

RADIO CONTROL

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50¢

MODELER

THE WORLD'S LEADING PUBLICATION FOR RADIO CONTROL SPORTS ENTHUSIASTS



1966 NATIONALS

CHICAGO, ILLINOIS

WRIGHT BROTHERS MEMORIAL

DAYTON, OHIO

THE MO-JO . . . AND A PYLON EVENT DESIGNED FOR YOU!

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.

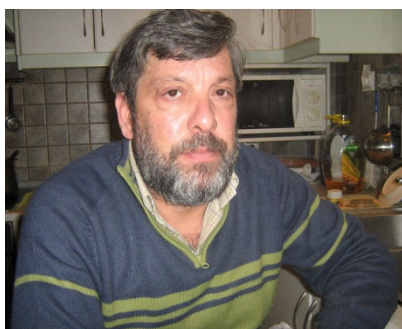
Now after all this experience I have decided to digitize, to clean and to re publish in digital edition and free of all issues RC Modeler magazine from 1963 to 2005 and others books and magazines.

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.

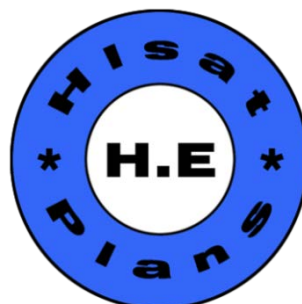
Δεν είναι η μητρική μου γλώσσα γιατί είμαι Έλληνας.

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.

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CTOBER

VOLUME 3 NO. 10

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OVER

ay Irvin poses with his Sterling Spitfire in front of the full-scale prototype at the entrance to the Royal Australian Air Force Memorial Building, Perth, Australia. 4 x 5 tachrome by Ray Irvin.

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EDITOR'S MEMO

BY DON DEWEY



ANOTHER RUSSIAN-HELD WORLD'S RECORD BROKEN!



Maynard Hill unreeling the line from the electric winch in preparation to launch.

MAYNARD HILL, noted for setting new World's Records, smashed the World's Altitude Record for Remote Controlled Gliders on July 25, 1966 at Bong Field, Wisconsin. Flying a glider of his own design, Maynard Hill found sufficient thermals to lift the 6.5 lb. barograph equipped model to a record altitude of 3,550 ft. The record has been submitted to FAI Headquarters in Paris for homologation.

Maynard and his son, Chris, had driven to Bong from NAS, Glenview, Illinois to watch the FAI competitions in Nordic, Wakefield and FAI power, where the finals were being held to choose the team to represent the United States next summer in Czechoslovakia. Al and John Lukey had driven up from Chicago, picked up Dale Willoughby at Glenview, and all met Maynard at Bong.

The weather was perfect for thermal flying — warm, sunny and with the sky almost free of clouds. Both the Hill version of the electric winch and the Willoughby Hi-Start kit were set up and it was soon evident that the electric winch was unequal to the task due to very low velocity winds. About noon very strong thermals were forming as shown by the FAI Free Flight competitors easily obtaining three minutes maximum flights. Dale Willoughby then

launched his Kurwi 33 via Hi-Start to over 400 ft. and hung onto a 12 minute thermal. Maynard's next launch was again thwarted by non-existent winds and he soon came down after gaining less than 100 ft. The thermal activity seemed very low in strength below 100 ft. About one in the afternoon, the sky was marked with a few cumulus clouds, and the thermals seemed to beckon, though there were no strong winds. Both Maynard and Dale had skipped lunch for they mutually agreed that good R/C gliding weather certainly existed. Dale then launched to above 500 ft. with the Hi-Start, and just off the tow hook, bumped into a strong lift which took his Kurwi 33 to over a thousand feet.

Maynard had resolved to get airborne somehow, so he unreeling about 900 ft. of line from the electric winch, put his son Chris in the trunk of the car to hold the reel and keep it from unwinding, as well as to verbally direct the driver of the car. Maynard instructed Al to drive about 35 mph along the partially completed runway until Maynard had reached maximum altitude. As they were both hot, tired and thirsty, this was to be the final attempt, with the temperature hovering around 90°.

Earlier, Al Lukey flew his Cox .051 powered "CLOU" on several flights to

show how the thermals hung under the clouds. By now they completely covered the sky, though at different levels. He flew his CLOU on a Kraft 6 channel reed system.

When Maynard's glider came off the tow hook, he looked in vain for thermal action for the first couple of minutes and was down to below 300 ft. when he caught a strong bump up to 600 ft. then joined Dale in circling in the same thermal. A very pretty sight to watch two red-orange gliders working the same thermal. Gradually, Maynard's glider outclimbed Dale's Kurwi and was up to over fifteen hundred feet. Dale in the meantime, was experiencing a bit of rudder interference from the CB walkie talkies used by the FAI competitors to monitor their free flight model's position. Dale then left the thermal and drifted downwind for nearly a mile, until the Kurwi was just a pencil line in the sky.

At this point, Maynard's huge glider had moved over into another thermal area, clearly marked by a large cloud that was ever expanding while growing darker in the process. Dale, not wanting to lose his Kurwi, and still experiencing intermittent loss of rudder, put his bird into a steep dive which brought it back over the edge of the field. Another steep dive toward the transmitter using elevator only suddenly brought the rudder to life and it came under full control at about 500 ft. This was just over the FAI contest site and consequently was landed. By now the sky was completely overcast, and Maynard's glider was almost out of sight under the darkest cloud. As Dale landed, Maynard reached his maximum height which, at the time was estimated to be around 5,000 ft. by both Maynard and John Worth who had driven up in his car while Maynard was in the final stages of his altitude attempt.

Later, Maynard said he was tempted to fly higher, but was confident he had broken the altitude record held by N. Malikov of Russia, so he started his descent. Spiral dives and one loop (its first) brought the glider down to altitude of 500 ft. By now the air was lightly buoyant with small thermals abundant.

The FAI Sporting Code specified the landing must be within 500 meters (1640 ft.) from the launch point. Maynard had been flying the glider (without too much drift) very close to the launch point, and upon landing, the point was marked and measured so that Dale, as Contest Director, could certify the distance. Measurement proved he landed within 155 ft. from the launch point after a flight lasting nearly 52 minutes.

(Continued on Page 8)

CUNNINGHAM ON R/C



MIDWEST-RCM AIR RACES---

THE NEW PYLON EVENT DESIGNED FOR YOU!

THE wings flashed orange and white in the afternoon sun. The high pitched whine of the powerful little engine grew louder as the craft whirled toward the last pylon . . . suddenly the green ship with the grinning pilot began to overtake the orange and white beauty. Then, round the pylon, the green craft skinning closer, finally leveling out for the dash to the finish line. Now the orange winged ship pours on the coal as they pass the checkered flag. Both ships banked high, then swung around and chopped throttle for a landing.

Sounds like fun, doesn't it? Could be the real thing, high over the desert race course, or it could be miniature Good-year racers battling it out. Or, it could be . . . you . . .

Midwest-RCM Air Racers! The very latest thing in air races, and designed for small engines and both beginners and old pro's. How does that grab you?

With the new galloping ghost rigs making a rather large impression on the R/C sport fan, it's a natural! Small ships have long been overlooked by all but the fun fliers, but thanks to the new, simple, and yet reliable single channel pulse proportional rigs, we now have a racing even scaled to the kind of ship you can

build in a weekend and learn to fly with ease.

The name—Midwest-RCM Air Races—stems from two characters that have long been advocating small ships, and who were instrumental in pushing along the idea of small racers—Frank Garcher of Midwest Models and Don Dewey of RCM. We could also add in the names of Min-X, Controlaire, Rand, Airtrol, and the like, but the line had to be drawn somewhere, so it has become Midwest-RCM Air Races!

If you've "popped your cool" enough by this time to want to get on with the rules and regulations covering this invasion of Mickey Mouse land, read on, then go out and grab yourself a bunch of sky and practice a while!

Midwest-RCM Air Races

1. General

The object of this class is to encourage flying of small model aircraft in racing type events. These models should be scale-LIKE in appearance, and should have some provision for a pilot. The models may have either a cabin or cockpit suitable for a pilot of 1-1½" scale. Any type aircraft may be entered with the exception of delta ships. Any type radio gear may be used. There is no limit on the control surfaces that can

be utilized. Throttle is not mandatory. Races may be held either in heats of two or three ships, or against the clock. Racing of two or more aircraft simultaneously is to be encouraged.

2. Classes

Class A—Maximum engine size of .051, minimum wing area of 225 square inches.

Class B—Maximum engine size of .10, minimum wing area of 320 square inches.

Class C—Maximum engine size of .15, minimum wing area of 320 square inches.

3. Design

a. fuselage: No minimum size, any configuration. Use of a pilot is optional but craft should have a cockpit, cabin, or canopy large enough for a 1-1½" scale pilot. Recognizable midget racing type designs are to be encouraged.

b. wings: Any number of wings may be used, minimum wing area specified for each class.

c. weight: No maximum or minimum weight.

d. scale: No extra points or handicap for scale designs, however realism as per rule 3a should be stressed by contest director.

4. Race Course

a. The race course shall be a three-legged pylon type race course laid out as shown in Fig. 1. Ten laps will constitute a 1½ mile race.

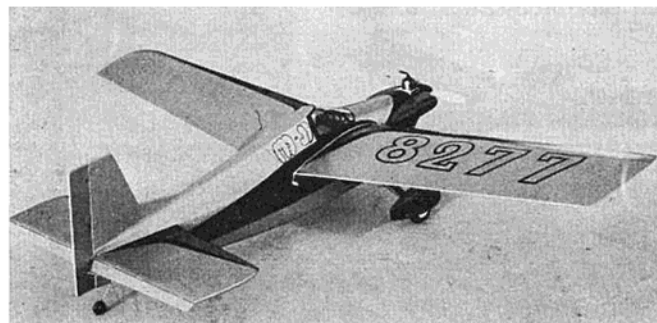
b. At the discretion of the Contest Director, the AMA standard pylon course may be substituted for the above official course.

That's it! No more rules are needed. This can be both an interesting event and a lot of fun! Charlie Stiff Joints can fly his ship against Joe Junior for fun and games and Paul Pro can lean his big fuel gulping, high-powered multi against the wall and get in on the fun, too.

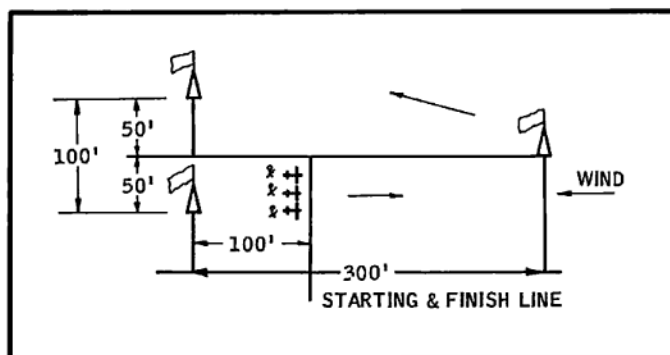
Probably the most popular class will be Class B since this engine size is pretty much a natural for the model size. Class C will no doubt develop into the "pro" class, since a .15 in a 320 square inch ship is going to come on real strong.

(Continued on Page 7)

The Mo-Jo . . . first of the new breed of Midwest-RCM Air Racers. This class B design featured in this issue of RCM.



A simple course that can be set up at any field. Hand launch is permitted for rough field conditions.



CUNNINGHAM ON R/C

(Continued from Page 6)

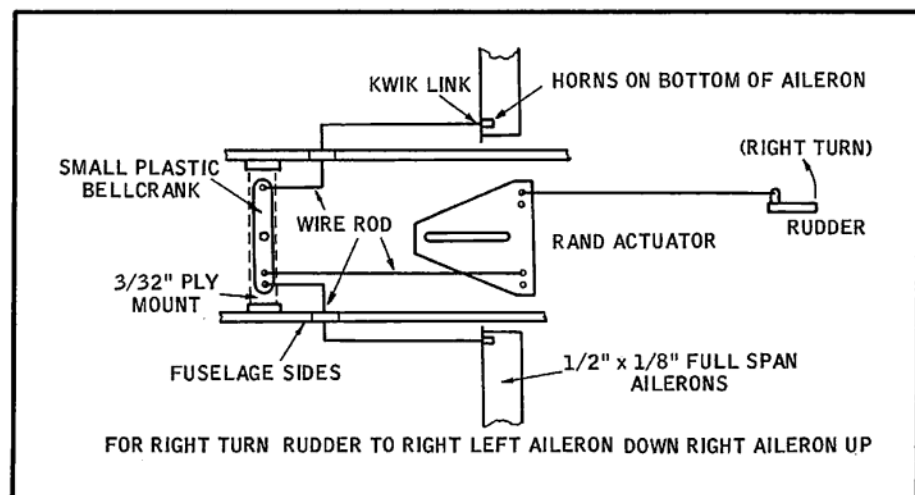
Class A is perfect for beginners and for the younger pilot just getting his wings.

There are currently a number of models well suited to these classes. Some are kits and some from magazine plans. For Class A you can choose the Junior Falcon, Schoolmaster, etc. Rumor has it that a hot Class A design is forthcoming in RCM, using Tee Dee .049 and the Airtrol propo system. Class B and C do not have as many kits that will do the job, but this issue has the Mo Jo — an outstanding design that has already won its first contest! And if you think it's slow — just build it and see! The Midwest Lil Tri-Squire is a suitable kit that fits the specs. From magazine plans, try the Wolfmeister LR-3, Top Dawg, Royal Coachman, or Herb Abram's low-wing "Name The Plane!"

You don't have to stop at the known designs — get out the drawing board and glue pot and try your hand at whipping up one of these ships on your own. It isn't too hard to design it yourself, and who knows — you may be in for a lot of fun with a winning design in this new event!

I must admit that when the small radio gear made its way back upon the scene I was very skeptical. I've been down this road before! In fact, I got my feet wet many years ago in R/C with small ships and single channel gear, and after long periods of hung escapements, flyaways, interference, ad nauseum, decided that the larger stuff was for me. While playing with the small ships, though, I spent a lot of time with pulse rudder, and most good flying was done in this manner. As a matter of fact, one evening, my wife, Jan, was prevailed upon to take the stick of my tail-flipping .049 ship, and after I told her how to keep the nose up and watch the banks, left her alone with the ship. Naturally, she greased it in for a landing about twenty-five feet away! "So what's so tough about this?" she wanted to know! If I had been smart I would have converted her on the spot to a pilot rather than a mechanic. Short flights with reeds, and later, full house proportional gear, never have quite matched the thrill that she got with that first flight. But it does point up just how easy it is for a beginner to fly this system. With the addition of the Rand actuator to the slick new Min-X or Controaire rigs, the problem of elevator has been solved nicely. After experimenting with pulse rudder and a blip-type elevator, old-style galloping ghost was tried. Somewhere around this great world of R/C, a lot of lads had a lot of fun with GG.

But I didn't. So, I have been pretty much on the fence about these small rigs and ships ever since. But, after taking in what has been written these past few months, the old bug began to grow.



Wouldn't it be great to have a small ship again . . . one that could fly from the school ground or a parking lot. One that didn't have to drink half of the alcohol in the state of Texas on each flight. So the urge grew, but along with this urge developed the idea that Don had put forth a couple of months ago. Why not a racing class for small ships?

So here it is. Frankly, I would like to see ships flying in this class that look like the Goodyear Racers—Shoestrings, Bonzos, etc., and there are several that are being kitted right now, specifically for this class. But ever since the NMPRA racers got started one of the most often heard arguments was the trouble in building a special ship, or a scale ship that required a lot of work for a very short life span. Okay, no argument — if you want to fly a small ship, build anything you want, but don't overlook the scale ships for this event. Kinda' starts you to thinking, doesn't it?

Recently, I put away my full house propo for a rest and ordered a Min-X GG system. Bob Schmidt at Min-X informed us that his backlog was over a month on the day I called him, so you'd be advised to get your order in early. The package finally arrived, and the first thing that happened was that my kids made off with the Detroit funny papers that had been used to cushion the gear. They said that it was strange, but the funnies way up in Detroit were almost the same as those in Texas!

The radio rig, itself, is very neatly constructed and beautifully housed. That evening was set aside for building the battery packs and hooking up the gear in my new ship so that the next evening could be used for flying. The one thing that I think should be changed is that a battery pack should be available from the manufacturer as this could present a problem to the beginner. If he follows directions, however, he should encounter little difficulty, but in many cities, nickel cadmium cells are hard to find. So please, Bob — take pity on the newcomer and go just one step further with your excellent system and supply

a battery pack and switch harness.

The little gear works perfectly — almost no gallop in the system and pylon turns and rolls can be executed almost like the big boys. Almost, because the rolls are done with rudder. But why not try ailerons? Just because the instructions say for rudder and elevator you don't have to stick with this! Try coupling in ailerons and rudder. For a long time I have been an advocate of this control — the 3+1 proportional systems are now using it, so why not our little racers? Figure 2 shows an easy route for doing this. And if you come up against Dave Gray of Airtrol in a Class A race — don't say we didn't warn you! He uses proportional rudder, elevator and ailerons in .049 ships, and is a darn hard man to beat!

Now for a few hints along the way. Don suggests that, if you're using the Rand actuator, you use a small diameter wire that will "slop" around in the Rand throttle arm, eliminating the slight amount of "dither" at the throttle. Another word of caution — do not use the same batteries for the actuator and the receiver — the range is severely limited. Use either a nicad pack for the actuator and a dry cell pack for the receiver, or build up a big battery pack of seven nicads for the entire system. Frankly, in order to save a little gold, try the four nicads plus two alkaline energizers first.



You will have many fine flights and then, after a few paychecks, add on the other three nicads. Remember to follow the instructions and solder the dry cells — do not use a battery box. Many, many troubles have been traced back to intermittent contact due to a loose battery box.

If this is your first venture into the wonderful world of R/C, then a few flying suggestions are in order to help you get over the rough spots. First, be sure that your system is working perfectly and that you have checked all controls with the engine **running**. If you're ready, start the engine, turn on the receiver switches along with the transmitter switch, check everything once again, and heave it into the sky. Be gentle on the stick. **Don't** pull back on the elevator, let it wobble all by itself. Give the bird very gentle commands with the rudder and keep the nose up. Also, stay UP WIND! Limit the first flight to about thirty seconds of fuel, and when the engine quits, let the craft land itself with very little help from you. It will, and you won't, but try it anyhow! Make all flights of short duration until you get the hang of this business. Pylon turns are made with rudder and elevator. Bank the ship to the left with the rudder, then pull back on the stick to bring it around. There are a lot more bits of help in this learning-to-fly business, but we'll save them for another article. For now, pick out a spot that has high grass for the first few flights — it helps cushion the shock.

One other word on the M.R.A.R. (that's Midwest-RCM Air Races, Clyde). It is not necessary to take off to have a race. If your field is rough, a hand launch is okay — **but all of the ships in the same heat must be hand launched**. Can't you just see it now — three racers lined up at the starting line, engines churning the air . . . the starter waves his flag, and three grown men go leaping down the runway holding aloft a little bit of balsa and glue. The guy that gets to the pylon first whips around and throws his model back down the second leg of the course! You know — come to think about it, we could station another man at the next pylon and the first would pass off his model to him, and so on down the line. We could even call it a Relay Race and eliminate the flying altogether! Just watch the ancient Greeks revolve slowly in their graves.

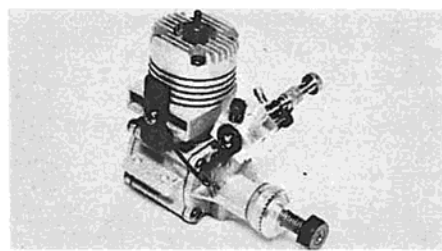
So much for this issue — try your hand at the small ships and the new class of air races. I think you'll have fun. By the way — special to Bernie Murphy: I was going to say something to you with YOUR initials as a code as you did to me in your last column, but I suddenly realized that this was a family magazine and that I couldn't do it, so go back on and shovel some more . . . snow(?).

SHOWCASE '66

(Continued from Page 8)

Missing page before

Ueda .15 R/C — Associated Hobby Manufacturers, Inc., 3200 Boudinot St., Philadelphia, Pennsylvania, 19134, recently forwarded a production unit of the new Ueda .15 R/C. Priced at \$11.95, this engine is exceptionally well made and features extremely easy starting (as is normal with the entire Ueda line of engines), completely adjustable throttle with excellent idle, and an admirable power-to-weight ratio. Tested and recommended by RCM. See Bernie Murphy's 'Kits and Pieces' for a review of this engine. For further information, Circle #7 on the Reader Service Card.



R/C Accessories — One of the finest lines of accessories for the RC'er is the line offered by Rocket City R/C Specialties, 1901 Polk Drive N.E., Huntsville, Alabama 35801. From their new brakes at \$2 per pair, through their control horns and ready-made pushrod ends, this entire line has been extensively tested by RCM and is recommended. For further information on these accessories, Circle #8 on the Reader Service Card.

Scale F4F-4 Wildcat — Andrae Plan Kits, P.O. Box 112, Elmwood Park, Illinois 60635, has released their scale R/C plan kit of this famous WW II Navy fighter. The plans are of the finest quality and complete down to a very thorough instruction book. Included with the plans is one of the finest moulded canopies we have seen in the industry, a set of wing plug-in tubes, formed main landing gear struts and special torsion tail wheel strut, and complete parts layout. No building materials are included. Price is \$8.75. This design is a 57" span ship for .29 to .40 engines and either reeds or proportional. This is a builders delight — it is not a slab side "throw together" ship, but one that would please even the most discriminating builder. Highly recommended by RCM for those wanting something 'a little bit better.' Also available from Andrae is a 70" span plan kit of the twin engine Martin A-30 Baltimore at \$7.75. For further information, Circle #9 on the Reader Service Card.

Noise-Free Pushrods — D. C. Enterprise, Hillcroft Drive, Boston, N. Y. 14025, c/o A. Donatelli, has made available a completely noise-free pushrod. This is an all nylon, self-lubricating unit that consists of two 30" lengths of nylon tubing which slides one inside the other. This pushrod, which can be cut to any desired length, comes complete with two #2-56 x 3/4" long clevis screws. At 95c per unit, this is an excellent unit which eliminates most of the slop in pushrod installations as well as providing an RF noise-free installation from the pushrod standpoint. Tested and approved by RCM. For further information, Circle #10 on the Reader Service Card.

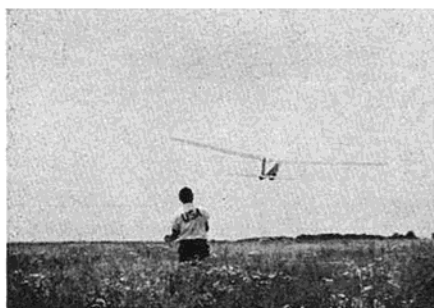
EDITOR'S MEMO

(Continued from Page 5)

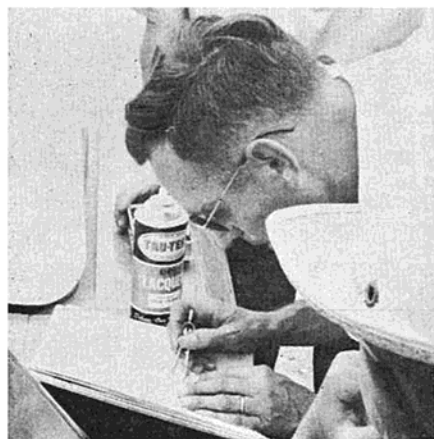
Anxious and trembling hands removed the smoke trace barograph from the glider, and a hurried examination showed the trace on the smoked drum to be about 4,000 ft. Maynard and the crowd which had gathered, sensing something important was in the wind, gathered around Maynard's car to watch the comparison of the divider measurements with that of the previously prepared graph in Maynard's notebook. The first step was to spray the smoked drum with clear lacquer to preclude smudging and destruction of the recorded altitude. Then, both Dale Willoughby, the Contest Director, and John Worth, dated and initialed the drum, which was again sprayed with clear lacquer as a means of preserving the signatures of authentication.

The dividers provided the information that a new World's Altitude Record for Telecontrolled gliders had been set at 3,770 ft. The drum was then sealed and delivered to Dr. Walt Good who would put the barograph into a Bell Jar and again calibrate the altitude.

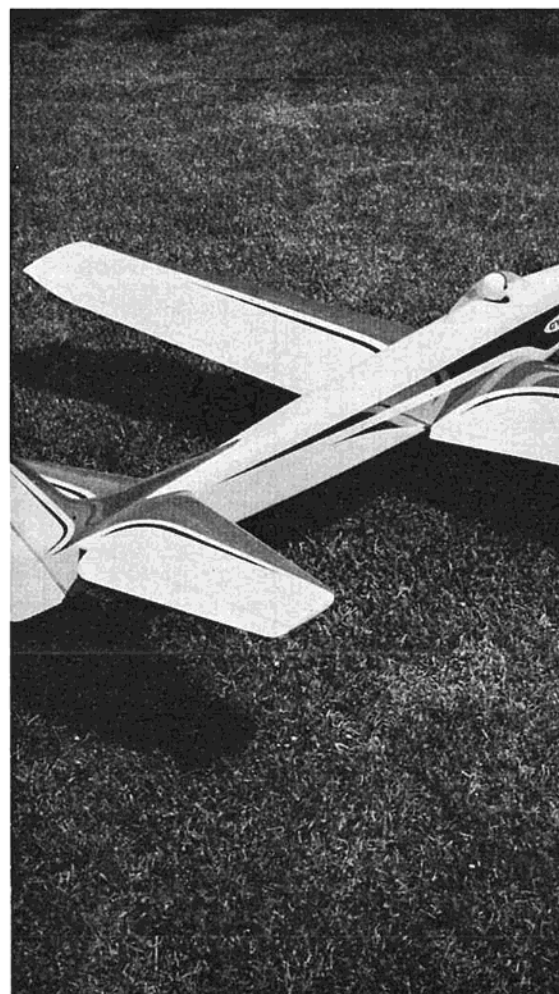
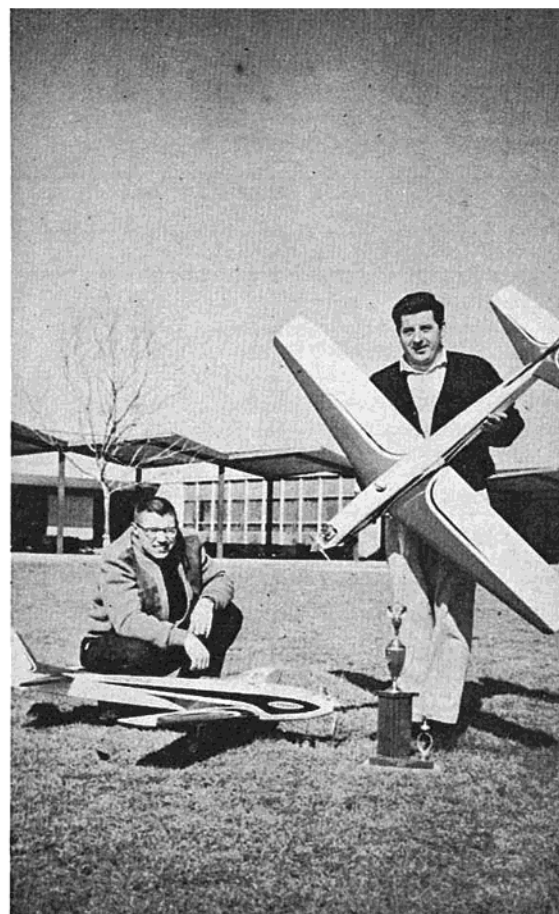
Congratulations to Maynard Hill for a new World Record!



