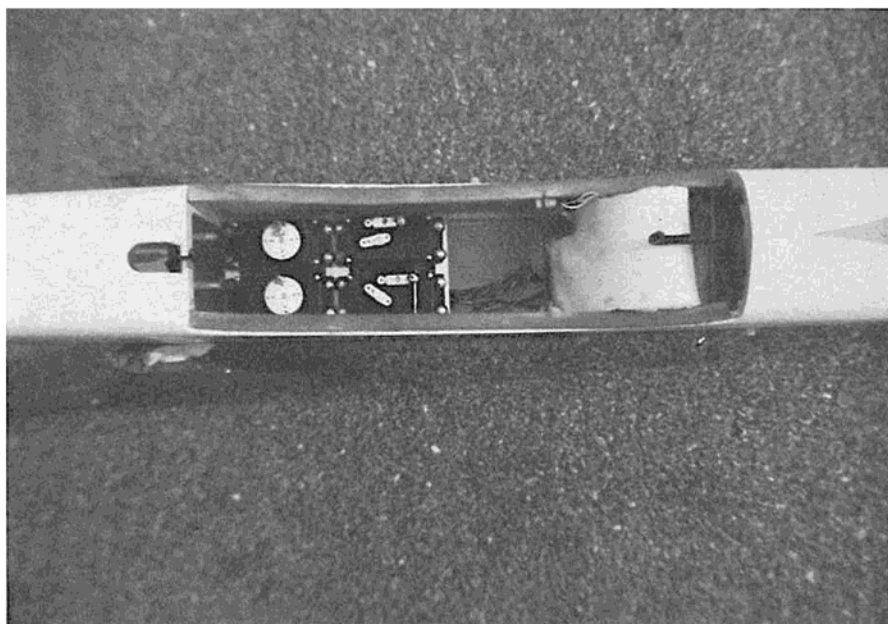
*Vic's 80" span King Altair uses a Veco .61
for power. Radio equipment is an Orbit 7-14
digital proportional system. Fuselage
length is 73", weight 8 pounds 12 ounces.*

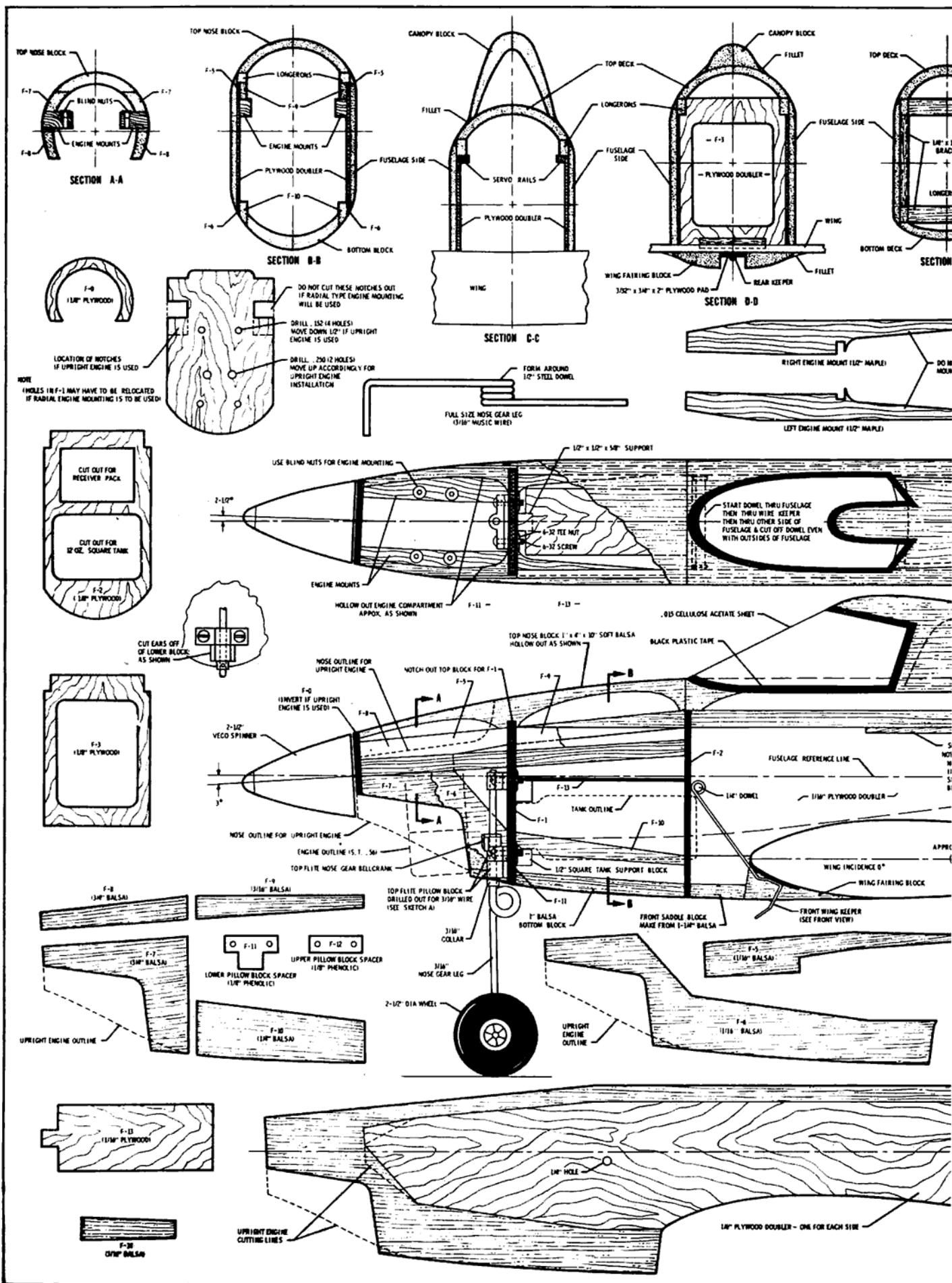
THE "King Altair" is basically a scaled-up version of the latest of the Altair multi ships that I have been experimenting with and flying during the last three years. Good looks, simplified construction and excellent performance in an aircraft larger than the average R/C multi ship flown today, have been the main goals pursued, and from all indications thus far, have been achieved in this multi ship.

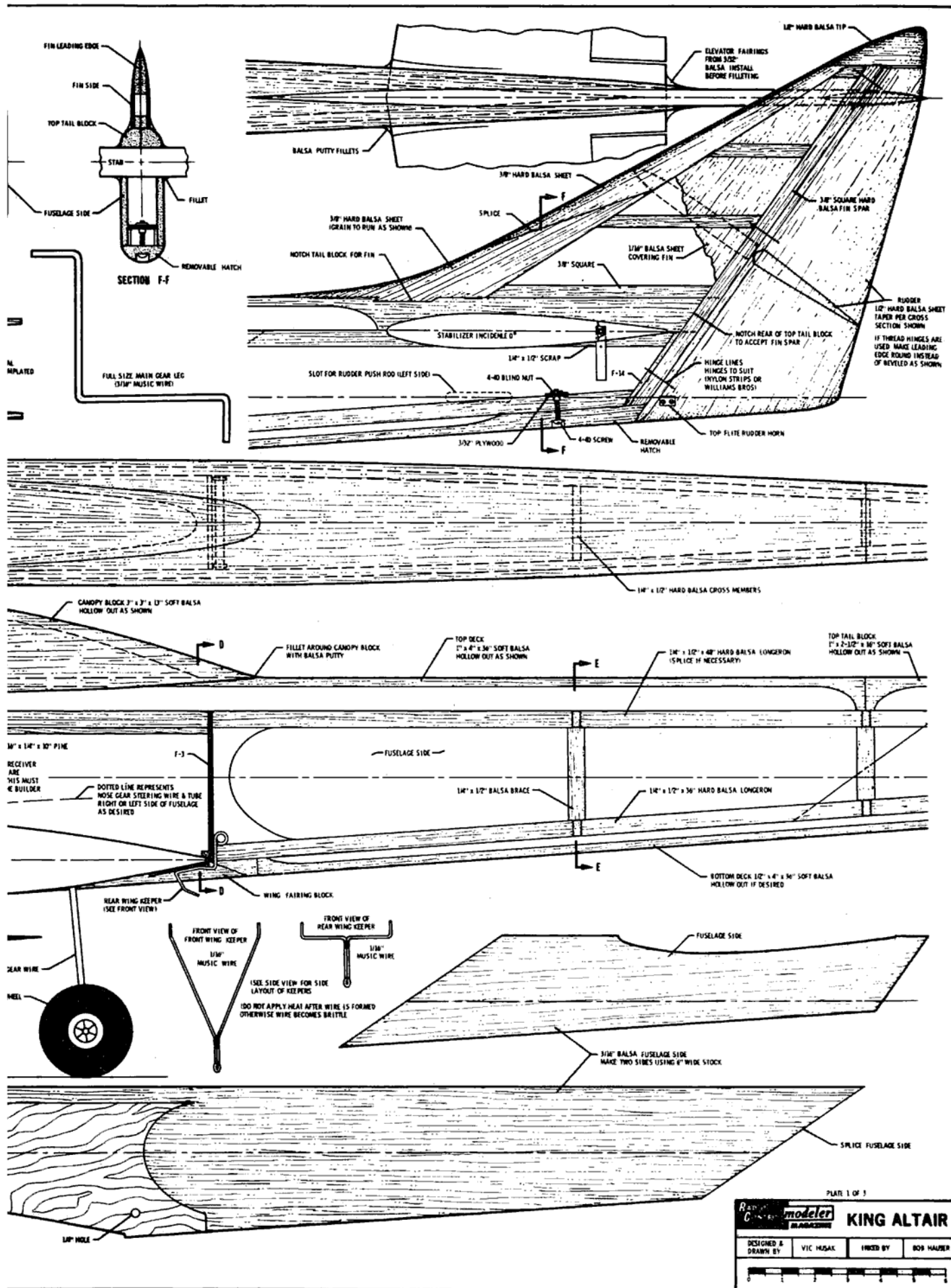
The "King Altair" is a relatively large ship, 80" in span, 71" in length, with 860 square inches of area, and weighing 8½ lbs. You might wonder why I have gone the larger than normal route as far as R/C multi ships are concerned, but I believe that this size aircraft has certain advantages over the smaller type of ship we have known in the past few years. A few of these advantages, I believe are — greater fuel capacity, easier installation of radio gear, a greater landing gear track, which make for much better ground handling, less susceptibility to small wind gusts, and a softer, more graceful response to control application, and — it just looks better. May I assure you that the size of this bird is not the least bit detrimental to performance. One other surprising thing about the "King Altair" is that it moves out very well when powered by a good, hot .56 or higher displacement engine; yet it can be dragged in for very slow, realistic landings. The ship performs the patterns with real elegance, which I believe, is due to its size. All maneuvers appear clean and precise.

I have been flying the "King Altair" with proportional equipment, whereas the earlier, smaller Altairs were flown on reeds; yet these smaller Altairs displayed exceptional performance. This big job should do just as well on reeds, if you are not a proportional flyer.

I designed the "King Altair" with an inverted engine set-up mainly for a clean front-end configuration. For one thing, the top nose line remains unbroken from spinner to canopy, giving the airplane a more scale-like effect. Also, the area around and in front of the nose gear is a rather dirty area aerodynamically anyhow, so why not utilize it instead of adding another one on top of the fuselage. Some R/Cers may look upon the inverted engine with skepticism, since all kinds of problems are associated with inverted engines. The secret of starting and running an engine successfully is to spend some time learning the idiosyncrasies of your particular mill, finding the proper needle valve setting and leaving it alone, priming sparingly, utilizing a good glow plug, and checking the plug just before an official flight to be certain that it is not loaded with castor oil. I have learned these little tricks over a period of time and I can honestly say that I now experience very little trouble with the inverted en-

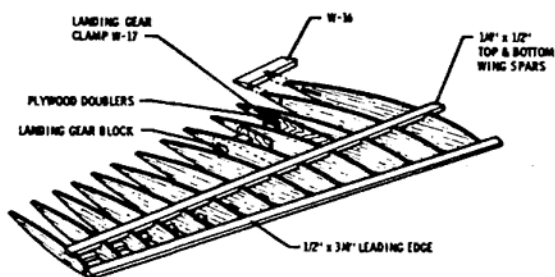




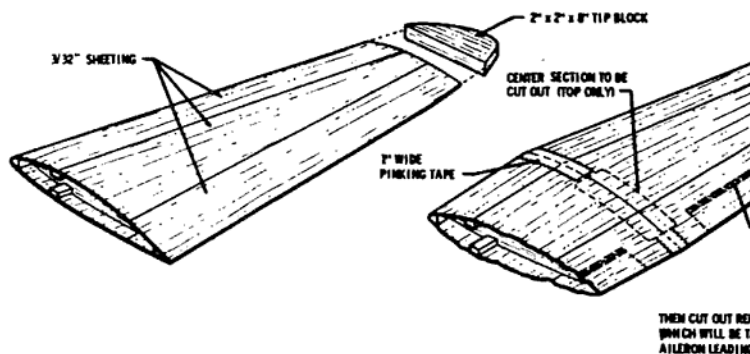


BASIC STEPS IN CONSTRUCTION OF WING

- 1 ASSEMBLE BASIC PANELS OVER PLAN-ADD W-16, PLYWOOD DOUBLERS W-4-A, W-4-B, W-5-A & W-5-B, THEN ADD LANDING GEAR BLOCK & CLAMP W-17



- 2 BEVEL LEADING EDGE UPPER & LOWER SURFACES PER SECTION H H, THEN SHEET ENTIRE TOP OF PANEL WHILE STILL ON BUILDING SURFACE. WHEN TOP SHEETING IS DRY REMOVE PANEL FROM BUILDING SURFACE, TURN OVER & BEING CAREFUL NOT TO PUT A WARP INTO PANEL WHILE APPLYING SHEETS WHEN DRY ADD TIP BLOCK

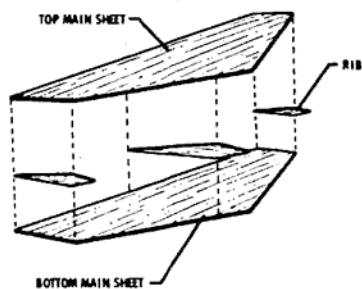


THEN CUT OUT REH WHICH WILL BE 1/4\"/>

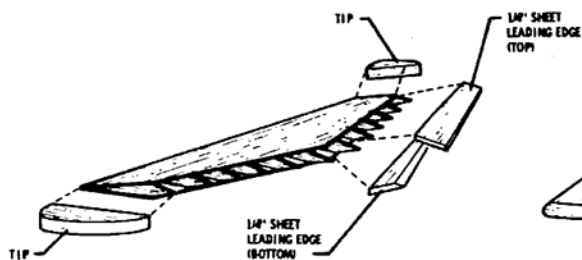
- 3 BEVEL IN BOARD END OF EA TO ACHIEVE THE PROPER DI THEN JOIN THE TWO WING P ALIGNMENT. WHEN DRY SA PROPER SHAPE & CONTOUR CENTER SECTION NEXT CUT PER DOTTED LINES NOW CI

BASIC STEPS IN CONSTRUCTION OF STABILIZER & ELEVATOR ASSEMBLY

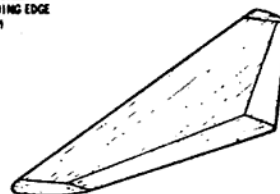
- 1 LAY BOTTOM MAIN SHEET ON FLAT SURFACE ADD RIBS-ADD TOP MAIN SHEET



- 2 ADD TOP & BOTTOM LEADING EDGES ADD TIP BLOCKS



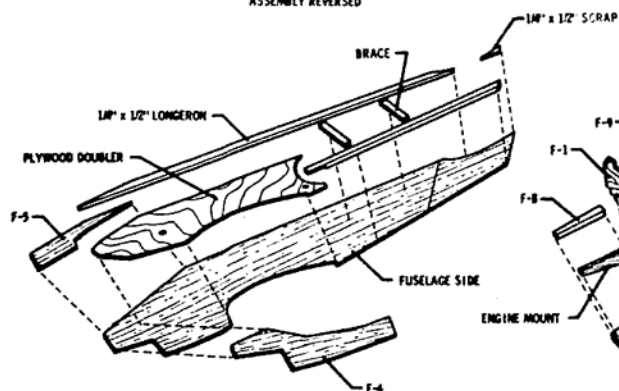
- 3 SAND AND CONTOUR ENTIRE STAB AND ELEVATOR ASSEMBLY (SEE SECTION G G)



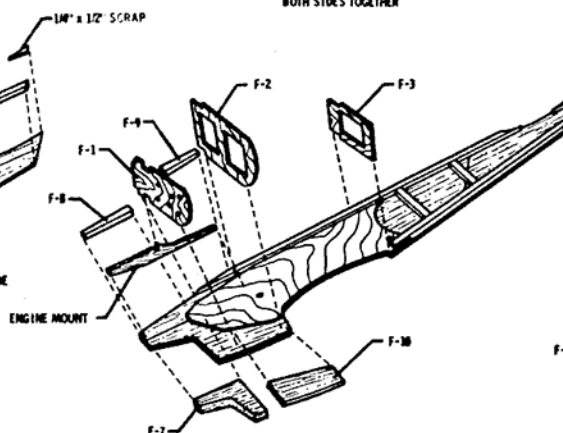
RUDDER DEFLECTION: AT LEAST 30° TO EACH SIDE FROM NEUTRAL
ELEVATOR DEFLECTION: 40° UP FROM NEUTRAL AND 35° DOWN FROM NEUTRAL (PROPORTIONAL GEAR)
AILERON DEFLECTION: 35° UP FROM NEUTRAL AND 25° DOWN FROM NEUTRAL

BASIC STEPS IN CONSTRUCTION OF FUSELAGE

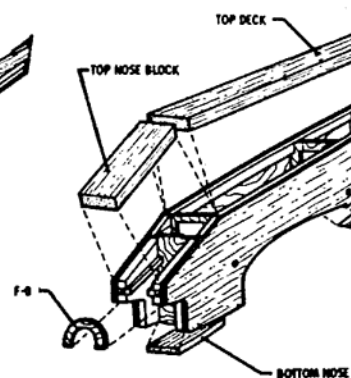
- 1 MAKE UP BASIC SIDES BY ASSEMBLING ITEMS AS SHOWN LEFT SIDE ASSEMBLY REVERSED



- 2 ADD ENGINE MOUNTS, FORMERS AND NOSE FILLER BLOCKS THEN ASSEMBLE BOTH SIDES TOGETHER

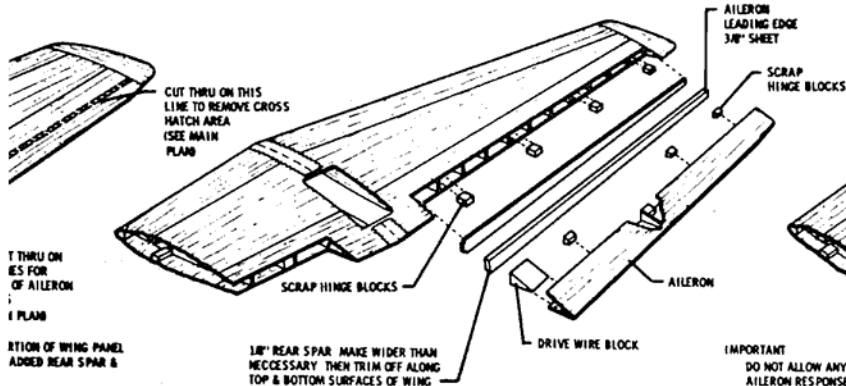


- 3 ADD F-14 AT REAR OF FUSELAGE SIDES PROPERLY ALIGNED TEMP FASTEN TOP & BOTTOM BLOCK A

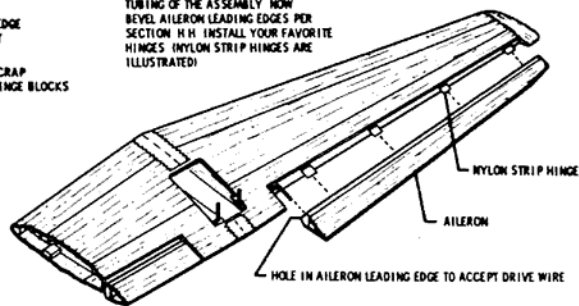


2" UNDER EACH TIP
ING SURE OF PROPER
ING STRUCTURE TO
INKING TAPE AT
SECTION ON TOP
ONS PER DOTTED LINES

- 4 CEMENT SCRAP HINGE BLOCKS IN PLACE. ADD REAR SPARS TO MAIN PANELS. WHEN DRY TRIM OFF FLUSH WITH TOP & BOTTOM SURFACES. CEMENT DRIVE WIRE BLOCKS IN PLACE AT INBOARD ENDS OF AILERONS. THEN ADD AILERON LEADING EDGES WHEN DRY TRIM OFF FLUSH WITH TOP & BOTTOM OF AILERON (SEE SECTION H H)