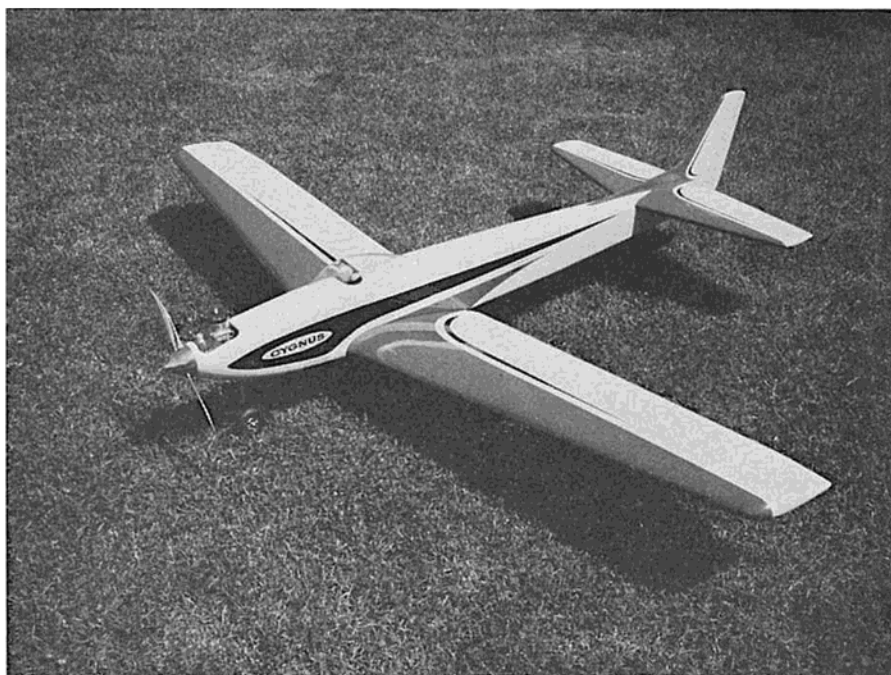
Action shot of the big R/C glider on tow from the electric winch. Note low angle of climb due to insufficient wind at Bong.



The dividers are being compared with the graph after being spaced against the trace on the barograph. First indications were about 3,550, later confirmed to be 3,770 ft.



CYGNUS

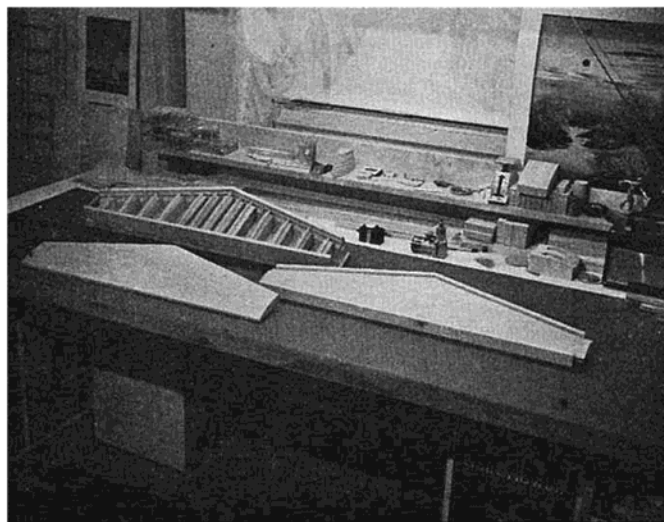
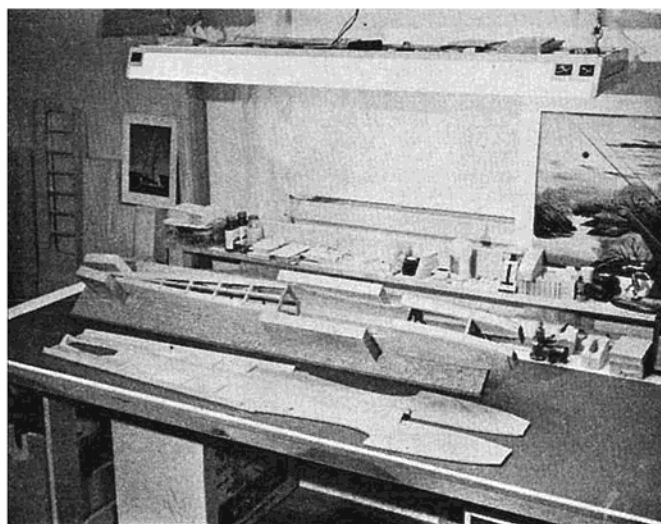
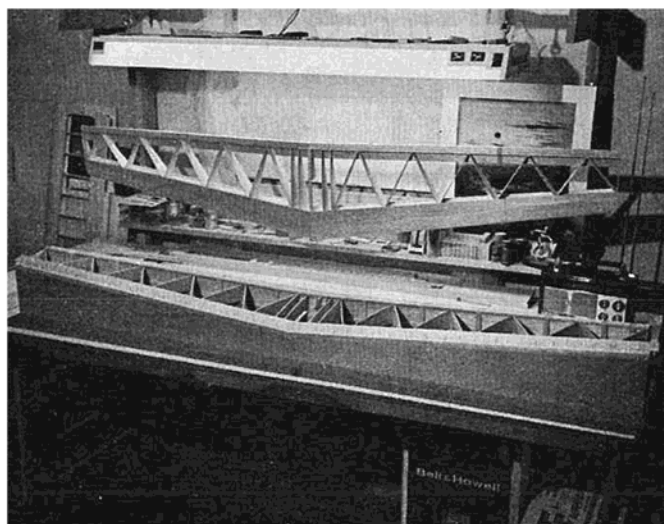


Winner of the R/C Modeler Editors Trophy at the Toledo Conference, the Cygnus is the remarkable product of its designers' dedication to an ideal of no compromise in R/C design and construction.

Photos And Text By
NICK BOZNOS
and
GORDON BELL

FAR in the back of most every modeler's mind lies a vision of the "perfect plane"; the plane he'd create if he were going to design his concept of the "ideal airplane." This vision had been haunting us for quite some time. On several occasions we discussed the various properties we'd include in each of our respective airplanes, and to our surprise, found that our ideas of what the "perfect plane" should have were basically similar. There were certain characteristics which we both felt were vital to a well-designed model. And soon the temptation to combine our efforts in creating one "ideal" ship could no longer be resisted. We thereby set forth in designing what we thought would be a most attractive airplane. But, devising an attractive plane and a functional one are not necessarily the same thing! Having built numerous kits for Class III multi-stunt ships, we had great respect for the basic aerodynamic principles

which these tried and proven, predecessors had successfully utilized. We were not so foolish as to disregard the many good features which these planes had to offer, and we wished to incorporate as many of them as possible in our own design. But there were other desirable features which the available aircraft lacked. In our design we wished to answer some of the common problems of the average modeler which the existing airplanes did not solve. One of these was to devise a sure-fire method of building a warp-free wing and stabilizer. A second feature we wished to include was a quick construction, sheet and block fuselage with clean lines. As you will see, these features and the method of building them are of some value to any modeler building a Class III ship. Another aspect which we wished to incorporate in our design was an attractively cowled upright engine with a spinner. True, engines had been



Top row: Cygnus wing jig assures perfectly true surface. Fuselage sides shown with jig. Quickly built fuselage jig assures true fuselage contours plus rapid assembly. Lower row: Stabilizer shown from jig construction to finished unit. Completed Cygnus prior to finishing steps.

cowled before in an inverted position, but this created operational difficulties in the engine itself, and we wished to avoid this. The engine, therefore, had to be upright. But the problem of symmetrically balancing a fuselage, tapered to spinner, with a cowled upright engine was more difficult than it first appeared. And it was of greatest importance that the engine, propeller, and spinner operate efficiently. After many hours of frustrating trial and error, we hit upon a feasible way to do this.

All these features make the CYGNUS more than just another Class III ship, and we hope that our experiences and findings will benefit other modelers like ourselves in building or designing future aircraft.

Wing Construction

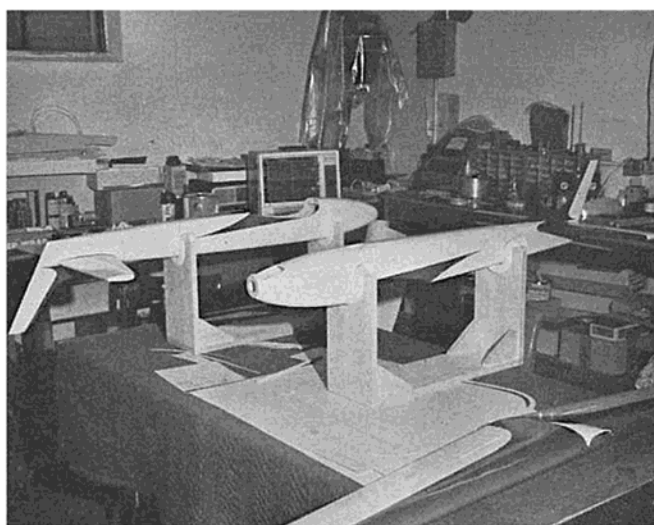
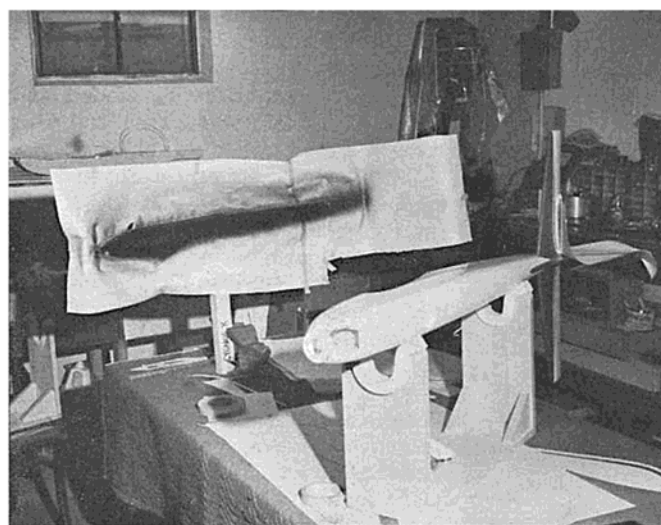
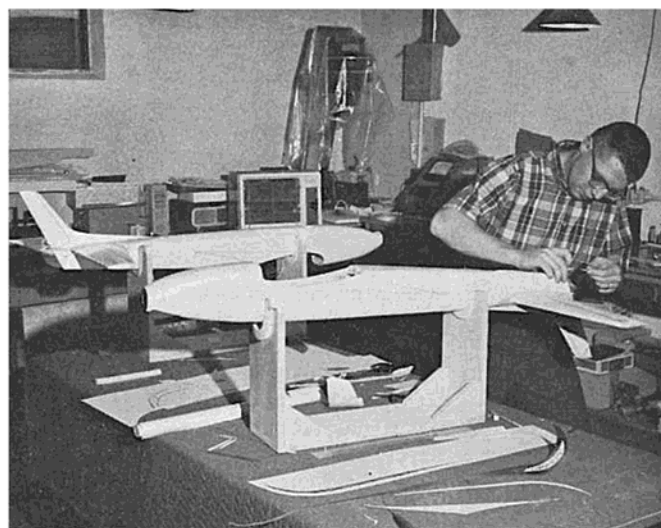
Finding the answer to a warp-free wing was not an easy task, but one thing we found invaluable in its construction was the use of a jig (see drawing). This insured a truly straight wing. The true key to the warp-free wing, however, was

in the word "Geodetic." It was through Ed Kazmirski that we were first introduced to this concept. He explained how this particular type of wing construction had the advantage of being extremely strong and rigid without adding extra weight. From these ideas, we developed our first swept-back geodetic wing. The most difficult problem we faced in developing this wing was in finding an accurate method of plotting the angular ribs. This same swept-back wing was tested March, 1964, by Ed during his demonstration tour in Japan and was found to be very successful.

The building of this wing is somewhat unconventional, but the final product is well worth the effort. The first step in building is in preparing the $\frac{3}{32}$ " sheet spars, which must be cut and marked for the rib placement and then pinned to a flat surface. Next, the small angular uprights are glued to a center line in order to keep the ribs standing on the proper angle during the construction. (The rib section, incidentally, is a modi-

fied NACA 2419-19% section.) The ribs #1S — #12S should then be glued and pinned to the spar and angular uprights where the ribs have been marked. This spar is then transferred to a perfectly flat leading-edge jig in order to complete what will be the leading-edge or "D-tube" of the wing. A $\frac{3}{8}$ " square piece of soft balsa is used to reinforce the leading edge. When dry, shape the $\frac{3}{8}$ " square by sanding to conform to the shape of the rib. Next, a pair of Taurus, pre-formed leading-edges are glued to the upright leading-edge on the jig. Securing these tightly with masking tape will insure a good job of gluing on each rib. The upper and lower $\frac{3}{32}$ " planking is added behind the preformed leading-edges in such a way that it extends about $\frac{1}{4}$ " past the full depth spar (which acts as a locking device and prevents any further movement in construction). The first and most basic part of the wing, the leading-edge, will now be complete.

The next problem is in sanding the two "D-tubes" accurately to fit at the



Top row: Cygnus fuselages in painting jigs. Author applies masking tape to trim areas. Paper is applied to fuselage and trim areas sprayed. Bottom row: Another view of fuselage masked off and first coat of red applied over basic white. Both fuselages in painting jigs with basic color and trim applied.

center of the wing. This can be done best by first building a sanding jig of "Nova-Ply" (see photograph). After having tried to sand three angles simultaneously, we can assure you that the extra time involved in making the jig is well worth the trouble. The jig was made using the basic principle of the miter-gauge on the table saw. This jig can also be made adjustable to suit any wing, whether built on the "D-tube" principle or not.

After sanding the left and right leading-edge, determine the location of the aileron servo on the $\frac{3}{8}$ " balsa center rib, and cut partially but not completely through. This will insure that the rib will retain its shape during the wing construction. The next step is in gluing the two "D-tubes" and center rib together. After these have been joined, the unit is placed on the jig. Next, the tip ribs must be added. The trailing-edge stock is securely pinned to the back of the jig, and the tip and center ribs are then glued to the trailing-edge. Masking

tape should once again be used to hold the "D-tubes" to the front uprights on the jig. The #1S and #2S ribs are now fitted and glued into place. Then fit and glue #1A through #10A into place. Note that ribs #1A - #10A are slightly longer on the plan than necessary. This was done to allow for fitting. Let the entire structure dry overnight.

A perfectly flat sanding block 1" wide by 18" long by $\frac{3}{4}$ " thick, with #100 sandpaper contact-cemented to one side, is used to lightly touch-up any high points on the ribs. After this is done, a 2" piece of $\frac{3}{32}$ " sheet is fitted and glued to the trailing-edge stock.

The next step is removing the wing from the jig and cleaning off any of the excess glue which may have dripped through. The gussets are now added to the trailing-edge and center rib. (The center rib gusset also serves as a servo mount.)

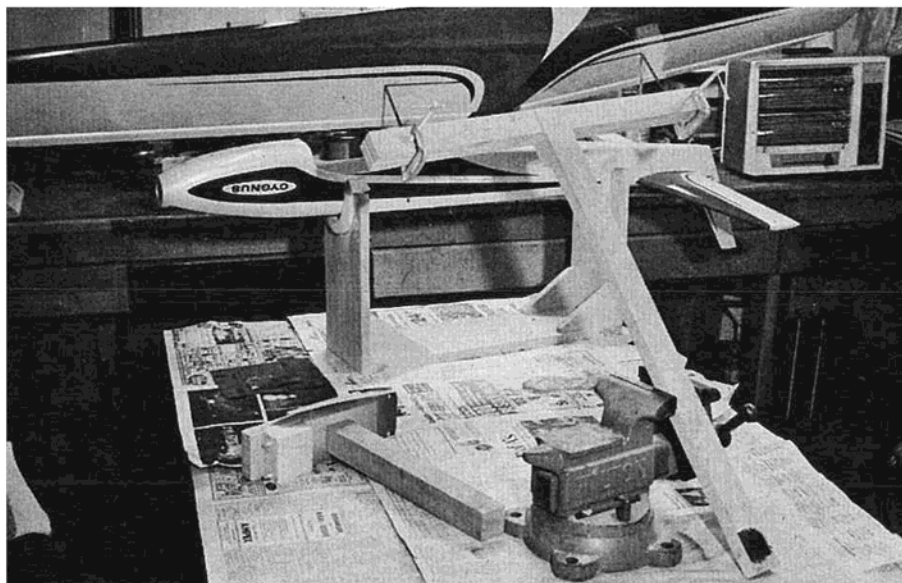
Basswood filler blocks should be used between the center rib and #2S as reinforcement for the 8-32 screws used

to hold down the wing to the fuselage. The $\frac{3}{8}$ " square balsa is added between the front of ribs #1S and #2S and the spar as shown in the plan. Next, add the landing gear blocks and $\frac{1}{8}$ " balsa wedges. Be sure to check the grain direction; this is important. The small landing gear blocks are now glued to ribs #1A in order to anchor the landing gear. Add the $\frac{3}{32}$ " plywood scabs on either side of the blocks to prevent any movement of these blocks.

Before adding the final top and bottom $\frac{3}{32}$ " sheeting, check the rigidity of the wing by holding the center section and twisting one of the tips. This will eliminate any doubts as to the possibility of future warping. If the jig is built accurately, the wing will be true. Finally, add the soft balsa tips and the wing construction will be complete.

Fuselage Construction

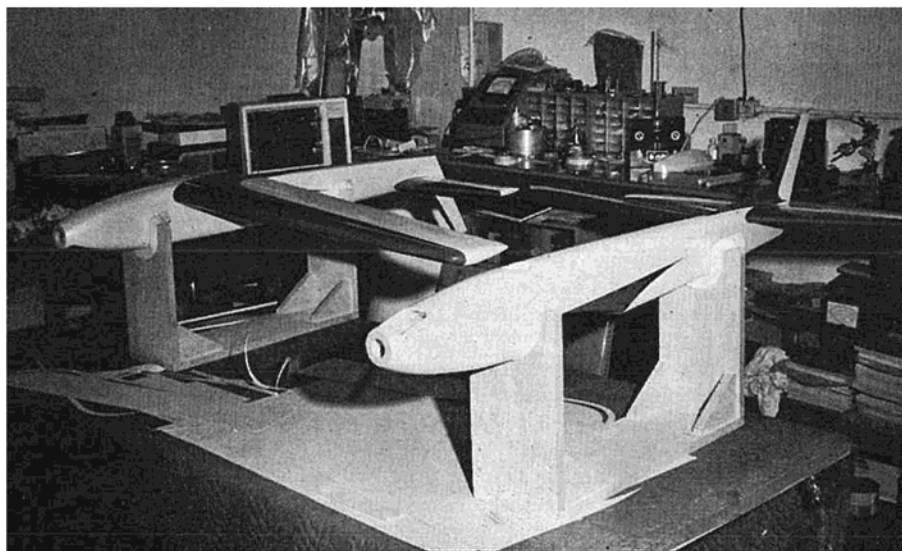
For convenience in building the fuselage, the plan has been laid out in such a way as to allow the patterns to be cut while still having the side and top views



Completely painted fuselage and wing. Jig in foreground.



Closeup of nose section of Cygnus.



Two Cygnus prototypes in authors workshop.

intact for reference needs during the construction. The fuselage sides should first be laid out and marked for the former and doubler placement, etc. The top and bottom longerons are then added. The $\frac{1}{32}$ " plywood doubler underneath the stabilizer saddle is added with contact cement. Next, the $\frac{3}{32}$ " front doublers are cut and pinned into place on the fuselage sides. The bottom edge should be cut somewhat longer so that the $\frac{3}{32}$ " plywood wing saddle may be aligned. A line should be scribed along the top of the saddle. Then all the doublers are unpinned and cut along this line for a perfect fit of the wing saddle. Before the saddle is glued, however, the 4-40 blind mounting nuts and nylon blocks for the wing hold-down are installed.

Contact cement may be used to glue the doublers behind former "C." The front doublers ahead of former "C" are glued with regular airplane glue — a glue which can be easily sanded and feathered as this will either make or break the sanding job on the front end.

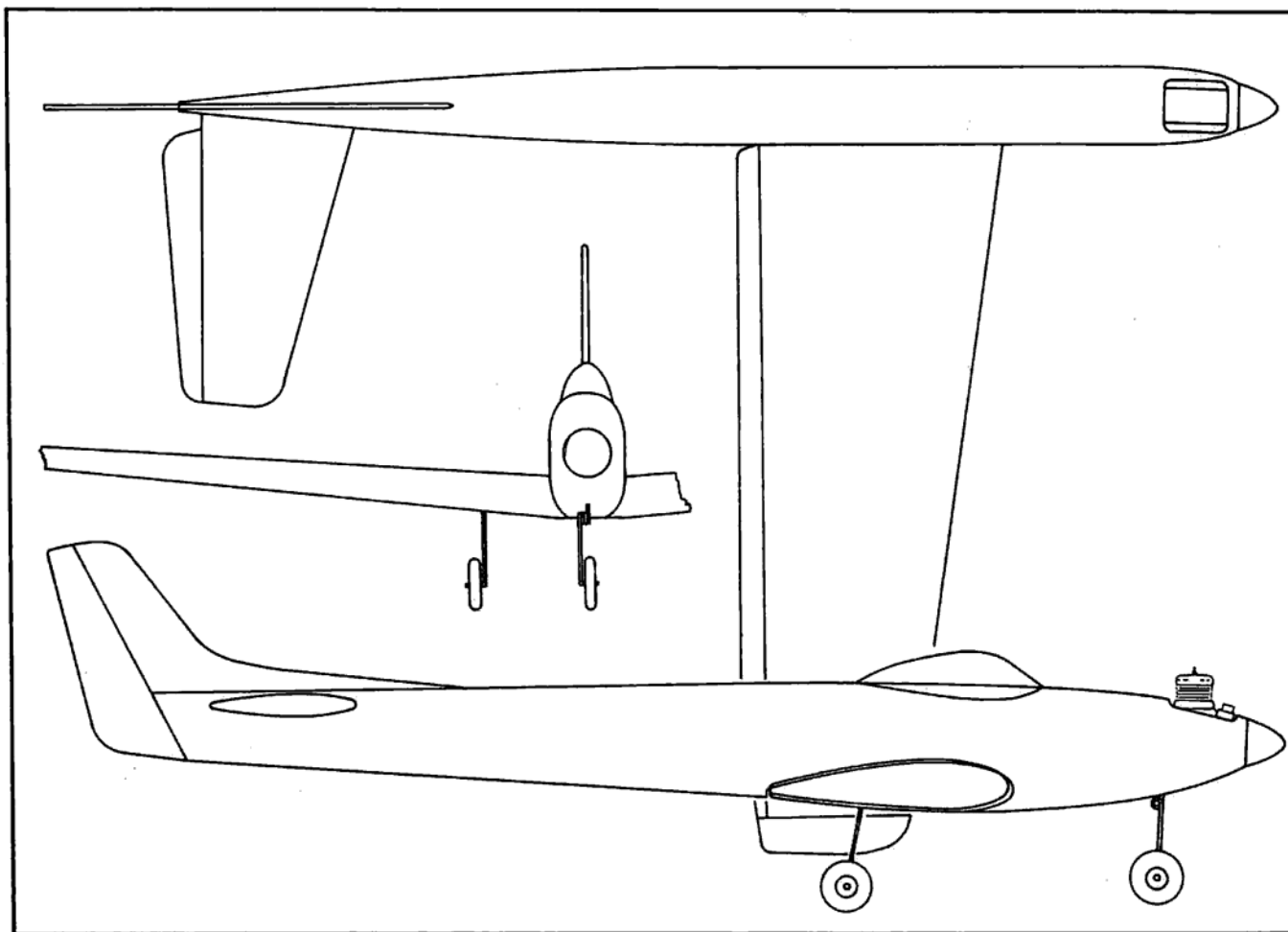
When fairly soft fuselage sides are used, the rear section needs to be stiffened up to avoid having the sides drawn in after the finish has been applied. The fuselage sides behind former "D" are beefed-up somewhat by the $\frac{3}{32}$ " x $\frac{1}{4}$ " upright and diagonal braces without adding much additional weight. (See plan.)

The front-end pieces, including nose blocks, doublers, motor mounts, and formers, are fitted separately before any are glued down. This takes a little time but saves a good deal of grief later on. The upper and lower nose blocks and doubler behind former "B" should be cut from one block of wood. This will make sanding much easier and more accurate since all the wood will be the same degree of hardness.

Now the motor mounts should be made, and then the 4-40 blind mounting nuts added in place for the specific engine being used. The corners of the mounts should be cut on an angle to allow balsa fillers to be added. This will eliminate the problem of sanding hard wood next to balsa block which makes it almost impossible to sand evenly. By adding these balsa fillers, sanding becomes a pleasure. Now former "B" is cut and drilled and the blind mounting nuts for the nose gear are added. Pieces of balsa filler are also added to the corners of former "B."

The $\frac{3}{32}$ " plywood former "C" should now be cut, with holes for battery pack, gas tank, engine control, and nose gear linkage. The balsa fillers should also be added to its lower corners. The motor mounts and formers "B" and "C" are placed over the plan, and the doublers between formers "B" and "C" are then sanded and fit into place. Next, the left and right, upper and lower nose blocks are cut and fit into place. The engine is

CYGNUS DATA SHEET



MATERIAL LIST

Fuselage:

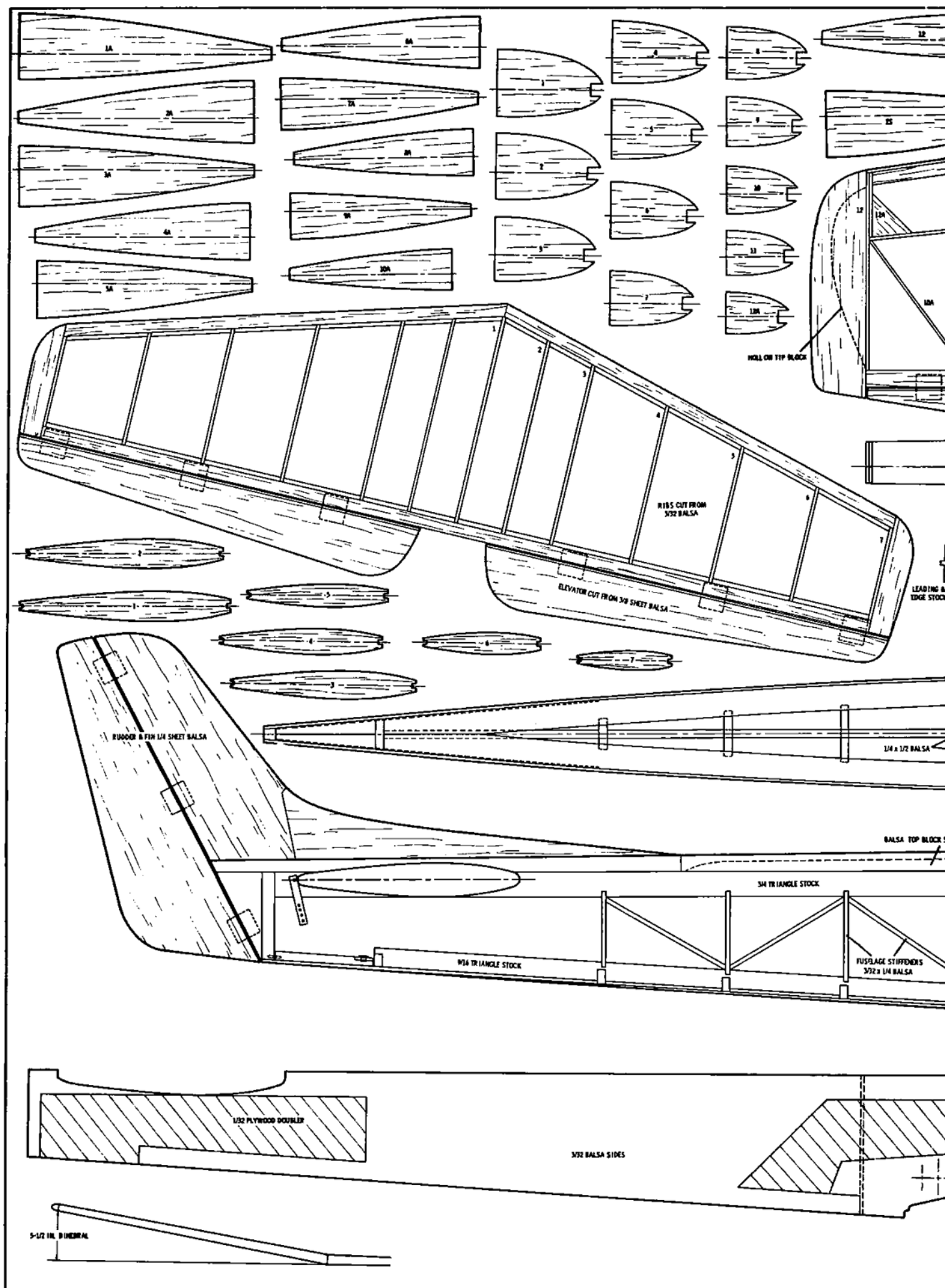
- 2 — sides — $\frac{3}{32}$ x 4 x 48
- 1 — top block — $\frac{5}{8}$ x $3\frac{1}{2}$ x 36
- 2 — top longerons — $\frac{3}{4}$ x 48 (45 degrees)
- 2 — bottom longerons — $\frac{5}{16}$ x 22 (45 degrees)
- 2 — doubler — $\frac{3}{32}$ x 3 x 36
- 2 — saddles — $\frac{3}{32}$ x 3 x 16 (plywood)
- 1 — bottom stringer — $\frac{1}{4}$ x $\frac{1}{2}$ x 46
- 2 — fuse stiffeners — $\frac{3}{32}$ x $\frac{1}{4}$ x 36
- 2 — formers — $\frac{3}{32}$ x $3\frac{1}{8}$ x 5
- 1 — former — $\frac{1}{4}$ x $3\frac{1}{8}$ x 4
- 1 — front doubler — $\frac{3}{4}$ x 3 x 24
- 1 — fuse bottom — $\frac{3}{32}$ x 3 x 36
- 2 — $\frac{1}{32}$ ply doublers — $\frac{3}{32}$ x $2\frac{1}{2}$ x 10
- 2 — motor mount, hardwood — $\frac{3}{8}$ x 1 x 10
- 1 — fuse bottom front — $\frac{3}{4}$ x $2\frac{1}{4}$ x 10

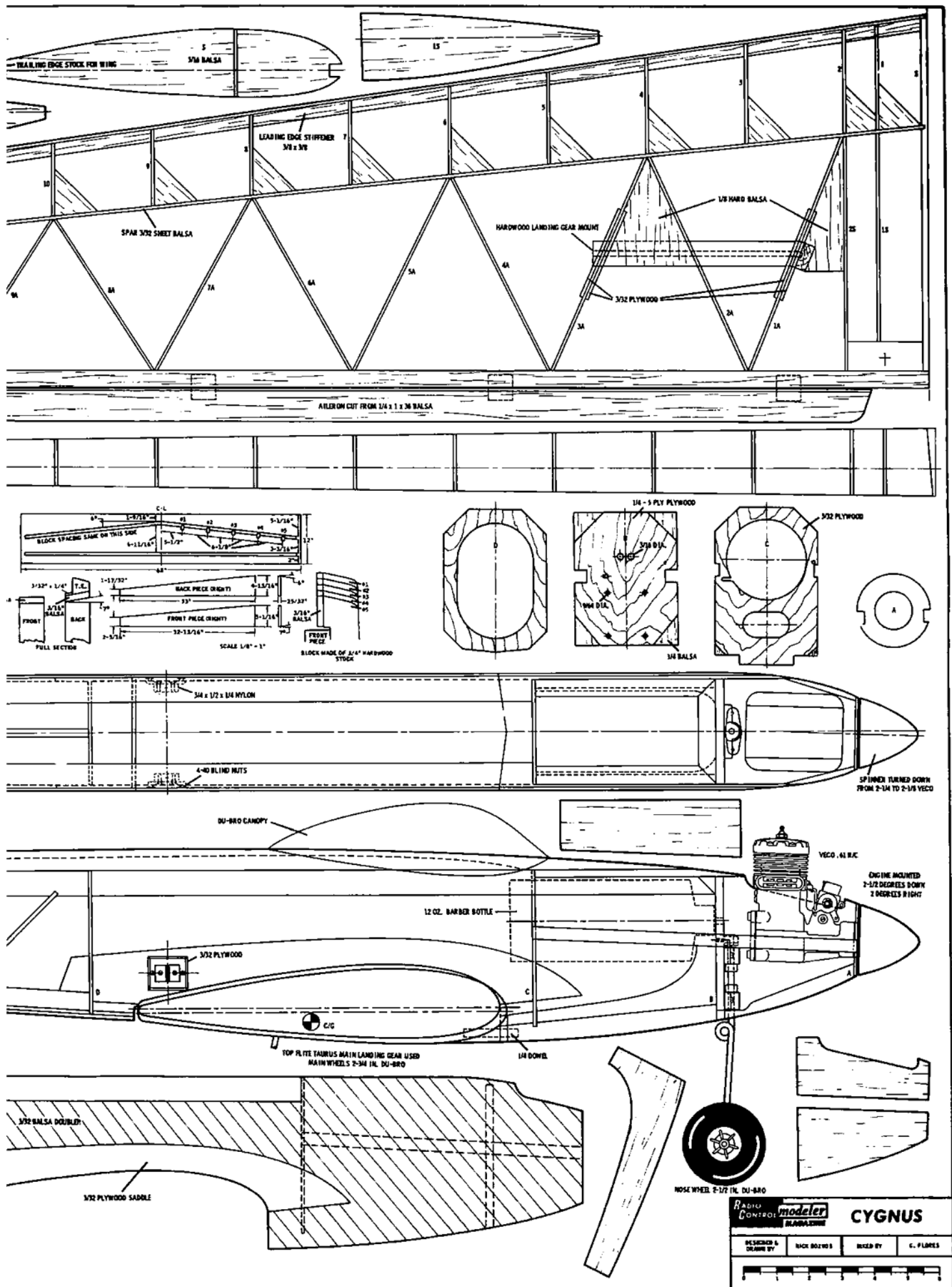
Wing:

- 1 — spars — $\frac{3}{32}$ x 4 x 36
- 2 — trailing edge — $\frac{1}{2}$ x $\frac{1}{16}$ x 36
- 2 — leading-edge stiffener — $\frac{3}{8}$ x $\frac{3}{8}$ x 36
- 2 — forward leading-edge — $\frac{3}{32}$ x 4 x 36
- 4 — planking — $\frac{3}{32}$ x 3 x 36
- 4 — planking — $\frac{3}{32}$ x 4 x 36
- 2 — ailerons — $\frac{1}{4}$ x 1 x 36
- 3 — tips and blocks — $1\frac{1}{2}$ x $1\frac{3}{4}$ x 7
- 2 — rib angle supports — $\frac{3}{32}$ x $1\frac{1}{4}$ x 12

Tail Group:

- 1 — rudder — $\frac{1}{4}$ x 4 x 36
- 2 — leading and trailing edge — $\frac{1}{2}$ x $1\frac{1}{8}$ x 26
- 2 — planking — $\frac{3}{32}$ x 4 x 36
- 1 — planking — $\frac{3}{32}$ x 3 x 36
- 1 — $\frac{3}{32}$ rib stock — $\frac{3}{32}$ x 4 x 36
- 1 — elevators — $\frac{3}{8}$ x 3 x 36







screwed down to mounts, and all the parts are then placed into position to assure a proper fit.

The doublers must now be marked to allow for the proper downthrust. (Check this carefully against the plan.) Then, glue down one motor mount, formers "B," "C," and "D," and the doubler between formers "B" and "C" to one fuselage side. On the other fuselage side, glue the other mount and doubler. Allow this much of the construction to dry thoroughly overnight.

Now you can take up the fuselage side with the mount and doubler and fit it to the other side with the formers. Add the tail block to the fuselage side with the formers and weight-down for a tight fit.

A simple jig was made to insure a straight fuselage when gluing the tail cone together. This is shown in the fuselage construction photo. When the fuselage is in the jig, glue in the bottom $\frac{1}{4}$ " by $\frac{1}{2}$ " cross-pieces. Allow this to dry. Then sand the stringer and add the bottom $\frac{3}{32}$ " sheet while still in the jig. This way the fuselage will remain straight after it is taken out of the jig.

After removing the fuselage from the jig, add the upper and lower nose blocks and the $\frac{1}{4}$ " upper doubler between form-

ers "B" and "C" above the motor mounts. Then add the short longerons to these doublers and to the upper-back of former "B." These are important when the sanding and shaping operation is started. They will be utilized since the top block is very tapered. Next, the $\frac{1}{4}$ " sheet should be fitted and glued into place over the fuel tank. After this has been done, fit the bottom $\frac{1}{2}$ " balsa blocks under the engine and battery pack.

Before gluing on the top block, the engine should be screwed down to the mounts, and the plywood piece behind the spinner should be fitted. A hole the same diameter as the crankshaft must first be drilled in the center of a $2\frac{1}{2}$ " square piece of $\frac{1}{8}$ " plywood. This piece is then slipped over the shaft and pushed snugly against the mount. Next, the spinner backing plate is put on the shaft. The spinner used is a Veco $2\frac{1}{4}$ " which has been turned down to $2\frac{1}{8}$ " as shown on the plan. The spinner is assembled on the engine, and a line is carefully drawn around the spinner. Another line $\frac{1}{16}$ " outside the outline of the spinner is drawn to allow for contour when the final sanding and shaping is done.

To insure a proper fit when gluing the top block to the fuselage, a very large

sanding block of "Nova-Ply," 6" wide by 48" long, with #100 sandpaper contact-cemented to it, should be made. This sanding block is put on the floor or clamped to a bench, and the top of the fuselage is then sanded perfectly flat on this block. The top block is also sanded perfectly flat before gluing. This will make a perfect joint between the longerons and block. The top block may also be hollowed slightly to reduce the weight of the fuselage. When gluing the top block to the fuselage, masking tape should be wrapped all around to assure a tight fit. Allow this to dry 24 to 36 hours. There is nothing more frustrating than to begin shaping the fuselage with a razor plane and have the top block come up because the glue has not yet thoroughly dried.

Sanding the fuselage is best done by holding the fuselage between your legs and using the old "shoe-shine" technique. This should make it entirely symmetrical. Check to see that the spinner fits properly while the final sanding on the nose is being done.

Stabilizer Construction

A flat surface is all that is required in building the stabilizer. The leading and

(Continued on Page 18)

trailing edges are cut according to the cross section on the plan, as shown. The ribs are now cut, pinned, and glued to the trailing-edge stock in place over the plan. Next, the leading edge is added. Sheet the top with $\frac{3}{32}$ " sheeting. Then the excess trailing and leading edge stock is trimmed down. Sand and shape the contours before adding the tips. This completes the actual stabilizer construction.

The fuselage jig is used again to properly align the stabilizer and rudder to the fuselage. After the fuselage is replaced in the jig, top side up, center lines are lightly drawn on the leading and trailing edges of the stabilizer. The stabilizer is then fitted to the saddle. As it is fitted, it should be checked for alignment by using a square to measure the distance between the flat surface of the bench and the lines on the stabilizer. When an accurate fit has been achieved, glue the stabilizer to the fuselage, re-checking for alignment during the process. Allow the glue to dry overnight.

While the fuselage is still in the jig, draw a light center line on the top block to determine the proper placement of the rudder. Once this is done, the slot may be cut. Glue in the rudder-fin and stabilizer and sand to shape. The wing fillet is added after the wing has been fitted to the fuselage. This fillet has the $\frac{1}{4}$ " dowel rods which align and hold the wing to the fuselage. The 8-32 2" oval-head screws are used to hold the rear of the wing to the fuselage. The entire structure should be sanded lightly with very fine sandpaper as the last step in the construction.

Finishing Procedure

Although your own individual taste will guide you in trimming the airplane, you may find some of our suggestions helpful in obtaining a durable and lustrous finish.

Once again, special fixtures were made for holding the wing and fuselage during the finishing operation. (See photograph.) It may seem to you that the numerous jigs and devices, used throughout the various steps of building and finishing, are too much work to build for just one plane. Remember, however, that they can be used again, with some modifications, on other airplanes. The painting fixtures enabled us to rotate the entire wing or fuselage in one hand, leaving the other hand free to spray-paint. A second advantage was that after the painting was done, the fixture still

holding the wing or fuselage was clamped in a vise, allowing the wing or fuselage to dry untouched.

The procedure outlined here is basically the one we followed in finishing our planes for the Toledo Conference. Naturally, special care and effort went into this finishing project. If you are more familiar with the use of dopes than with acrylic lacquers, dope may be substituted. As stated, finishing the airplane is purely a matter of personal preference.

The first step in finishing the airplane is in applying several coats of "Hobby-poxy" glue, with sanding and scraping between coats. When the "Hobby-poxy" has completely cured, fiberglass tape is resined to the center portion of the wing and feather-sanded. Now, several coats of acrylic primer are applied and wet-sanded between coats to obtain a smooth finish. White acrylic lacquer is then sprayed over the entire model as an under-base for the pearl. When this has dried, the pearl is then evenly sprayed over the entire airplane. Immediately after the pearl has been applied, several coats of acrylic clear are sprayed on. This layer of clear will give added depth to the pearl.

To avoid marking or denting the finish, the paint should be allowed to dry for several days (or until hard) before the taping for the trim colors is done. After all the trim painting is completed, it is again most important that adequate time be allowed for all paint solvents to thoroughly dry before a final coat of clear is applied. This final coat is applied because when dry, the acrylic clear is a hard material that can be readily polished to a high luster. To achieve a beautiful finish, however, patience is very important.

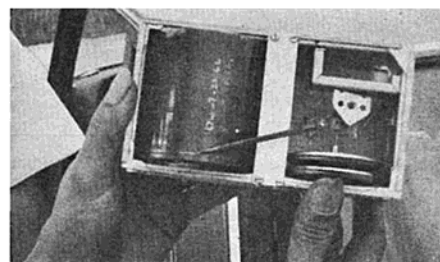
We designed the canopy used on the CYGNUS; it was manufactured by Du-Bro Products, and is available through them. The wheels used are Du-Bro's low-bounce wheels. The nose wheel is $2\frac{1}{2}$ " and the main gear wheels are $2\frac{3}{4}$ ".

The most difficult step in completing our plane was choosing the right name. In case you're curious about the name we gave our design, Webster defines CYGNUS as, "A northern constellation . . . in the Milky Way," and also as "a young swan." (We hope that this trivial bit of information does not lead you to conclude that the CYGNUS is our "swan-song" in the area of designing.)

We felt very honored to have received the "Radio Control Modeler Award" for best finish at the Toledo Conference last February. This, plus the satisfaction of seeing a completed airplane from that which had started out as a thought in the back of our minds, made all the effort worthwhile. In conclusion, we hope that our experience will encourage and assist other modelers like ourselves to create new and better designs.



About 52 minutes later the big bird had been flown to maximum altitude to just under the base of the biggest and darkest cloud and this photo shows it just after landing.



Innards of the barograph showing the trace, the initials of Dale Willoughby and John Worth and the date. Unit weighed 6 ounces, and was rigged to record up to 22,000 ft.



First look at the smoke barograph taken from the glider after descent from what was supposed to be near 5,000 ft.



Congratulations to Maynard Hill's newest record . . . R/C Glider Altitude being offered by Dale Willoughby, the FAI Contest Director at the site and participant in the Record Trials.



MAYNARD HILL SHATTERS WORLD SPEED RECORD

U.S. F.A.I. delegate for R/C captures sixth record victory. 140.28 m.p.h. set at Westover A.F.B.

Maynard Hill is congratulated by Cliff Piper, Contest Director, on breaking yet another world's record. Planning and hard work paid off for both.

MAYNARD L. HILL, Silver Spring, Md., holder of more world's records than any American, captured his sixth FAI world victory on June 26 by sending his R/C speed model through the traps at an average of 140.28 mph, during recent trials at Westover AFB. The record attempt, part of an open house at Westover, broke the previous record of 126.9 mph, set in 1963 by Bob Scott and Don Jehlik at Dahlgren, Virginia.

Maynard's speed record model is an original design with 36" span and weighing about 3½ pounds. Power was provided by a Supertigre 60 using Hill's own fuel mix. Radio equipment was a Dee Bee Quadruplex 21 operating aileron, elevator, and engine. Maynard had been furnished an unlimited number of props for the speed tests prior to the Record Trials by Top Flite's Sid Axelrod, which assisted materially in utilizing the power available from the stock ST .60. Hill revealed that he had analyzed the sound of the airborne engine which was recorded on tape and then played back on scientific equipment to determine if the maximum efficiency of the engine was being utilized. Though not used on the record breaking flight, a

four-bladed Top Flite prop was the choice as indicated by the equipment to provide the most thrust for the fuel/weight combination. Another Top Flite speed prop was used, according to our reports.

Lou Andrews served as crew chief for the flight which consisted of ten passes in opposite directions through the 656 ft. course. The record breaking flight was flown at 2/3 throttle, except when not actually going through the 100 meter entry or the 200 meter course. From watching Maynard fly, it seemed apparent that he was not utilizing full power due to the torque. It was also evident that he was not going full bore through the entry course, which could have upped his top speed. As it was, the downwind pass was clocked at 2.97 seconds, or better than 150 mph, while the fastest upwind pass (out of ten) was clocked at 3.4 seconds.

The FAI Record Trials were held under the sponsorship of the Hampton County, Massachusetts, R/C Club, and were directed by Mr. Cliff Piper. Major John Fahr, USAF, was instrumental in obtaining the use of the SAC base at Westover for the trials. He is a member of the HCRC, and was official "Project

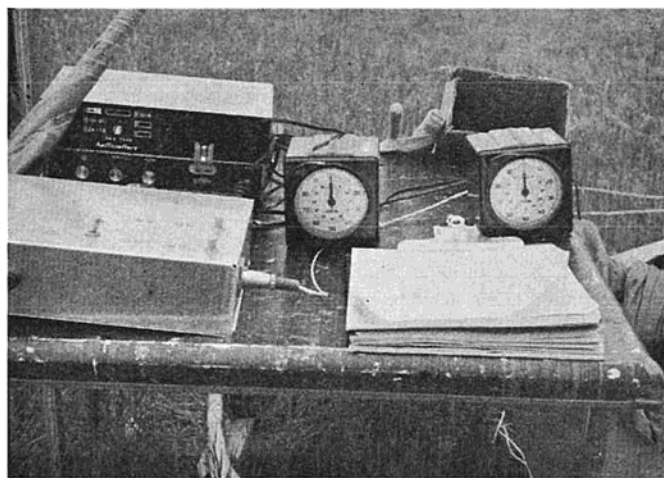
Officer" — which, in effect, means to start a project from an idea and build it into a completely planned and well supervised event. The Air Force declared "open house" on Sunday for the event, in spite of having heavy bombers "on the alert" at the end of the runway.

Other participants in the Record Trials were Fran Mitchell and Marvin Kawalewski, who consistently flew too high to register official speed runs.

For Maynard Hill, congratulations for yet another record. Last year, Hill captured the straight-line distance record from a Russian by flying an eight-foot model 183 miles from Batavia, N. Y. to Canajoharie, while riding in a convertible on the New York State Thruway. Hill also took from Russia the duration record with a flight of 8 hours 52 minutes, while circling a field near his home, and at the same site, took the world's closed course distance record with a flight of 173 miles. Maynard also shares the world's glider speed record with a fellow team member. Hill's present plans include attempting to recapture the altitude record which now stands at 16,610 feet. Hill held the record from 1963 until last year with a flight to 13,328 feet.



Maynard Hill, who is the U.S. delegate to F.A.I. for Radio Radio Control Committee, explains the rules and procedures in a briefing of the members of Hampton County Massachusetts RC Club. Fourteen RC fliers were used as flagmen, timers, recorders, observers, etc.



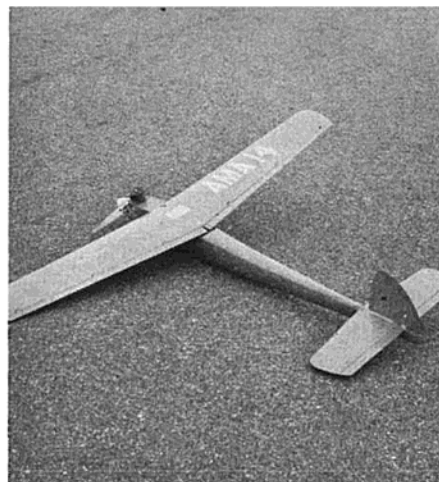
Timing equipment consisted of a double set of electric clocks, calibrated to 1/100th of a second, individually controlled by a button microswitch. The timers used a sighting bar (double poles) erected at either end of the speed trap as a means of starting the clocks. Equipment furnished by DCRC.



Last minute changes in prop and top-off fuel tank for official run. Maynard very methodical, almost as if he maintained a mental "checkoff list."



Lou Andrews holds speedster as Maynard cranks. Super Tigre 60 started at half throttle. Fuel was mixed last fall for the Altitude trials, aged in bottle as shown, proved reliable and sufficient.



Full view of the world's record holder taken immediately after the record run. Flew with elevator and ailerons on Dee Bee radio. Note small control surfaces.



The FAI Sporting Code in part 5, specifies that the loading of R/C models must be between 3.95 oz./sq. ft. minimum and 24.51 oz./sq. ft. maximum. The model must be weighed with fuel aboard and must not exceed 11.023 lbs. After the model was weighed, the scales must be verified. Maynard's scales held a 5 kilogram weight which had been certified and stamped by the Bureau of Weights and Standards.



This delta, powered by a Rossi 60, taken from a Carrier model, made a one-way official pass of 132.6 mph, however the FAI Sporting Code specifies the model must pass through the speed trap both ways without any intermediate landing within 30 minutes. Flown by Fran Mitchell. Also in competition was Marvin Kawalewski with a delta, but he, too, had trouble keeping below the 98 foot mark on official runs.



1966 A.M.A. NATIONALS

GLENVIEW NAS, CHICAGO, ILLINOIS

WRIGHT BROTHERS MEMORIAL

WRIGHT-PATTERSON AFB, DAYTON, OHIO

1966 A.M.A.

CLASS I Junior-Senior

1st — Robert Williams
2nd — Michael Ritter
3rd — Robert B. Greer

CLASS III JSO

1st — James Whitley
2nd — Neal Kilby
3rd — Phil Kraft

N.M.P.R.A. GOODYEAR

1st — Phil Kraft
2nd — Lou Penrod
3rd — Cliff Weirick

SCALE FLIGHT ACHIEVEMENT

Bud Atkinson

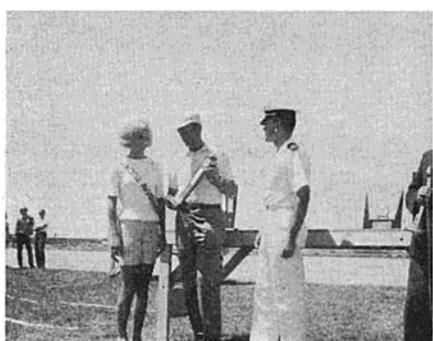
CLASS I Open

1st — Jackie Gardner
2nd — Gary Villard
3rd — Bernie Williams

AMA PYLON

1st — Austin Leftwich
2nd — Ted White
3rd — Peter Reed

Jim Whitley, 3-way winner of first in Class III, plus highest total points and best single flight.



Neal Kilby, 2nd Class III



Phil Kraft, 3rd Class III



Bill Thomas, 1st Class III



Bill Knost, 2nd Class III



Jackie Gardner, 1st Class I



Gary Villard, 2nd Class I



Bud Atkinson, 1st Scale



Ralph Jackson, 2nd Scale



Charles Smith, 3rd Scale

NATIONALS

HIGHEST TOTAL POINTS

Bobby Williams Cl I JS
Jackie Gardner Cl I O
William Thomas Cl II
Jim Whitley Cl III

CLASS II JSO

1st — William E. Thomas
2nd — Bill Knost
3rd — C. W. Reed

SCALE

1st — Bud Atkinson
2nd — Ralph Jackson
3rd — Charles Smith

BEST SINGLE FLIGHT

Mike Ritter Cl I JS
Jackie Gardner Cl I O
Bill Knost Cl II
Jim Whitley Cl III

A portion of the Goodyear lineup and excellent spectator attendance.



Austin Leftwich, 1st A.M.A. Pylon



Lou Penrod's fast Shoestring —
2nd Goodyear



Mike Ritter, 2nd Class I Jr-Sr



Bobby Williams, 1st Class I Jr-Sr



Part of the scale lineup at 1966 Nats



Joe Bridi's twin Piper Comanche



Ken Bard's Junkers JU-87B-2



Howard Bonner flags off Goodyear heat



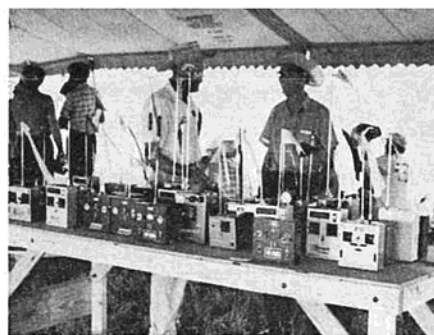
Phil Kraft's winning Goodyear racer



Walt Burgen's Pitts Special



Ralph Jackson's 2nd place Comanche



Transmitter impound area



Maynard Hill & Clare Waas with altitude glider



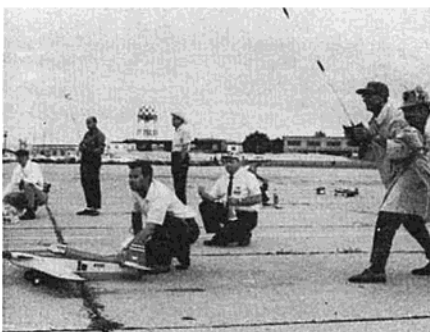
Japanese visitors with Ron Murray of Royal Products



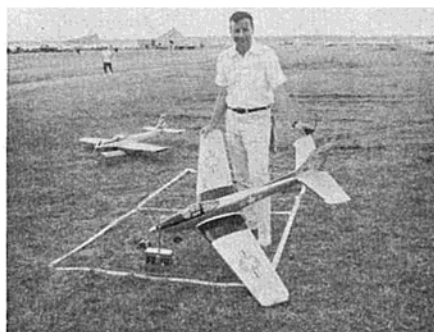
One of the frequent bull sessions.