- 5 SLIDE AILERON DRIVE WIRE ASSEMBLY IN PLACE BY FIRST THREADING THE CENTER LEG OF WIRE THRU HOLE IN RIB W-2, THEN PUSHING THRU SLOT 3 IN RIB W-2. CENTER THE DRIVE ASSEMBLY CAREFULLY AND EPOXY IN PLACE BEING SURE TO APPLY THE GLUE ONLY TO THE BRASS TUBING OF THE ASSEMBLY. NOW BEVEL AILERON LEADING EDGES PER SECTION H H. INSTALL YOUR FAVORITE HINGES (NYLON STRIP HINGES ARE ILLUSTRATED)



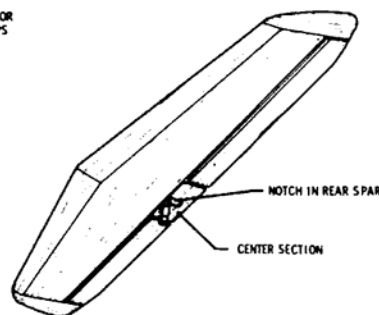
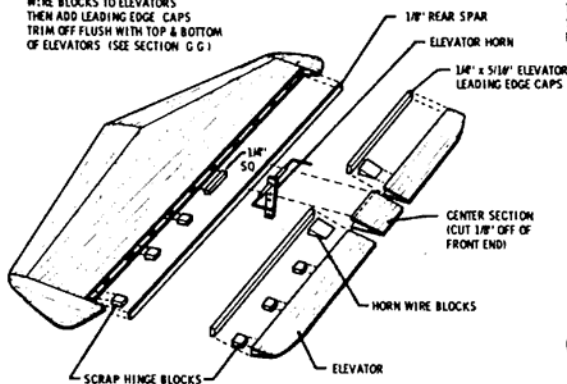
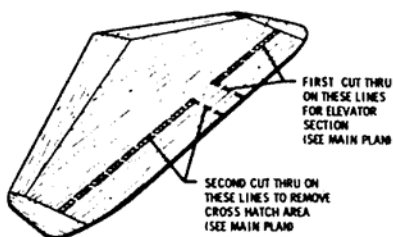
SEE VIEW "A" FOR FAIRING BLOCK DETAILS

IMPORTANT
DO NOT ALLOW ANY VISIBLE GAP BETWEEN AILERON LEADING EDGE AND REAR SPAR
AILERON RESPONSE WILL SUFFER IF THIS CONDITION EXISTS

- 4 CUT OUT ELEVATOR SECTIONS ON LINES INDICATED. THEN CUT OUT CENTER SECTION

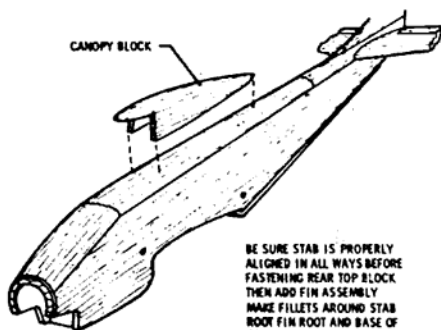
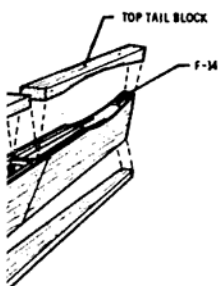
- 5 INSTALL SCRAP HINGE BLOCK AS SHOWN IN MAIN LAYOUT. THEN ADD REAR SPAR. ADD SCRAP HINGE BLOCKS AND HORN WIRE BLOCKS TO ELEVATORS. THEN ADD LEADING EDGE CAPS. TRIM OFF FLUSH WITH TOP & BOTTOM OF ELEVATORS (SEE SECTION G G)

- 6 NOTCH REAR SPAR AS SHOWN IN MAIN LAYOUT. EPOXY ELEVATOR HORN IN PLACE. CEMENT CENTER SECTION BACK IN PLACE OVER HORN. TAPER LEADING EDGES OF ELEVATOR. SILK ENTIRE STRUCTURE INCLUDING ELEVATORS. ADD HINGES AS DESIRED



UNDER SIDE VIEW OF COMPLETED STAB AND ELEVATOR ASSEMBLY

- 4 SHAPE OUTSIDE. REMOVE BLOCKS AND HOLLOW OUT IF DESIRED. RECENT IN PLACE. ADD CANOPY BLOCK (REAR TOP BLOCK IS PERMANENTLY CEMENTED AFTER STAB IS IN PLACE)



BE SURE STAB IS PROPERLY ALIGNED IN ALL WAYS BEFORE FASTENING REAR TOP BLOCK. THEN ADD FIN ASSEMBLY. MAKE FILLETS AROUND STAB ROOT FIN ROOT AND BASE OF CANOPY BLOCK WITH PLASTIC BALSA PUTTY

- A AFTER WING IS COMPLETED AND SILKED, TURN FUSELAGE UPSIDE DOWN AND CAREFULLY FIT WING TO SADDLE IN FUSELAGE. CHECK CONSTANTLY TO MAINTAIN PROPER INCIDENCE. NOW CAREFULLY ALIGN WING ON SADDLE AND CARVE AND FIT FAIRING BLOCKS. CEMENT BLOCKS AND PLYWOOD PADS IN PLACE BEING VERY CAREFUL NOT TO DISLODGE WING FROM ITS POSITION IN FUSELAGE SADDLE. WHEN DRY, FINISH SAND AND SILK FAIRING BLOCKS (SEE MAIN LAYOUT & SECTION D D)

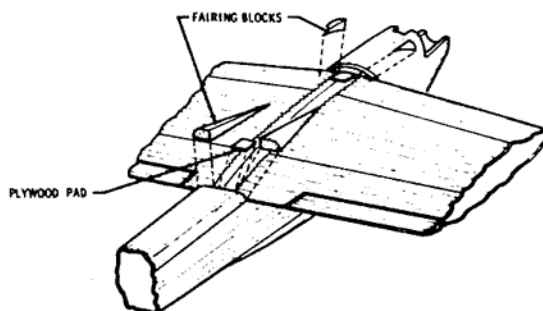
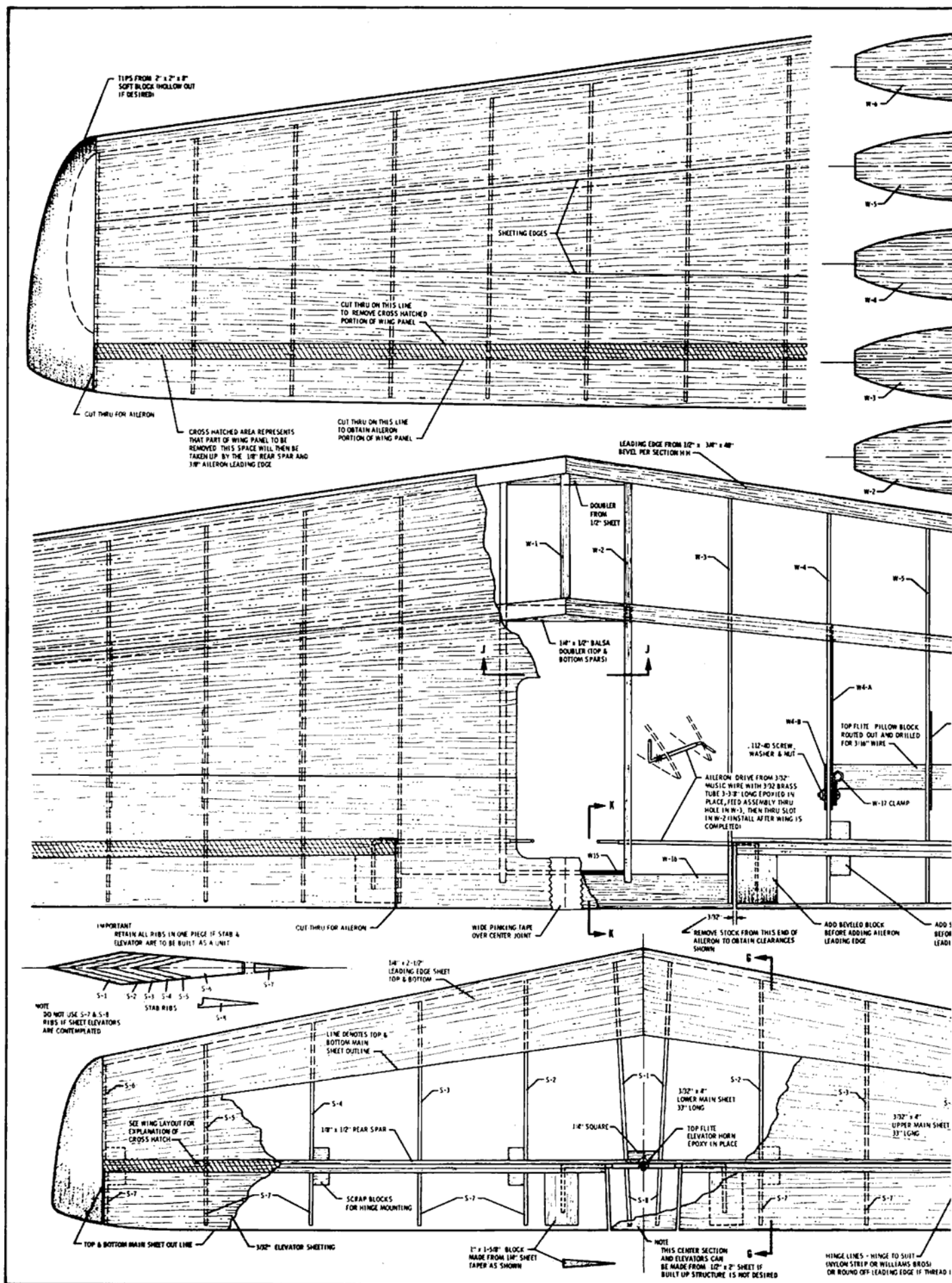


PLATE 3 OF 3

RCModeler **KING ALTAIR**
DESIGNED & DRAWN BY VIC HUSAK INKED BY BOB HAUSER
0 1 2 3 4 5 6



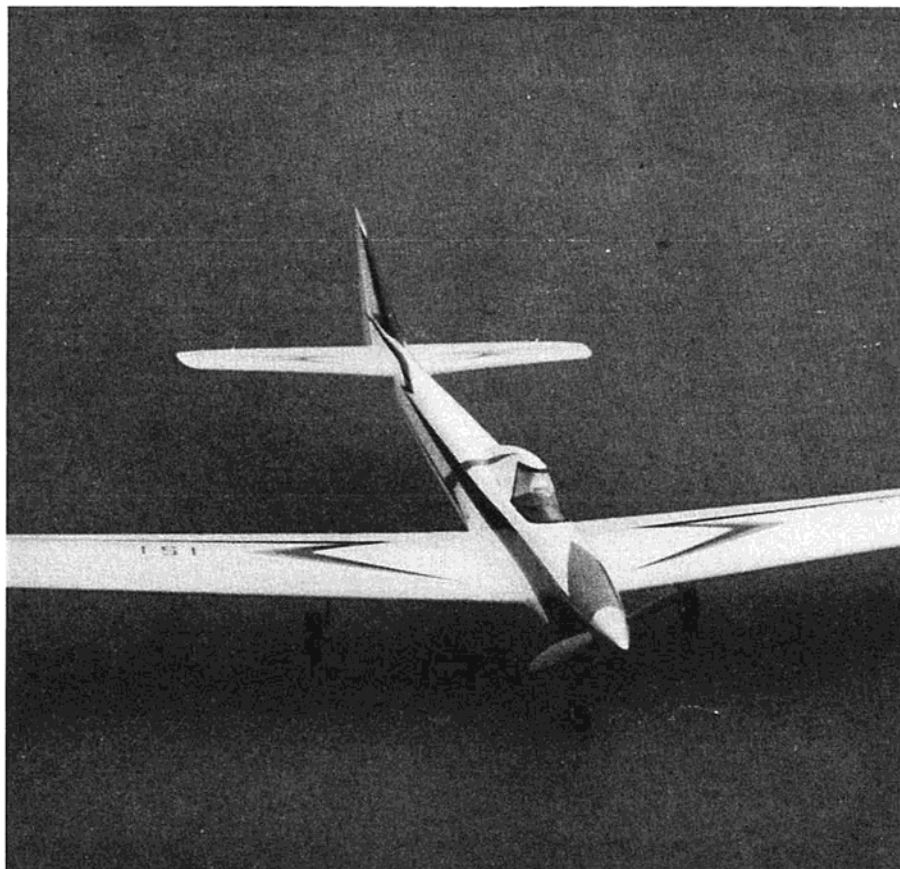


gine set-up. However, for those of you still skeptical, the plans indicate dotted lines on a number of fuselage components which will allow the nose to be shaped for an upright engine installation.

Construction of the "King Altair" is straightforward, being assembled entirely of balsa; yet considering the fact that it is a built-up structure, it is relatively quick and easy to put together. Why an all-balsa job in these days of fiberglass and prefabs? Believe me, I have absolutely nothing against foam wings or fiberglass fuselages — I think they are wonderful for those of us who are not too keen about building, or just don't have time; and they are strong. I just happen to like balsa wood, and I enjoy working with it. Nostalgic, I guess. A few 48" long balsa items are used although they are not absolutely necessary, since splicing of shorter lengths will suffice. No special construction information is needed, since the plans and supplementary sketches show all pertinent details for constructing the "King Altair." The method of assembling the stabilizer is, I feel, a real short cut in built-up structures, and is exceptionally light, yet strong.

For those of you contemplating construction of the "King Altair," a few notes of advice at this point should come in handy. Start by building the stab first, next the fuselage, finally the wing. Refer to the plans constantly, checking cross-sections and sketches for hidden details. Keep a careful watch on the alignment of the fuselage, the trueness of the wing panels, and the trueness of the stab and fin during construction. If you desire to mount the engine in an upright position, drop the engine bearers down one-half inch throughout their length from the position now shown on the plans. If radial mounting of the engine is to be used or mounting of the engine on its side is contemplated, dispense with the maple engine bearers and do not notch out firewall F-1, and build up the nose as per the upright installation.

You will notice that I have indicated no method of installing servos, bell crank and linkage to the nose wheel, brakes or push-rod details. These are items which, I feel, are best left to the discretion of the individual, depending, of course, on equipment used. The method of retaining the wing to the fuselage is admittedly a little different and may at first seem a little strange. The rubber bands (#64) strung between the front and rear keepers cause them to act as clamps, with pressure applied to the plywood pads. This system works very well and almost completely hides the wing bands. You may, however, use the standard exposed dowel and band method, therefore eliminating the need for



the $\frac{3}{4}$ " space between wing fairing blocks and the plywood pads.

Just a few words on finishing the "King Altair." I feel that this ship, or for that matter, any ship upon which the builder has spent time and money certainly deserves something more than a spackle brush paint job. The big secret behind any good finish is preparation of the under-surface. After sponge block sanding the wood with 220 grit, I always sand with 400 paper (dry). This gives the wood a slick feel. I then apply two coats of clear dope, sanding with 400 paper (dry) after each coat. Then comes the application of the silk, followed by a coat of talcum and dope mixture, sanding this with 220 grit. Now two or three coats of clear dope, again sanding with 400 (dry) between each coat and wet standing the final coat — and the under-surface is ready for the color coats. For color you can use butyrate dope, Hobbypoxy, acrylic lacquer or whatever your personal preference may be (mine happens to be acrylic lacquer). Spray or brush color coats on evenly. Sand between coats for good coverage, and when the final coat is dry, wet sand with 600 paper, following with a good fine white rubbing compound. If done correctly, you should end up with a very nice finish on your "King Altair."

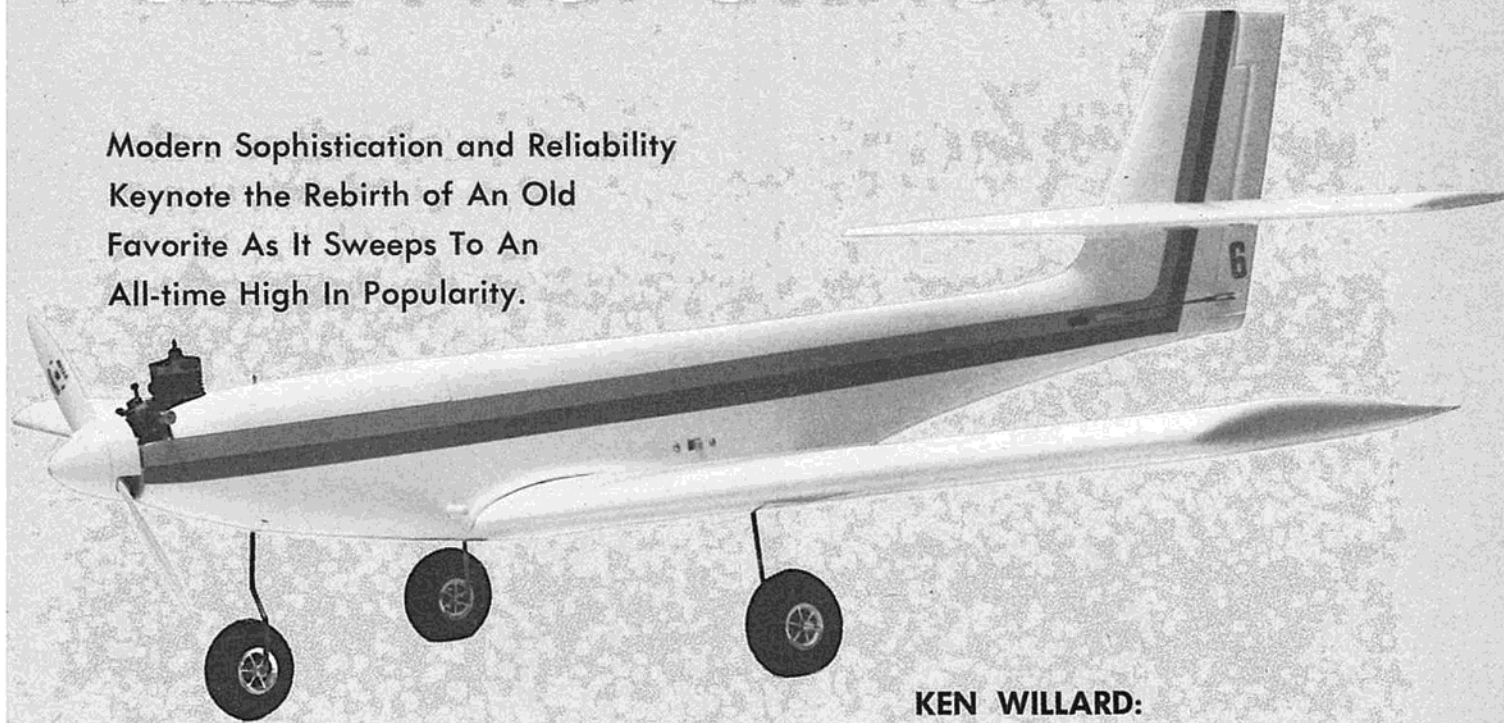
As far as actual flight testing of the "King" is concerned, my only bit of advice to the neophyte multi R/Cer is to let an experienced flyer take the ship up first and trim it out for you. This usu-

ally makes for greater longevity. To the experienced multi flyer not too much can be said. Assuming that all surfaces are true, radio gear is installed, wired and working properly, decalage is right, CG is approximately where it should be, and the engine is peaked, the "King" should fly off with just a slight nudge of "up" elevator after a short take-off run. Trim the ship for straight and level flight with elevator in dead neutral. Some slight shimming of the wing (either up or down) may be needed here. Possibly a slight shift in the CG position may help. Now check for unwanted rolling tendencies. You can correct for a slight roll with aileron deflection, but if the roll is severe, look for a warp in one of the panels. Rather than correct with aileron, try to eliminate the warp, should you face such a problem. After the trimming process, put the "King Altair" through its paces. A tip on aileron response, particularly with the type used on this aircraft — gaps may exist between the leading edge of the ailerons and the rear spars of the main panels. These gaps act in such a way as to kill the lift created by aileron deflection. Should your bird be slow on rolling action, and you have adequate up and down aileron movement, check for these gaps, and if apparent, close them up. The roll rate will definitely improve.

After flying the "King Altair" for a short time, I am sure you will be thoroughly satisfied with its look and performance. I know I am.

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Keynote the Rebirth of An Old
Favorite As It Sweeps To An
All-time High In Popularity.