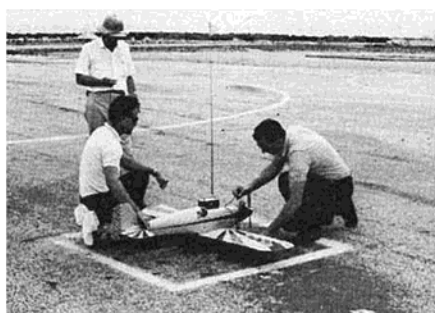
Realistic PT-19 by Maxey Hester



RCM's Bernie Murphy holds new Goodyear prototype



Tony Bonetti and original Class III



Ernie Huber and excellent Sportmaster



Bryan Lakin and Deb-N-Air



Maxey Hester with new size Goodyear



Monitoring area at '66 Nationals



Jim "Hammerhead" Fielding



Phil Kraft and 1st place Goodyear Trophy



Weirick and Spreng talk it over



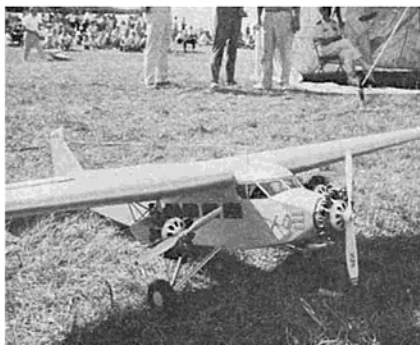
Judges watching Jim Grier's flight



Miss Model Aviation and friend



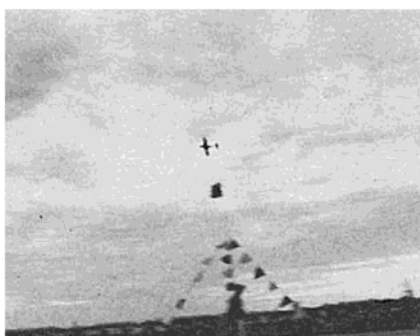
RCM's Jerry Kleinburg



Closeup of Ford Tri-motor



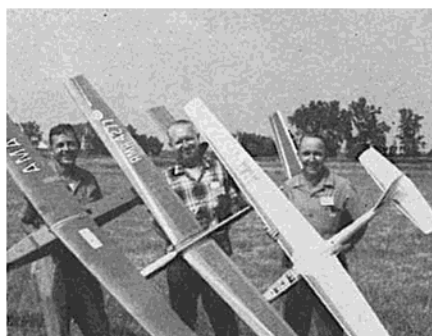
Loren Tregalles' Deltair



Goodyear machine rounding pylon



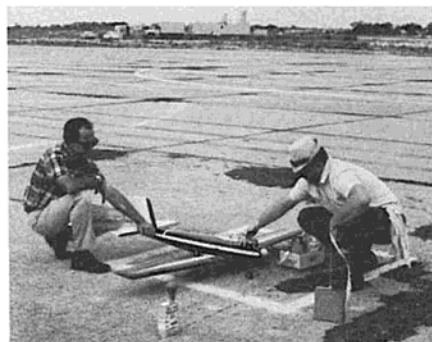
Larry Jensen's Candy-Bosch



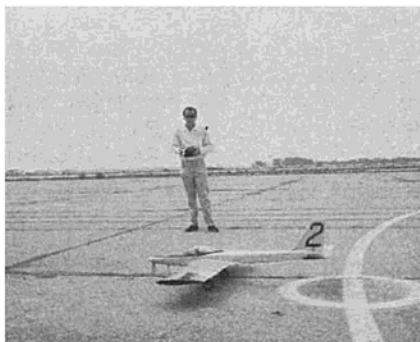
Hill, Willoughby and Good with gliders



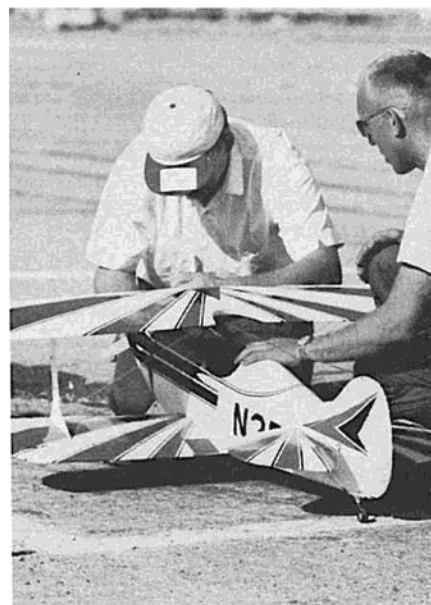
Don Sump, oldest R/C contestant



Kraft holds for Whitley



Doug Spreng and Thunderstormer



Wally Burgen and Pitts Special



Winners, officials, and meet organizers at 1966 Wright Brothers Memorial event.

4TH ANNUAL WRIGHT BROTHERS MEMORIAL

W.O.R.K.S. Annual at Wright-Patterson AFB proves to be finest Radio Control Meet of the year. By Chuck Waas.

ONE of the best R/C contests in the world—at least that is what one well known R/C expert said about the recent contest held June 18 and 19 at Wright Patterson AFB, Ohio. The contest, sponsored by the Western Ohio Radio Kontrol Society (WORKS), was blessed with two days of excellent flying weather, 93 contestants from 13 states and Canada, excellent prizes (including twelve new Super Tigre engines donated by World Engines, Inc.), and one of the best flying sites in the world—Wright Field. Wright Field may be a wee bit small for today's 500,000 lb. B-52 bombers, but is more than adequate for R/C models. The Air Force also provided other critical support functions such as concessions, electric power, drinking water, and the ever popular privys.

The importance of this contest is illustrated by the fact that four of California's fliers flew in for the contest—

Cliff Weirick, Phil Kraft, Larry Leonard, and Chuck Waas (RCM staff member), the latter flying RCM's 6 place Cherokee. This contest was also selected as one of the regional contests to qualify contestants for the September fly-off to select the U.S. 1966 FAI R/C team. Mr. Ed Izzo, Dewitt, N. Y., won the Class III-Expert event and automatically qualified for the September fly-off. Ed was flying his original Javelin powered by a Super Tigre 60 and using Kraft KP-6 radio gear. A fly-off was held for the top five Class III-E contestants for the Jack Port Memorial Trophy in memory of the late Jack Port, one of the founders of the WORKS and a former NATS winner. Phil Kraft, flying a Kwik-Fli II powered by an Enya 60 and using Kraft KP-4B gear won the fly-off which used the FAI pattern.

One mid-air collision occurred late the second day during the Open pylon race when Larry Leonard's plane

(Northridge, Calif.) scraped the wing of Ed Sweeney's plane (Washington, D. C.) and lost part of his wing tip. Ed continued in the pylon race with a ripped wing covering but Larry made a successful, emergency landing with his ailerons reportedly jammed. East meets West as they say.

The high point of the contest from the spectator's view was undoubtedly Limbo and Combat. Jimmy Grier, Chicago, Ill., who had a string of five consecutive Class III-E wins broken when he experienced equipment troubles, finally got everything working right to make nine consecutive passes under two streamers 5' above the ground and 50' apart. In combat Jim again came out on top when paired with George Spadie, Pleasure Ridge, Ky., who was flying a delta. Jim's "Anonymous," also dubbed the "Mean Green Thing," was not as maneuverable as George's delta, but Jim's greater experience made a real

even show.

The Goodyear Pylon event, tried for the first time this year at the WBMRC, would have been a real flop without the presence of Cliff Weirick and Phil Kraft. This event indicates that the California flyers have a real lead on the rest of the nation in the Goodyear event.

Scale was again well represented with first place going to Hale Wallace, Endicott, N. Y., for his excellent P-63 Kingcobra. Bill Laubengayer of Allen Park, Michigan, was second with his scale PT-19.

Two Class III airplanes were equipped with wing flaps. Ed Sweeney, flying a prototype of Carl Goldberg's Sr. Skylark (an excellent flying plane that may not see production) used perforated, split flaps that permitted him to make very slow landings and short takeoffs. James Fielding, Champaign, Ill., had his Hammerhead design equipped with flaps on about 1/3 of the wing's trailing edge. He stated that he achieved decreased landing speed, improved low speed control, and shorter take-offs. He also had a sixth servo in his plane to provide needle-valve adjustments in flight.

In the opinion of RCM, the 4th Annual WBMRC was the finest radio control contest we have attended. Nationally attractive in its scope, and outstanding in administration, the Wright Brothers Memorial is the meet to watch in coming years. With the prospect of a separate R/C Nationals not too far distant, the Wright Brothers Memorial would be our choice for the "big event of the year."

RCM offers its congratulations to the Western Ohio Radio Control Society for their outstanding contribution to the competitive sport of radio control, and for their hospitality at this fourth annual event.

Results of 1966 Wright Brothers Memorial Radio Control championships:

Class III Expert

1. Ed Izzo, Syracuse, N. Y.
2. Phil Kraft
3. Jack Dunn
4. Harold Parenti
5. Don Ballreich
6. Harold Coleson

Class III Novice

1. Bob Mitchell, Huntsville, Ala.
2. Ken Schneider
3. A. P. Annis
4. Keith Finkenbiner
5. David Corven
6. James Goad

Class II Jr-Sr Open

1. W. A. Knost, Tulsa, Okla.
2. Charles Williams
3. Bud Atkinson
4. Jack Clapp
5. W. E. Bertrand
6. D. M. Penry

Class I Open

1. Bernie Williams, Birmingham, Mich.

2. M. C. Reed
3. Dallas Armstrong
4. L. F. Gerber
5. Clarence Houk
6. Garry Villiard

Class I Jr-Sr

1. Michael Ritter, Gobles, Mich.
2. Robert Greer
3. Robert Williams
4. Paul Siegel
5. Bob Woods

Scale

1. Hale Wallace, Endicott, N. Y.
2. W. Laubengayer
3. Ralph Miller
4. W. E. Bertrand
5. Bill Wischer
6. Mel Santmyers

Goodyear Pylon

1. Phil Kraft, Monterey Park, Calif.
2. Cliff Weirick
3. V. Springer
4. Bob Campbell
5. Harold de Bolt

Open Pylon

1. Harold de Bolt, Buffalo, N. Y.
2. Maurice Woods
3. Harold Coleson
4. William Fryer
5. Jim Grier

Limbo

1. Jim Grier, Chicago, Ill.
2. John Day
3. Bob Campbell (Tie)
3. Hal de Bolt (Tie)

Combat

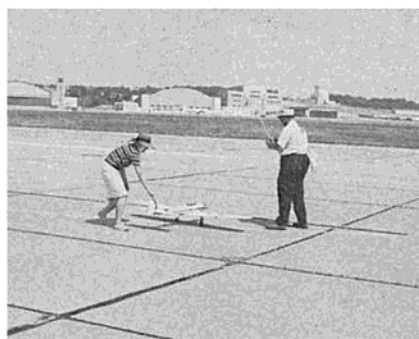
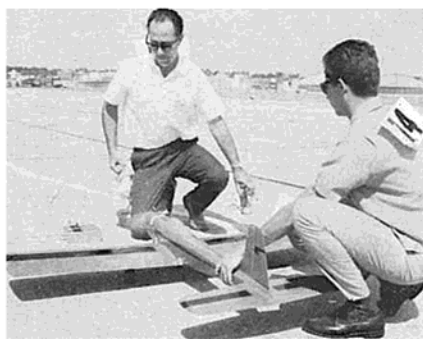
1. Jim Grier, Chicago, Ill.
2. Harold de Bolt
3. George Spadie (Tie)
3. Harold Parenti (Tie)

FAI Flyoff for Jack Port Memorial Trophy by top 5 Class III Expert flyers

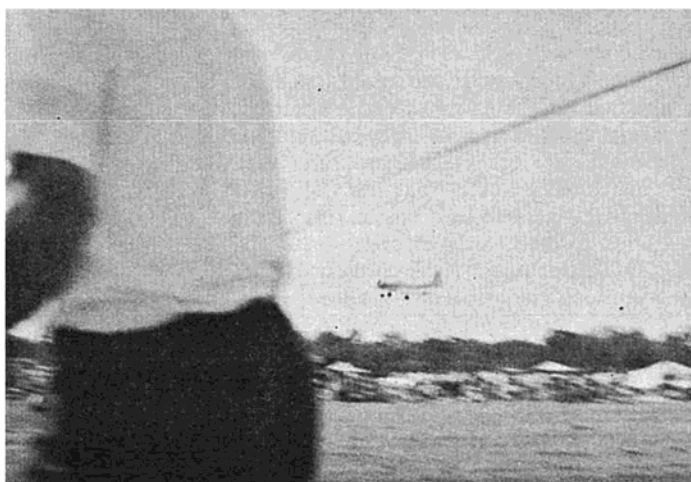
1. Phil Kraft, Monterey Park, Calif.
2. Don Ballreich
3. Harold Parenti
4. Ed Izzo
5. Jack Dunn

Grand Champion

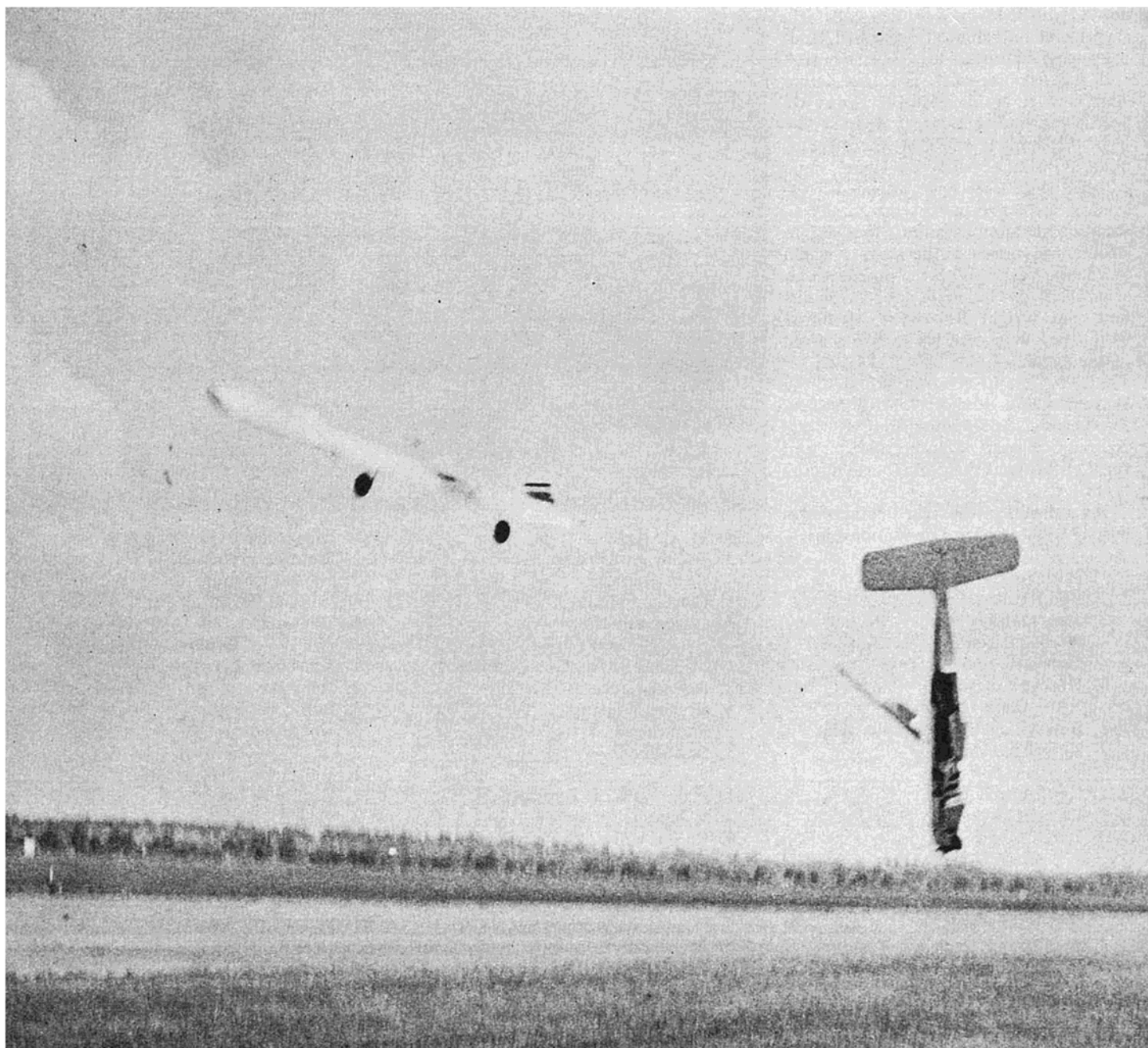
Phil Kraft, Monterey Park, Calif.



1st Row: Phil Kraft and Larry Leonard. R: Mr. & Mrs. Ed Izzo on flight line. 2nd Row L: John Day at start of Goodyear heat. R: The winners and trophies. Bottom Row, L: Bernie Williams, 1st in Rudder. R: Models in from California.



RCM Exclusive: Clifford "Crash" Weirick, holder of West Coast Hand Launch Paper Glider Altitude Record (junior-senior category), demonstrates professional form in limbo event at Wright Brothers Memorial. Shortly after these pictures were taken, "Crash" was cited for flagrantly littering the grounds of a military installation. In an interview at the Provost Marshall's office, Weirick claimed that the limbo poles were deliberately moved during his flight. He was later deported to California.





The author with his Mo-Jo prototype designed for the Midwest-RCM Air Races. Min-X 1200 Pulsemitter and Receiver, Rand LR-3 actuator, McCoy diesel. Mo-Jo is fast but easy to fly.

MO-JO

The first of the new Midwest-RCM Air Racers, the Mo-Jo is a Class B machine designed for .09-.10 size mills and single channel proportional. A top contender for this new event. The Mo-Jo will bring home the hardware for you!

"... go out and fly simple proportional. You'll love every minute of it!"

This concluding statement from the article, "Return of the Ghost" (RCM, April 1966), sums up all I can say about this type of flying, with the possible exception that the Midwest-RCM Air Races are a natural for the Ghost systems. I prefer to call them, simply, "Ghost," since the appearance of the new actuators and reliable single channel proportional systems has reduced the "gallop" to a smooth trot.

The MO-JO (a good luck piece) was designed around the proposed Midwest-

RCM Air Race rules and qualifies for Class B competition. This type of model is not limited solely to pylon racing, although it does that best, since they are very maneuverable with the higher speeds and smaller moveable surfaces smoothing out the flight. In my own particular area, several modelers have shown an interest in flying this proposed event. Some are currently building their own designs while a racing program is being established. The MO-JO is fun to fly by itself, but the real excitement comes only when you get one or two more in the air with you! With the Tee

Dee .09 installed, the speed is estimated to be about sixty miles per hour, yet with the Min-X 1200, Rand LR-3 actuator, and seven 600 MAH nickel cadmium cells, the landing speed is surprisingly low.

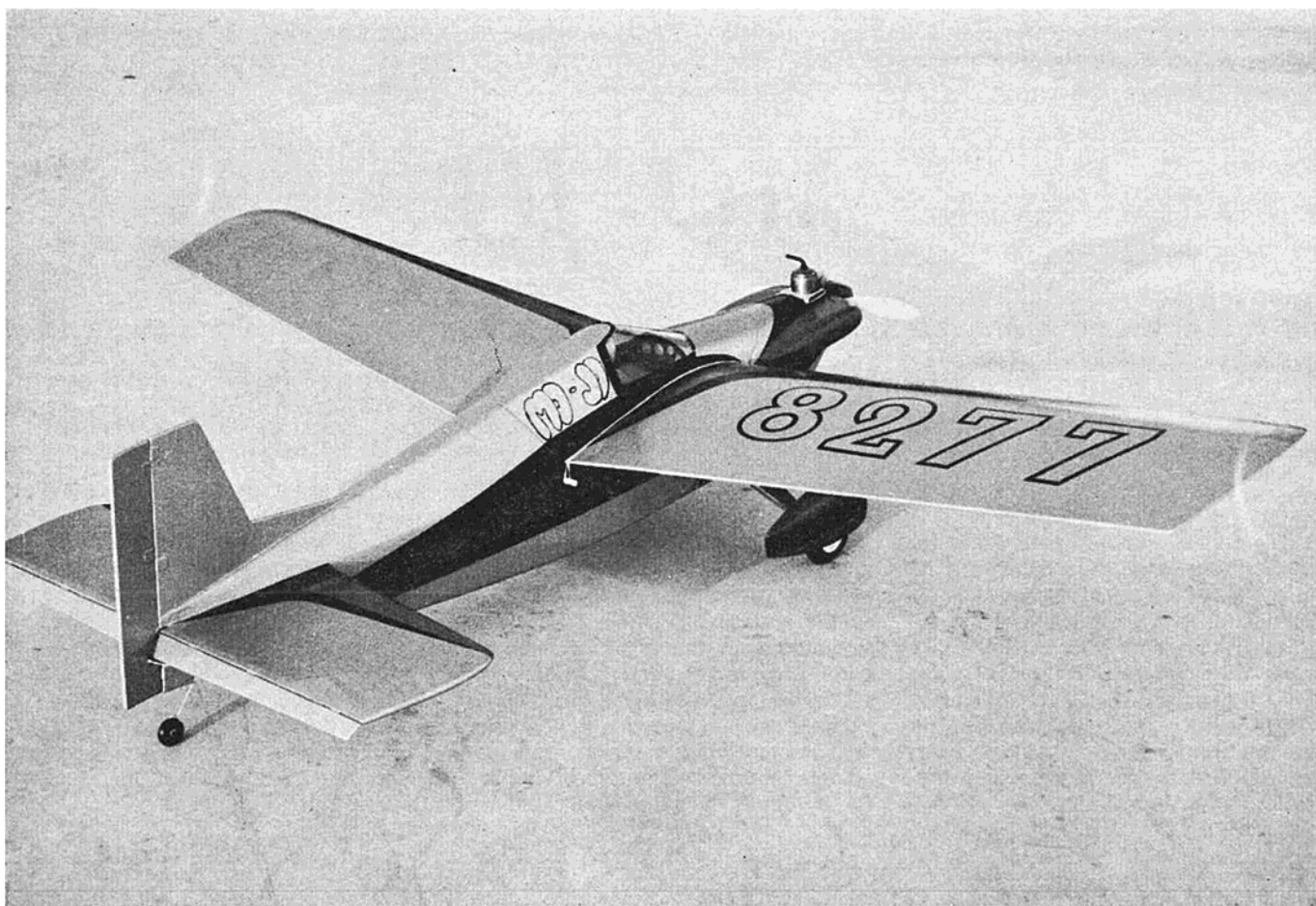
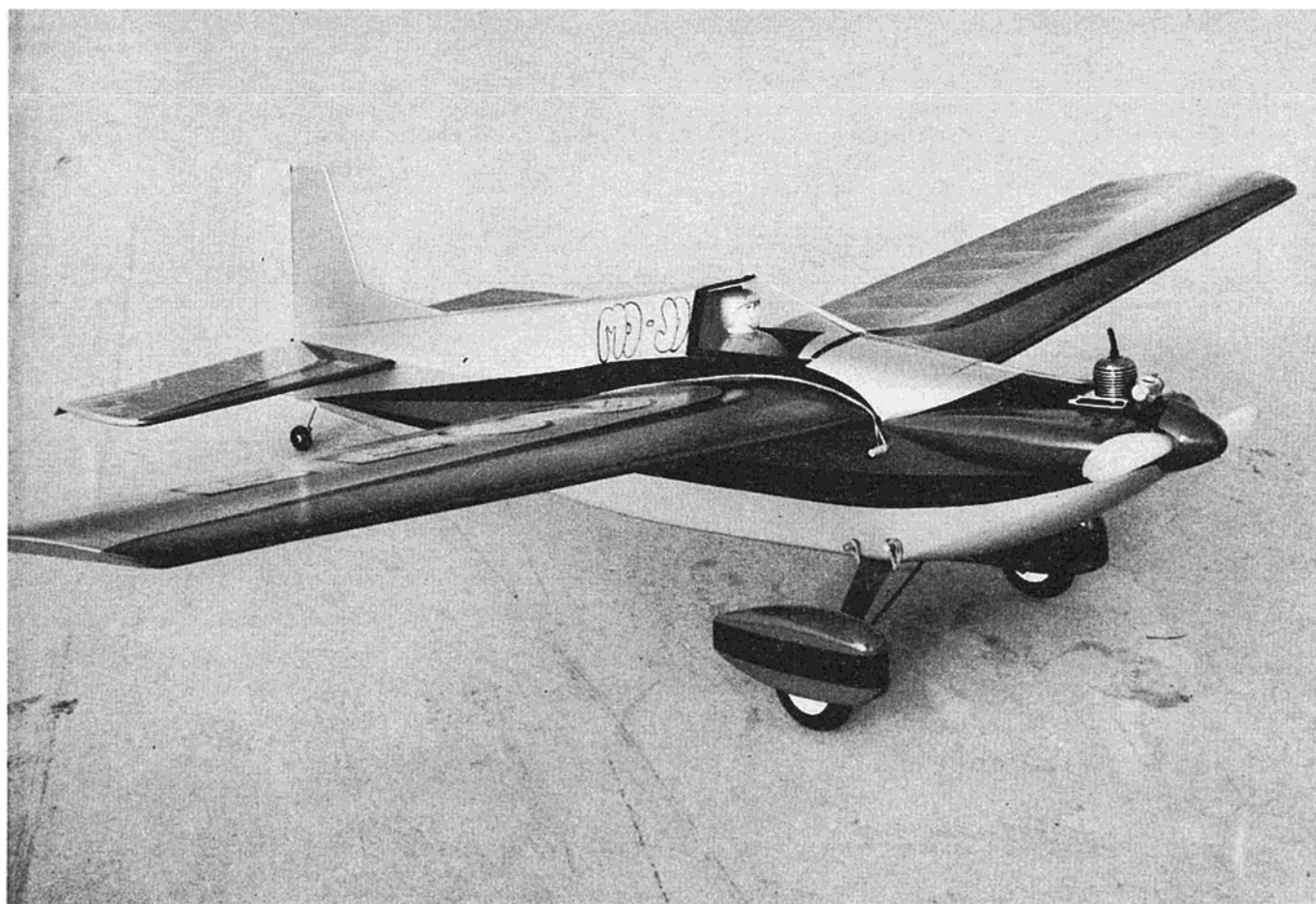
CONSTRUCTION

Medium weight wood is used throughout construction of the MO-JO. Be sure to pick firm, straight grained "C" stock balsa with the exception of the leading edge wing sheeting which should be "B" grain.

Fuselage

Cut two sides from 1/8" sheet and ce-

BY ED SIMPSON





ment the $\frac{1}{16}$ " plywood doublers to the inside of each. Cement the $\frac{3}{16}$ " square longerons in place. Cut out bulkheads #2, 3, and 4, and cement to one fuselage side. When dry, add the remaining side, checking for squareness with a draftsman's triangle. Pull the rear of the fuselage together and cement. Install bulkheads #5 and #6. Cut the engine mount from $\frac{1}{8}$ " ply and use white glue to secure the $\frac{1}{4}$ " square maple engine bearers to the underside of the mount. Soak the outside section of the fuselage sides forward of bulkhead #2 with water, pull together, and use white glue to mount the engine assembly in place. To assure a close, even fit at the spinner, cut out the $\frac{3}{32}$ " nose ring using the spinner for the outline. Now, slip the ring over the front of the engine and mount the prop and spinner. Position the engine in the mount cut-out with nose ring snug against the front edge of the mount. Mark, drill holes, and install the blind mounting nuts. Although not drawn on the plans, a few degrees of downthrust is recommended. Mount the engine with one washer under each rear mounting hole, position the nose ring in place, and cement to mount. Carve the bottom balsa block and cement in place. When dry, remove the spinner. Now, cut a hole in a piece of sandpaper, slip it over the crankshaft, reinstall spinner and prop, and rotate prop to sand off approximately $\frac{1}{64}$ " from the nose ring.

Cut the turtledeck top from $\frac{1}{8}$ " sheet and cement to formers. Now add the top sheeting. Build up the cowl hatch and removable cockpit section. Tack cement this assembly to fuselage and sand as a single unit.

Now apply two or three coats of a talc and dope sealer plus one coat of clear butyrate dope, sanding between coats. Cover the model with silk.

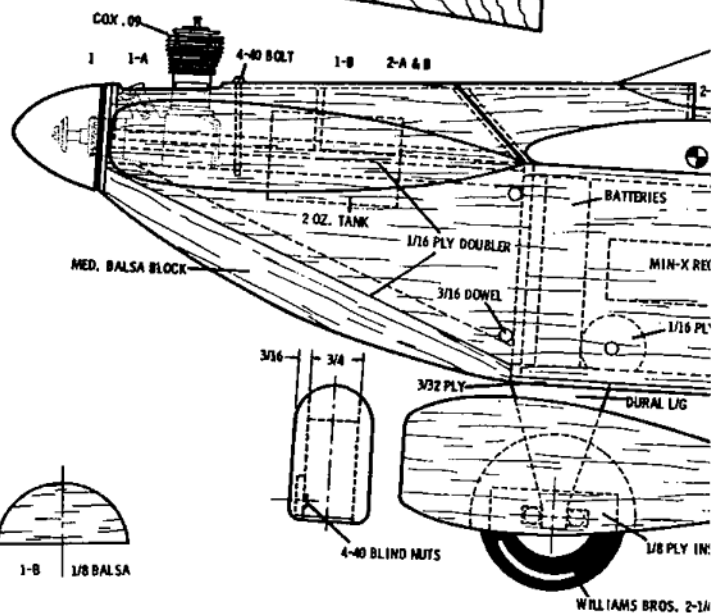
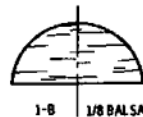
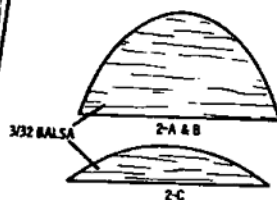
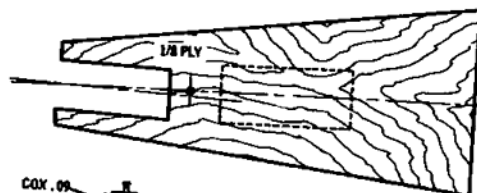
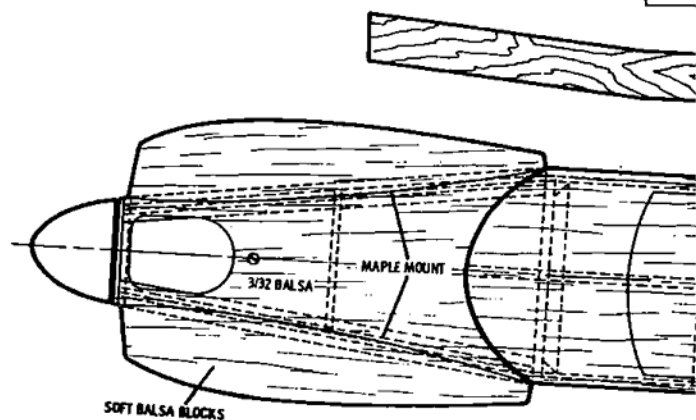
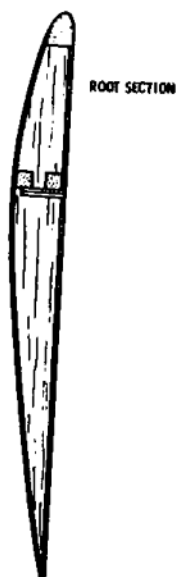
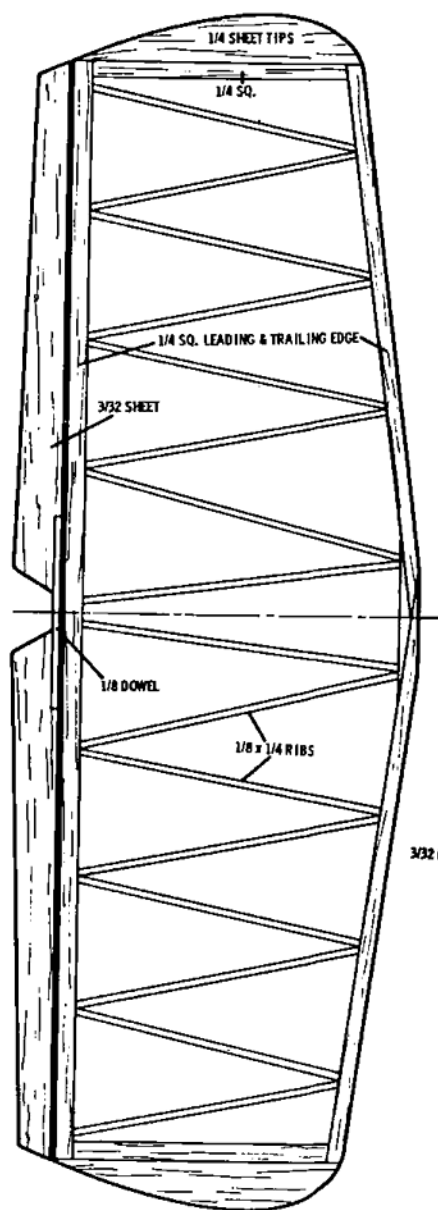
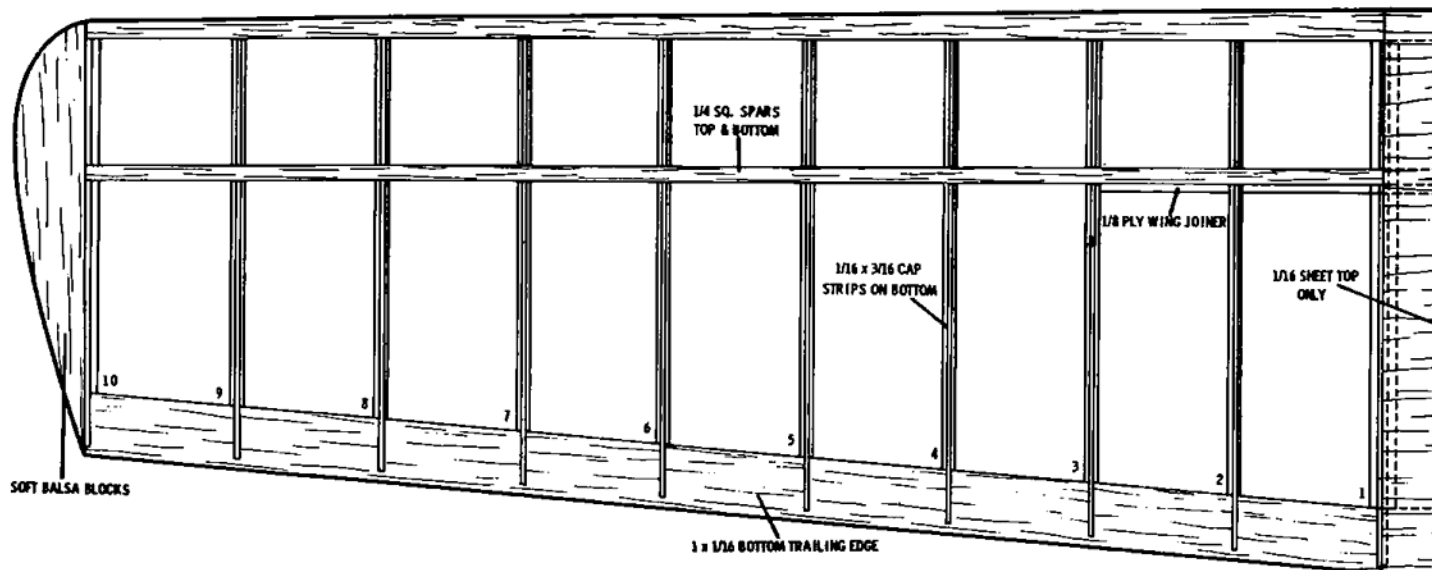
The cheek blocks for the cowling hatch can be carved from balsa or

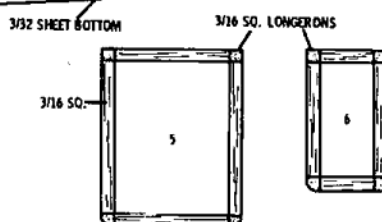
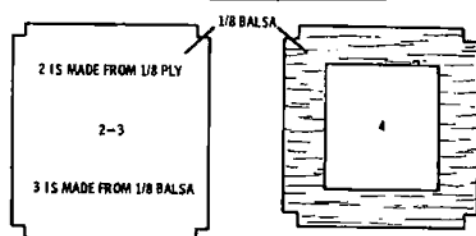
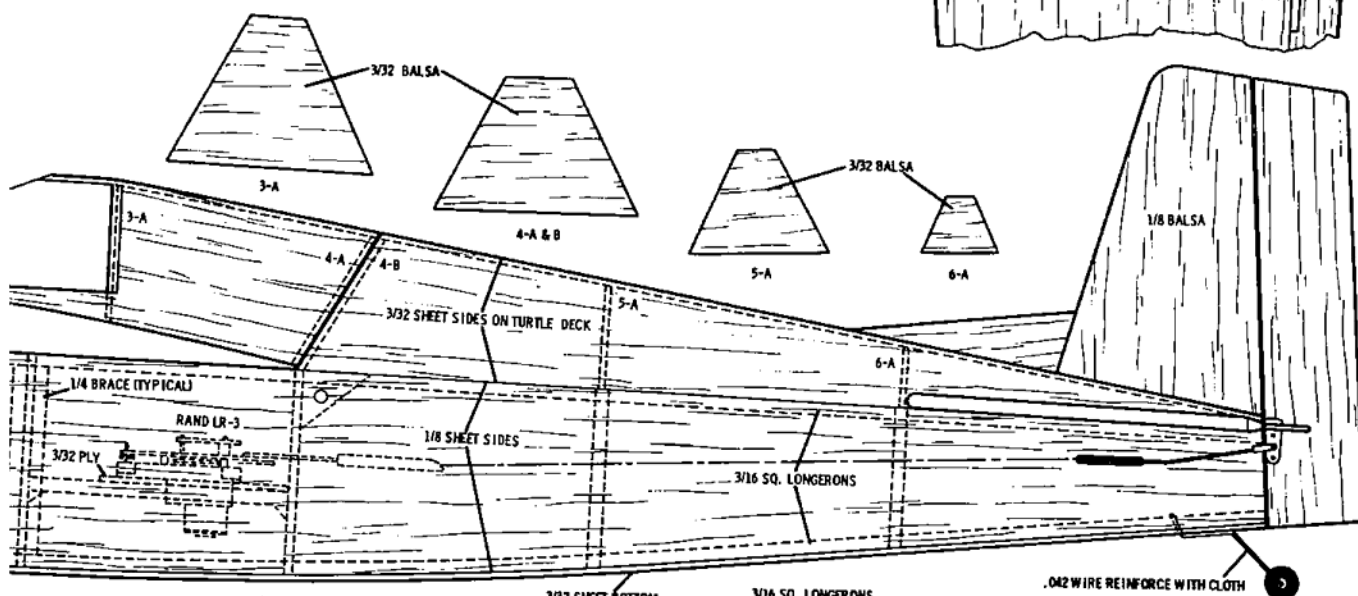
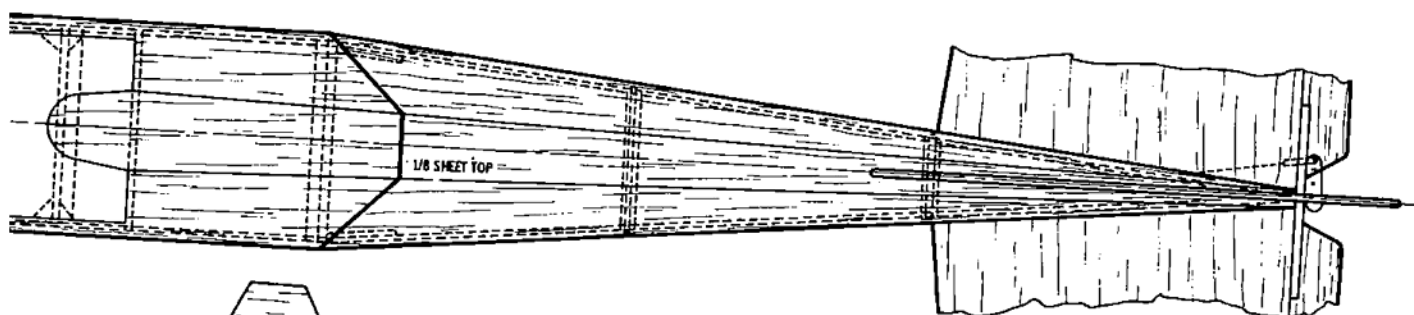
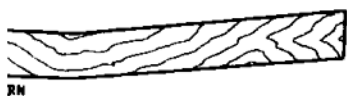
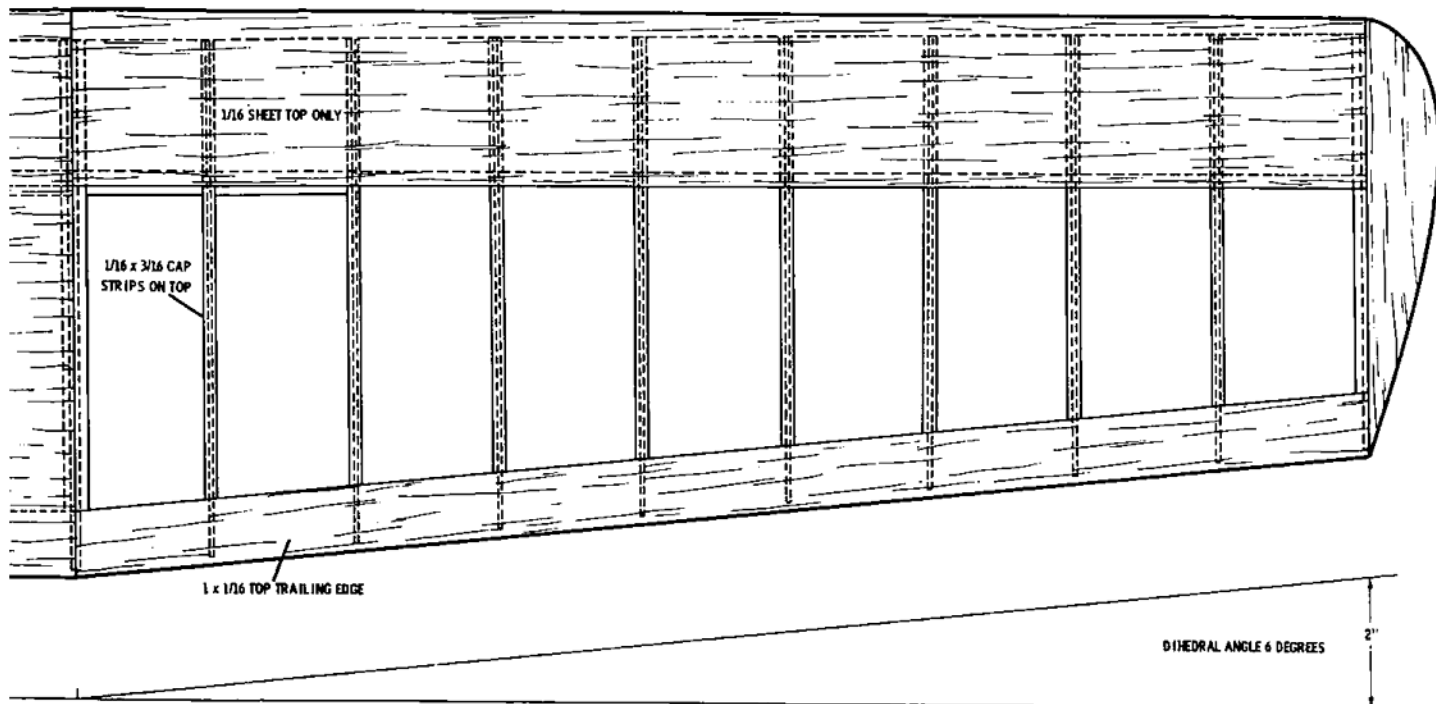
molded from fibreglass. We used the latter on the original. These are cemented to the top hatch only and act as a key for the hatch. This hatch-cheek assembly is held down by a long 4-40 bolt threaded into the $\frac{1}{8}$ " ply engine mount.

Wing

Pin down the leading edge and the $\frac{1}{16}$ " x 1" bottom trailing edge. Cement in the bottom capstrips and then add the bottom spar. The tapered ribs are easily cut by making an extra #1 rib, cutting it off at the trailing edge to the length of a #2 rib. With a straight edge, cut off a strip from the bottom leading edge to the top trailing edge. Repeat this process for the remaining ribs. Duplicate each rib for the opposite wing panel. Notch the ribs and cement in place. Carve the leading edge top shape while the panel is still on work board. Make sure this is flush with the top of the ribs. Cement in place the top spar and sheeting, capstrips, and top trailing edge. When dry, shape and sand the leading edge as well as sanding all the capstrips flush. Build the opposite panel and center section. Be sure to check-fit the panels to the center section before applying cement. Check to make sure you have the proper dihedral angle before the glue dries! When dry, cut notches from the bottom of ribs #1, #2, #3 for the $\frac{1}{8}$ " ply dihedral joiner. Carve the tips from medium balsa and cement in place. Sand the wing assembly, apply two coats of sealer and one coat of dope. Sand lightly and cover with silk. Cut the cockpit assembly from the fuselage, and cut the roof airfoil outline from the bottom. Be sure to cut this slightly under-size, and with wing in place, trim until everything fits flush.

(Continued on Page 34)





RADIO CONTROL modeler MAGAZINE

MO-JO

DESIGNED BY ED SIMPSON
DRAWN BY LARRY SIMPSON

MIXED BY G. FLORES

0 1 2 3 4 5 6



(Continued from Page 31)

Stabilizer & Fin

The stabilizer is built flat on the plans. The fin and rudder is cut from $\frac{1}{8}$ " sheet. Cement the elevator joiner dowel well and cover with silk. Cut notches for the stab and fin and cement in place. Cloth hinges may be used, or you can try Ken Willard's Monokote hinges (Top Dawg,

RCM July 1966). Do not use nylon sheet type — no use overloading your actuator deliberately!

General

Sturdy wheel pants can be made from medium balsa and covered with fibre-glass cloth. Mounted as shown on the plans, they will "give" under shock, but will stay in place under normal flight conditions. Commercially available dural gear may be used or you can fabricate your own from .032" hard aluminum.

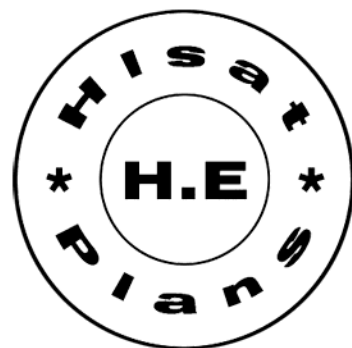
Finish the MO-JO in bright colors and add some flashy numbers. Our original was finished with a base of silver and orange mixed together. Trim was green and black. However, on a hazy day, things get a little fuzzy at the far pylon!

FLYING

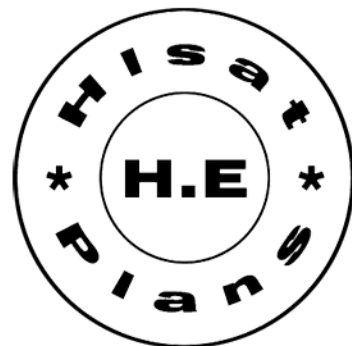
Be sure your MO-JO balances as shown on the plan, adding weight as necessary to achieve the proper CG. Be absolutely certain all surfaces are free of warps. For best racing trim, wash out the right wing panel approximately $\frac{3}{16}$ " at the tip. This makes for better pylon turns (left) without a tendency to drop the nose abruptly. Another added advantage is a quicker recovery after the turn. Drift to the right, if any, can be corrected with rudder trim. Adjust the elevator so that almost full down trim is required for level flight. This eliminates gallop entirely while still allowing plenty of up for emergencies.

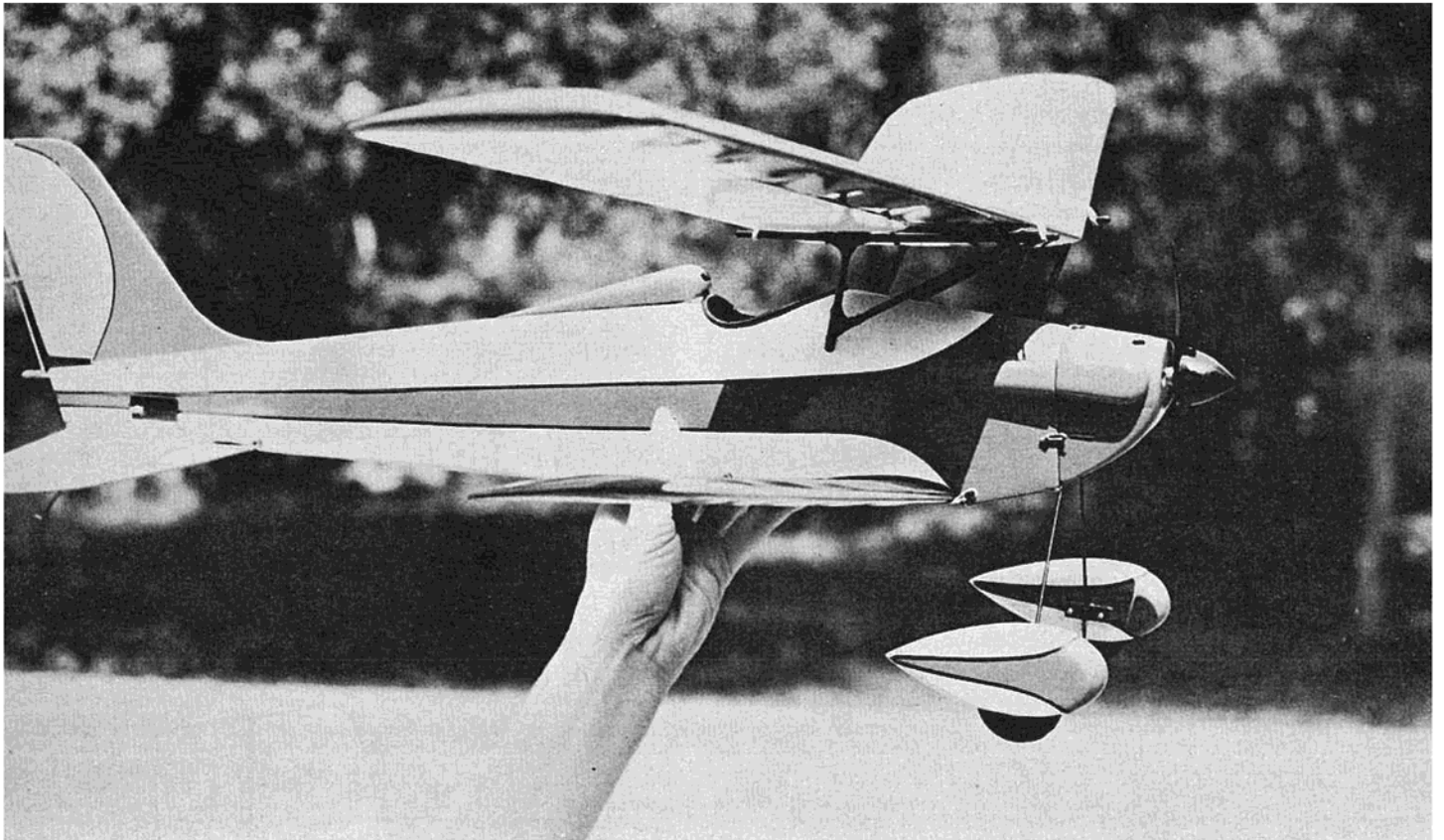
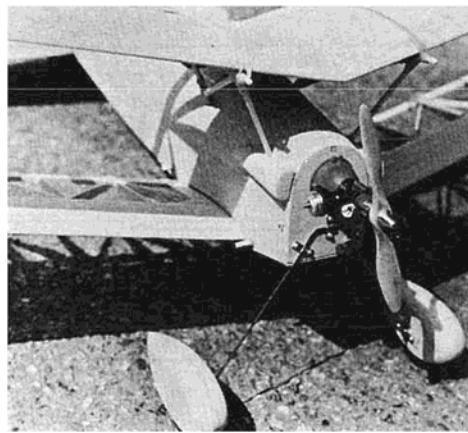
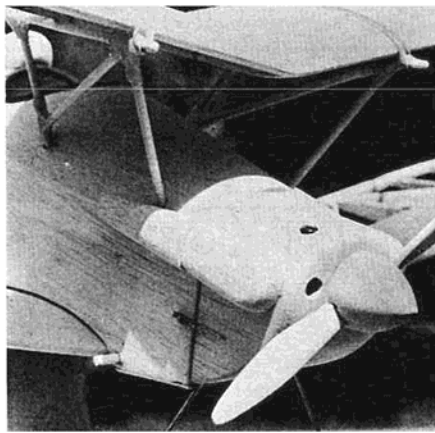
Now it's your turn. Get a couple of these little Midwest-RCM Air Racers airborne and watch the sport flyers come around.

And you'd be surprised. Even some of the "multi" guys are getting converted!



Ed Simpson's Mo-Jo comes in for a landing. Fast and easy to fly, this Midwest-RCM Air Racer was designed to put competition in the realm of the sport flier.

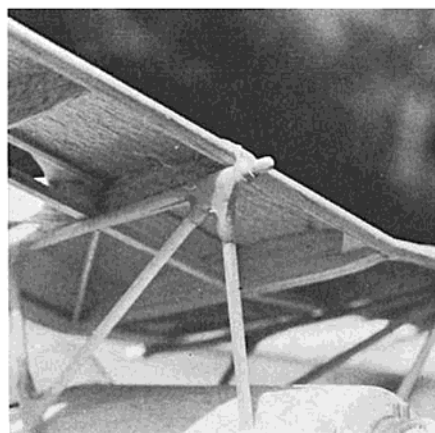
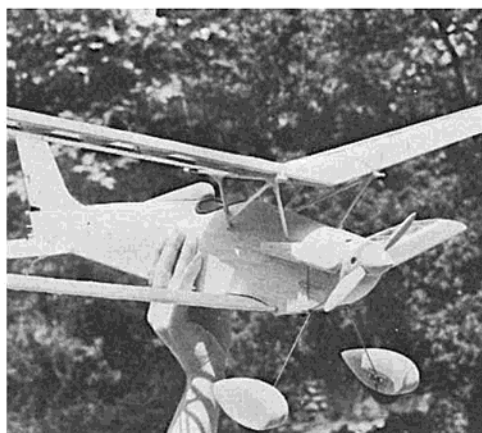




LI'L BIPE

Reminiscent of the early biplane era, Li'l Bipe is for the sport single channel flyer. Easy to fly? The author's daughter, Laurie, soloed on Li'l Bipe at the age of 10!





BY ARTHUR E. SCHULTZ

ASK any kid.

If one set of wings is good, he'll tell you that two sets are twice as good. I guess I've never really outgrown this childhood logic because I still prefer biplanes. My first airplane ride was in the front cockpit of a crummy old biplane that operated from a small midwestern field until the cash customers gave out. The ride didn't last long, and I'm sure I was more thrilled than scared, but since that day, an airplane to me has meant a craft with two sets of wings. Perhaps this will explain why I think a biplane model always looks more like a true airplane in flight—which is the only way the appearance of a model should be evaluated.

I call this design **LITTLE BIPE**. If you're an experienced modeler, the construction should be a breeze; if you're a beginner, it's simple enough for you, too. To any modeler, this challenge: doesn't **LITTLE BIPE** look like and fly like a real, honest airplane? That's because it is a distillation of free flight features and ideas from home-built planes.

CONSTRUCTION

Fuselage

Trace the sides on a sheet of $\frac{1}{16}$ " medium balsa and cut them out. Mark the location of all the formers on the inside of the fuselage halves. Be sure you have the **strut** areas marked on formers F2 and F3 before you glue them in place. Drill the holes for the engine and landing gear in the $\frac{1}{8}$ " plywood firewall. After the formers and firewall are glued and dry, add the $\frac{1}{8}$ " square stringer on the top. Cover the top of the fuselage only with $\frac{1}{32}$ " soft sheet. Start from the center of the $\frac{1}{8}$ " stringer and work out to the edge. This is an excellent time to cover the wing mount area with your favorite material, before installing the

wing struts. Epoxy glue is good insurance for the wing mount and firewall joints as indicated on the plans. The .020 and gear can be installed at this time. Don't cover the bottom of the fuselage until all of the radio gear and torque rod has been installed and checked.