KEN WILLARD:

*A full-house multi? Not at all — Bob Schneider's
50", .19 powered high-performance design
for Galloping Ghost.*

Basic Description by
KEN WILLARD

Design Considerations by
CHUCK CUNNINGHAM

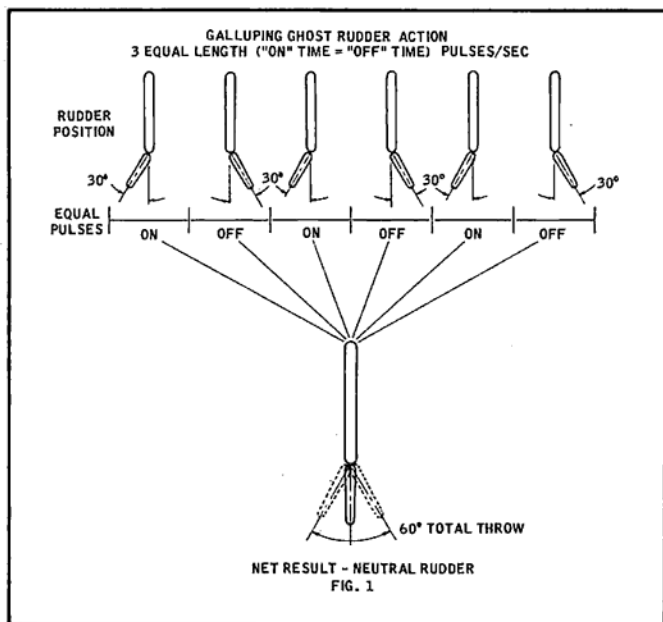
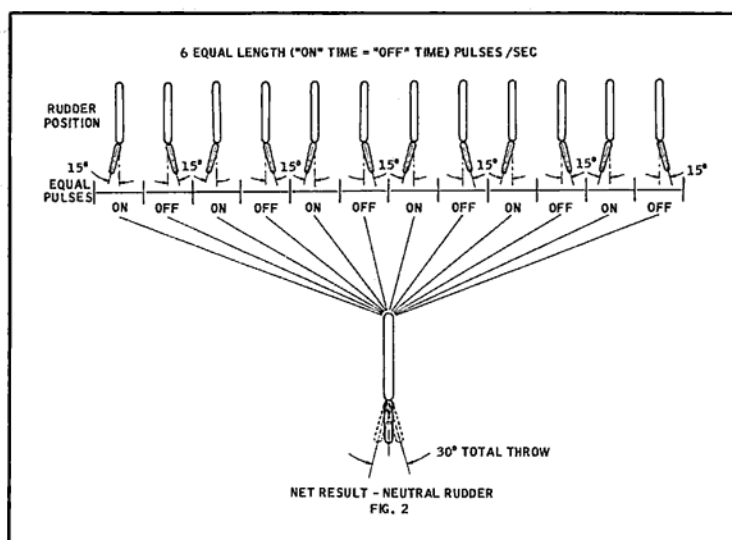
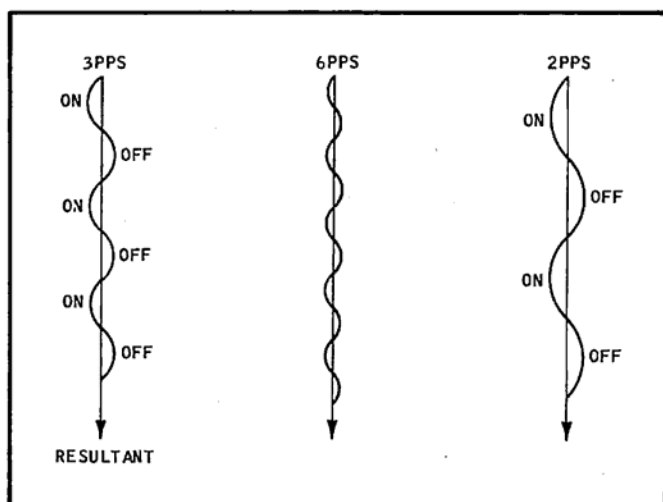
Hoosier Hot Shot by
OWEN KAMPEN

Electronic Switching by
HERB ABRAMS

Product Report by
DOUG TUCKER

AS I promised you last month, I'm going to take a stab at explaining the radio control system known as Galloping Ghost. It won't be easy, because the doggone system is so simple it's hard to explain what all the flopping is about! Also, a lot of other guys have explained it, yet from the letters I keep getting, your reaction has been "Wha'd he say?" Maybe you'll still feel the same after you read this. Well, let me tell you something; I understand the aerodynamics involved, and the mechanical linkages on such units as the Rand, Tomoser, World Engines, or the "birdcages" that are used with a simple actuator — but I'm still hazy when it comes to electronic decoders, tone detectors, pulse omission or pulse rate detectors, that are used on some of the more sophisticated systems. However, the net result is the same — proportional control at a very reasonable cost.

Most of you, by now, know where the term "galloping ghost" comes from. Briefly, though, for some of you newcomers, the term describes the flight path that models used to take. I say "used to take" because the term really isn't descriptive any more. But in the early days, the control system used to make the rudder flop slowly from right to left, with the elevator simultaneously flopping almost full up to full down. This caused the tail of the model to



Ken Willard explains the "Basics" of Galloping Ghost. Now more popular than ever before, this was one of the earliest forms of proportional control. Once considered as "Mickey Mouse," or a "Tinkerer's Delight," single channel proportional has come of age, due largely to the perseverance of its devotees and the efforts of a few manufacturers to perfect this phase of R/C.

oscillate up and down and right to left as the model flew through the air; it seemed to be galloping along, and since the control was invisible, it got the name "galloping ghost."

O.K. Now, just what is this system? How does it operate?

Well, it begins at the transmitter. The simplest transmitters, now available, when turned on, send out a continuous "carrier wave" on the frequency which has been "tuned in" to the circuitry of the transmitter through the "crystal." Then, when another part of the circuit is actuated by closing a switch, or pushing a button (which is really a switch), this causes a "tone" signal to go out over the carrier wave. This tone signal, when received by the receiver (which has been tuned to match the carrier frequency of the transmitter) causes a circuit in the receiver to close. When this happens, the battery supply in the circuit, which has been closed by the tone signal, in turn sends voltage to an actuator—which may be an escapement, a motorized servo mechanism, or a magnetic

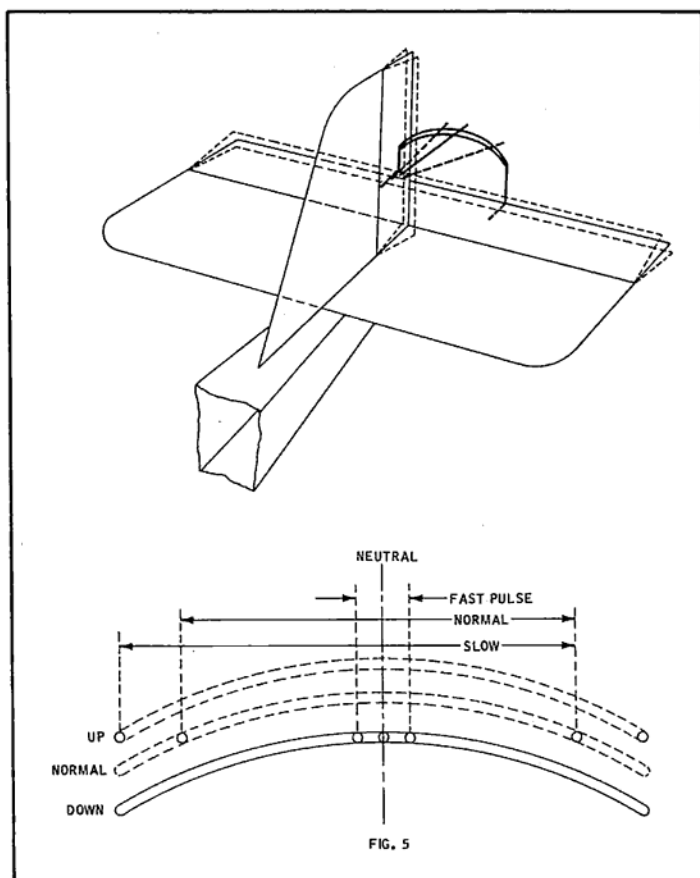
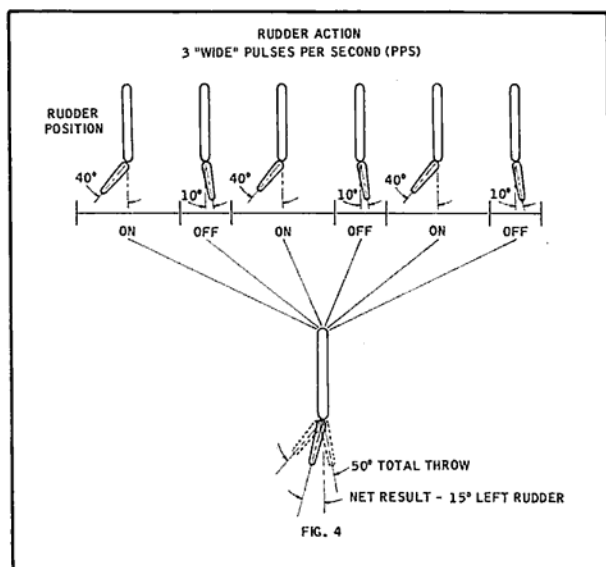
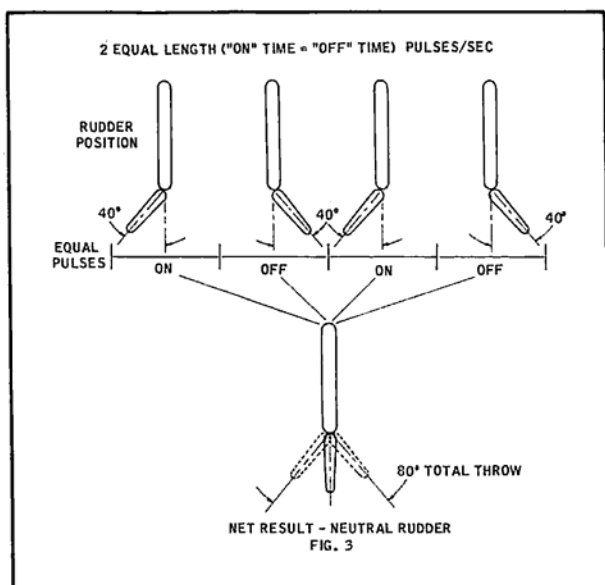
device, depending on the modeler's choice.

In the case of the escapement the operation is obvious. When a tone signal is sent by the transmitter, the receiver circuit to the escapement is closed, sending voltage to the coil of the escapement. The magnetic force which is generated "pulls in" the armature, or "rocker" on the escapement, permitting the mechanism to turn to the first stop. This movement, by a series of linkages, causes the rudder to move (or whatever surface or other device is connected to the escapement). Then, when the tone signal from the transmitter is discontinued, the escapement circuit in the receiver is opened, voltage to the escapement is cut off, and the spring on the armature pulls it back to the open position, permitting the escapement to proceed to the next position—or back to a neutral position, depending on the geometry of the escapement mechanism.

I know we're not discussing escapements, but this little background helps lead into the galloping ghost type of con-

trol. You see, with the escapement method of control, the airplane, when not receiving a signal, is basically in free flight mode. This fact, at one time, caused a writer to describe single channel radio control as "free flight, periodically disturbed by a radio command." This resulted in a lot of irate letters from avid single channel enthusiasts. Well, the furor died down, as modelers recognized the basic truth. What wasn't said is that a skillful man at the control of the transmitter can "disturb" the flight of an escapement controlled model in such a way as to make it perform many of the aerobatic maneuvers!

Now when you progress to galloping ghost, there's a difference. The model is never in free flight mode. It is continuously under control from the transmitter. Please don't nit pick the "on-off" bit, because the surfaces are continually moving from one position to the other, so it is continuous. Changes to the airplane design can be made to take advantage of this—less dihedral, for example, making inverted flight easier to



Galloping Ghost, simply stated, is utilizing a single tone from a transmitter in such a fashion as to provide information to operate rudder, elevator, and motor from one mechanical actuator.

maintain.

So let's get into the meat of this on-off sequencing of the tone signal from a single channel transmitter which comes out as galloping ghost.

First, there's the "pulser." Actually, it's nothing but a mechanical or electronic button pusher which establishes the length of time the transmitter sends out a tone in comparison to the length of time the signal is off, and also establishes the rapidity with which the total on-off sequence is completed.

The relative length of time the signal is "on" compared to the length of time the signal is "off" is called "pulse width."

The rapidity with which the on-off sequence is completed is called the "pulse rate."

O.K. Now let's go to the receiver. To handle the pulses, the receiver circuit to the actuator is a little different. It's set up so that when the receiver is turned on, a circuit to the actuator is also turned on, even though no signal is being transmitted to the receiver. The voltage thus going to the actuator makes

it start to run in one direction, if it's motor driven, or move in one direction if it's magnetically operated. Then, when the transmitter sends a signal, the receiver shuts off the "no signal" circuit to the actuator, and turns on a "signal on" circuit. This latter circuit reverses the direction of the current flowing through the actuator and makes it move, or run, in the opposite direction.

The receiver accomplishes this reversal of current to the actuator in several ways, depending on the receiver design. Most common, of course, is the relay method, where opening and closing the relay does the job. Relayless receivers have a power transistor which allows current to flow under a "no signal" condition, but which is cut off, and another transistor cut in when a signal is received. There are other devices, but we're not concerned with them right now. What we want to get at is the net result of all this on-off, pulse width, pulse rate action.

Let's look at what can be done with the condition where, during a one sec-

ond interval, 3 "on" pulses are sent, and each pulse is $\frac{1}{6}$ of a second in length, followed by an "off" period of $\frac{1}{6}$ of a second. Figure 1 shows that the actuator will drive the rudder, through the linkages, alternately right and left, and an equal amount in each case.

Now look at Figure 2. Here the number of pulses per second (PPS) has been increased to six, but the relative length of "on" time to "off" time has been kept equal — in this case $\frac{1}{12}$ second on, $\frac{1}{12}$ second off. Again, the actuator drives the rudder alternately right and left, in an equal amount, but not so far, because the actuator doesn't have time to run in one direction very far before the current is reversed and it starts to go back.

Fig. 3 shows what happens when you reduce the number of pulses per second (PPS) to 2, but maintain equal "on" and "off" time intervals, in this case $\frac{1}{4}$ second on, $\frac{1}{4}$ second off.

So neutral rudder action results, as stated on the summary, if the "on" pulse

(Continued on Page 25)

(Continued from Page 24)

is equal to the "off" period in elapsed time.

However, even though the net result is neutral rudder, which would give straight flight if the airplane is properly trimmed, the flight path would oscillate slightly.

Obviously, the faster the pulse rate, the less deviation from neutral, and less "gallop" to right and left. In actual practice, a pulse rate of 6 PPS results in a flight path without visible oscillation for most models.

Now let's take a look at what happens with the rudder action when we vary the relative length of time the "on" signal is transmitted compared to the "off" period immediately following in any given unit of time. If the "on" pulse is longer than the "off" time, the actuator will run further in the direction caused by the current resulting from the "on" signal circuit, before the current is reversed when the signal is "off." And before the actuator can complete its return movement, the "on" signal drives it back. Confusing? I guess so, when you say it fast — but not when you see it. So Fig. 4 is a somewhat exaggerated diagram which should clear it up. I hope.

And that sums up the situation insofar as galloping ghost operation of the rudder is concerned.

Now to tackle the elevator movement. Since, as we have seen, the rudder action is independent of the pulse rate, then we need to figure a way of translating pulse rate into elevator movement.

Fig. 5 shows an ultra simple installation back at the elevator which will do just that. A wire, sticking straight out from the rudder trailing edge, in line with the rudder, passes through an arc slot made of wire and attached to the elevator as shown.

When the rudder is in neutral, the wire from the rudder passes through the arc of the slot at the uppermost point.

When the rudder is in full right or full left, the wire passes through the slotted arc at the extreme right or left ends, both of which are lowermost on the arc. And when this happens, since the wire moves horizontally as the rudder swings, the slotted arc must move up whenever the rudder moves away from neutral. This pulls the elevator up.

So now we have a condition where, with neutral rudder, the elevator is full down; and with full right or left rudder, the elevator is full up. Just what we want in order to take advantage of "pulse rate."

With a fast pulse rate, the actuator — and in turn the rudder — doesn't move very far in either direction. This keeps the wire near the top of the arc. So, with fast pulse rate, we get down elevator.

With slow pulse rate, the rudder will oscillate from right to left, the wire will move from end to end in the slotted arc, and the elevator will flop all the way down. The average, or mean, position of the elevator under this condition is the effective full up position. So, with slow pulse rate, we get up elevator.

With a pulse rate somewhere in between the fastest and the slowest, the rudder will oscillate part way to right and left, and the elevator will flop part way up and all the way down. Thus a median, or average pulse rate can be established which will yield a neutral elevator.

And that's all there is to it — unless you want to go into all of the infinite number of variations in combinations of pulse rate and pulse width. There's not enough time or space for that — but let's just look at a couple. For example, if you have an on-off switch on your transmitter in addition to a pulser (most commercial setups do) and you're using a simple setup similar to Fig. 5, you can get some very spectacular flight maneuvers by either turning the transmitter full on or full off. Either condition will result in full up elevator (even more than when pulsing since the wire remains at the end of the arc) and full right or left rudder. And this is where the controls should be to do snap rolls or spins.

After you become familiar with some of the interactions, it will become apparent that, as pulse width is varied to get rudder action, there is some interaction with the elevator linkage which tends to give a little up elevator action at the same time. Normally this is favorable, since most models tend to drop the nose in a turn. However, if the interaction is too pronounced, and the nose tends to come up in a turn, you can apply any needed correction by increasing the pulse rate at the same time as you vary the pulse width.

Back to the on-off switch plus pulser combination. In the simple setup, you can use it for aerobatics — but the gadgeteers, like Herb Abrams, Herb Tomoser (must be related somehow to the Chinese herbs, the way they keep sprouting ideas) and all the others, have devised various ways of letting motorized actuators run continuously in either direction, depending on whether signal is "on" or "off" and while the rudder and elevator are flopping merrily right and left, up and down, a linkage to the motor moves forward or back and gives engine control.

Of course, there are the electronic counterparts, too. Back in 1959, when Howard McEntee and I battled it out for the National Championship in the "Intermediate" class, Howard was using some sort of an electronic circuit — I think he called it a "Kicking Duck" to

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pulse a single channel transmitter tone. Luckily for me, it kicked more often than it ducked, and I won, but Howard later on solved his problems and went on to many winning flights in Eastern meets. But we were considered a couple of "tinkerers" then — he electronic and I mechanical.

Now both the electronic and mechanical galloping ghost mechanisms are really coming of age. New combinations are showing up — mechanical devices, together with electronic auxiliaries, making it possible to have pulse rates so fast that the surface movements are almost nil; rudder action with virtually no elevator interaction; instantaneous motor control without flopping surfaces. By the time you read this, the MATS trade show in California, and the Toledo Weak Signals show will be over, and the things I've mentioned will be on the market.

Meanwhile, I hope this column has helped you to understand the very basic principles of galloping ghost.

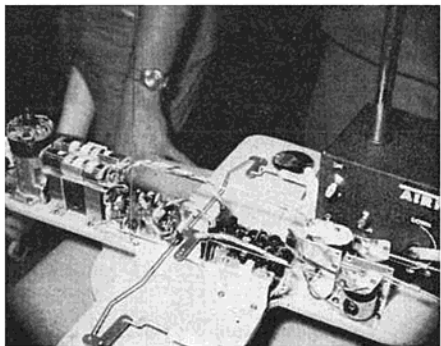
Let me know!

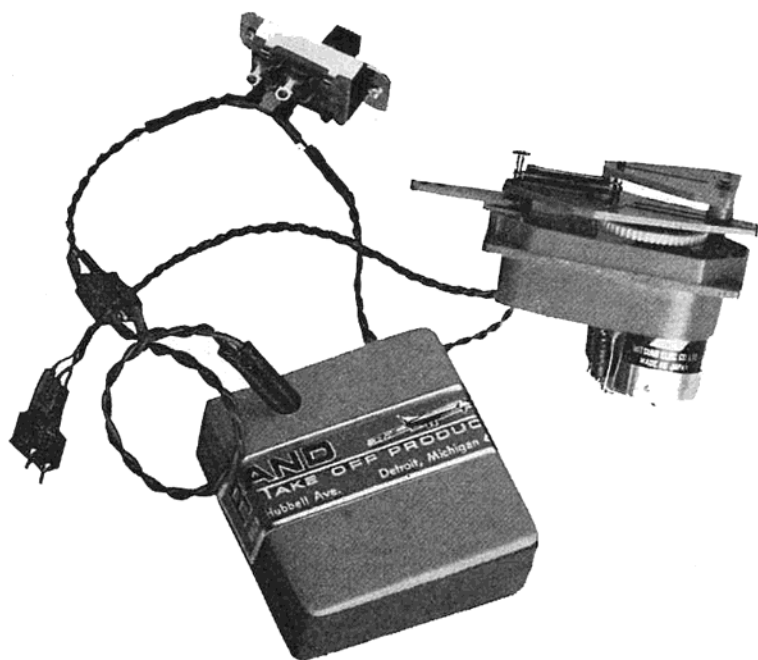
Like I said — by the time you read this, the trade show will be over. In fact, I was able to get to the MATS show and still make deadline. I'll let Doug and Don cover the general aspects of the show, but I took some shots of the items of most immediate interest to you and me as Sunday fliers.

First, in connection with galloping ghost, or pulse systems, Airtrol showed their new unit, weighing 11 ounces, which gives simultaneous rudder (and coupled ailerons if desired), elevator, and motor control. It uses pulse width, pulse rate for rudder and elevator, but instead of stopping the pulses to get motor control, they figured a way to let the pulses keep right on going, and, by changing the tone which is transmitted, they operate the motor servo unit. Surface movement is very small — barely noticeable except when up elevator (slow pulse rate) is used.

The whole system (transmitter, receiver, decoder, servos, and batteries), must be matched. Therefore it will only be

Airtrol's Digipulse—.049 to .35. \$164.00. M.A.T.S. Display unit pictured.