Cowl

Soft $\frac{1}{4}$ ", $\frac{1}{8}$ " and $\frac{1}{32}$ " sheet balsa is used in the cowl construction. The side and bottom pieces are $\frac{1}{4}$ " sheet—double $\frac{1}{4}$ " sheet is used on the bottom to form the curve of the cowl. The cutout area in the inside bottom piece is where the ballast is to be located. The cylinder cover on the right side is made from $\frac{1}{64}$ " aluminum. Cut out a hole on the top to admit the battery clip. If you wish you may mount the engine upright and make the necessary changes in the cowl. Hold the cowl against the firewall with small rubber bands attached with one hook on the fuselage and one on the cowl. It will stay firmly in place eliminating dowel alignment pins.

Wheel Pants

After you have cut, glued and sanded the covers to desired shape, glue the $\frac{1}{16}$ " plywood mounting plate in place. The finished covers are then slipped over the wheels and bolted to the $\frac{1}{32}$ " brass mounting bracket. The nuts are secured onto the inside of the wheel covers with epoxy glue. Check the wheels to see they do not drag.

Tail Surfaces

Tail surfaces are made of $\frac{3}{32}$ " medium sheet. Any excess weight in the tail surfaces will have to be accounted for in balancing out the model.

Wings

The top wing construction is begun by pinning down the $\frac{1}{8}$ " square spar and trailing edge. Glue all the ribs in place except for the first $\frac{1}{8}$ " rib. Add the leading edge and top spar. When dry,

remove the plan and build the other half by turning over the drawing. After both sections are ready, prop them up on a flat surface with the correct dihedral under each wing tip and glue the $\frac{1}{8}$ " rib in place. Each section is still separate. Now plank the top of the wing with $\frac{1}{32}$ " sheet and add the tips. Shape the tips and sand each wing carefully. This is the time to join the two sections together. Glue the two $\frac{1}{8}$ " ribs well and butt them together, making sure there is no twist or misalignment in the wing. The lower wing is constructed in the same manner, except the center section is included.

Covering the Frame

The entire model is covered with orange silk except for the tail surfaces. These are covered with orange Japanese tissue. Two light coats of butyrate dope were applied. Any color scheme can be adapted to this model. One final coat over the whole model should be sufficient. For the expert who wants a better finish, go right ahead and add more coats, but watch the weight of the tail.

Adjustment and Flying

Test glide the model to achieve a flat glide. If you have checked the c.g. carefully, very little ballast should be necessary. Now try some powered flights using only one eye dropper of fuel in the tank. This saves a lot of gray hairs. (When the new model desperately needs finer adjustments, one prays for the motor to quit before complete control is lost.) Nice short flights prevent the model from gaining too much altitude and gives the flyer a chance to make some fancy spot landings. After you have gained confidence and can control the "**LITTLE BIPE**," fill the tank and try for some real maneuvers.

May all your flights be happy ones!

TECHNICAL FEATURE



By **ED THOMPSON**, RCM TECHNICAL EDITOR

HOW would you like to sit in an empty house day after day waiting for the arrival of your household goods? Then, after waiting all day, go back to a motel designed to bring out your worst tendencies toward claustrophobia? How about ten days of this same routine with the moving company telling you — “Don’t worry, your furniture will be in tomorrow” — each time you call? How would you like it if, when you finally got fed up and paid for a long distance call, you found out that for six of these waiting days your furniture was not even loaded on a truck but setting within 10 miles of your previous house, 1000 miles from your new location? Then, after it was loaded, the truck went even further from your new location to pick up more furniture to make the trip prof-

itable to the moving company! To top it off, when you do locate the truck, you are told that it is due to arrive late Friday night and your furniture can’t be delivered until the following Monday! Would you be mad? Would you feel kindly toward the moving industry? Would you say “thank you” when you finally got your household goods?

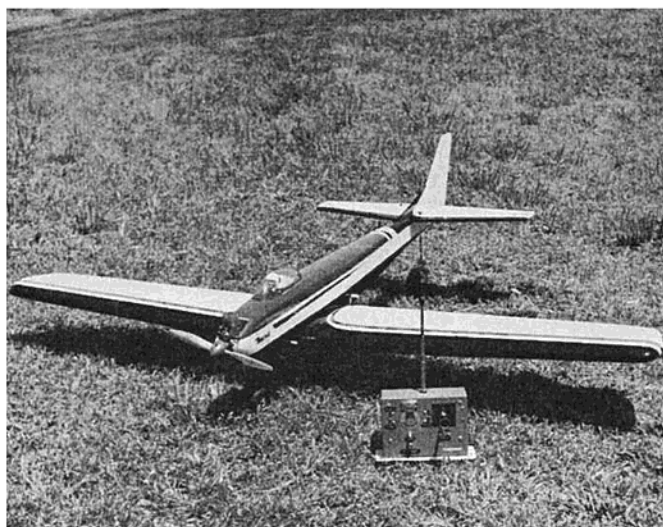
What would you say if, after you told the moving company if they arrived while you were gone, to check next door with the neighbors in case you went out for hamburgers, they advised you not to leave because it would cost you \$10 per hour for any delay you caused them, and that, in addition, the truck driver might not check next door as he was told. Well, as you can see, I could go on and on about the cost of motels, eat-

ing out every day (feeding a wife, three children and a dog), paying rent on a house that is only useful as a waiting post during the day, ad nauseum. Am I mad? What do you think?

How about the Digitrio-4 decoder article I promised for this month? Would you believe the moving company again? They loaded a box of writing material and manuscripts I specifically told them not to touch. When asked to unload it, again, I was told that it would be in Denver before I would so there was no problem. Are you mad, now? I’ll tell you the same thing I was told — “Really, sir, you’re not the only person to be inconvenienced by a move . . . it happens all the time!”

That’s what I like — sympathy!

So, in lieu of the decoder article this



The Jonesboro test team. L to R: Jim Holman, Warren, and Jim Clouse, pose with Jim's Orion prior to first tests of the Digitrio-4. Far right: Jim's Taurus, also equipped with Digitrio-4.

month, here's a few random comments about the Digitrio that may be of interest. First, I recommend that if you use the McKnight charger for overnight charging, to use 47 ohms and a piece of wire in place of the 100 ohm and 47 ohm resistors, respectively. The transmitter indicating lamp burned out on the charger I have and I now recommend a 10-12 ohm resistor in place of the 47 ohm in series with the transmitter batteries. Even though the current is within the lamps rating, it appears to cause short life. In any case, the 10-12 ohms will give adequate charging current for overnight charging and will more closely match the charging current of the receiver pack. There is no need to make the change until the lamp burns out, however, and you might get by for quite some time as is.

I have received replies to all the prototype four channel modifications I sent

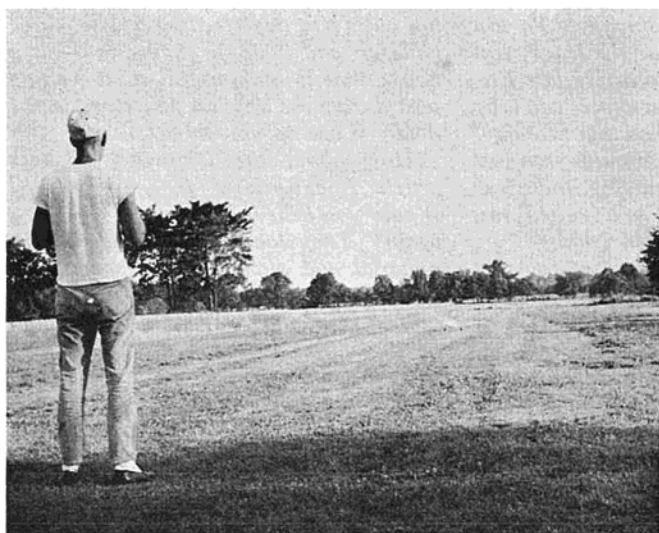
out and am happy to say that they all met with success and no complications. I will print some of the letters I received with the understanding that they may be somewhat biased due to the success enjoyed by the people selected to evaluate the four channel modification.

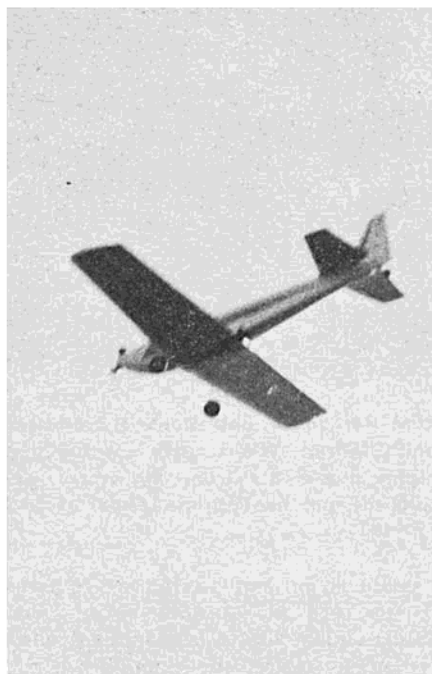
We have received some of the forms that are printed at the end of the Digitrio booklet and so far it looks as if most modelers building the Digitrio are having good success. As soon as we receive more of the questionnaires, we will compile the information and publish it, as promised. This issue will contain the question form and those who have built, or are building the Digitrio are asked to complete the form and mail it in to use in order to assist us in getting an accurate picture of your desires in the technical field.

I don't like to bring up the subject of not answering my mail again, but feel

I must before everyone thinks I am an inconsiderate so-and-so. I try my level best to answer the letters I receive but just can't keep up with it. At best, I can only answer about four or five a night on the evenings I am free to do so (which isn't very often). The amount of mail I receive makes it impossible for me to answer but a fraction of those I honestly feel deserve an answer. I usually put aside the letters I feel that I must answer eventually, hoping to get to them later on. This just leads to an enormous pile that makes it even more impossible to delve into. Nothing infuriates me more than an unanswered letter, especially when I am trying to get information I desire, and for that reason I feel guilty that I am, so inept to cope with this situation. I do, however, read every word of every letter I receive and thoroughly enjoy receiving them. In fact, letters are generally what keeps an

Left: The first takeoff with the newly completed 4-channel Digitrio. Jim Holman at the stick. At right, Holman makes a full-bore fly-by.





editor or a writer going and putting forth his best efforts. I try to incorporate the letters and answer them in my articles. In addition, I get most of my inspiration for future projects and solve problems I may be having by comments that are included in the letters I receive. These letters, whether complimentary or critical, are the best assets a Technical Editor has. Your letters are invaluable to me and I hope to continue receiving them in spite of the fact that I cannot acknowledge every one. I sincerely hope you will try to understand my reasons and tolerate my shortcomings until I find a way to meet the situation.

As you can see, the content of the article this month is not very technical. This is due to the fact that I am calling it in to Don at the magazine via phone due to the mail delay that has accompanied the airlines strike. I hope that when it is translated it comes out close to its original form.

One final note: In the July '66 issue, the sync diode for the first flip-flop Q3 and Q4 of Buddy Tomlinson's decoder was omitted on the schematic. Buddy also says he traced his sync trouble to an improperly installed C16 in the receiver. It should be installed as per the overlay of the original article.

BUILDING AND FLYING THE DIGITRIO FOUR CHANNEL CONVERSION TECH EDITOR'S NOTES

Here's a report on the Digitrio-4 from one of the Jonesboro boys. Warren was selected to evaluate the four channel modification due to his lack of electronic's knowledge (no offense Warren) and because we feel he is an average R/C modeler (no offense again Warren). Warren gets a little carried away

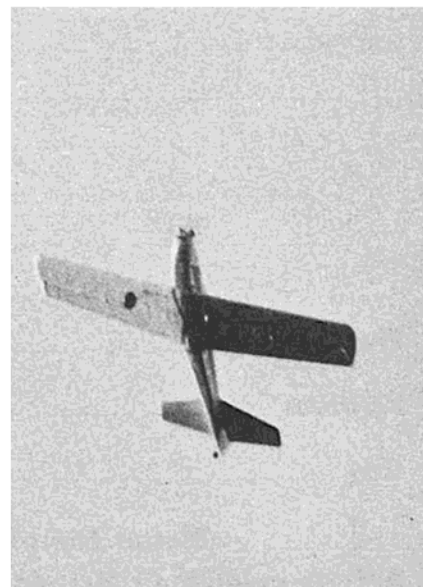
about "sloppy modelers" and we don't agree that any difficulty you might have with the Digitrio is due to "sloppy" workmanship. We do feel that sloppy work will insure difficulty however. This is not a technical report due to Warren's electronic limitations but simply the feelings and experiences of one "average" modeler. We also know that everyone may not have the "perfect results" the trio from Jonesboro had and still recommend that you buddy up with a technician friend in case you have difficulty.

FIRST off I would like to say that without a doubt, the enjoyment that I receive from all aspects of the model airplane hobby is more than you would imagine. I truly feel sorry for the hundreds of fellows in this country who might feel that model airplanes are toys and those that offer condescending remarks about our hobby. The enjoyment in the actual flying of the model is only a very small part of the overall picture—the construction of a special control stick, the rewiring of a receiver, a servo, a modification here, the testing and flying a new model, are only a few of the many different thrills you receive. Of course all is not a bed of roses! But believe me, fellows, if nothing ever went haywire you would never feel the sheer fun of making it go!

We feel the greatest thing that ever touched our group of RC modelers here is the Digitrio. The efforts of Ed Thompson, the staff of RCM and World Engines, has made possible complete enjoyment for our group because we get as much fun from one phase of modeling as another. We try to encourage neatness in building and construction practices and I am absolutely sure if anyone constructing Ed's Digitrio has had much trouble it is surely their own sloppy way they have of putting anything together. We have seen lots of modelers come and go, and we feel the primary reason is the narrow margin of success they have experienced. This is largely due to the sloppy way they pursue their hobby. I recall, on one occasion, when a modeler lost control and crashed, that he just couldn't understand why! But, as I observed the broken model I was appalled at what I saw inside the fuselage. The wires were running like a "bee-stung Bobcat," and I am sure he made his solder joints by melting a pan of solder on the kitchen stove, then backed off a couple of feet and flung it! Man! What a mess! So we feel you only get out of it what you put into it. So if you are having trouble—in the name of the Red Baron, ask someone for help! You will be delighted at how quick another modeler will be to help guide you along the right path!

We have been in constant letter and phone contact with Ed on the Digitrio

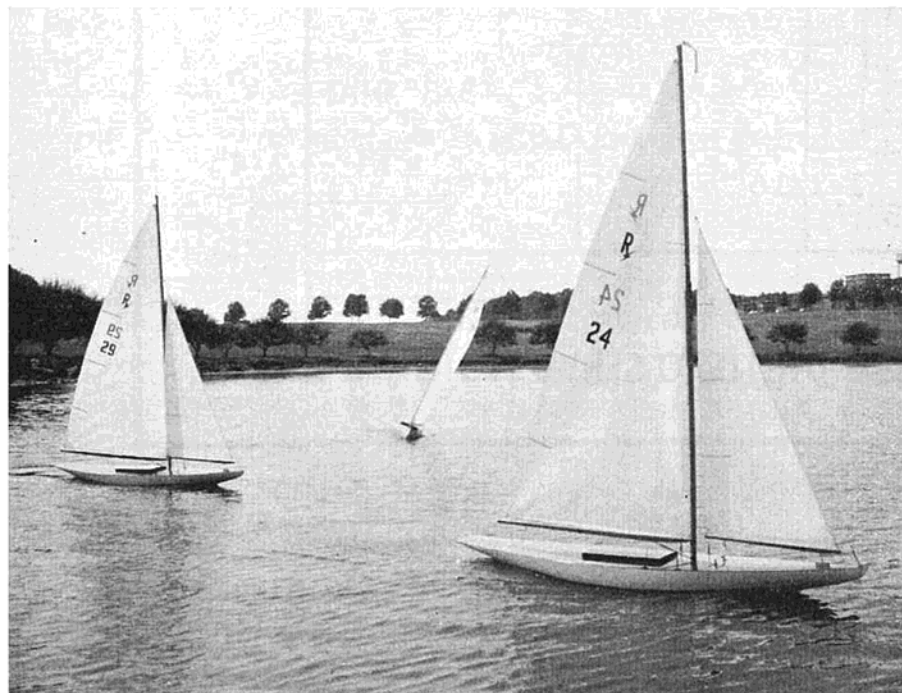
and I was delighted when he said that a fourth channel was in the making. I could hardly wait until it became available! I was sure Santa Claus only came on Dec. 24th but this year he came early! When I opened a small package from Ed — (to my amazement it was a World Engine's prototype kit on the fourth channel conversion to the Digitrio) — my eyes lit up like an arc welder! Ed said, "convert, fly and send me your evaluation along with some pictures." So I gathered in Jim Holman and Jim Clouse and "away we went" on a maximum effort. We were a little disorganized because we were all building four channel sticks. Jim Holman's TX was down waiting for a stick so we decided to put the prototype in his system. Jim started the transmitter conversion and I took his receiver-decoder while Jim Clouse finished the control stick and made available his superbly built and beautiful Orion. This airplane flies like it's on a railroad track, right where you put it, hence we decided this would be the perfect ship to test the perfect gear. As usual, the kits were by World Engines and they were superb. Ed's PC work and arrangement of components was excellent, as usual. There was ample wire and heat shrink tubing; Jim said the transmitter conversion was simple due to Ed's simple step-by-step construction notes. I pulled the decoder and made plans to tackle what I thought was going to be a real job. With all the parts that were in the Digitrio decoder, I figured with one more channel this decoder was going to look like a 100 lb. sack of sprouted rye grass! To my utter amazement there was hardly a handful of parts and I immediately assumed that "somebody goofed!" When I looked at the schematic and overlay I just couldn't believe my eyes — so simple, and easy!



(Continued on Page 43)

KITS & PIECES

BERNIE MURPHY



A RECENT siege of hot humid weather, coupled with Fearless Leader's recent series on R/C sailboats, prompted us to reactivate our own Regatta One out of mothballs (Jan. '66 RCM), and head for the cool water.

Since our last outing with the Regatta One, several additional boats have been built locally. With little or no planning (mostly the latter), three ships arrived at the John Hopkins Applied Physics Lab lake almost simultaneously. Phil McShane's Regatta R29, Al Montzka's Santa Barbara One-Design SB95 and our own R24 Regatta One-Design.

With three sailboats running in a relatively small area, the tendency to race with one another became almost a compulsion. Everyone agreed, and so the East's first (to our knowledge) R/C sail yacht race was born. A five foot steel post in one end of the lake was an obvious choice for one pylon (Oops! Buoy), while anchored soda bottles served as the other markers. The post proved to be a poor choice, as a close turn often ended with snagged rigging or a ding in the hull. Apparently, steel posts just don't move!

The melee that followed would have stirred excitement in the most avid flyer. If every foul had been counted, we would still be attempting to complete the first race! Except for rounding the

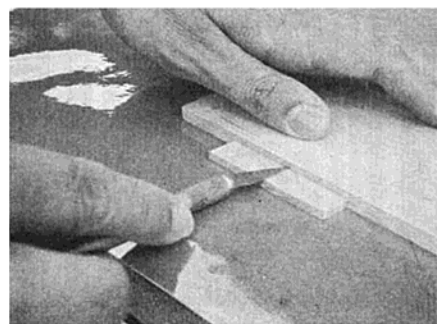
buoys, the races — four in all, were run on an "anything goes" basis. In most cases the turns were "push and shove" all the way! The little boats bumped, scraped, and rammed each other, mostly due to problems of visibility, since it becomes pretty hard to see beyond your competitor's large sail. Thank heavens they were boats and not airplanes, or there would have been nothing left for another day. All of the boats proved quite seaworthy with only a few minor dents along the deck as a result of the pounding.

Why not build one of the fine R/C sailboat kits and join in on a little "relaxing excitement?"

Have you ever tried to drill the $\frac{1}{4}$ " or $\frac{5}{16}$ " dowel hole through the fuselage sides of your latest creation, only to end up with a hole that looked like it was made with a dull spoon? In general, drills and balsa don't mix, especially the larger drill sizes. A clean hole may be cut very simply by using a piece of sharpened tubing of the proper size. Use a rat tail file to reduce the wall thickness to a sharp edge from the inside of the tubing. A light pressure, together with a steady twisting motion, will cut easily and cleanly through any thickness of balsa. By filing a few teeth around the end of the tubing, these cutters will

also cut thin plywood. If you are real lazy, tubing type cutters can be purchased from most scientific supply houses. Brass tubing can be very simply cut (thin wall) by rolling the tubing under a #11 X-Acto blade.

We have received numerous letters concerning problems encountered in installing nylon or polypropylene strip hinges. Most of the comments seem to indicate trouble in getting the hinges to work freely, without an excessively wide gap between the surfaces. In general, this problem is caused by misaligned hinges and/or improperly shaped edges. The simplest method that we have found to align these hinges is to place the surfaces — say elevator ($\frac{1}{4}$ " thick at edge) and stab (also $\frac{1}{4}$ ") on a flat surface. Use a small scrap of wood one half of the surface thickness ($\frac{3}{8}$ ") with a #11 X-Acto blade to make the cuts for the hinge material. This assures that the surfaces will line up height-wise and also produce parallel cuts along the same centerline. Quite often, plans in-

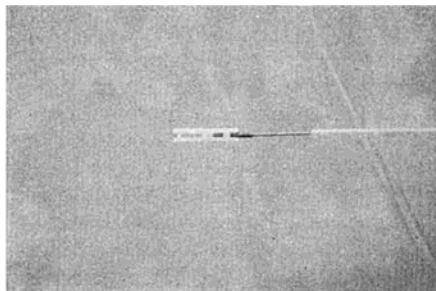


dicating strip hinges show mating edges both rounded. It has been our experience that the surfaces can be coupled closer if the edge of the movable surface is cut at an angle above and below the hinge line. We use the following method of holding the hinges in place: Force epoxy glue into the slots, assemble the surfaces, and lock in place with two small pins in each hinge (dowels or toothpicks can be used but should be pre-finished).

One of the most troublesome points in linkage installation appears to be between the servo and the throttle. Often, flexible cable is used due to twists and turns in the line. The use of cable, while

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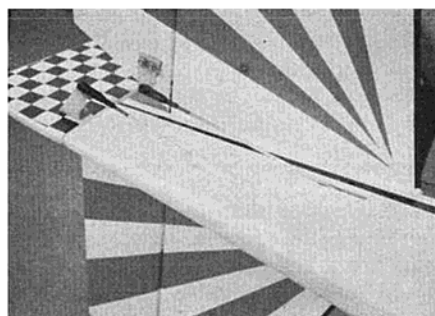
extremely good from the point of free movement, can create problems in the end terminations. The R/C Craft Nylink can be used, but is not adjustable when used on cable. An alternate linkage which we have used with success consists of a nylon tubing sleeve with an .025 or .032 inch diameter solid wire. These wires will run around any reasonable bend. A space saving coupling is added to each end by drilling the proper size hole at least $\frac{1}{4}$ " into the center of a 2-56 brass screw (head removed), and soldering it on the end of



L to R: Nylink, 2-56 screw with $\frac{1}{32}$ " hole, .032 wire, nylon tube. Works like a champ!

the wire. A Kwik-Link or Nylink will then thread onto the screw allowing adjustments in length to be made. The Nylink or Williams link is strongly recommended for the throttle coupling, since any noise generated in this linkage is generally carried directly past the receiver.

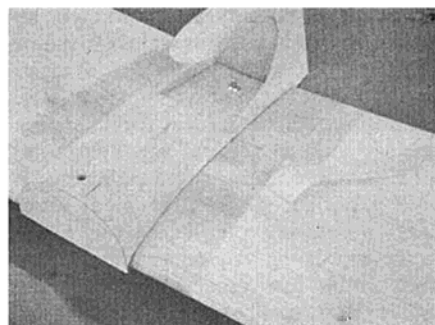
While on the subject of linkages, a neat pushrod exit to the tail surfaces can be made by slicing a piece of $\frac{1}{4}$ " dowel at an angle, drilling a hole through it, and using a piece of nylon tubing as a guide.



Before and After — showing one nylon bushed dowel fairing in place. Sure helps appearance as well as strength factor.

Many otherwise meticulous modelers seem to fall short when it comes to fiberglassing a wing center section. Some even omit the step completely. Fiberglass in this area adds a considerable amount of strength and abrasion resistance and should not be overlooked.

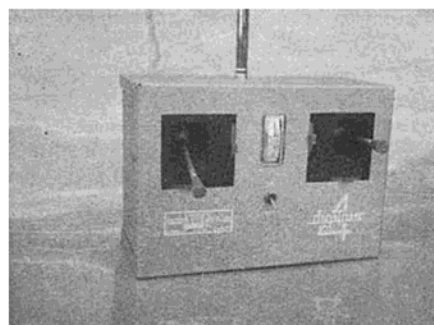
The problem here is generally caused by the inability to feather the fiberglassed area into the raw balsa. This is, indeed, a tedious task, so let's forge it. It is usually advisable to extend the glassed area beyond the fuselage sides, providing a more rigid surface at the wing saddle. So, let's use 4" or 6" wide glass tape (available from Hobby Lobby, 2604 Franklin Road, Nashville, Tennessee). Carefully apply masking tape around each wing panel about $\frac{1}{4}$ " beyond the outer edges of the width of the glass tape. Now apply resin (epoxy glue will do) to the entire center section of the wing, being especially careful to apply a good coating along the tape edge. Don't get resin beyond the tape! Slowly press the cloth into the resin, and using a piece of scrap balsa, squeegee the cloth in and smooth the resin on top, until the cloth is completely saturated, at which time the tape will appear to be transparent. Make sure the surface is as smooth as is possible to obtain. Remove the masking tape, taking care not to smear the epoxy resin. Allow the whole mess to cure. If the glass cloth has been well filled, the area may now be sanded smooth. If not filled, replace tape and apply another coat of resin. When sanding, it is a good



idea to replace the tape as a protection for the balsa. It is not necessary to feather-in the edges, as this method produces a clean sharp line which is hardly objectionable. If it bothers you too much, use it as a paint separation line to disguise it!

To the delight of the telephone company, many hours have been spent with Ed Thompson via Mr. Bell's invention during the many months of development on the RCM Digitrio. Each such visit generally ends in a discussion of the various prototype systems under construction, and the problems encountered. It appears that about 90% of errors in assembly are caused by improper installation of diodes and transistors. Transistor placement is a matter of strict adherence to the assembly overlays. BE CAREFUL! The diodes are another story. Many of you never knew what a diode was before the Digitrio,

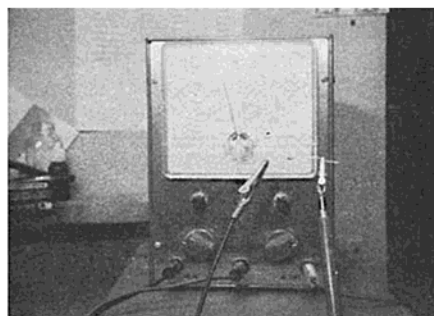
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Our own Digitrio-4 sporting Bonner sticks, new four channel emblems, and vertical meter face.

much less having attempted to tell one end of a diode from another. To add to the confusion, some of these little devils are actually marked incorrectly at the factory! See — they don't even know which end is up! (Ed's note: I told 'ya you weren't the only one, Bernie!) If you own an ohmmeter you can determine which is what. If you don't have one — you should! With your meter set to read resistance, the leads actually have a small voltage across them, one

Cathode of diode and negative lead on left of photo. Meter shows low resistance indicating current flowing.



lead is positive and the other negative. Determine which lead is positive and which is negative (for this you need a voltmeter — so borrow one!). With the diode attached across the meter leads, the resistance reading in one direction should be high, while with the diode reversed, the reading will be low. With the meter reading low, the anode of the diode is the end attached to the positive lead, while the cathode (bar end) is the end attached to the negative lead.

Who said 'obviously'?

Some time ago I received copies of scale drawings by Bob Holman for the Heinkel HE100D-1, and also for the Fokker EIII Eindecker. Both of these sets are very well done. The Eindecker is 2" scale of the actual aircraft construction, presented in a manner so as to be easily built for R/C. The Heinkel shows model type construction and is $2\frac{1}{2}$ " scale. Bob has about twenty different plan sets available, and all may be

KITS & PIECES

(Continued from Page 42)

ferent plan sets available, and all may be obtained through Hobby House Plans Service. These sets, mostly WWI, are a must for every scale buff! In addition, over 20,000 photos are available covering all dates and nationalities! These are 5 x 7 in size and quite reasonable at 25c each. For more information, contact Bob Holman, Box 741, San Bernardino, California 92402.

In the August issue, we mentioned the new mechanical brakes from Rocket City Specialties. These brakes had proven to be quite smooth and positive, as well as inexpensive (\$2 per pair), while applying a minimum load on the actuating servo. After a reasonable amount of use, it appeared that the brake drum was wearing or melting due to the frictional loads. Rocket City Specialties, not satisfied with the units only surviving "reasonable use," has modified these brakes, adding a fibre sleeve which should extend the life indefinitely, and still at the same modest price. Their other accessories are also unusually nice and reasonably priced — aileron horn, rudder horn, nosewheel tiller, and an exceptional set of push-rod "ends" which include a moulded plastic end in which a metal rod is inserted. Using $\frac{1}{4}$ " balsa or spruce push-rods, the ends of the pushrods are dipped in thinner from 5 to 15 seconds, then inserted into the Rocket City push-rod ends. When dry, they are permanently installed, and you have a strong, durable, and exactly "centered" push-rod.

While mentioning improvements, the fabulous Rand actuators have been improved. A new, lower drain, quieter (RF) motor has been employed, along with a new, stronger gear material.

Associated Hobby Manufacturers, importers of the UEDA line of engines announced the addition of the 15 R/C. We managed to latch on to one of the first engines imported, and must admit that we were somewhat surprised by the

high quality of the casting and machinery. This engine is a little jewel, complete with a full throttle that really works. Haven't had a chance to get it airborne yet, but bench tests indicate that the UEDA 15 R/C is quite smooth with better-than-average power. Even old Fearless has one, and swears by it. This is something of a recommendation, since he usually swears at things!

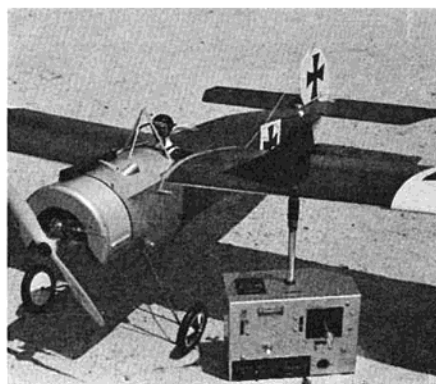
Have been sitting on a pair of pants — wheel pants, that is, waiting for a chance to check them out. These are one piece molded polyethylene pants. This material has proven extremely durable and capable of withstanding the abuse to which wheel pants are subjected. They come complete with special axles and turned aluminum "Pant Loc" that mounts the pant to a dural gear. Pants will accept wheels up to $3\frac{1}{4}$ " diameter, and are available from Gee Bee Line, Box 347, Forest Park Station, Springfield, Massachusetts. Before the summer is over, I'm going to have a set of their floats on something! (Ed's note: Probably on the shelf!)

Did you ever complete your radio installation only to find that the throttle takeoff on your engine was on the wrong side? So you realize it in time, but are forced to juggle your servos to an unwanted position. Darin Bros., 5221 Allen Road, Allen Park, Michigan 48101, has the answer, in their motor control crossover, a compact unit which attaches directly to the engine crankcase screws and provides take-off from either side. Also from Darin Bros. is a compact four-way "Pocket Socket," a telescoping nut driver with four sizes in one tool. (\$4.95). Mighty handy!

One of our local Einsteins has assembled his own five channel version of the Digitrio. True to form, every part has been substituted with the expected results—"this damn Digitrio won't work!" After pointing out Ed Thompson's admonition to use a name other than 'Digitrio' when you've Mickey Moused it up, he happily agreed. "Okay, then Digiquin — after all, it's five channels!" After much tinkering without much success, the name has changed to Digiquit, and Einstein is busy building "another" Digitrio — this time, by the book!

Till next month — see you at the field. F-I-E-L-D . . . field. Okay, fellas? Last month, Ken Willard made me stay home and write "I will not fly in the street!" one hundred times — so now what?

RCM TECHNICAL FEATURE

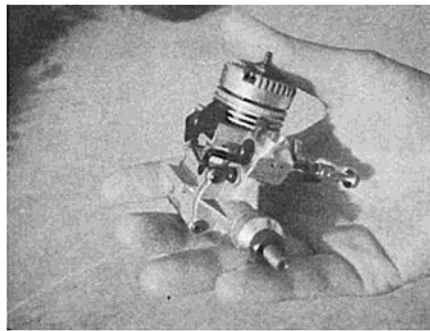


RCM Art Editor Bob Dance's Eindecker and Digitrio. WW I craft is actually a highly modified Falcon. Rig works, despite the fact that Fearless Leader built it!

I could go on and on, but we received the package on Saturday morning and Sunday night (quite late I might add), Holman started the countdown and threw the switches — it worked perfectly! This was Saturday night, actually Sunday morning. We were going to fly Tuesday and we did. I don't believe enough can be said for the simplicity of this system, for simplification means progress. We have had the opportunity to compare the Digitrio with a well known proportional rig and we are happy to report in our evaluation that we have found the Digitrio system to be much more stable. (Tech Editor's Note: I don't know what Warren means here. I assume he means smooth servo operation which is only one part of overall system evaluation.)

In conclusion, we have close to 50 long and strenuous flights on the system now, and have really put the Orion through the paces. By the time you read this we will have more than a hundred, I'm sure. So what more can you say, except, you people have a real thrill coming. So, with that, we here in Arkansas, will say goodbye and go shake a few "digits."

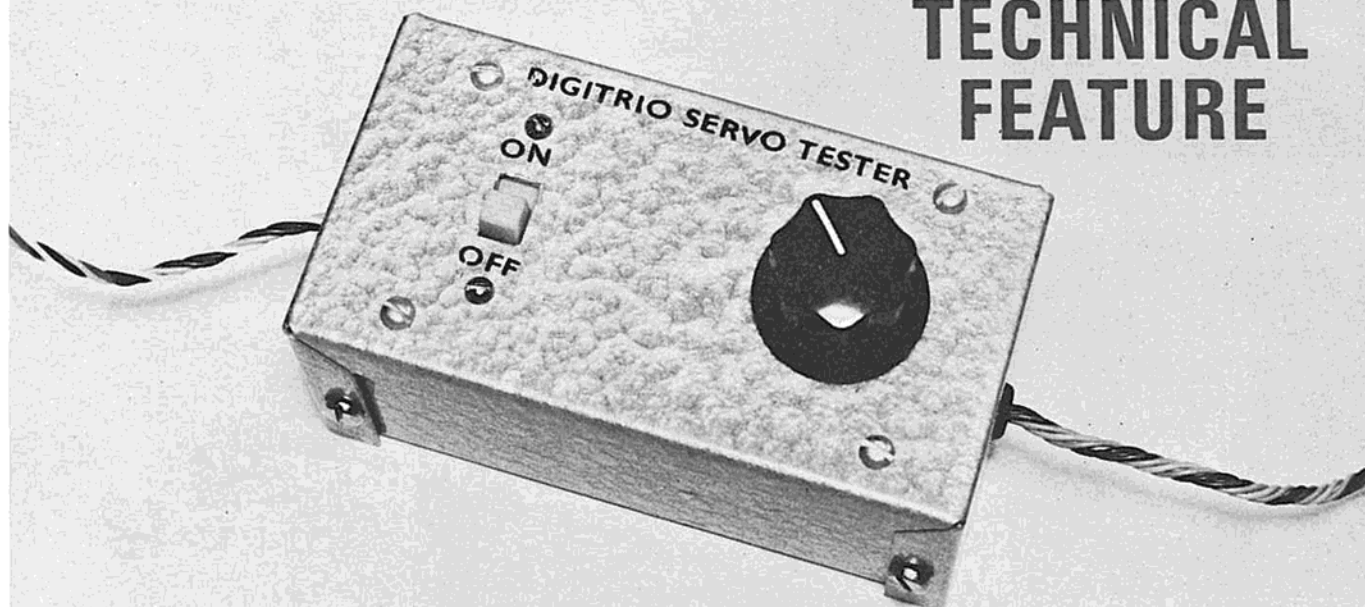
Bill Hobbs and early prototype of Digitrio-4. Note rudder control addition in lower left corner. Over 100 flights. Senior Falcon.





**R/C
MODELER**

TECHNICAL FEATURE



By **DAVE HOLMES**

DIGITRIO SERVO TESTER

Designed for the Digitrio, this servo tester can be modified for use with any digital system. Excellent for setting up linkages or operating servos without using the transmitter.

Tech Editor's Findings

RCM has checked Dave's servo checker and finds it to be an extremely useful device for testing Digitrio servos. As the author says, the basic design can be modified for use with other type digital servos. Some servos will require a negative going pulse for proper operation and a pulse inverter could be added.

THIS is the first in a possible series of articles on test equipment for proportional equipment. While this tester is designed particularly for the Digitrio equipment, it can be modified to work with other systems such as Micro-Avionics, Kraft, PCS, etc.

This little device will allow you to work on servos without having to use

the transmitter and receiver and also comes in handy for setting up linkages in a new airplane. Since I often fly in contests, I have also felt the need for some way to operate the throttle servo when my engines are acting up (normal conditions) and my transmitter is impounded. Contest pilots can appreciate this point.

The cost of this tester is in the vicinity of \$12.00 or less and it is well worth the time and expense involved.

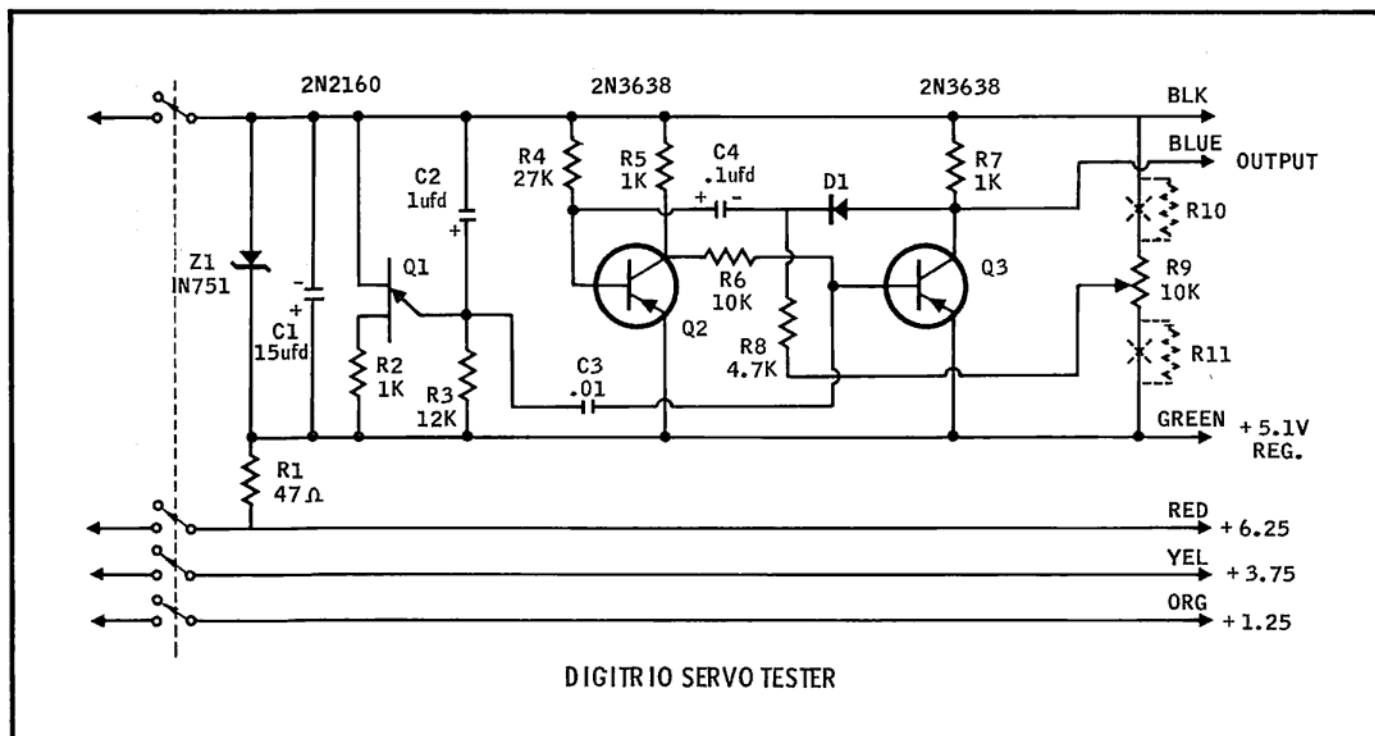
Construction

Construction is quite simple and proceeds as follows:

- () Drill all holes in board with #67 drill.
- () Enlarge mounting holes with #44 drill and tap for 4/40 bolt.

- () Install all resistors.
- () Install all capacitors. Observe polarity of C1, C2 and C4.
- () Install diodes. (Check polarity.)
- () Install transistors.
- () Install 4" lengths of red, black, yellow, orange hookup wire in proper holes. (Zener end of board.)
- () Install 6" lengths of red, green, blue, black, yellow, orange hookup wire.
- () This completes the wiring of the board. Clean all joints with thinner or alcohol.
- () Lay full-size template over top of box and mark holes and switch cut-out.
- () Drill all holes as indicated. On the

(Continued on Page 45)



cutout for the switch, a little care in drilling a row of holes around the inside of the marks and filing out the remaining will give you a neat appearing cutout.

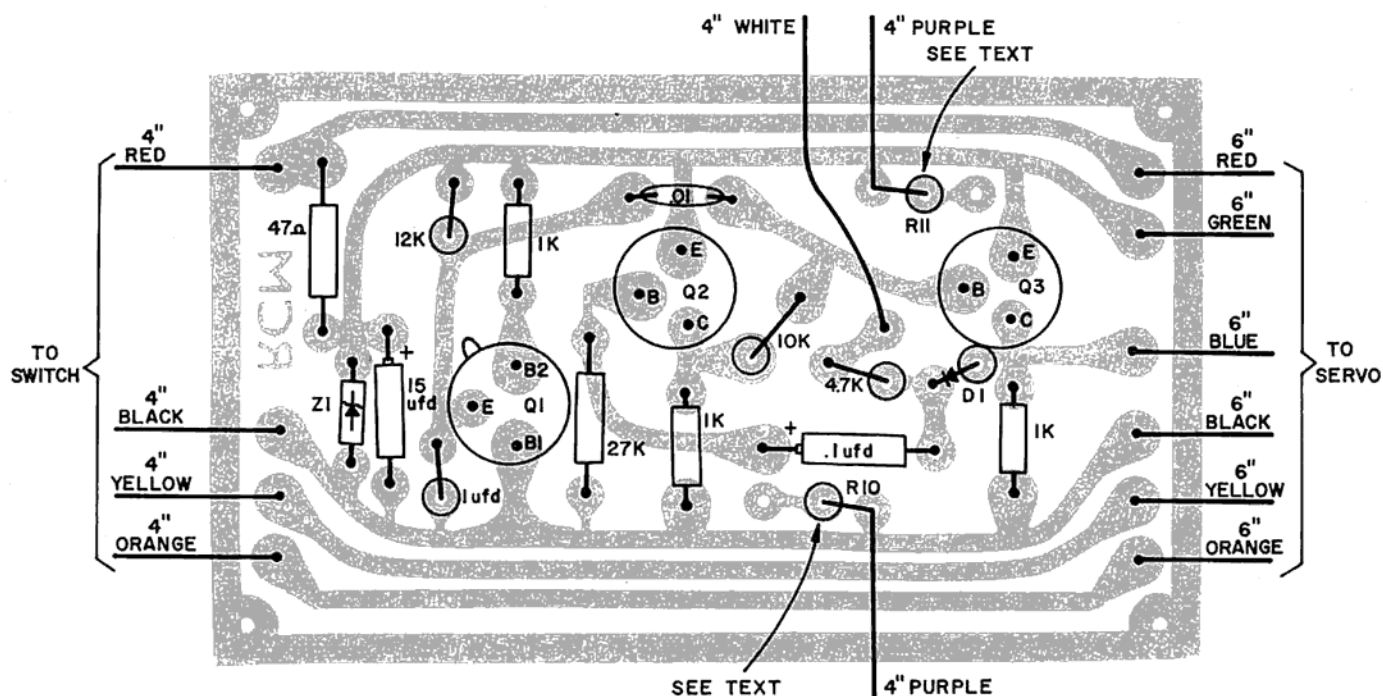
- () Drill holes centered in the ends of the box to accept $\frac{1}{4}$ " grommets for servo and battery leads.
- () Cut 4 ea. $\frac{15}{16}$ " lengths of $\frac{5}{32}$ " brass tubing for spacers.

Assembly of the tester is best done by first mounting pot and switch in the case. Wire the battery leads to the center arms of the switch. Lay complete P.C. board component-side down beside box and route 4" leads to switch. Trim

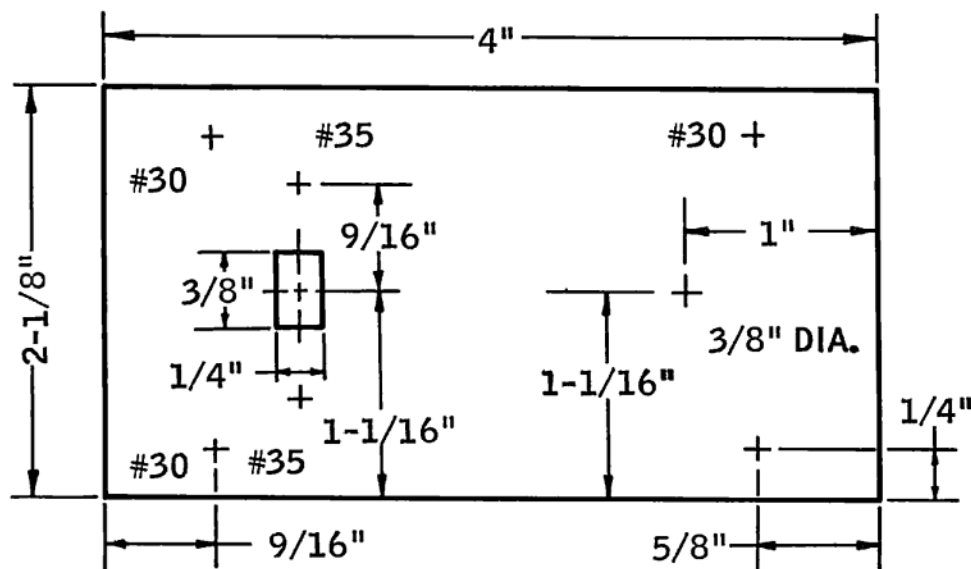
and solder. Route 4" purple and white leads to pot with white going to center arm. Fold board over and install bolts and spacers. Route servo and battery leads out through grommets and assembly is complete. Recheck all connections and check battery cable with ohmmeter for shorts and proper connections to board. If you are sure of the connections then a smoke check is in order. Plug in battery (no servo) and turn on switch. Check voltages at servo cable with a volt meter. Measure voltages with minus lead of voltmeter to black lead of servo cable. All voltages should check as indicated on schematic. If all

voltages are right, set the pot in the center of its rotation and plug in servo. Turn on power. Servo should seek approximate center and stop. Adjust knob to position servo in exact center of its rotation and reset knob on pot to a reference mark. That completes alignment of your servo checker.

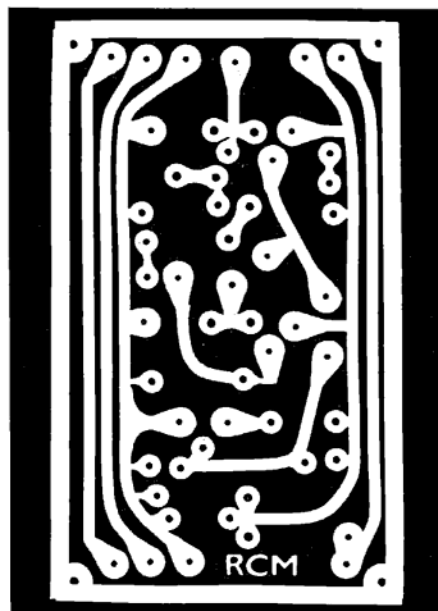
The tester with the parts values as shown yields the same servo movement for pot rotation as your transmitter gives you. If vernier action is desired, two 4.7K resistors may be inserted, one in each arm of the pot as shown in dotted lines on the schematic (R10 and R11). Pads are provided on the board for these



FULL SIZE LAYOUT FOR TOP OF CASE



CASE DIGITRIO SERVO TESTER

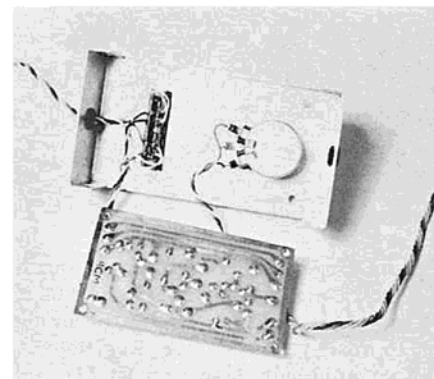
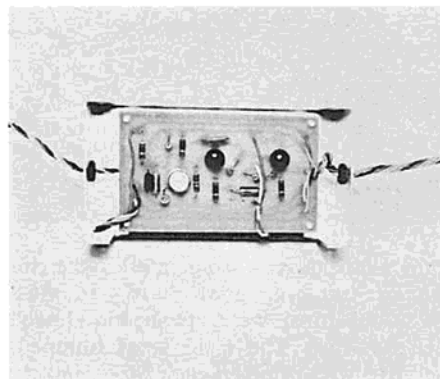


resistors if you wish to use them.

If it is desired to use this tester with other than the Digitrio, some wiring changes may be needed. The output from the unit is a one MS nominal positive-going pulse. If the servos you wish to use it with take a one MS positive pulse you are "in." Otherwise R4 may have to be varied. A larger value of R4 gives a longer nominal pulse and vice-versa. The pulse repetition rate can be varied by changing R3. Here a larger value gives you a lower repetition rate. These two resistors could also be replaced with trim pots if desired.

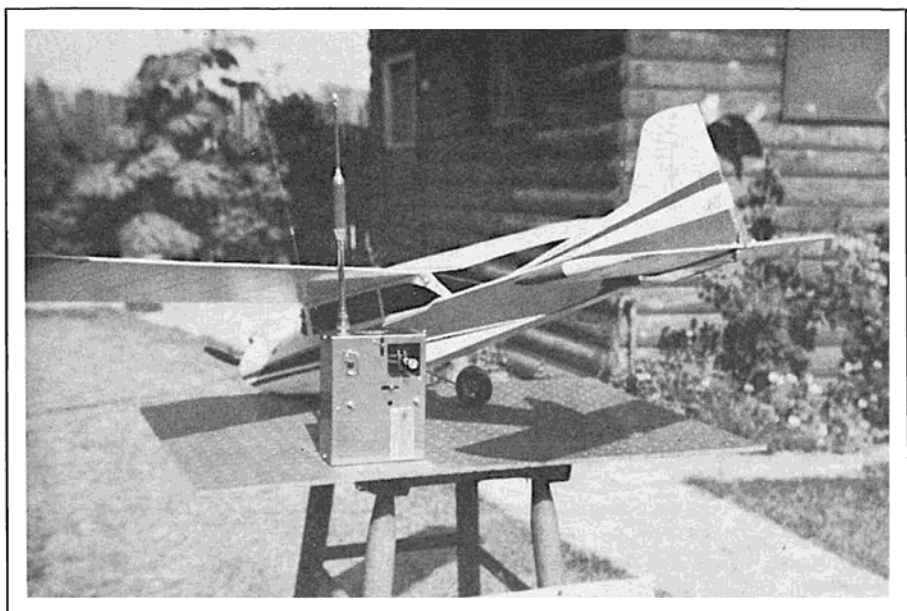
I hope you get as much pleasure from your servo checker as I have from mine. With this unit there should be no excuse for not giving your servos the periodic maintenance recommended by Ed.

Good luck and may you grow fewer grey hairs at the service bench.



PARTS LIST FOR DIGITRIO SERVO TESTER

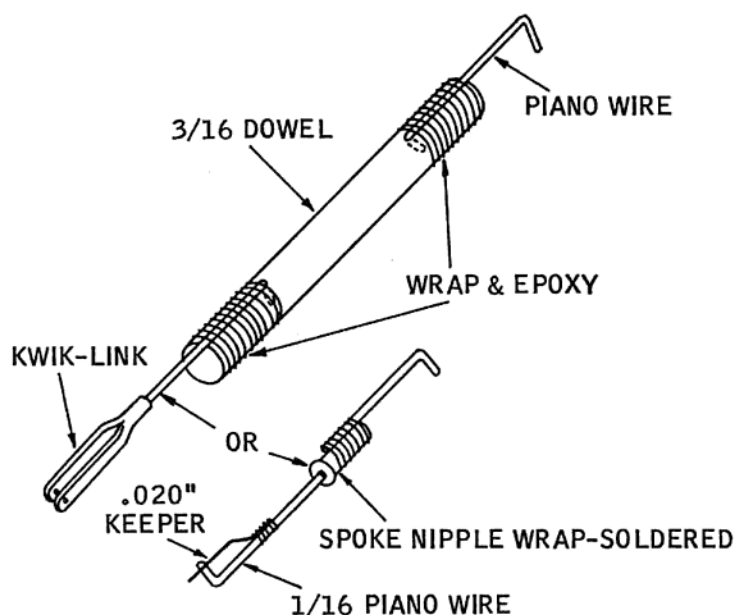
R1	47 ohms	1/4 W 10% Carbon
R2	1K	" " " "
R3	12K	" " " "
R5	1K	" " " "
R6	10K	" " " "
R7	1K	" " " "
R8	4.7K	" " " "
R9	10K	potentiometer CTS PQ 11-116
R10	4.7K	1/4 W 10% Carbon
R11	4.7K	" " " "
D1	DHD806, 1N658 etc.	Silicon Diode
C1	15 ufd	6 volt tanalytic
C2	1.0 ufd	6 volt tanalytic 10%
C3	.01 ufd	ceramic capacitor
C4	.1 ufd	6 volt tanalytic 10%
Q1	2N2160	G.E.
Q2	2N3638 or 2N3640	Fairchild
Q3	2N3638 or 2N3640	Fairchild
Z1	1N751	Zener
1	Aluminum case, Premier #PMC-1002,	4 x 2 1/8 x 1 1/2
4	4/40 x 1 1/8" bolts	
2	1/4 grommets	
1	Pkg. hookup wire (8 colors)	
1	ea. female servo connector and male battery connector	
1	W.E. 9F switch 4PDT	
1	Knob	
1	4" 5/32 brass tubing	



WALT AND WAGGER on the RANDWAGON

By LOREN DIETRICH

FIG. 1 PUSH RODS



"THREE guesses," said Walt, as he slammed the door of his new hobby shack and stood with his back firmly against it. "If you can't figure out my new project by then you lose one Milk-bone!"