ELECTRONIC SWITCHING FOR

Galloping Ghost

The introduction of the Rand actuator was a major factor in the new image of simple proportional. Now, the man behind the product goes a step beyond . . .

By Herb Abrams

EVER since starting in R/C and working with galloping ghost, I have been searching for a way to eliminate the need for the relay in the receiver and to eliminate the troublesome requirements for as many as seven cells in the battery complement. Judging from the number of modelers who have written and called me about their problems, I realized that they had been searching for the same thing.

Last summer at the NATS, I met Don Fisher of Whitewater, Wisconsin, who was flying a pulse rudder ship with 4 cells and an electronic switch to eliminate the relay. Don had many good ideas that aimed in the direction we were going at RAND. He had been working with electronic switches for the past six years. We discussed the various forms of electronic switching circuits and outlined more possibilities than one could imagine. Out of this we decided to develop an electronic switching circuit to meet three requirements:

1. It had to utilize only three cells and therefore two wires and a single-pole, single-throw switch to complete the harness.
2. The circuit had to be compatible with any $2\frac{1}{2}$ to $3\frac{1}{2}$ volt receiver and operate with or without the relay.
3. The circuit had to be quiet enough electrically to utilize the common battery supply for actuator and receiver.

Don and I felt these requirements would yield the lightest and most reliable system and still be economically feasible. The cost of the electronic switching circuit would be offset by the cost of the cells it would replace.

Let's look at the problems associated with the battery supply for galloping ghost. The main problem is R.F. noise from the actuator and relay being fed

back to the receiver detector, amplified and sent to the actuator again, causing a phenomenon called "oscillation" of the receiver. The result is a solid signal "on" type interference. To limit or eliminate the problem, we use two sets of batteries, one for the receiver to provide a "quiet" supply and one for the actuator. However, this solution is costly and heavier than we would like. The separate battery to the receiver presents other complications. If we use dry cells, we find them undependable. The state of their charge cannot be determined by testing with a voltmeter. To increase the reliability of the receiver power supply, they can be replaced with nickel cadmium batteries. In order to have sufficient voltage, three cells are generally used, providing 3.6 V to the receiver. To save cost and weight, 225 Ma cells generally are used. However, this presents another irritation to the modeler. Unless he builds a special charging circuit, he finds he cannot charge 225 Ma nickel cadmium cells in the same circuit or on the same charger with his 500 or 600 Ma cells used for the actuator. The most reliable and convenient system would be three cells of 600 Ma capacity used for both actuator and receiver. And that is just what RAND has in the GG PAK!

The problem with the relay is that it is the main source of the R.F. noise fed back to the receiver detector. This noise is generated at the relay contacts (1) by the arc produced when they interrupt a heavy current, (2) by the bouncing of the relay contacts when rapidly making and breaking and (3) by the vibration of the contacts caused by the airplane engine. It can be seen that much of the R.F. noise would be eliminated if the relay contacts carry only 8 Ma signal

current rather than the motor current which can be as much as 800 Ma. The GG PAK does just this when used with the relay. Therefore, reliability is improved to the extent that the relay contacts will not become pitted and dirty or create R.F. noise. However, the relay is still subject to vibration of the airplane. When using the GG PAK, the relay can be removed, thereby eliminating all of the problems associated with relays. We feel this relayless GG circuitry will give the modeler the most reliable system.

When the relay is removed from a receiver, a resistor is needed in its place to properly load the receiver circuit. We have included this resistor in the GG PAK circuit so the modeler will be able to remove the relay and merely connect a wire to the relay connection on the receiver p.c. board as an input to the electronic switch. The output of relayless receivers on the market is connected directly to the input of the switching circuit. If the modeler elects to keep the relay, he connects the positive side of the battery to the relay armature and the input to the electronic switch to the normally open connection of the relay. This way, when the relay is energized, the electronic switch receives a positive pulse signal. The GG PAK is supplied with all wiring, switches and plugs. The modeler has but three wires from the receiver to solder to the plug.

Don Fisher did a great job of designing the electronic switching circuit. Its action can best be compared to that of a double-pole, double-throw switch or relay. It uses all silicon transistors for the best temperature stability. The transistors are the latest available with cur-

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ELECTRONIC SWITCHING

(Continued from Page 26)

rent ratings well above our requirements. The action of the actuator and total system in the GG PAK performs beyond our fondest dream. Test flying this package, I was able to do maneuvers like inverted flying with the GiGi plane.

As we worked with the three cell battery, we recognized an additional benefit which we exploited to the fullest. By matching the rated voltage of the actuator motor to the three cell voltage, we had the lowest drain and best action with the galloping ghost actuator. We knew that increased voltage would cause the actuator motor to run faster. The actuator action would be improved. In the past, when voltage above 2.4V was applied to the LR 3, there were two drawbacks. There was a proportional increase in the current drain and unwanted motor control with the stick in the extreme position. We solved these problems with the GG PAK. We have matched the electrical characteristics of the motor to the GG PAK to provide a lower current drain at 3.3 to 3.6V operating range. We are able to retain faster motor control and improved action of the actuator without penalty of increased current drain or unwanted motor control. The actuator in the GG PAK is the same as the LR 3, but with the case changed to make room for the electronic circuit. The motor is similar to the one in the LR 3 but wound for 3V and available only with the GG PAK.

Batteries have been selected after careful investigation. GE cylindrical cells are our choice. A comparison of discharge curves indicates the cylindrical cells with self-sealing vent construction have a flatter discharge curve. Cylindrical cells maintain a higher voltage for a longer time. The self-sealing vented cells are designed so that they are not easily damaged from excessive charging or discharging rates or times. Quoting from GE, these self-sealing batteries may be left on charge for several weeks with no damage to the cell. On the other hand, button cells are particularly sensitive to overcharging. GE states that if the self-sealing cell is caused to vent, it will reseal and operate satisfactorily afterwards. We arranged to have these vented cells spot-welded together and packaged to provide the most reliable battery pack possible. 600 Ma cells operate the GG PAK for approximately 1½ hours before the voltage per cell is below 1.1 volts. The three cylindrical cells are arranged in a flat pack ⅝" thick, 1⅞" wide and 2" long and weigh approximately 3 oz. The modeler will find it easy to install in his airplane. He can place the battery flat against a bulkhead, a safe place in a crash.

We test flew the GG PAK with our Old Faithful GiGi airplane, using Min-X, Controaire, and Citizen-Ship equipment. The airplane flew better than ever before because of the much lighter installation weight. Total installation weight of the GG PAK and receiver was approximately 6 oz. The GG PAK with its additional control provided more thrills. INVERTED FLYING! I even made a turn inverted. The throttle improved to the point where I was able to make touch and go landings using the throttle control any place in the landing pattern.

One of the lessons we learned during testing, that I would like to pass on to other modelers, is the effect of vibration on the actuator. We had been mounting the actuator solidly to a plywood plate, mounted solidly in the airplane. As vibration levels went up, problems of control became greater. The actuator in the GG PAK contains additional electronic circuitry and should be soft mounted as any proportional servo would be. I suggest that the actuator be mounted on a ⅜" plywood board which in turn is mounted with rubber grommets or foam strips to rails in the airplane.

The GG PAK will be a natural for the Midwest-RCM Air Race planes. These are recommended to anyone who wants a real challenge and plenty of fun!

KEN WILLARD

(Continued from Page 25)



Comparison of present Digimite transmitter, receiver and servo with new 11 oz. system.

sold as a system — no separate components. The price is \$164.00 — and that's pretty hard to beat. It has enough power to control planes with engines in the .19 to .40 power class, yet small and

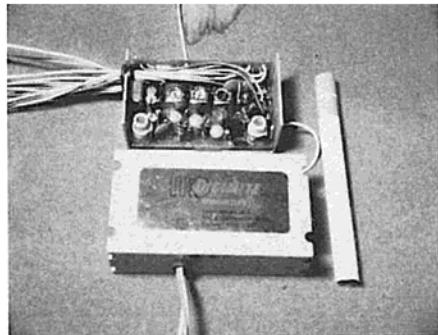
light for the .049 — .09, .10 enthusiasts.

The other item at the show, of great interest to everyone, was Howard Bonner's new Digimite 4. Listen to this — full digital proportional control — rudder, elevator, ailerons (not coupled), and motor, with all-up airborne weight at 12 ounces! Yet it provides the same thrust as the former 25 oz. system! This is a fantastic breakthrough!

The photos show the relative size of the new servos and receiver compared to the present system.

Think of the total impact on the modelers for a minute. First, it is obvious that now you will be able to fly small ½A jobs with digital proportional — a new market, really. Second, the guys with the big .61 powered jobs can put almost ¾ of a pound into additional structure strength at no increase in over-

Bonner's new Digimite receiver and servo compared with cigarette.



all weight. Third, when there's a clobber — and there will be — the light weight of the receiver and servos will cut the impact energy in half, and the damage will be less, so the repairs won't be so long or, hopefully, so costly.

It's a great breakthrough, and bound to affect all the other manufacturers. At press time the price had not been firmed up; "somewhere in the \$375-\$400 bracket" was mentioned. Availability — some time this summer.

So — pay your money and take your choice. \$164 for Airtrol, or, if you can afford the "high-priced spread," you can get the Digimite for around \$200-\$250 more. Actually, I don't see them as competitors — they fill the need for two separate markets. Both markets include the Sunday fliers, though, and that makes me very happy.

I'll lay odds that they'll make you happy too.

DESIGNING FOR PULSE PROPORTIONAL

The Properly Designed GALLOPING GHOST Ship Will Give You Maximum Performance. HERE'S HOW . . . AND WHY.

BY CHUCK CUNNINGHAM

WITH the advent of the small single channel proportional rigs, galloping ghost and pulse rudder, a re-awakening of interest in ships of this type has been sweeping the country for the past year. Several months ago I set out the rules covering a competition for this class, the Midwest RCM Air racers, and many new designs have been offered for these systems. The new Testor's pulse rudder, all-plastic ready-to-fly is only a forerunner of things to come. This rig, by the way, is really pretty slick, and is an ideal entry into R/C for the beginner, or for a son or daughter, or a wife. The point is, there are lots of slick ships that are perfect for this type control system and many fine small engines to provide the power. But, with all of these new gadgets, ready-to-fly models, and so on, a refresher course is needed for the old rudder-only flier, and a new lesson might be of some use to those of you new to this hobby. Last month we dug into trimming out a full house ship (should we call them "multis" anymore?) so for this month, let us go into the design of a small rudder-only ship and then see how it is modified for galloping ghost. Now, if only my badly damaged right index finger will stand up to the rigors of typing! (Damaged by a backfire from my slightly, loaded, and cold .61. Naw, Fearless, the engine was loaded!)

A small ship, unlike some of her larger relatives, flies on the wing, not on the engine power alone. (Dirty dig, I'll admit.) Since we must depend upon the wing for lift, as well as self neutralizing flight, we should be happy to contemplate the good old Clark Y section for an airfoil. Why stick with this old section when the symmetrical and semi-symmetrical airfoils are the thing in "multi"? Simply because this airfoil will fly the ship at a slight nose up attitude; will fly it slowly and safely; will land at a nice slow speed; will not drop out of the sky if slowed up too much in the glide; and will pull out of a spiral dive by itself. This last factor by the way is most important, since with a rudder

only ship, ya' simply "ain't got no elevator."

Let's look at the drawing of the basic aircraft. Notice that the nose is blunt, and strong, the wing sits on the fuselage at a positive angle, the engine is mounted with downthrust and sidethrust, and that the wing is rather short and stubby. Why?

First, the nose should be reasonably blunt to slow down the aircraft in a spiral dive, and strong because a rudder only ship often lands on her snoot when coming back to old mother earth (again, no elevator for a flared landing). The wing parks with its leading edge higher than its trailing edge because this positive incidence acts as an elevator (we'll find out how later). The engine is mounted with downthrust so that it will tend to counteract the extra lift generated by the positive setting of the wing, and is cocked off to the side to counteract the torque of the engine, which tends to turn the aircraft to the left. The wing is stubby because this is stronger than a long thin wing, and this type of aircraft has been known to cartwheel once in a while. With a short, strong wing the chance of damage is minimized.

We are talking about using a pulse rudder on this ship, so what kind of monkey shines will be going on at the South End of our ship while it is flying North? The rudder will be flapping away like crazy, that's what will be going on, and in flapping madly from side to side, will act just like an air brake. A very effective air brake, at that! If you want all-out performance, use a larger engine; if you want slow flight, use a $\frac{1}{8}$ A engine, but remember, with the nervous rudder a lot of power must be consumed to overcome this braking effect.

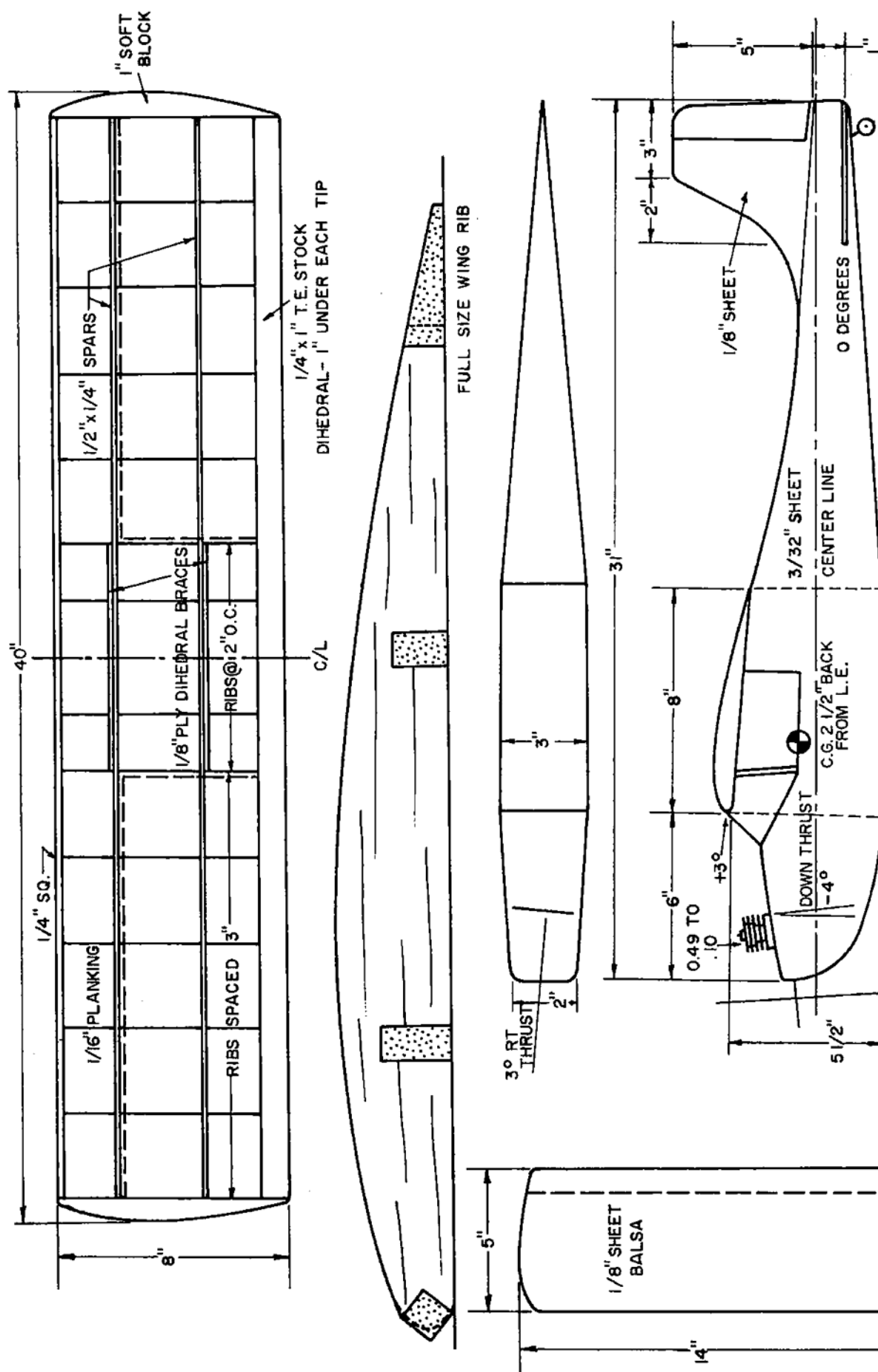
Most kit models that have been designed for use with escapements are highly suited to use in pulse rudder, with one modification. The moveable portion of the vertical stabilizer is generally too small. For an escapement operation a small rudder is desirable, since upon command, the rudder moves to one side

and stays there. With pulse, though, the rudder is swinging in an arc, and when you give a command for right or left rudder, the center of the arc simply shifts to that side. The total effect is to minimize the rudder control. This is overcome by simply increasing the size of the rudder. Usually, doubling its area is about right.

For the next step, let's assume that you have a completed ship, batteries charged, ready to fly. Let's take a theoretical flight and find out what kind of problems we run into in the first flights and what can be done to solve them.

Since this is a theoretical ship we will extend the theory even farther and assume that there are no warps, nor misaligned components. (Who ever heard of these?) Start the engine, turn on the switches, check the operation of the rudder, and pitch it! If it flies away from you with a gentle upward movement with no tendency to turn to left or the right, forget about reading the rest and just go on and fly! If it dives to the ground about fifty feet in front of you, you probably didn't heave it hard enough to build up flying speed, or it may be too heavy. Let's subscribe to the "harder heave" theory, start the engine again, and pitch it once more. Don't throw it with the nose up — just run along with the model held aloft in a flying attitude, and when it begins to feel light in your hand, push it forward with a gentle shove. Watch the climb out! If it turns either way, trim a little rudder into the transmitter until you have her flying straight away. Now, attempt a gentle turn and let the craft make a sweeping turn. Don't let the nose drop — if it does begin to fall, ease up on the rudder and let the turn widen out. Make the first flight with nothing but large sweeping turns. If the trim settings are correct it will not climb too rapidly. If, though, it does climb out too fast, reaches an attitude of stall, then falls off and roller coasters around the sky, then

(Continued on Page 30)



RADIAL MOUNT ENGINE
USE TATONE MOUNT

2" WHEELS

"RUMPUS" 1/2A TO .10 PULSE RUDDER OR G.G.
310 SQ. IN. WING AREA DESIGNED BY CHUCK CUNNINGHAM

CHUCK CUNNINGHAM

(Continued from Page 28)

you probably don't have enough down thrust, or you have too much positive incidence, or a combination of both. The best way to break up a roller coaster is to turn it at the bottom of the dip, let the excess speed be dissipated in the turn. When the engine cuts you can check for many of the trim settings that were impossible to determine with the little mill grinding away. In the glide, the ship should glide straight ahead at a reasonable sink rate. If it continues to porpoise, then you have too much incidence. Raise the trailing edge of the wing with a balsa shim. If the glide seems to be about right, then the roller coaster bit was caused by insufficient down thrust, so add some when the bird is on the ground again.

If, when gliding, the ship turned to the right, and when you had power flight it turned to the left, and you corrected this turn with a trim setting, then you need more right thrust. If, on the other hand, it flew to the left under power, and left in the glide then the rudder setting is at fault, so leave the trim setting alone. It is generally better to have more right thrust than you need than to have too much left thrust.

After you have gotten the feel of the ship you will want to try your hand at aerobatics. As we said earlier, the rudder is to get you into a spiral dive in order to build up speed, while the wing is to pull you out of the dive and let the lift pull you into a maneuver. Get plenty of altitude and then give it a hard right rudder. If your transmitter is equipped with on and off buttons, use these and give the rudder a hard turn to the right. Let the ship spiral down about two turns, then let off and give just a little left stick. The speed of the spiral should bring her up and over in a loop. If you want to roll, at the bottom of the spiral, let up on the hard turn, let the upward zoom begin and then give a hard rudder again. With practice you can roll round and round the field with the initial speed build up. Just let the nose come up, give a hard rudder, then let up and watch the nose again.

Spins are accomplished by letting the ship climb up, then giving a hard rudder when she is just on the edge of a stall. With a good amount of power this is hard to do, but with smaller engines it is easy. The main thing to remember when flying a rudder only ship is to keep flying at a reasonable altitude, do your stunts up high, and always fly upwind. There is nothing worse than to try and bring a rudder only ship back upwind once it has gotten downwind. Keep upwind and keep your ship!

The logical solution to many of the problems encountered in the rudder only ship are solved by the addition of an elevator, a-la galloping ghost. With an

elevator many things are possible, and lots more fun is yours for the taking. Wherein the rudder only ship relied upon the wing to provide an elevating means we now have a nifty little elevator to do the work, and in case we wander off downwind on a breezy day, we only have to trim in a little down elevator to penetrate the wind conditions and have our ship come right back to us.

The design of a galloping ghost aircraft differs from the rudder only just slightly, but this difference is of great value. The main point of difference is in the amount of incidence required. For the rudder only ship we needed about three degrees, but in our G.G. ship we can get by with one degree very nicely. Downthrust may be reduced slightly, but chances are, will remain the same.

With our G.G. ship we can do many of the aerobatics that the larger ships can do, and if we realize our limits we can have a complete ball. I've heard it said that it is impossible to make pylon turns with a galloping ghost ship, but those who made these profound statements had not seen a good G.G. ship fly. With the proper ship a beautiful pylon turn can be made and it is hard to tell from a Goodyear racer.

The elevator on the G.G. is most important. The flipper need not be very large to be very effective. A width of $\frac{3}{4}$ of an inch is usually just about right. The elevator movement should be limited to about $\frac{1}{8}$ " down and about $\frac{1}{4}$ " up. This will vary on the individual aircraft, but if you keep this movement to a minimum you will keep the brake effect of this surface to a minimum also, and yet retain a good amount of control over the craft. The proper amount of throw can be best determined in flight. If your ship stalls out when given an up elevator, then chances are that you have too much elevator, and/or too much surface movement. A well trimmed ship will fly at neutral with the elevator at neutral (and trim setting in the middle), and will go into a shallow dive with trim all the way to the down position. Up trim should provide a gentle climb out, while full up-stick should give you a nice round loop if your engine is large enough to pull the model through this maneuver. If it will not, then dive a bit to build up speed and then pull up into a loop.

Keep in mind when landing that your elevator is sensitive and must be used in moderation; don't flare too much, but rather, let her come on down and just ease back on the stick slightly to let the wheels touch.

In general, it is easier to trim out a simple ship such as we have been discussing than to trim out a full house craft, primarily since we are not nearly so critical of the little ship as we are of her big sister. If it flies, we are happy,

and this is the root of the fun. With a minimum of time and effort we can own a ship that will give us hours of pleasure. For the beginner to the hobby there are many, many lessons we have touched on here, but others are: to fly away from the sun, make sure that your batteries are fresh, or freshly charged, that your trim settings are the same as the last flight (in other words, the kids haven't been messing around with 'em), vibration and electrical noise have been held to a low level, and that your aircraft is stressed for the loads that you are going to induce into it. Most ships will take the additional load of a little larger engine, and more batteries, but if you are in doubt, beef up the center section of the wing; it can't hurt, and sure could help. Our old flying partner, Dan'l Carey, has a complete six channel rig resting at the bottom of Lake Benbrook due to a folded wing! It can happen, and when it does, it hoits!

Pulse rudder and galloping ghost are winning new friends for this sport by the hundreds. I only hope that those new to the game will take words of advice from the old hands around your flying field, and that the main rule to have better and better flying is to remember that there may be more than just yourself on your frequency. Take the time to check around and see just what is going on. Don't turn on unless the air is clear!





The Midwest-RCM Air Races was the first major competition event designed especially for pulse proportional. Join the Goodyear races with the . . .

THE CASE FOR THE COMPACT RACER

THOSE of you who are regular readers will recall the "Getting Started in R/C" article in December RCM. This step by step program introduced you to the Whiz Kid and the Cessna 150, both of which utilized the Midwest molded foam wing. By now you should be semi-pros at guiding the tame ones and are, no doubt, itching to move onward and upward in R/C with something that offers more challenge and more fun. If so, hang on for the Hoosier Hotshot.

There is scarcely a modeler alive who has not been moved by the sleek lines and frisky performance of a Goodyear racer. Yet for many of us, the fun of building and flying in a simple competition event has been little more than a dream for a variety of reasons. Certainly lack of time, skill and money are among the foremost. The "Hoosier Hotshot" is the first of three simple solutions to your problems. Designed around the readily available .049 size engines and using the molded foam Midwest wing, this mover is easy to build and a cinch to fly with a choice of tame and hot configurations. With the growing variety of single channel equipment to choose from—a multitude of mortgage free versions await you.

HOTSHOT

The .049 class Goodyear racer is a logical outgrowth of the interest created by the return of full scale racing throughout the country and the .40 engine sized R/C versions which have created coast to coast interest in recent years. The latter have provided a much needed shot in the arm to a somewhat jaded and pattern-weary sport, but of late have been the subject of criticism. Some of it seems justified. The author was one of many who witnessed the Goodyear exhibition races at the Chicago NATS last summer. As the guided missiles rounded the pylons at a variety of attitudes and altitudes (causing more than one flag man to hit the dirt) and then leveled out to hit speeds in the neighborhood of 100 mph plus on the straight-away, the strong personal re-

actions was to run for cover. Before the Friday night session was over—several expensive and beautifully finished models' remains were scattered around the area. To this "chicken" racing fan it did not add up to "fun" flying.

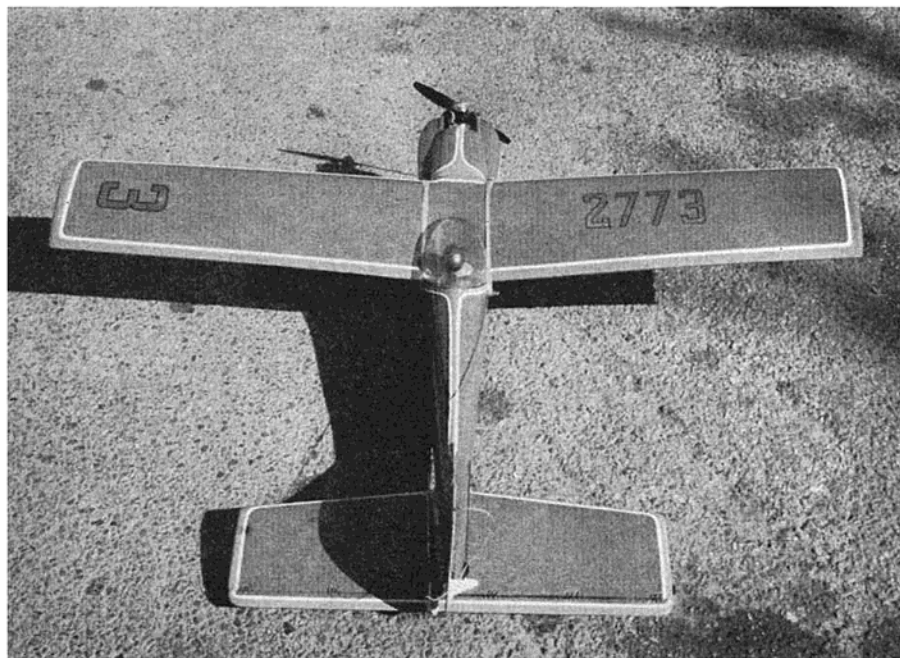
It is not the intent here to deny anyone their form of fun, but rather to extend the definition to include more of us "jus' plain folks." To each his own—live and let live and all that.

The Hotshot and his brothers would not have been born but for the gentle urging of Frank Garcher who whiled

away many an hour of AT&T time with ye olde editore Donne in deepe discussions regarding small Goodyears. Big Frank confronted this designer with the problem over a cup of coffee one windy Wednesday last June. Demonstration flights of the Whiz Kid and Cessna 150 had been successful and the talk turned to .049 Goodyears. The situation was outlined and a decision made to utilize a cut down version of the regular 44" foam wing. On the trip back to Madison with Frank Adams, the basic ideas began to shape up through a prolonged dialogue.

HOOSIER HOT-SHOT

by Owen Kampen



The following day rough drawings were sketched out—some calculated hunches based on several months of foam wing flying resulted in what seemed like a reasonable force arrangement and the balsa began to fly. The Hotshot was completed by Monday—test flown by Adams and ye timid author on Wednesday and placed in Garcher's hands—at dusk the following day. His whoops of joy could be heard as far away as Chicago and before the day was over a decision was made to kit the Hotshot. While this must establish some sort of record it is basically a confirmation of an old saying (which I just made up) to the effect that given wings, tail, motor and a framework to hold them together—something is bound to happen!

Be that as it may—some interesting facts were beginning to appear. First, on an .049 Golden Bee engine, the Hotshot wasn't hot. Responsive—but not hot. Second—the clipped wing and the 26 oz. plane had a power off glide that defied the rules—it just slowed down and eased in like a bird. On short grass, the wheel landings were a joy. The whole job was a novice's delight. One small question remained, like would it go like a racer? A $\frac{3}{4}$ oz. tank and a Cox T.D. solved that in a hurry.

All flights in 1966 were made using an Adams twin actuator on rudder only, giving response immediate and solid with fine proportional action. Rolls were something to see, and in the turns, the Hotshot responded to a little top rudder by grooving without diving. Holding full rudder resulted in a fast steep spiral dive which built up speed in a hurry. This was converted into many exciting premeditated and unpremeditated maneuvers. Fearless leader has installed an Airtrol system in his beautiful version and reports being most pleased with the results. A Tomoser GGI-S has since been acquired but current winter weather in Wisconsin has prevented testing. Also to be considered is the Rand and World Engines GG units. The only caution is to go easy on batteries to keep weight in the 26-28 oz. range for best performance.

No actual racing was attempted by the author, though 2 planes have been flown to gain some experience in togetherness. Reliable authority has it that some two dozen Hotshots are being flown by a group in Texas and that enthusiasm is running high.

All indications point to this becoming the year of the "compact racer." Why not jump on the bandwagon before it's too late—you wouldn't want to be the last on your block—now would you?

WING STAB

The Midwest molded wing and stab can be used as they come from the box, though some surface treatment of the foam is recommended. Perhaps the

easiest is the application of contact shelving paper available in a wide variety of colors. It's a good idea to seal around the edges using plastic tape to prevent loosening.

Another method involves a couple of coats of thinned down white glue—then silkspan and a couple more coats of glue. **WARNING—airplane glues and dopes dissolve foam!** Some spray enamels also contain damaging solvents so test first. The author has found the use of artists' acrylic polymer colors work quite well. In any event, watch the weight build up.

The wing should be cut down to 36"-38" using a sharp knife, coping saw or what have you. Both squared tips and those tapered up from the bottom have been used with little apparent advantage either way. The experimenters might try adding vortex tips a la Phil Kraft's Nats winner, Nov., RCM. It's my belief that there is more at stake here than is generally acknowledged. The stab, too, can be shortened by as much as 1" on each tip with no danger and somewhat faster performance. It's your option. If the foam should break—repair with Hobby Pox, no ribs and spars to untangle here.

Before starting, decide on which engine will be used as an internal tank installation is necessary for the Cox T.D. Midwest aluminum motor mounts bolt directly to the firewall eliminating hardwood bearers. A side mounted engine version should be given consideration as it permits a lower tank installation and somewhat cleaner lines. The Cox .049 Golden Bee is recommended for the novice primarily interested in sport flying.

FUSELAGE CONSTRUCTION

1. Place doublers carefully in position on the inside of each fuse. Side and mark with a ballpoint pen. Glue in place using contact cement such as Weldwood. **Be sure you have a left and a right side.**
2. Place right side over plan side view and mark location of formers F1-F2+F3. Glue F1 and F2 in place on right side.
3. Glue $\frac{1}{8}$ " sht. braces on fuse top and bottom between F1 and F2 and add $\frac{1}{8}$ " sq. strip along rear fuse bottom.
4. Glue two sides together at F1 and F2—keep square while drying. Add $\frac{1}{8}$ " sht. braces and $\frac{1}{8}$ " sq. strip to inside of left side.
5. Glue and clamp rudder post in position making sure post is vertical and sides bent equally. When dry, glue F3 in position.
6. Drill the $\frac{1}{8}$ " ply motor mount for $\frac{3}{16}$ " blind nuts for a Golden Bee or for the Midwest $\frac{1}{2}$ "A motor mounts if a Cox .049 TD is to be used. Epoxy in place.

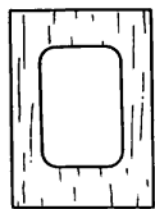
7. Glue bottom and side nose blocks in place and carve to shape.
8. Glue rear fuse top deck sides in place.
9. Add fin making sure it is aligned **straight**. Do not attach rudder yet!
10. Glue and bind tail skid in place and then add stab saddle.
11. Line nose with $\frac{1}{2}$ " foam—install tank if T.D. is used. Glue on nose top block, carve and sand to shape. Carve soft block cheeks if desired and glue in place. Add wing and stab dowels.
12. Install R/C actuator and push rod or rods of $\frac{1}{8}$ " sq. spruce. Finish sheeting fuse bottom. Add oil scoop.
13. Put waxed paper between fuse and wing and rubber band wing in place. Use Epoxy or white glue to fix the canopy former and the carved front block to wing, sand to smooth fit with the rest of the fuselage.
14. With cut down canopy in place, trace around base where it rests on the wing. Remove canopy and paint cockpit interior with flat black enamel (not dope). Epoxy canopy in place.
15. 2 coats clear dope plus 2 of color followed by 2 clear. Then stitch rudder in place and connect push rod using a Du Bro "quick link." Use a nylon rudder horn if flying superhet radio—to eliminate noise.

FLYING

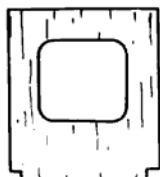
1. Make sure the plane balances as shown with batteries and receiver installed. Keep C.G. forward for racing.
2. The glide should be flat and quite fast—shim the stab if necessary to achieve this.
3. Launch **fast** and straight out or in a **slight** climb.
4. As this model is very responsive to rudder, give small control signals until you are familiar with the plane. The nose will drop quite fast if rudder is held too long.
5. Pylon turns should be made while nose is up. Establish the degree of bank desired then back off and hold a little top rudder to maintain altitude. When using rudder only, **pulse proportional is recommended**.
6. Model slows up considerably when engine quits and glide is surprisingly flat and smooth.

When using galloping ghost systems for added elevator control a Cox .049TD is recommended to compensate for the increased drag inherent in these systems. Make minor control corrections until familiar with plane and system.





FORMER F-1 1/8" Balsa



FORMER F-2 1/8" Balsa



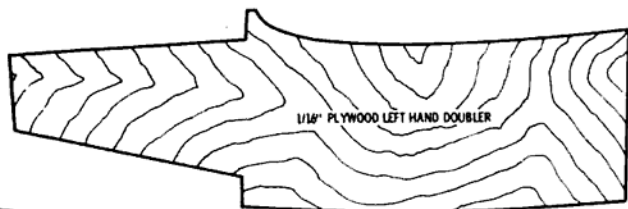
FORMER F-4 1/8" Balsa



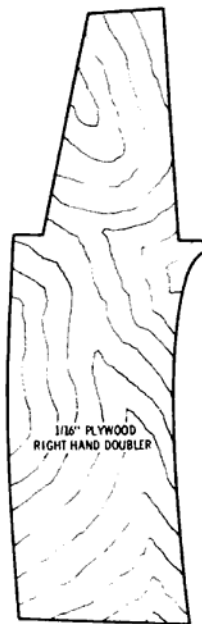
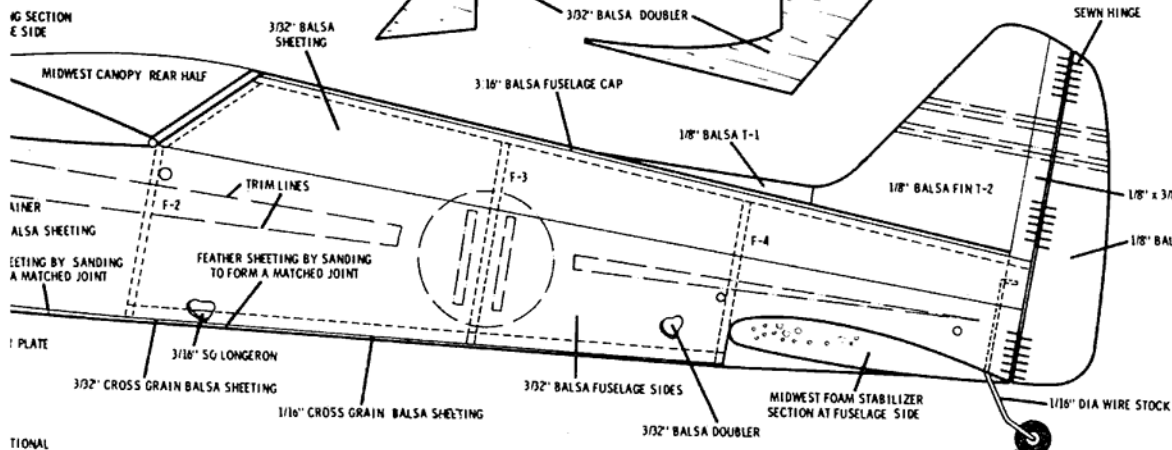
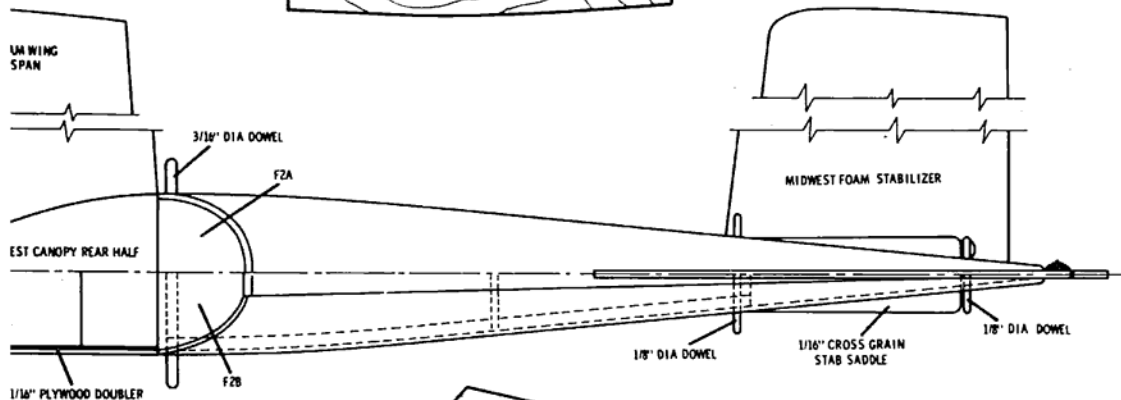
FORMER F-3 1/8" Balsa



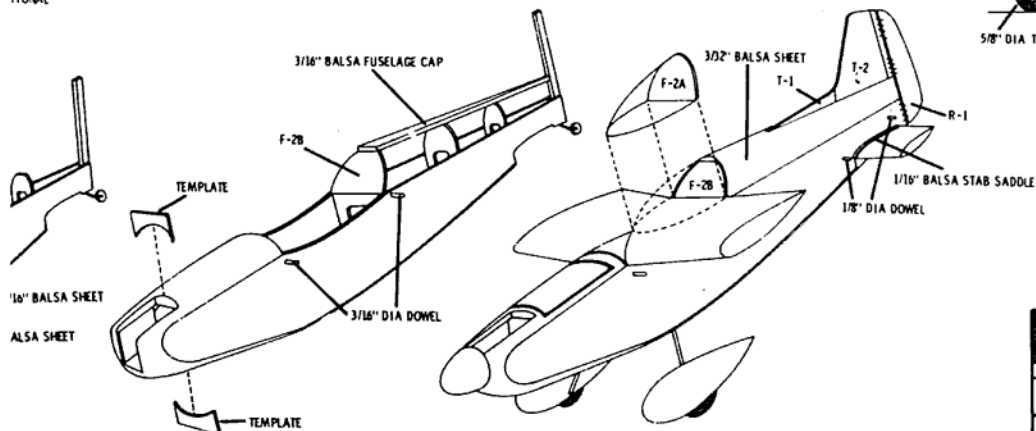
1/8" Balsa RUDDER R-1



1/16" PLYWOOD LEFT HAND DOUBLER



1/16" PLYWOOD RIGHT HAND DOUBLER



1/16" PLY L.G. RETAIN



1/16" PLY L.G. RETAIN

SPAN 36" LENGTH 30"
ENGINES .049 .09

ORIGINAL DESIGN BY OWEN KAMPEN
REVIEWED & APPROVED BY FRANK GARCHER

RADIO CONTROL modeler		HOOSIER HOT SHOT	
REDESIGN & DRAWN BY	DAVE FLOYD	INKED BY	G. FLORES



AIRTROL'S DIGIPULSE

Pulse Proportional With
Built-in Sophistication . . .

RCM PRODUCT REPORT by
Doug Tucker

ONE of the most interesting developments in the single channel proportional field is the new REM-1 system from Airtrol, 1001 Railroad Avenue, Adrian, Michigan 49221. Although basically a pulse system, the REM-1 Digipulse eliminates a great many of the less desirable features of the single actuator pulse proportional system. The servos are independent units, one each for rudder, elevator, and throttle, and have more power due to a higher gearing ratio of 236 to 1. The common "flutter" of simple pulse systems is almost completely eliminated. Response time is exceptionally fast due to the transistorized switching used. The only disadvantage we can see is the use of Micro Mo motors, which occasionally have a tendency to slip their internal gear shafts. These units were used, however, due to their small size, thus keeping this new unit to an overall minimum in both weight and physical size.

One of the major features of the REM-1 Digipulse is the fact that all control functions are simultaneous — including motor control! The fact that

the throttle can be operated simultaneously with the rudder and elevator is due to the new decoder circuit which utilizes the standard rate and width for the rudder and elevator, but adds a tone control for the throttle function. The motor control buttons control the tone of the transmitted pulse and this, in turn controls the throttle function.

The decoder is a separate unit from the receiver and is completely transistorized with 18 transistors and 1 diode. The receiver is a relay type Controaire SH-100, single channel superhet. The relay, however, does not switch heavy current so that there is no tendency to arc or burn the contacts. The receiver is wired to send its tone signal to the decoder to be used for motor control. The decoder, itself, draws no current and has no cut-off voltage, so that the decoder and servos will continue to operate as long as there is any life at all left in the battery pack.

As the batteries go down in voltage, the servos lose power. At approximately 2.5V they only move enough to get you back on the ground, if you happen to be

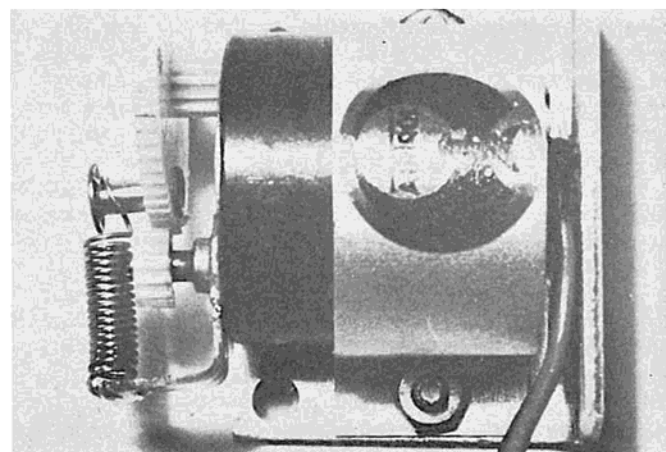
flying at the time. Normal operating voltage is 5V center tapped for servos. The REM-1 system will operate approximately two hours on the 500 mah nickel cadmium pack supplied with the system. This is rated at a continuous operation. Two alkaline energizers are supplied in the battery pack for the receiver supply.

The transmitter utilizes a standard 9V dry cell battery. Its output is approximately 150 MW. Modulation is 85%. Tone range is from 300-600 CPS. Both the transmitter and the pulser are completely transistorized.

The original prototype of the REM-1 Digipulse had a considerable number of flights to its credit when we received it at RCM. The system, which weighs a total of 11 ounces complete, had been successfully flown in both a .40 powered P-Shooter by deBolt as well as a Lil Tri-Squire by Midwest.

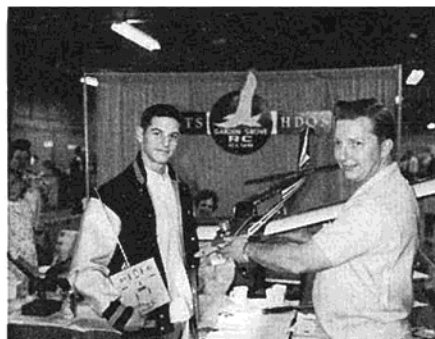
Our overall impression of the original prototype is that it will definitely be a step forward in single channel pulse equipment, offering the modeler a powerful, reliable, and lightweight proportional system for under \$200.

Airtrol's REM-1 Digipulse servo. Extremely small and powerful. Rudder, elevator, and motor.





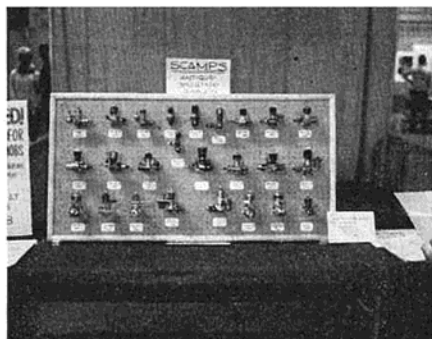
Garden Grove R/C Club headquarters booth.



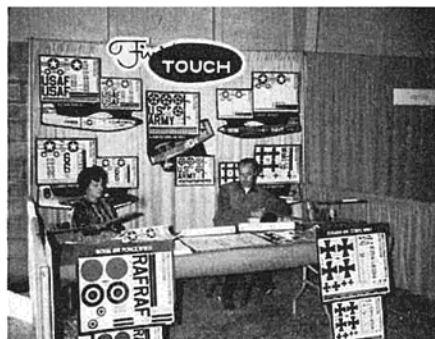
Fred Briggs, winner of drawing — VK Cherokee.



Pre-M.A.T.S. dinner for exhibitors.



An unusual exhibit — antique engine display.



New products were unveiled — Finishing Touch Decals.



A display of models in the exhibit hall.

2ND ANNUAL MODEL AIRPLANE TRADE SHOW

**Record 2000 attend Garden Grove R/C Clubhosted M.A.T.S.
New products for 1967 highlight Southern California spectacular.**

THE Second Annual Model Airplane Trade Show, held at Orange County Fairgrounds, Costa Mesa, California, closed its doors at seven p.m., Sunday, January 8, 1967, after a highly successful two day run.

The show, planned and organized by the Garden Grove Radio Control Club Incorporated, hosted thirty-five of the top manufacturers in the world of plane and boat kits, accessories and radio control equipment. Exhibitors traveled from as far afield as Chicago and New York to display their 1967 line of merchandise. Fifteen of the exhibitors in fact were from out of state.

A total paid attendance of 1723 coupled with an estimated 300 free admissions, consisting of club members and their families, Boy Scout and Indian Guide troops, etc., brought the total number of show visitors to just over the two thousand mark.

In addition to manufacturers' displays, the show boasted a colorful display of some sixty-five model planes spanning the years of model aviation from 1938 to present. All types of air-

craft were represented from jet powered control line planes to antiques — from finely detailed scale craft to huge seaplanes and from multi-engined airliners to sleek deltas. The display created great attention from both modeling and non-modeling visitor alike.

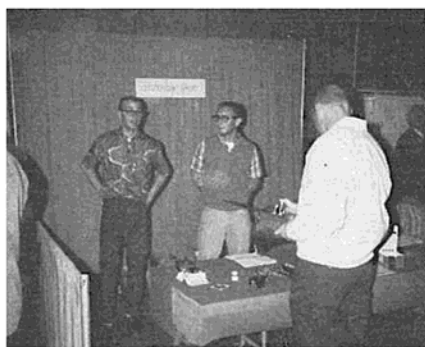
Outside the exhibit building a continuous air show provided thrills for an ever present, large crowd of spectators. Fine demonstrations of fast and slow combat and precision stunt flying at the control line circle was greeted by enthusiastic applause. R/C flying also received its share of the limelight as fans turned their eyes skyward to watch as local flyers put their ships through every maneuver in the book. Modeldom's air aces Cliff Weirick, Doug Spreng and Phil Kraft vacated their exhibits in the show at regularly scheduled intervals to further enhance flying activities with demonstrations of their superb skills. The air show, literally blown out on Saturday by high winds was a distinct highlight of the week end activities.

Another successful part of the show which the Garden Grove Club plans to

incorporate in future shows was a raffle. This year the grand prize was a completely built, ready to fly VK Cherokee outfitted with a Super Tigre .51 and a Kraft KP6 proportional radio. The drawing for the plane was held at 3:30 PM on Sunday and was won by Fred Briggs, a newcomer to R/C flying and a recently joined junior member of GGRCC!

Orange County Fairgrounds has already been tagged as the site for the 1968 M.A.T.S. and plans are already underway to make this show the biggest of its kind in the country. Manufacturers, distributors, dealers and clubs interested in participating in or receiving more information about the 1968 Model Airplane Trade Show are invited to write to M.A.T.S., P. O. Box 127, Midway City, California.

R/C Modeler Magazine extends its sincere congratulations to the Garden Grove R/C Club, Inc., for a job exceptionally well done, and for setting a trade show precedent that will not only be hard to top, but will be a "must" in 1968 and the years to come.



Citizen-Ship Radio display.



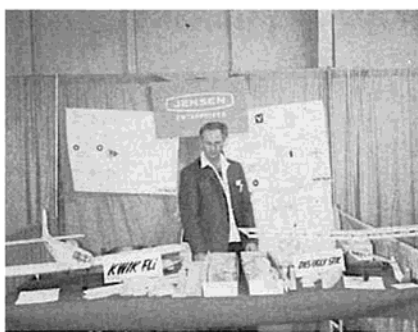
Top Flite with new kit and jig box.



Bonner introduces 11 oz. Digimite.



Tatone's accessory line.



Jim Jensen with kit line.



Steve Muck with RCM's ski boat.



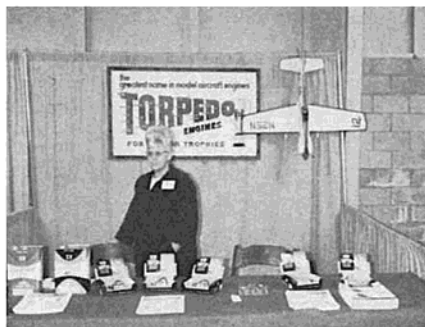
Stafford Models with new Chipmunk.



Dewey Broberg with DuBro line.



Hall Co.'s new line of G.G.



Beverly Wisniewski rep's for K & B.



Carl Goldberg and CG Models.



Jerry Krause of E.K. Products.



Jay Brandon of Dumas Boats.



Phil Kraft and Kraft Propo.



Lou Proctor and Antic.



Jerry Nelson and Orbit display.



Jack Doty with Foamcraft wings.



Norco Marine and Newporter.



Granger Williams and accessories.



Micro-Avionics new boating system.



Post M.A.T.S. confab at RCM office.



Cliff "Sweetheart" Weirick and P.C.S.



Bev Smith and wing jig.



Cal Hobby distributor display.



Cox engines and planes.



Willoughby Enterprises & friends.



Geri Tucker and RCM's booth.



Dave Gray and Airtrol exhibit.



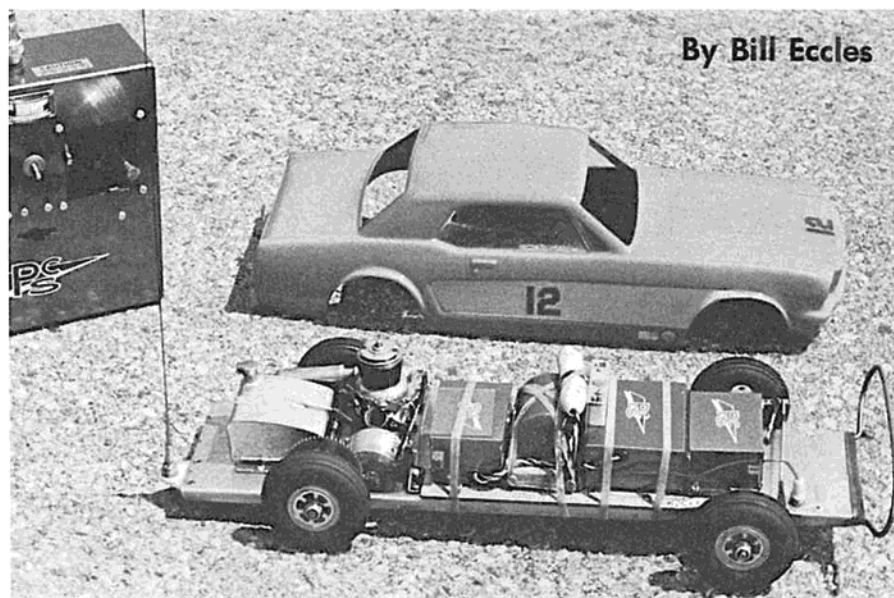
Summit meeting at RCM offices. Cleveland, Dewey, Schroder, Goldberg, and Broberg.



Frank Garcher, Bev Smith, Doug Tucker, and Dave Gray at RCM.



Bill Eccles and two R/C cars.



The R/C car with shell removed. Cox .15, PCS propo.

By Bill Eccles

R/C CAR RACING BECOMES REALITY!

**Smooth Acceleration, 0-35 mph Variable Speed Highlights
Proportional R/C Mustang With Clutch, Muffled .15**

SOPHISTICATED radio control car racing has become a reality!

After almost a year of development, two glow-engine R/C cars are now running in competition and have been demonstrated throughout California, including the recent Model Airplane Trade Show at Garden Grove, California. The completion of the project has been the result of continuous experimentation and development, the generous cooperation of Cliff Weirick of Proportional Control Systems, the spiritual boost of Don Dewey at RCM, and the forbearance of my wife.

Work was first started on a $\frac{1}{8}$ scale, although after considerable effort, and three cars later, it was decided to scale down to $\frac{1}{12}$. The most difficult problem was to design and construct an effective and compact centrifugal clutch that would engage to turn the engine to start it and then disengage so that the engine could idle, and then engage centrifugally

as the engine speed is increased. After much trial and error, this was accomplished.

The P.C.S. Digital System included two servos, receiver, and battery pack, all located on a $\frac{3}{32}$ " veneer pallet, the latter removable for service and cleaning. The forward servo is used only for steering while the rear servo is utilized for both brake and throttle.

The rear axle ratio is 12:56 with the 56 tooth gear as large as space and ground clearance will permit. Wheels are semi-pneumatic $\frac{2}{4}$ " Veco, which are well suited for traction and long wear.

The final selection of the engine was a Cox Medallion .15 with part of the throttle control used as a collector ring for exhaust and excess oil. The carburetor spray bar was reworked to give a better idle, while an adjustable stop was installed.

The chassis is formed of stainless

steel, although both brass and tempered aluminum were also used. Independent front suspension is used. Steering is rack and pinion.

Overall length is $16\frac{1}{2}$ "; height $4\frac{1}{2}$ "; width $6\frac{1}{4}$ "; all-up weight $3\frac{1}{2}$ pounds.

The body is formed from .060 butyrate-acetate vacuum formed over a plaster model. Speed is complete range, from idle to full open, giving any desired speed from 0-35 mph. Starting the engine is accomplished simply by rotating the rear wheel.

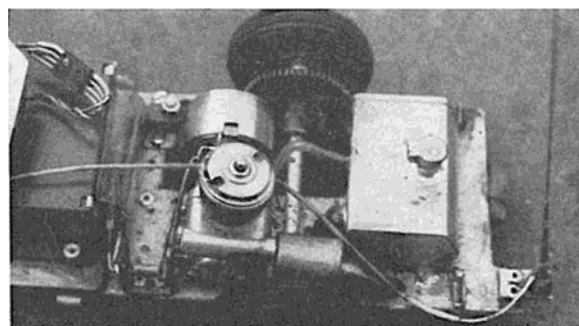
An exhaust deflector-muffler combination has been used and is sufficiently quiet to enable the car to be run indoors at low speeds.

And when you open it up for racing against 2 or 3 other cars — you have all the thrills of full-scale auto racing.

Give it a try — it's a whole new era in radio control!

Bill makes his own flexible fiberglass bodies. Unpainted shell displays installation.

Original clutch is secret of the car's fantastic performance.





What's it doing here? A hand-launch glider in an R/C mag, that is. Well...

HAVEN'T thrown a hand-launched glider in years? Too busy tinkering with that proportional system? Your youngsters think you've deserted them?

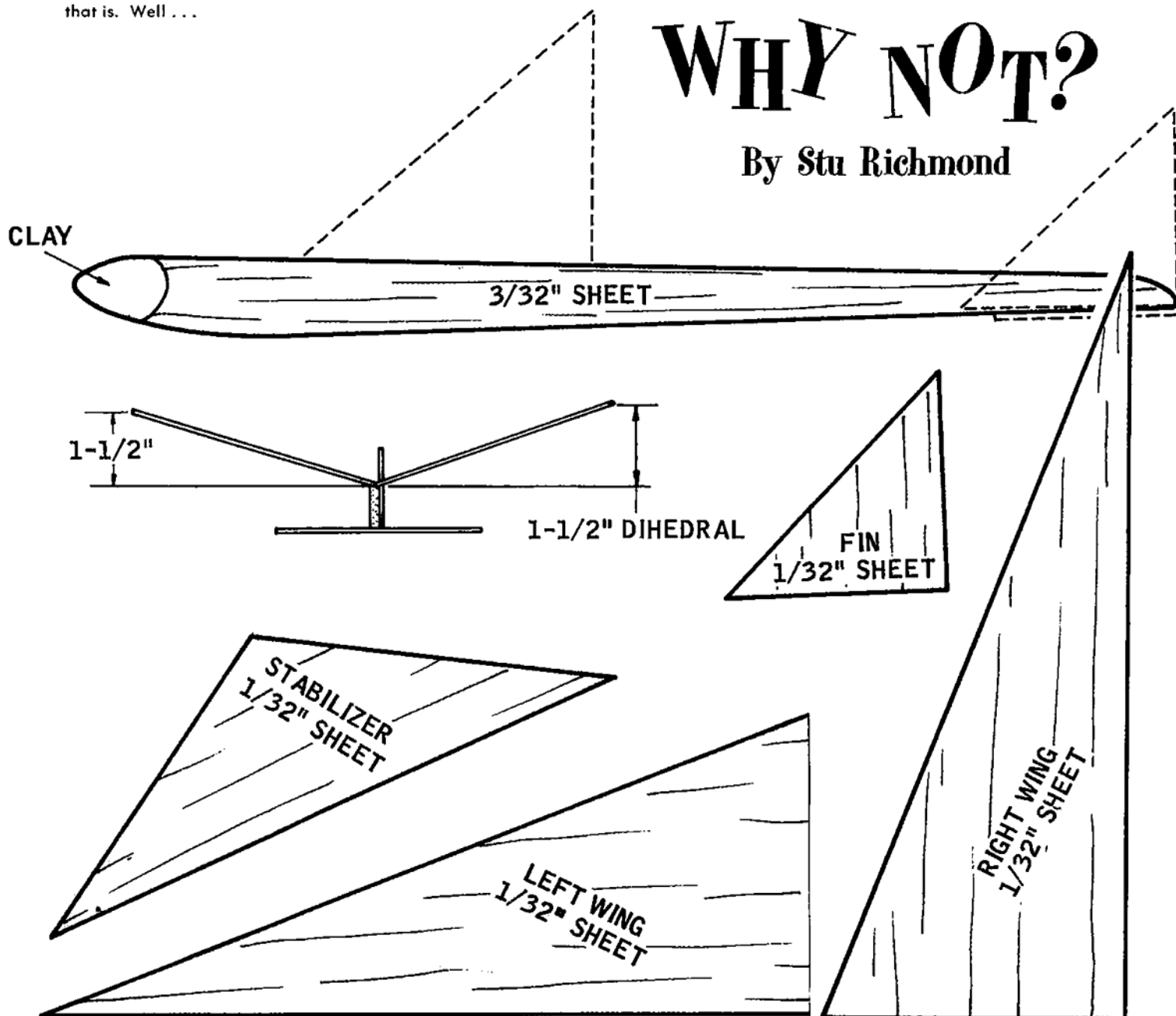
Why not break down and build half a dozen of those for your youngsters or the neighbors' children, so that they can learn what fun model airplanes can be.

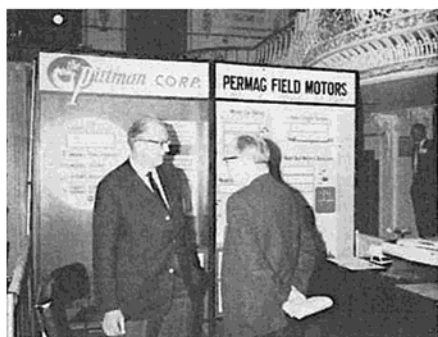
My three boys, 9, 7, 6 years old, are very much airplane oriented... probably because for years now I've taken time out to build little projects for them such as this. The oldest has done well this year in single channel R/C, but the two smaller ones are delighted with simple gliders like this one.

A wad of clay, 50c worth of balsa, and 30 minutes of building and an hour of drying time can produce six of these high flying, high strength gliders. So why not give the youngsters a break and get them started in the hobby we R/C men enjoy so much?

WHY NOT?

By Stu Richmond





Bob Kling at Pittman booth.



Sterling introduces PT-17.



Leonard Paul at X-Acto.

30th H.I.A.A. CONVENTION AND HOBBY TRADE SHOW

Despite the Worst Snowstorm in Chicago's History, the Hobby Industry Association of America Presented One of the Largest Trade Shows Ever Held. RCM's Doug Tucker Reports on the R/C Exhibitors.



MRC-Enya exhibit.



Testor's popular items.



Carl Goldberg of CG Models.



CitizenShip Radio display.



Big Frank from Midwest.



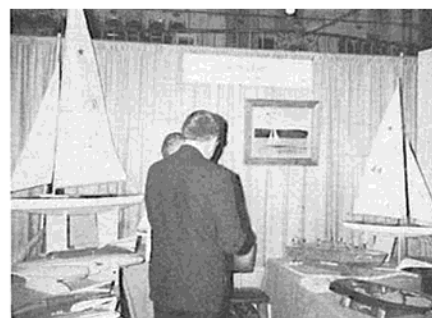
Ahm's popular booth.



Du-Bro's accessory line.



Sid Axelrod of Top-Flite.



Dumas Boat display.



Power & Sail crew discusses R/C boating at RCM Open House. L to R: Lee Spencer, Nemo Hobby Distributors; Doug Tucker, RCM Assistant Editor; Steve Muck; and Jim Whitlatch, RCM Boating Editor.

POWER & SAIL

BY JIM WHITLATCH, RCM BOATING EDITOR

THIS month we had the pleasure of attending the Model Airplane Trade Show, better known as M.A.T.S., held January 7-8 at the Orange County Fairgrounds. All we can say is it was a "darn good shew!" The big news, from our viewpoint at Power & Sail, was that the radio manufacturers are coming out with proportional sets for boaters! Orbit, Kraft, and Micro-Avionics were showing their new rigs for the first time. And, the prices are right!

I am currently installing the new Kraft 3-channel in my little ski boat so that I can give you a "user's test" report next month. The Orbit is a very small

two channel with extremely powerful servos. Micro's boat rig is unbelievable! The receiver, servos, battery pack, switch, and charging jack are already packaged in an aluminum water-tight box. The whole unit is then mounted in your boat on four large rubber shock grommets — just like you'd mount a single servo. I drooled over this unit so much that I can personally vouch for its being able to operate under water!

Norco, Dumas, and Octura were well represented at M.A.T.S. with display booths and boat movies — the latter featured by Octura. It was really quite encouraging to see how much interest

there was in R/C boats, and I don't mean just by the exhibitors! The public, who paid to get in, were asking the right kind of questions, such as "where can I buy it?"

Duke Fox was showing his new .60 and .74 engines. They look quite good for power boat usage, and feature double ball bearings, needle bearings on the bottom and top end of a steel con rod, throttle baffle in the exhaust stack casting (not an outside wiper type). Both of Fox's new mills use the same mounting and dimensions so that you can change from Class E to F in minutes using an engine swap in the same boat.

Top Flite's MonoKote display showed how to use their product to trim boats and make a truly professional looking finish in much easier fashion than the old method of repeated masking tape striping.

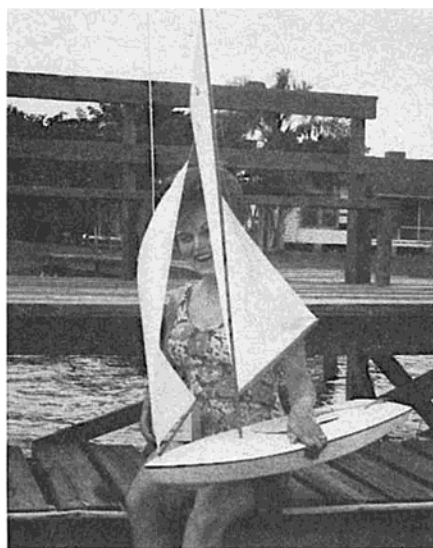
All in all, an excellent show — and a very bright future for the growing sport of R/C boating.

John Reynolds reported that nine skippers participated in the recent Tampa sailboat regatta, some of the entrants bringing several yachts, for a total of twelve in all. Races were conducted so that each skipper sailed three races against each of the other skippers. This called for nine heats, three to a race. The winner, with three firsts, was Bill Miller of Orlando, Florida, with an overweight baggy sailed 6 Meter. Lloyd Blanchard of St. Petersburg earned second place with two firsts and a second. His yacht is a sparkling home-built 6 Meter. Lloyd, by the way, is also an R/C flyer, and by his dual participation, sets a fine example for us all. Buddy Black of Tampa edged Cliff Hampson of St. Petersburg out of third place by winning the third and final heat. Buddy is an experienced yacht skipper and has been doing much of the design work on the new Reynolds 12 Meter.

The recent regatta was unique in several ways, and may well be a precedent-setter for other regattas around the country. Trophies were color photographs of the winning yachts in action.



Left: Micro-Avionics new propo boat system. Above: Beautiful Sportsman by Fibo Craft.



Left: Mazie Salerno holds Reynold's 36" Snipe. Kit contains pre-cut sails, lead bolt-on centerboard and wood for bulkheads and stand. Fiberglass deck and hull have to be cemented together. Right: New Dumas 30" Model Star sailing with single channel R/C gear.



These were framed in black with an engraved brass plate explaining the event. Also, after the serious racing was over, and while the judges computed points, a local power skipper demonstrated his hydroplane. This was good entertainment and an excellent way to build good will between skippers of both types of boats.

Even though a squall threatened, everyone put their sailing yacht in the water and tried to race in spite of frequency interference and crowded conditions. There were no casualties, but lots of "whooping and hollering." The Tampa group should be commended for an exceptionally good job of organizing and conducting the regatta.

According to John, affable proprietor of Reynolds Manufacturing Company, several other informal events have been held since then with the boats in dry dock since the holiday season. Watch for a big one coming up in May.

While we're on the subject of sailboats, Dumas Boats, Tucson, Arizona, has developed a smaller 30" model of their very successful Star racing sailboat. Designed for use with single or multi

channel radio control, or for free sailing, the new model will make its debut at the HIAA show in Chicago. Supplied with the same high quality die cut plywood frame, mahogany planking, and ready-made sails, the kit is truly deluxe. List price for the 30" Star sailboat kit is \$27.95.

The J. T. Goode Company, 894 W. 18th Street, Costa Mesa, California, manufacturers of precision instruments for full size ocean racing yachts, has announced two new digital proportional systems designed exclusively for sail and power boat operation! Produced under the name of Aquatronics, these new systems are sure to become a popular favorite with R/C boat enthusiasts. The transmitter is a powerful .6 watt unit with 100% modulation, and employs a 270 degree knob for steering. The sail version has two pushbuttons for in and out sheet, while the power version has a throttle lever in place of the pushbuttons. The coder is of all silicon transistor construction. The transmitter power supply is 12 volts and is not furnished. Instructions specify that the owner may use dry batteries, alkaline cells, or nickel cadmium cells, as he may prefer. A charging panel, charging jack and connector are furnished.

The receiver is a superheterodyne unit of single deck construction and weighs 5 ounces. Three microvolt sensitivity is specified with a 40 Ma idling current and 200 Ma under full load command. Perhaps the most noticeable feature, and certainly a first in this industry, is the

plug-in crystal in the receiver and transmitter. The manufacturer states that this has been accomplished so that the boater can plug in any desired 27 Mc frequency crystal on-the-spot with **no tuning required!** This will certainly be a plus feature in the popular multiple boat races, both power and sail!

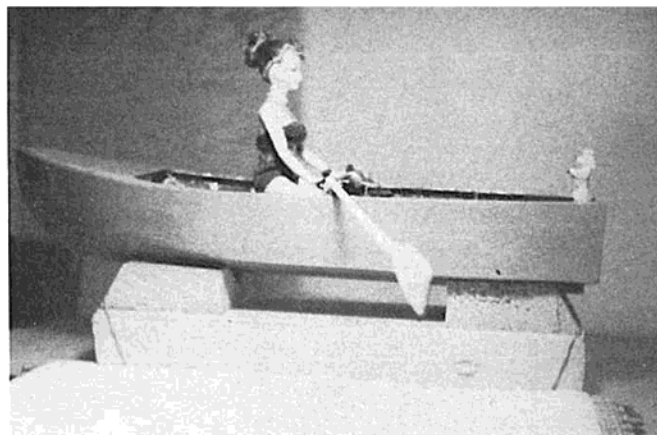
The receiver and servos use a 7.5 to 9.0 volt power supply, which again is not furnished, but can be made up from dry cells, alkaline energizers, or nickel cadmium cells. One interesting feature of the receiver-servo supply is that no center taps are required on the pack, evidencing some interesting circuitry in the design of the system. When using nickel cadmium cells, either 225 or 500 Mah, 4 to 8 hours of running time can be expected between charges.

The servos consist of two units — two proportional servos with disc, or wheel, output for the power boat version, and one such servo plus a sheet winch type output servo for the sail version. Servos are high power, high resolution digital type, with $\frac{1}{8}$ " throw.

Retailing at \$195 each, direct or

(Continued on Page 44)

Doll powered rowboat. Something different for the R/C'er who has everything!



PT Boat Flotilla by Leon Krisiloff of Bay Shore, N. J. PT-109 and PT-73 with Air Sea Rescue Boat, all by Fibo Craft.

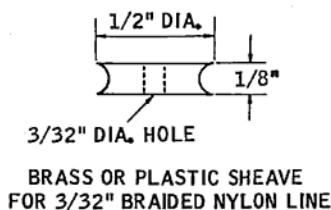
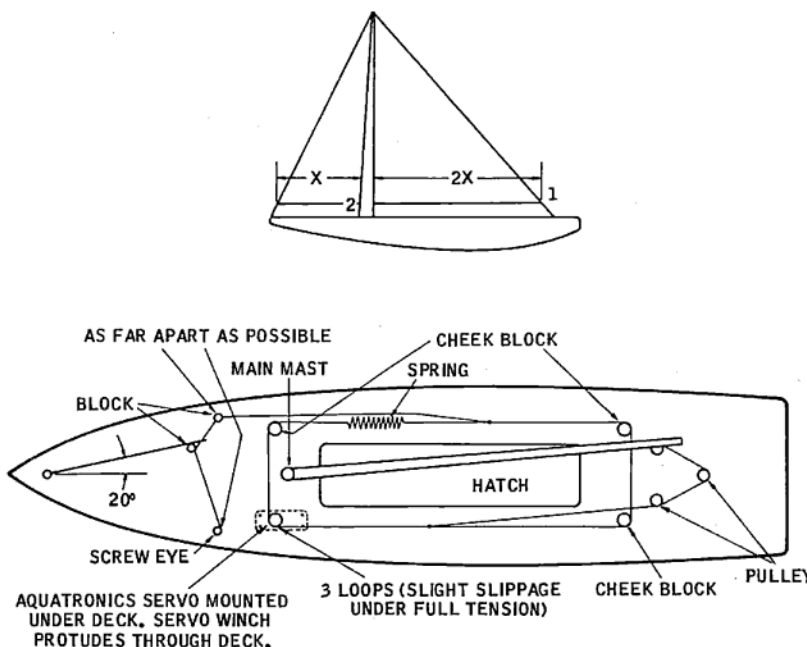
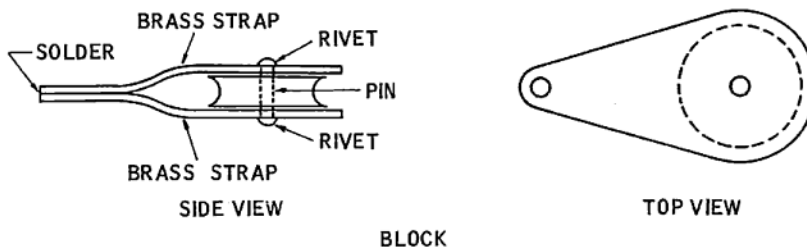
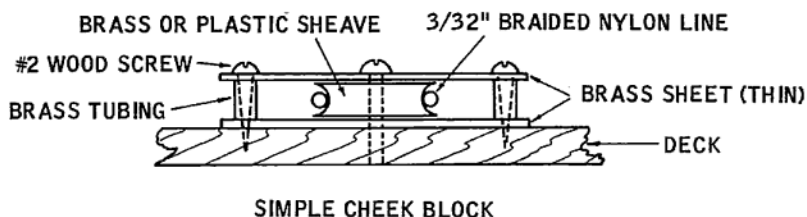
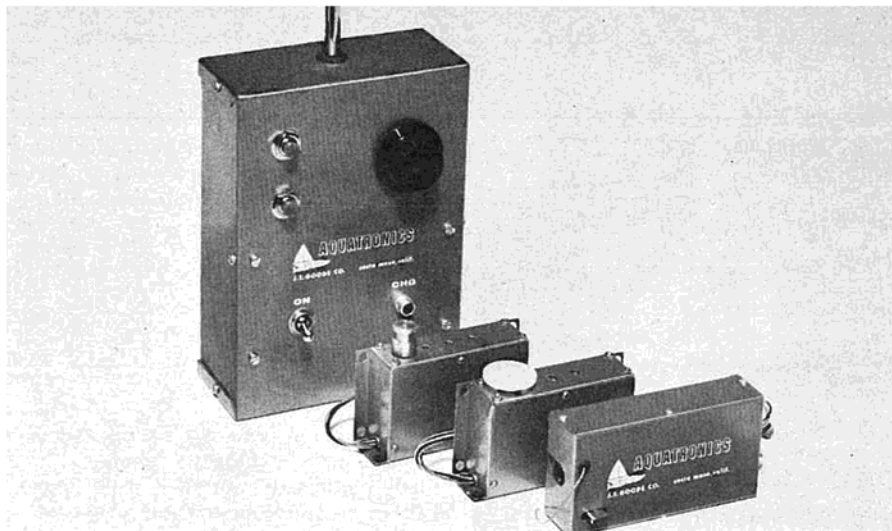


through your dealer, it would seem that Aquatronic's new digital systems will help fill a long-felt need in the R/C boating field. RCM is currently testing these units and will report on them fully in a forthcoming issue. We have included some sketches with this column on the method of installing and rigging the sailboat unit.

The photograph of Mel Harris's (Santa Rosa, California) latest model, "Miss," won't set up a two or three foot roostertail like the 60 powered hydros, but she does draw quite an audience when taken to the lake. Particularly, when you note the "cleavage." The model is 20" long and 7 1/4" wide at the oar locks, and is constructed primarily of 1/16" balsa. Oars are removable for transporting and are held in the locks, when in operation, by small pins. Power is a Bonner servo motor geared down so she makes around 30 strokes per minute. The doll's hands are held to the oar mechanism by small screw eyes screwed under the hand. The servo is a two-position single channel, self-neutralizing Citizen-Ship unit. The section of the rowing mechanism where the oars are connected consists of two spring-loaded crown gears operating so that when a signal is given, either oar may be stopped for steering. This system was worked out, after the original model with a rudder was very ineffective in dead calm water. R/C equipment consists of a single channel Min-X relay receiver tucked under the small front deck with an on-off switch mounted on the forward seat. The latter also serves to hold the receiver forward. The model operates on 6-500 mah nickel cadmium cells which are visible behind the servo.

According to Mel, the most difficult part of the construction, after designing and making the rowing mechanism, was getting the doll loose enough in the joints to enable her to bend with no binding or extra drag. She's no speed demon, but looks very realistic when operating!

Aquatronic's new \$195.00 system for power or sail boats. Artwork illustrates method of operation of sail version.



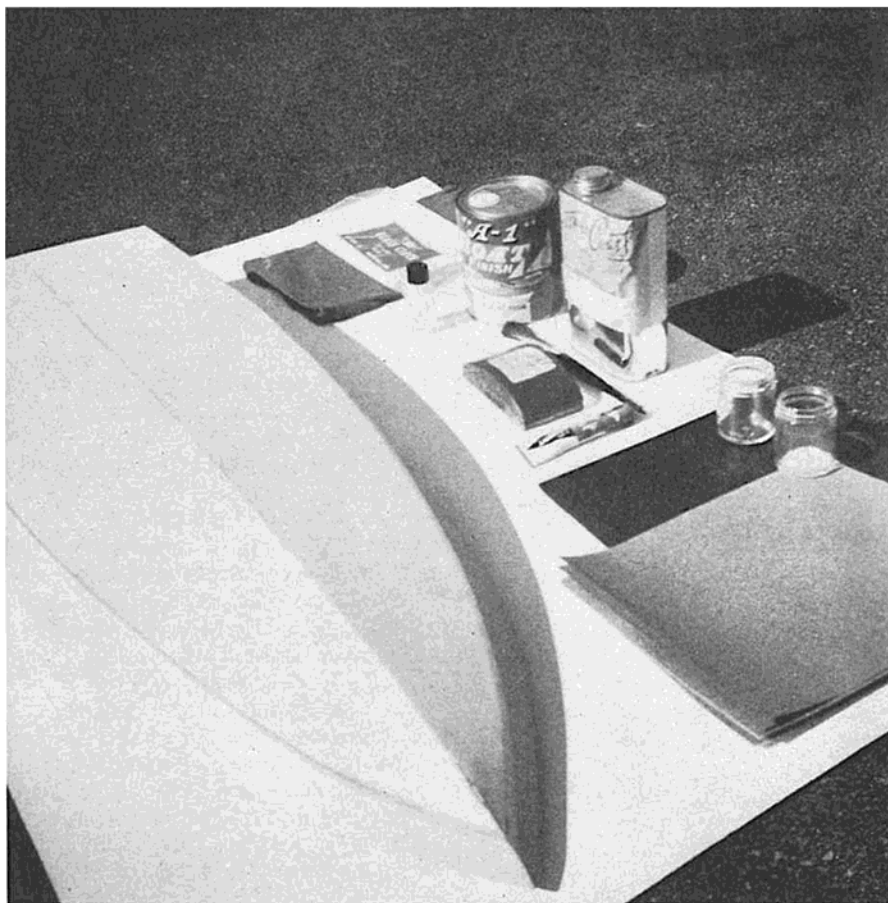
THIS article is one man's way of applying fiberglass cloth and resin for covering a model boat. The author, in no way, means to infer that this is the only way it can be done, but intends it to serve merely as guidelines for its application. This article will be broken into four areas, as follows:

1. Materials needed.
2. Preparation and covering of surface to be glassed.
3. Applying and sanding the resin surface for painting.
4. Painting and finishing.

As can be seen in the first picture, not too many materials are needed to do the job. At the present time I use Standard Brands Polyester Boat Resin and Hardener, although Sig and other brands are available from your local hobby shops. I find the Standard Brands Polyester Boat Resin a little easier to work with in relation to pot life (working time), or time you have after adding the hardener or catalyst before it sets up. The glass cloth can be purchased in one ounce weight from Sig or Hobb-E-Craft, and usually comes one square yard to a package, which is plenty for the average model boat. Other tools needed include a 3M hard rubber sanding block, 3M wet-or-dry Tri-M-It waterproof 280, 400, and 600 sandpaper, 3M garnet finishing 4/0 150 sandpaper, acetone or lacquer thinner, a fine one-inch art brush, rags, bowl or container (to hold water when wet sanding fiberglass), two babyfood or jelly glasses (for mixing the resin), and Pactra Aerogloss C-77 Cement (fast drying).

The first step is to make sure all large holes in the hull are filled before the glass cloth is applied. Such things as joints between sides, bottom, and deck should be filled with glue, wood filler, or Hobby-Poxy Epoxy Glue. If these joints are not filled before glassing, they could lead to cracks later on due to engine vibration, or a hard, occasional beaching of the boat by the skipper! All wood surfaces should be sanded smooth with 150 garnet sandpaper and all edges, such as chine lines, transom, and deck, squared off to the shape you want them to be after glassing. One note here: although you can sand and add resin without too much trouble to areas where it is needed, it is easier if all surfaces are shaped and filled before glassing.

The next step will be applying the cloth to the hull. As shown in the example picture, we are glassing the bottom and sides at one time with the deck to be done last. The glass cloth can be attached in several ways; some fellows use staples to hold it in place, others hold it with their hands while glassing. I myself prefer to use Pactra Aerogloss Cement to glue the edges of the cloth in place. After gluing one edge in place, I draw tight the other edge while tacking it with glue. (Just like silking an air-



All of the materials necessary for fiberglassing.

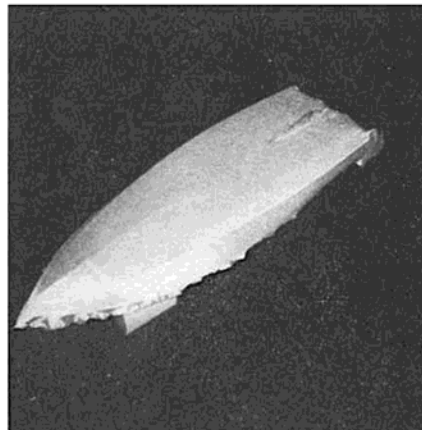
FIBERGLASSING THE R/C BOAT

STEVE MUCK gives a step by step account of a somewhat 'sticky' phase of R/C boat construction. Model used is Steve's famous West Coast ski boat hull design.

plane.) I leave one end unglued such as the transom, to take out any ripples that may appear while brushing on the resin. I do not advise any one to use glue of any kind to hold the cloth if you are going to want a clear wood finish, such as on a deck, because when you have completed your model, these glued spots do show up as a white patch of cloth under the resin.

Now that we have the cloth secured, we will apply our first coat of resin. Glass babyfood or jelly jars usually make good mixing pots for the resin and also for cleaning your brushes with acetone when finished. The proportion-

Hull with glass cloth glued in place.



(Continued on Page 46)

FIBERGLASSING R/C BOATS

(Continued from Page 45)

al mixing of the resin and hardener will have to be up to the user and the brand of resin he decides to use. Some brands have fast setup curing time, while others have a long curing time. There are two things that will cause resin to set up fast or slow. The first reason is the most important, that being the amount of hardener that is added. Living on the West Coast where we do not get freezing weather, the resin will normally stay at the same consistency, Winter or Summer, so it needn't be heated up to room temperatures which is necessary in areas of extreme cold. Because of this, I find when mixing one ounce of resin with 15 drops of hardener, I have about 10 to 15 minutes before it will start to set up. I normally wait over night to let the resin age or cure before sanding. It has been my experience that the first coat is always somewhat tacky, no matter what brand is used. This seems mainly due to the fact that some of the resin separates into the wood pores while the balance remains in the glass cloth. This first coat is not easily sanded and usually gums up the sandpaper no matter what weight wet-or-dry sandpaper is used. The second coat will usually harden completely overnight, allowing you to use 280 wet sandpaper without any loading-up problems. The one thing about sanding with wet-or-dry paper is that you can use water with it as a lubricant to make the sanding much easier. The water also carries away the dust in the form of a mud substance which should be wiped off with a rag frequently to allow for easier sanding. This also makes for less dust in the hobbyist's working area, which usually makes the wives happy, especially if this area is in the house!

After the second coat has been sanded, you will find that a third, and sometimes fourth coat of resin will be needed, depending on how true the original surface was before glassing. It is a **must**, when using polyester resin, that you sand each coat before applying the next, due to a waxy surface that forms when the resin has hardened. If you do not sand between coats, the next coat will not cover completely, leaving a spotty and untrue surface. It will also be very gummy and difficult to sand with either wet or dry sandpaper. I have found that a 3m hard rubber sanding block, available at most hardware stores, is a good investment for wet sanding. By using this block, you save your fingers from being worn to the bone (which is what the author has done on boats built in the past).

To apply the resin, a one-inch soft hobby paint brush is used. In using a brush any larger, you have more waste and more cleaning to do if you wish to save the brush for future use. In cleaning the brush, I wipe the surplus resin off on a rag and soak the brush many times in a jar of acetone, wiping it off between soakings until the brush is soft and dry again. Many fellow boaters are able to apply resin with a hard rubber squeegee which allows them to flow the resin more evenly over the surface of the hull. As yet I have not been able to master this method and prefer to stick to the cleaner brush system.

Experience has taught me to sand off the surplus cloth on the deck edge, in this case after the first coat, so that succeeding coats do not build up, making for more sanding work later on. After the third coat has hardened, I use the 280 wet to rough out the high-spots, then switch to 400 wet for a final finish. If this surface is to be painted, the 400 wet finished surface will suffice. If you plan to leave the glassed surface clear, I recommend a final sanding with 600 wet followed by an application of rubbing compound. My choice of paint at this point is Hobby-Poxy. First, it is fuel proof and doesn't require any final seal coat, such as lacquer does. My second reason is that it will spray easily with the most inexpensive of spray, or air, guns. It can also be rubbed out with 600 wet sandpaper and waxed to a beautiful finish. I have, on some occasions, used the color dye that is available from most fiberglass shops which is mixed in with your resin to give color to the finished glass surface. This is a very good way to apply a color finish, but it does have a few drawbacks. It tends to leave the resin not completely hardened which quickly gums up the wet sandpaper. A person could, although, apply his coats of color resin first and then seal it off with a final coat of clear resin.

In summing up, my first attempt at glassing was not all peaches and cream, so if you find your resin still tacky, read your resin can carefully, for you may find you are not adding enough hardener or, alternately, too much in some cases. Another point: do not get alarmed if, during sanding your second coat, you may sand down to the glass cloth. Do be careful not to sand through this cloth for it could have a weakening effect, so let the third, or if necessary, fourth coat, cover these spots. Remember, also, to use plenty of water during wet sanding, which makes it easier for you to get a smoother finish.

As I stated in the beginning, this is by no means the only way you can glass boats, but only the author's way developed after six years of building and running model boats covered with fiberglass.

The Roostertail



The Official Publication of the
International Model Power Boat
Association

General Office:
3638 S. 61st Court, Cicero, Ill. 60650

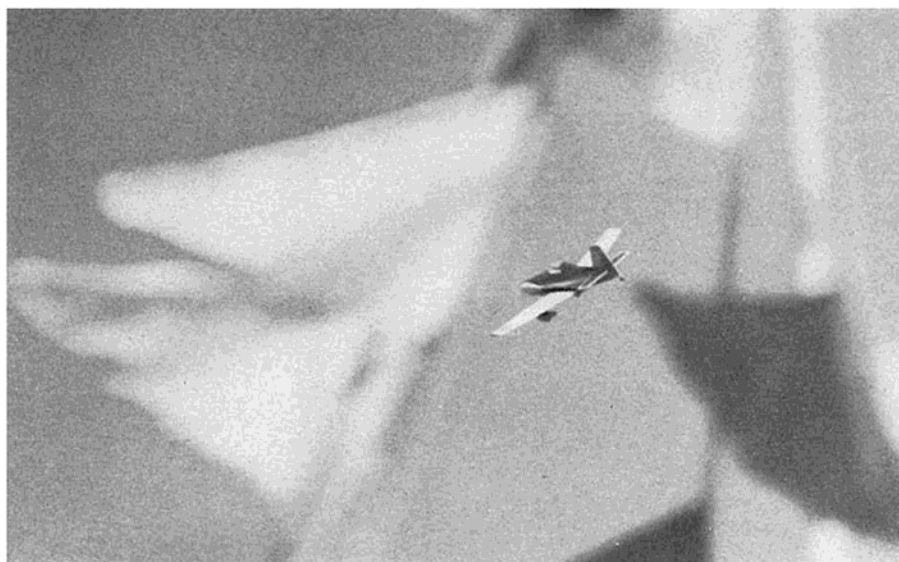
FELLOW boatmen, the I.M.P.B.A. has received a bid from the Nassau Model Power Boat Society, Long Island, for the 1967 I.M.P.B.A. regatta. So, we have both Nassau and San Francisco to choose from at this date. In the next R/C Modeler the choice of the I.M.P.B.A. Regatta will be announced.

If your club has not forwarded its request for sanction dates (time trials and regattas) you had better get on the ball and mail it today. In case you do not have the address of the recording secretary, it is as follows: Thomas R. DeMeskey, 321 Pavonia Ave., Jersey City 2, New Jersey.

For a lot of us the running will begin in the next few weeks. For the past few months the Roostertail has tried to lay the groundwork for a successful season. I think that all of us are aware that model boating is really on the go. More and more information is going to be needed to provide us with the knowledge we require for construction, regatta planning, and new methods. The copy you see in the Power and Sail section and the Roostertail is not the product of spontaneous generation, rather it is the result of a very few people forwarding their copy for publication. But, just like the comics on TV there is a limit on how much we can deliver. You can either contribute directly, or work through Jim Whitlatch, Doug Tucker, R/C Modeler, and Cy Crites, the Roostertail.

One question that is often asked is: "Why don't we have an R/C Scale Model Event?" Most of us realize that there is a very special character in a well built scale model. The beauty and excellence of detail are limited only by the builder's

(Continued on Page 49)



National Miniature Pylon Racing Association

613 DONNER STREET

LAS VEGAS, NEVADA 89107

The second year of NMPRA competition is now drawing to an end, and a review of the present status of pylon racing is in order.

As has been noted in the past, the present rules governing miniature Goodyear racing are not perfect, but have proved workable. Some new proposals are even now being submitted to the AMA, but in the meantime, the rules as they are, provide an excellent basis for a good, competitive event. This is evident from the fact that each scheduled NMPRA event shows increasing participation with a subsequent increase in the caliber of the competition.

National recognition is at a very high level. This is due in part to the AMA's acceptance of the event, and through public exposure while participating at full-scale air-shows, and the large general public attendance at the Nationals. In the Palm Springs, California show in the fall of 1965, the Goodyear miniatures all but completely stole the limelight from full scale craft. The NMPRA participants at this event were amazed at the wild enthusiasm the miniatures generated among the non-modeling public. From this reaction has arisen good possibilities of NMPRA Goodyear participation in at least one premier show early in 1967 on the West Coast.

Many manufacturers in the hobby industry have recognized the appeal and interest in racing by responding with products designed for this purpose. There are a number of kits for racers now available, and at least one propeller manufacturer offers a special line

of props for this purpose. The major engine manufacturers are releasing hot new .40 cubic in. engines to comply with NMPRA regulations.

Now, what about the future for NMPRA and racing? It is obvious from the appeal, interest, and constantly increasing number of participants in this racing event that the future is secure. However, it is realized that there is work to be done. As this letter is being written, there is a team of experts throughout the country working on the following points:

1. Resolution of a few points of confusion and ambiguity in the present rules.
2. The operation and conduct of racing meets; both all-out events and in simpler, modified forms that still offer a good basis for competition. The development of special contest "kits" containing all necessary materials and information to conduct a pylon race.
3. Consideration of possible new classes of racing.
4. Ways and means of making the NMPRA a closer knit organization nation-wide, for the purpose of being a true coordinating body for racing under AMA sanction and sponsorship. This will reduce the work load on AMA headquarters, and provide a better basis for future development since NMPRA will be concerned only with racing.

The amount of work yet to be done

requires the expenditures of hard cash. So far, much of the costs involved in operating NMPRA has been absorbed by a few generous individuals officially concerned with the organization, and by the generosity of Radio Control Modeler magazine. A few of the expenses involved in operating the organization are: Mailing costs, printing of pamphlets and rules books, NMPRA decals, investment of funds for development work on proposed contest "kits." The growth of NMPRA now precludes that generosity of a few individuals should assume any differences in costs. The conclusion reached by NMPRA officials is that membership dues be Three Dollars (\$3) for the period January 1, 1967 to December 31, 1967. Remit this amount to NMPRA, c/o Mr. Gil Horstman, 613 Donner Street, Las Vegas, Nevada 89107. Note with your remittance whether this is a renewal, or new membership application. If renewal, be sure to mention your racing number.

Yours for bigger and better racing events, I am

Sincerely,
President, N.M.P.R.A.

NATIONAL MINIATURE PYLON RACING ASSOCIATION OFFICIAL RULES FOR 1967 PREFACE

The rules which you are about to read are the product of many hours of discussion, research, and testing in actual competition. To really understand these rules, you first have to have a concept of what we are trying to accomplish with this event. If you are a newcomer to this event we welcome you, but also advise you to read on carefully for a thorough understanding of these rules is a necessity before you start building a competitive aircraft.

OBJECTIVE

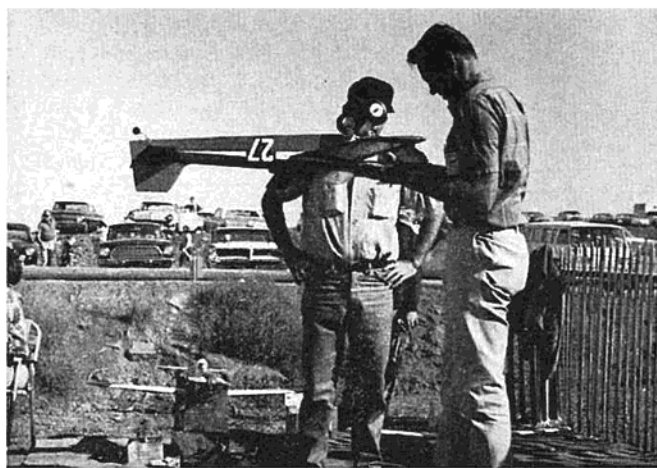
To run a scale race patterned after the 90 and 190 cubic inch class that will be interesting for spectators as well as challenging for the flyers. No Deltas or Bi-planes allowed.

1. SPECIFICATIONS FOR .40 CUBIC INCH CLASS RACING AIRPLANES

These specifications are the only official and approved regulations for the 1967 .40 cubic inch class of racing models. Therefore, they supersede those published previously.

2. GENERAL

2.1 All AMA and FCC regulations covering the R/C flier, his plane and equipment, shall be applicable to this event, except as noted herein. There shall be no limitation on the type of equipment fitted to the plane, or the number of controls. The owner of the model shall be allowed two entries in this event. The owner can only use his alternate model if the first model is not flyable. Only the first model will be processed. Only if the first model is not flyable shall the second model be processed. The owner may have someone else fly his model in competition if he desires to do so. However if this is done the model will be entered as a team. Both the owner



and pilot shall have current AMA sporting licenses.

2.2 Considerations of safety for spectators, contest personnel, and other contestants are of the utmost importance in this event. Any unsportsmanlike conduct or hazardous flying over a controlled spectator area or course will be cause for immediate disqualification of that flight.

3. ENGINES

Engine size will be a nominal 40. Engine must be a production engine that has been produced in quantities greater than a hundred units. The engine shall be equipped with a workable throttle that will allow it to idle at a reduced RPM for a period of at least 10 seconds. The thrust on prolonged idle will be less than 1 1/4 pounds as determined by measurement with a suitable measuring device (spring scale 0-4 pounds recommended). Furthermore the engine shall be equipped with a shut-off actuated by reducing the engine throttle position further than normal continuous idle or the engine will have a low enough idle to allow it to land the model safely when required by the contestant or contest officials. Main wheels shall be free rolling and the model will be placed on smooth surface when this test is made. The tail wheel shall be off the ground when thrust measurements are made.

4. PROPELLERS

Must be wooden fixed pitch propeller.

5. FUSELAGE

The fuselage will have a minimum outside width of 3 1/2 inches at the location of

the pilot. The ship will have a minimum height of 7 inches at the location of the pilot.

6. SPINNER

The model will have rounded propeller spinner of at least 2" diameter. This applies to a conventional tractor engine installation.

7. LANDING GEAR

Nonretractable type. Wheels must be 2 1/4 inches in diameter or larger. At least two wheels of the specified size must be used. Auxiliary or third wheel on tricycle type may be of any size but not retractable. A positive means of steering on the ground will be provided.

8. WINGS

Minimum of 450 sq. in. of wing area must be used, including that area displaced by the fuselage but not including fillets or stall stripes. Flaps are permitted but wing area is to be figured with flaps retracted. Wings shall be at least one inch thick at the root.

9. WEIGHT

Weight less fuel but including all equipment necessary for flight will be at least 5 pounds. Maximum — 6 1/2 pounds.

10. RACING NUMBERS

Racing numbers may be obtained from the National Miniature Pylon Racing Assoc. secretary. The use of these numbers is highly recommended. The numbers are located on the upper left and lower right hand wing panel facing towards the left side. The number will be right side up with the model in a left bank. The num-

bers will be at least 3" high on the wings. Area letters will be 1/2" high.

11. REGISTRATION NUMBERS

A registration number is required on the upper right and lower left hand wing panel. The same number is also required on the vertical tail surfaces. The minimum height of the numbers on the wing will be 2 inches. The minimum height of the numbers on vertical tail surface will be 1/4 inch. The letter N will precede the registration numbers.

11.1 An alternate method will be placing a minimum of 1 inch numbers along each side of the fuselage behind the trailing edge of the wing.

11.2 Suggested registration numbers are the entrant's AMA number. If the entrant desires he may use the last two or three numbers of his AMA number followed by the initial of his last name such as N204D.

12. MATERIALS AND WORKMANSHIP

Workmanship must be of satisfactory standards. Contest committees are empowered to qualify any ship which in their opinion, is not up to reasonable, safe standards in either materials, workmanship, detail design, radio installation or condition as a result of damage.

13. FLIGHT REQUIREMENTS

Before attempting to enter a competition the pilot must have flown the ship before two witnesses who are members of the AMA and demonstrated the following maneuvers before them:



1. Take-off at full throttle without veering more than 10 feet from either side of a straight line on the ground directly into the wind.
2. Pull-up from straight and level flight at maximum airspeed and RPM into a full up elevation loop.
3. Make a dive at a 30 degree angle for at least a length of 500 feet.
4. Make a 180 degree turn at full air speed and maximum RPM without any appreciable loss of altitude or control.
5. Make three laps of a simulated race course at normal racing altitude, making the turns at full speed as in a race.

14. HANDICAP SYSTEM

A handicap system will be used to provide a bonus time in issuance of up to 20 seconds head start. There will be a minimum interval of 2 seconds between release of aircraft.

14.1 Up to 20 points may be given for semi-scale appearance. Models shall be judged complete and ready to fly. After model has been judged, nothing will be removed from or added to the model, which in the judges' opinion, changes in any manner the appearance of the model from the way it was when presented for appearance judging. Wheel pants may be removed if in the contest committee's opinion the flying field's condition is such that damage would occur to the wheel pants if they were used. Judges should exercise prudence in assigning points, and reserve excellent point values for those models which are decidedly above average.

14.2 It is the contestant's responsibility to supply judges with a 3-view drawing (any 3-view drawing taken from any publication will be considered acceptable) and/or at least two photographs that show aircraft clearly.

14.3 Any model that receives less than 5 points will be disqualified.

14.4 Note that no points are awarded for a scale type finish. Scale paint trims are not encouraged because of repetition or duplicate airplane designs. Likewise the scale racing numbers need not be utilized. Therefore no bonus points will be obtained for a scale paint job nor will the entrant be downgraded for a nonscale paint job. It is suggested that base color correspond with frequency color.

14.5 Scale judges will be required to read current judging guide. It is suggested that scale judges may not spend more than 3 minutes judging any one aircraft (this does not include checking wing area or minimum dimensions).

15. RACING COURSE SPECIFICATIONS

The course will be laid out as follows:

15.1 The course is 10 laps with individual lap lengths of ¼ mile. Total distance traveled is 2½ miles (13,200 ft.). Race starts at the start-finish line. All take-offs will be unassisted ROG. The race is terminated at the start-finish 10 full laps later.

15.2 The racing course specifications may be modified in the interest of safety, to suit existing field conditions.

16. OPERATION OF THE RACE

A suggested method would be as follows:

16.1 At the number 1 pylon there will be an official flagman per entrant. It is suggested that the official flagman will have a colored flag corresponding to the frequencies the pilots are using. The officials at the number 1 pylon will stand perpendicular to the direction of the course on the right hand side of the pylon no more than 15 feet away from the pylon.

16.2 It will be required that all models are to be flagged as they pass the number 1 pylon and not before. The flagmen will have their flags in ready position as aircraft reach midcourse between pylon 3 and 1. There will be no flagging at the number 2 and 3 pylons unless a pylon is cut. There will be no pilot's helpers at any of the pylons.

16.3 At the number 2 and 3 pylons the official flagman will stand in close proximity to the pylons they are judging. If sufficient personnel are not available to act as flagmen for each event, one flagman can be used at each of the number 2 and 3 pylons. He will use an appropriate method to notify a missed pylon to the flier in question.

16.4 A maximum of 4 planes per heat will be allowed.

16.5 A two minute time limit for starting the engine will be allowed. A 6 minute flight time will be the maximum endurance of any flight. Any time over that will be disallowed and not counted.

16.6 All laps are to be flown counter-clockwise with turns to the left.

16.7 No minimum altitude required for racing.

16.8 If a pylon is cut that lap will not be counted. Two pylon cuts constitutes disqualification of that flight.

16.9 Flying outside of designated course limits will constitute a cut.

NOTE:

The guide for these rules is patterned after official NAA 1949 specifications for 190 cubic inch class racing airplanes. The source of reference was NATIONAL AIR-RACE SKETCHBOOK by Buehl and Gann, published in 1949 by Floyd Clymer.

Election results for N.M.P.R.A. officers for 1967 were tabulated as of January 15, 1967. New officers are as follows: President, Ed Shipe; Vice President, Maxey Hester; Secretary-Treasurer, Gil Horstman.

Attention all Western N.M.P.R.A. members: There will be a general meeting open to the general membership on Saturday night, March 11th at the Divine Gardens Motel, Turlock, California. This meeting is being held in conjunction with the Pioneers R/C Club pylon race contests. Be sure to attend!

skill and the time he has to use it. It would be a crime to judge such boats as though they were inoperative and on a shelf. Yet, we have found it nearly impossible to devise a competitive scale event that will select the winners on criteria that represent true merit, and allow all boat and ship types. One only has to ponder how he would judge the appearance and performance of a scale battleship or ocean liner to that of a cabin cruiser or runabout. Precision steering probably comes as close to a performance test as anything, but the turning radius of a destroyer is a great deal different than that of a tugboat.

It has been pointed out that we are having an increasing serious problem in obtaining enough time to run enough heats and time trials. A slow moving scale event is certainly not going to help this situation. So, how can we keep alive this aspect of our hobby? If we can devise suitable rules of competition, we could get the time by having special regattas during the year. If you are a true scale model fan, and disappointed in not being able to compete with your boats, may we suggest that you forward your proposals to the I.M.P.B.A. for consideration.

An agreement has been reached whereby R/C Modeler Magazine, in an effort to assist the I.M.P.B.A. President, will process all new and renewal memberships. This is being done on a no-charge basis in order to speed up membership application processing. Effective immediately, all new and renewal memberships should be sent directly to I.M.P.B.A., c/o R/C Modeler Magazine, P. O. Box 487, Sierra Madre, California 91024. Membership fee is \$6.00 per year, which includes a subscription to R/C Modeler Magazine. Annual dues, without a subscription to RCM, is \$2.50.

Please note that RCM is handling membership applications only. All general correspondence should be addressed to the I.M.P.B.A. General Office.





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R/C MODELER MAGAZINE

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A 2-Year Subscription for the Husbands of the First Three
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CONTEST RULES

1. Each entrant must write an essay on the subject: "I Am a Model Wife," e.g., what it means to be the wife of an R/C modeler, how you assist him or participate in his hobby. Essays shall be 2500 words or less.
2. All entries shall be typewritten on 8½ x 11 inch paper, double-spaced, and shall include the entrant's name and address in the upper right hand corner of each page.
3. Contest opens March 1, 1967 and closes April 15, 1967. Employees of Stardust Inc. and/or R/C Modeler Magazine and their families are not eligible.
4. Judges will be selected from R/C Modeler Magazine Corporation and Stardust Inc. Judges' decisions will be final. Contest winners will be notified by mail. All entries remain the property of R/C Modeler Corp. and none will be returned.
5. Entries will be judged on sincerity, originality, neatness and presentation.
6. Address all entries to: R/C Modeler Magazine, Contest Editors; P. O. Box 487; Sierra Madre, California 91024.
7. Contest is void wherever prohibited by state law.



Greece City Xanthi by Night



Old City Xanthi Street



Old City Xanthi House



Xanthi Central Square



Xanthi Lake Vistonida



Xanthi River Nestos



Xanthi Old House M.Xatzidakis