His mournful Bassett hound cast one eye to the sky in silent plea for help, then let it rest balefully upon his master. Patient to the end, Waggon sometimes felt the end was not too distant. "R-R-RUFF! A-R-RUFF! Yip raper!", he snorted.

Walt, who often imagined that his somnolent housepet had near-human powers of speech and reason, replied sharply, "Speak up, Gaines gobbler, or I'll take that as your first guess."

"Ruff!", said Waggon. "Whatever that new project is, it's bound to be extremely rough; perhaps like your idea to cast an entire R/C ship in sections in your Vacuform. That was a keen idea." With a snort of disgust, Waggon rotated neatly three times before collapsing with a snort into the flower bed beside the door. "You should have sent that little gem to Don Dewlap, the famous R/C Modeler editor."

"Sticks and stones," sniffed Walt, "and it's Dewey, not Dewlap. You have two guesses left."

Waggon crinkled his nose in thought. "You're going to enter the indoor event with a rubber-powered anvil."

Walt snapped "One more guess, and be civil else I convert your chow dish into a Goodyear cowl."

"O.K.," sighed the Bassett. "You finally took possession of a Rand LR-3 actuator for Galloping Ghost and you've installed it in your Junior Falcon for test flights. Am I close?" Waggon gazed deep into Walt's soul with mock seriousness, but the thunderstruck reaction seemed to gladden the Bassett's heart out of all proportion to his mournful eyes.

Back home again, the sad-eyed Bassett dropped the grimful litter basket in the corner and plopped into his favorite pile of shavings. (An old deBolt Livewire.) Fixing Walt with a reproachful stare, he opined, "You can't say that wasn't exciting. Who would have dreamed that a Junior Falcon could do a hammerhead tail-slide with snap-roll frosting right into a dry swimming pool?"

Walt sighed, as he usually did when the dog was proven correct again. "O.K., pulse-pup. Care to dispense a few words of wisdom on the subject of installing a Rand actuator into an existing bird?" So saying, Walt rested his chin in his hand resignedly to await the doggy dissertation which follows:

* * * * *

Let's start with some basics, (Waggon intoned, propping head on his favorite ball). Any Galloping Ghost or Simpl-Simul actuator is a compromise of the

FIG. 2 FUEL TANK

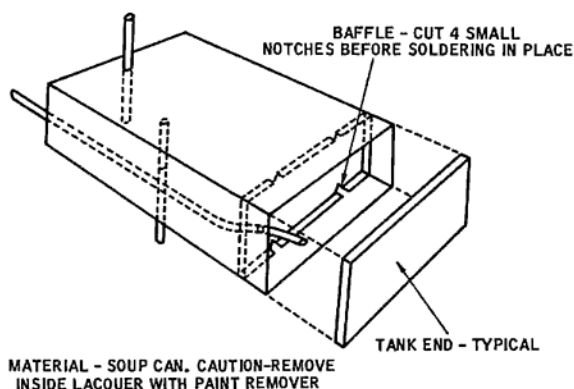
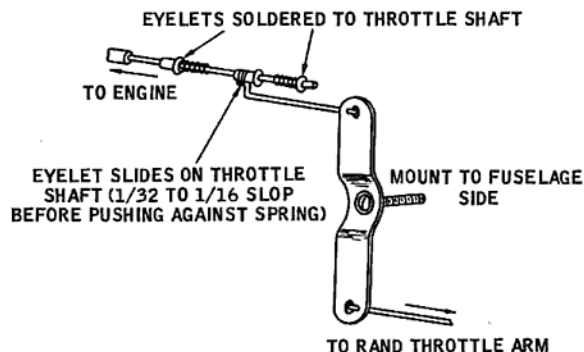


FIG. 3 THROTTLE REVERSE BELLCRANK, "SLOP" CLEARANCE & LIMIT SPRINGS



following items:

1. A pulsing transmitter, of the Min-X or Controaire type, must be used to give pulse-rate and pulse-width variation. The Ace-Phelps pulser can also be added to an existing single-channel transmitter.
2. Some type of linkage must be used to give RIGHT RUDDER and UP ELEVATOR with full "on," and LEFT RUDDER and UP ELEVATOR with full "off."
3. The surfaces MUST pulse or wiggle in flight so that rudder passes from RIGHT through NEUTRAL to LEFT quickly enough that the airplane will not follow, but rather flies as though no rudder were being applied at all. By varying the pulse length (or "on" to "off" time) the rudder will spend more time on one side of the airplane than the other, thus giving the effect of a certain amount of rudder application. This pulse-length variation is controlled by a sideways movement of the transmitter stick.
4. The elevator must be rigged to give UP with either rudder movement, but DOWN with rudder neutral.

Therefore, when the rudder pulses from one side to the other, the elevator passes from UP to NEUTRAL to DOWN to NEUTRAL to UP again, thus giving the effect of "neutral" elevator. If a slow pulse-rate (the number of on-off pulses per second) is used, the elevator will have time to travel farther into each UP position thus giving more UP than DOWN. If a fast pulse-rate is used, the actuator will not have time to travel very far from its spring loaded DOWN (centered) position, thus giving more DOWN than UP. This pulse-rate variation is controlled by a fore-and-aft movement of the transmitter stick.

5. If the actuator is properly constructed, a full ON or OFF signal will give the actuator motor time to travel completely around rather than pulse from side to side. Therefore, a separate arm can be geared to the motor to give a slight pulsing when the actuator is pulsing, or to move in one direction with signal OFF and in the other direction with signal ON.

This arm can be connected to the engine throttle and controlled with full transmitter ON and OFF buttons, giving a number of positions of engine speed. While the actuator is "running-through" in this fashion, the tail surfaces wiggle through their full travels giving essentially neutral control during engine change. Note that this device can be used to give neutral controls and low engine in case of signal loss.

"O.K., fleabite," interrupted Walt. "I agree that those are the basic principles of a GG system. What's new about the Rand LR-3 that tripped me up?"

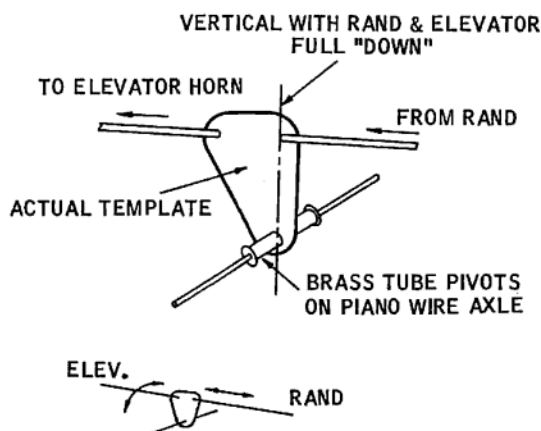
"Definition: An R/C expert is someone who knows WHY he crashed," sniffed Waggoner. "Pay attention!" and he went on with his explanation.

* * * * *

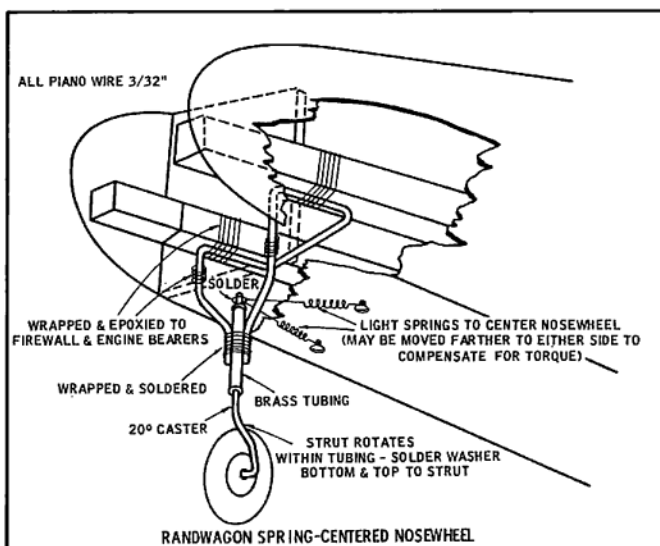
"The LR-3 (Waggoner went on, while scratching his blanket in a new position), has these features:

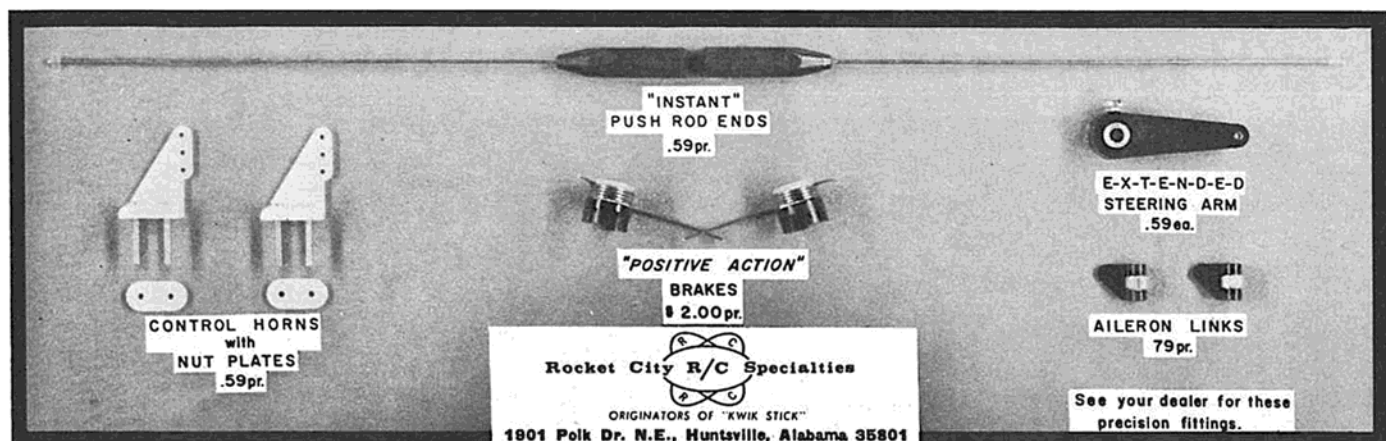
1. Push-rod connections to elevator, rudder, and throttle.
2. Adequate power and control-throw for most any size sport aircraft.
3. Small weight and size combined with

FIG. 4 INTERMEDIATE "LOST-MOTION" BELLCRANK TO ELIMINATE EXCESS "UP" TRAVEL DURING THROTTLE CHANGE



(Continued on Page 49)





RANDWAGON

(Continued from Page 48)

easy mounting flange.

4. Throttle arm adjustable to any position, and trimmable to any of 5 positions during flight with no sequence.
5. Full suppression of motor "noise" to eliminate receiver troubles.

"Now," said Waggoner. "Let's cover some of these points while we check the installation in your Junior Falcon to determine where you made your dog-boned boo-boo."

PUSH ROD TO SURFACES

"No problem here, old fuzz-face," chortled Walt. "I used solid $\frac{1}{16}$ " wire push rods just like we did in the small rudder-only ships."

"Egad!" moaned Waggoner. "Never use solid push rods in the larger ships! They flex too much, and also act as small antennas to give radio noise and signal loss. Always use hardwood dowel for the longest possible distance in the center, then epoxy your piano wire or KWIK-LINK ends to it. Also, with the Rand you should have some way of adjusting the pushrod length easily from outside the plane. (Fig. 1)

"I stand corrected, Wiggler," sighed Walt. "However, control was no real problem, since I had more than I could use."

"And there lay half your problems, forsooth," snorted Waggoner.

POWER AND CONTROL THROW

"You must remember that the basic principle of the GG system is that the airplane follows the average of the wiggling control surfaces, which it will do if you give it half a chance. However, large control surfaces and short control horns will make it try to follow every movement with disastrous "galloping" and loss of control efficiency. Those control surfaces which were fine for the TEE-DEE-BEE system were far too large for the Rand. I would suggest the following:

1. A rudder area of approximately 20% of the full vertical tail surface. A control horn of $\frac{3}{8}$ " from surface to hole-center should give a throw of about 25° each side of center when pulsing in neutral.
2. Elevator area of about 8% of the horizontal stabilizer area should be adequate, with a horn length of $\frac{1}{2}$ ". This will depend upon the efficiency of the stabilizer; when in doubt, cut down the area or travel for first flights and be safe. Set the elevator travel to be equal above and below the stabilizer while transmitter is pulsing in neutral, then trim this adjustment later for good power-off flight.

"But I practically cut them off on the second flight!" wailed Walt, "and I still took the inverted tour of the swimming pool. What about that?"

Waggoner shifted slightly and nosed the shards of the shattered Falcon. "That ties in with the next item: small weight and size."

RELAYS

"Remember my comments about that relay being strapped to the plywood mount?" Waggoner queried, with an 'I-told-you-so' glint in his bleary eye. "You could afford the weight of that relay (or a relay receiver), but you couldn't afford the engine vibration causing the relay armature to float. Always mount a relay or a relay receiver in soft, loosely packed foam rubber to damp out the engine vibration. I might also mention that a sloppy or loosely mounted engine can give a tremendous increase in vibration level and I do believe I noticed a slightly loose firewall before the flight, did I not?"

"O.K.," Walt sighed. "I guess you just have to be a born perfectionist or natural tinkerer to fly these single-channel multi-purpose units."

Waggoner laid his muzzle on the ball again, and gave his master a long, reproachful stare. (This had the effect of adding another dozen pleats to the furrowed expanse of forehead.) "I don't know why they call man 'dog's best

friend,'" he growled. "You cause me more trouble than a coat-hanger landing gear. Do you still have that old green Esquire you used for vertical dirt-penetration tests?" Waggoner was referring to one of Walt's abortive attempts to 36½ functions from a Bonner SN escape-ment, a coil spring, and 26 feet of piano wire. "If so, resurrect it and place it on yon bench. Then, while I plan our attack, go down to the hobby shop and buy an O.S. Max .10 engine, with R/C throttle. There, there, get along with you now!" Waggoner applied his nose to Walt's person in such a fashion as to speed his exit, causing much comment among the neighbors concerning the sudden industry of that bum across the street who played with toy airplanes and talked to dogs.

* * * * *

Waggoner blew the shavings from one whisker, and settled back on his haunches to view their labors to this point. "Now, oh mighty Sahib, let us review our approach to these problems as they came up. Perhaps this will convince you that problems are to be solved on the bench during construction, not on the field during destruction. Oh, I say! That was a rather neat phrase," he chuckled, thumping himself on the back with his tail. "Well, on to the review," he added hastily as Walt made menacing motions.

ENGINE AND TANK INSTALLATION

1. New $\frac{1}{8}$ " fuselage nose pieces, tied in to cabin structure with doublers and white glue. Length sufficient to balance with .10 engine.
2. Hardwood engine mounts, tied together for rigidity and secured with white glue and epoxy to birch $\frac{1}{8}$ " ply-wood firewall and leading-edge bulkhead.
3. Engine bolted to mounts with .032" aluminum strips between mounts and engine to prevent crushing. Elastic nuts to prevent loosening.
4. Large fuel tank fabricated from old soup can. No inverted flight planned at this time, so it was made with a

flat bottom to allow it to rest on sponge rubber directly on the mounts. Notice the baffle to prevent sloshing, foaming, and temporary starvation. (Fig. 2) All edges of tank bent over and "sweat-soldered," then tank was put under water and pressurized by mouth to check for leaks. (We were sure to remove the lacquer from the inside of the can before fabricating it, of course.)

LANDING GEAR

1. The conventional dural landing gear was removed, since it makes taxiing and landing difficult and is prone to tear off backward. Instead, we used $\frac{1}{8}$ " wire for the main gear and installed it Falcon-fashion; that is, laced and epoxied to plywood pads which are then epoxied to the fuselage insides. We placed these wheels about 60% of the chord back from the leading edge to give good take-off. Nose gear was fabricated from $\frac{3}{32}$ " wire which was coiled and then epoxied to firewall and mounts, then fashioned to give 10° swiveling to each side for control during take-off.
2. Underside of fuselage nose planked with $\frac{3}{16}$ " balsa to withstand nose-wheel impact on rough landings and to give additional rigidity to engine area.

RECEIVER AND BATTERY MOUNTING

1. Since we were using a relayless receiver, we mounted this and the batteries in a block of styrofoam which fitted neatly into the forward "niche" of the cabin. For relay receivers, we would have wrapped it loosely in foam and laid it in place. Note that we used 2 alkaline penicells for the receiver, and two nicads for the Rand; a small phonograph jack was run from each set to allow charging.
2. The Radiosonde relay (which we are still using because of the availability of both the relay and the space) we screwed to a scrap of plywood. Then we hollowed out a block of foam rubber and glued it to the cabin floor. The relay is then worked into the pocket of this foam where it is protected from both impact and vibration. A cover of clear plastic was molded in the Vacuform and then glued lightly to the sponge to protect from dirt, weeds, and so on.
3. The Controaire NND-1 Switcher was used to allow elimination of one set of nicads for the Rand actuator, leaving only one set needed. Mounting of these little switchers can be a problem, but it was nicely solved by 'gooping' it to a piece of $\frac{1}{32}$ " plywood and mounting it with the same screws used to hold the double-pole, single-throw switch. The 'goop,' by the way, was General Electric clear silicone sealer in the tube, available in most any grocery store or hardware for a buck. Terrific for sealing

wing openings, vibration-proofing wire ends and solder joints and the like.

4. A vertical antenna was mounted, for more freedom from glitches and to give better contact with the transmitter.

THROTTLE

1. We were careful to wire the Rand to give proper rudder command and response, when compared with transmitter stick movement. We then moved the throttle arm to the best location for our control movement, and then observed which direction it moved with full transmitter "off." We chose that direction for low throttle to obtain proper 'fail-safe.' The Max .10 engine hookup we used required that we use a reversing bellcrank to obtain proper direction for low throttle, so we made one from aluminum. By the way, Herb Abram's dog tells me that the throttle arm on the LR-3 has a couple of rather different features:

- a. The throttle lever pulses slightly during normal flight, so the linkage must contain $\frac{1}{32}$ " to $\frac{1}{16}$ " slop to keep this pulsing from being transmitted to the throttle. They use small piano wire in the large hole of the throttle arm to give this clearance.
- b. The throttle arm should travel a little farther than the engine throttle linkage, to assure proper idle and full throttle. When the Rand throttle arm reaches the end and feels resistance here, it will slip on its shaft. When it hits the stop in the other position, however, it will slip again and re-set. Abram's dog tells me it can do this any number of times with no damage.

We chose to take care of these two items by the 'grommet and spring' technique, allowing the slop and spring-loaded limit stops to occur in one place. (Fig. 3) Notice we chose the simplest and freest push rod arrangement we could find. Binding here could cause arm slippage in flight, giving erratic throttle settings. And now (said Waggoner) let's add a little new silk for the test glides and flights. We'll paint later if your results are worthwhile this time.

* * * * *

Walt set the slightly oily Esquire on the bench and stood back with admiration. "I must concede, old chow guzzler, that this ship brings single-channel multi into the hands of those who like size and power as well as throwing a bone to the Wee-Willard set! Loops without spirals, Immelmans, barber-poles, low passes, tight 360s, touch and go . . . whew! And that effortless overhead cruising with a purring engine is the equal of any multi I ever saw! One question, though. Changing from low

to high speed is very smooth, but dropping into a lower throttle gave us some pretty hairy tail stands. What can we do about that?"

Waggoner munched the dog yummy that Walt bestowed upon him in reward of the day's flights. "The main thing is altitude and technique," he crunched. "Like Herb Abram's dog says, any GG system has some compromises. There are several things that can be done to minimize it:

1. If you have to compromise on the flight trim, it is better to hold some UP during the glide than DOWN during the climb. Adjust the elevator push rod for this condition.
2. Give DOWN before, during, and after a change to LOW throttle.
3. Try putting it into a turn while changing to LOW, to see which turn will be simply steepened-up slightly during the change.
4. If you really have nothing to do, you can install an intermediate bellcrank in the elevator system to reduce the additional elevator UP travel during engine change. (Fig. 4). This will not eliminate the problem, but it will minimize it.
5. Simply learn to fly the airplane well under all conditions. Did you notice the way I 'gunned' the engine a little to clear the fence on landing?"

"Very smooth," agreed Walt. "Now, can we paint it? I found it very hard to see against the sky, and besides, my wife thinks it looks like your dog house. How can we make it look more like an airplane?"

Waggoner settled down snugly into the tattered blanket, and mumbled a last few words before again resuming his role as a house pet. "I suggest you go to the airport and look at some of the new Cessna and Beechcraft airplanes. You'll be amazed at what they do with a few stripes and splashes. They might even send a few colored pictures if you get the addresses from a flying magazine and talk nice. Just from memory, I'd say that the new Cessna 172 Skyhawk done in white and insignia red with a simulated black cabin would fit your Esquire nicely. Besides, then you could change its name to something sexy like the *Randwagon*!"

Walt leaped off the stool and headed for the garage to get the car.

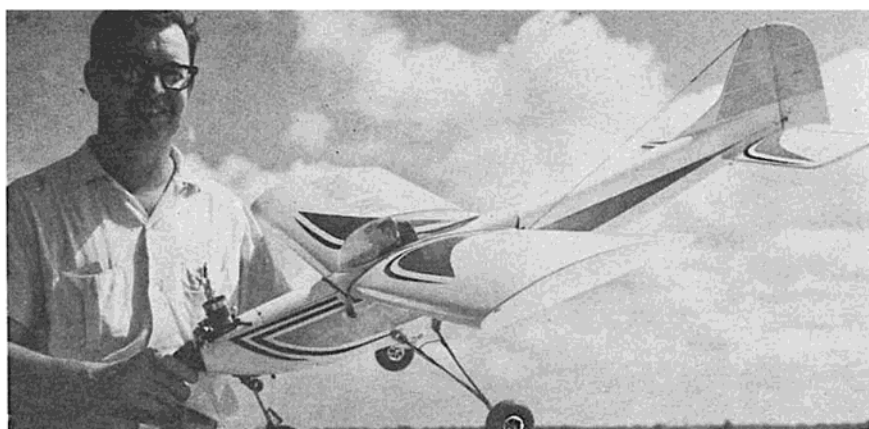
Waggoner stopped him with a paw. "Save yourself a trip, Walt, and look out in my doghouse. I brought a picture back from the airport last week which you can use."

Walt nodded his thanks, then stopped suddenly. "The airport? You have a friend out there?"

(Continued on Page 54)



JERRY KLEINBURG



CONTEST TRIALS

CLASS I contest action — after a slow start — stepped up at the Capital City R/C Annual in Jackson, Miss., and at Houston's Knights of Columbus 2nd Annual Model Airplane Contest. At these affairs rudderites unveiled their latest creations and hardware and took to the air to demonstrate a new peak of flight excellence which gave promise that 1966 would provide another memorable year of competitive progress across the country.

● Jackie Gardner and the Capital City R/C Club hosted the Jackson meet where a full assortment of R/C events attracted fliers from seven states to the island-like flying site of the Capital City RC'ers. In a spirited Class I clash Carl Von Seuter's experience allowed him to edge Rev. Lynton Younger, of Ridgeland. Carl flew his 4/5 size modification of Gardner's Penetrator (RCM, Aug. 1966) while Lynton used his new pretty "Skyline," a black and red original, in their duel for the top trophy.

The Skyline, which fairly well represents a "middle ground" Class I contest ship, sported a Veco 45 but negotiated a full 9 minute pattern on only a 6 oz. tank. With a wingspan of 53" and an 11" chord, the 560 square inches hoisted 5½ pounds for approximately a 21 oz. wingloading. The ship has a 12" nose

moment on a 43" fuselage which carries the 12% flat-sectioned wing at 4½° positive incidence. With 3° on the horizontal stab the decalage angle is 1½° and this is matched with 6° of engine up-thrust. Ground taxi was excellent and probably aided by having light pressure on the nose gear due to the main gear being located a short distance aft of the center of gravity. A balance point at 30% of the wing chord and a rib section having its high point at about 35% gave the aircraft an easy flying attitude at medium speed.

Carl Von Seuter's plane, finished in white and gold, used a Super Tigre 40 and featured a 14% sectioned foam wing covered with 3-ply bristol board. Many builders are discovering this method of construction, besides being a lot less expensive, produces surprisingly light wings with plenty of stamina to take the stress of all aerobatics in Class I's repertoire. Carl's ship carried Controaire 10 radio equipment to energize Royal servos, one of which was modified with an external switcher plate to give a two position rudder control utilizing 4 channels of the 10 channel reed gear. Engine control absorbed two other channels in a normal setup.

Main crowd pleasing attraction was performed by a starred set of twin red, white, and blue Citrons as Jim Kirkland

and Lou Penrod teamed to lace the sky with a nifty exhibition of formation aerobatics. They showed that propo radio gear makes it possible to produce sweeping maneuvers with control accuracy needed for effective formation flying that takes the worry out of aerial togetherness. Kirkland went on to head off the Class III pattern charge of Ron Chidgey and the genial New Albany dentist, Jim Edwards, to cop that event with a respectable 185½ point score. Kirkland went on to Oklahoma City to win the TORKS American Annual Class III crown as detailed here last month. Jim — it's really Tech Sgt. Kirkland, USAF — temporarily bowed out of R/C competition after these twin wins in order to report to S.E. Asia for a military stint in that war-troubled corner. The Florida Flash will certainly be missed and we wish him a safe and speedy return to the scenes of his many R/C triumphs. Incidentally, Jim's place on the Contest Board appears slated to be filled by Ron Chidgey who's been closely associated with him in R/C matters for some time. Dean Wright, District V VP who CD'd the Jackson meet, indicated final decision on the change would come shortly.

In other Jackson action Ken McClure

(Continued on Page 52)



Masthead pic: Penetrator, 4/5 size version, flown by Carl Von Seuter at Jackson, Miss., powered by ST 40, Controaire 10. Won Class I Open. Far left: Original Skyline of Rev. Lynton Younger sports Veco 45, placed 2nd in Class I at Capital City RC Meet. Left: A rare bird, John Dawson, doesn't fly, but effectively field manages RC activities. Major domo'd Jackson RC contest. That's Bob Hinkel's Kwik-Fli.

of Memphis bested John McLellan of Yazoo City, Miss., and Tom Bobe, the Pensacola hobby shop merchant, in a rejuvenated Class II slugfest. Flying in Class II at the Jackson meet along with that in many places has many Class III'ers wondering if they really need that aileron servo and should pass up so many trophies. . . .

The Jackson contest owes its success to efforts of the host club as well as to the patient judging of Bill Payne, Bill Taylor, Bob Hinkle, Fred McClellan, Lester Alais, and Jackie Gardner (who runs engines at the darndest times!). Ann Gardner, Jackie's helpful wife, kept paperwork and tabulated scores for the 30 contestants. A big measure of credit also belongs to John Dawson, a non-flier and perpetual motion machine, who devoted his considerable personal talents (a benevolent despot type—really) in keeping the two flight lines operating smoothly for two ideal contest days that provided plenty of flying for all.

● Houston's KC/RC annual saw a field of six Class I'ers tangle for two days while Class III flyers were concentrating to see who would get the FAI qualifying nod for the September finals in Oklahoma City. In a tight Class I race Buddy Brammer and his "Oily Bird" nosed out Norm Rhodes and his ancient Texas Mambo by a ¼ point! Jerry Jackson and Val Hutchinson closely trailed these leaders. Hank Walker, a Class III comer from Austin, Texas, outpointed hard flying Gordon Gabbert and Cal Scully of ACE Hobby in Port Arthur in the multi classic. Rain brought a halt to the pylon events and it was later arranged to finish them at the Oily Bird contest in Port Arthur two weeks later for what might be considered a long distance pylon record of some sort! Charlie Hirsch CD'd this year's Triple-A meet while Jack Beauchamp and Leonard Hudson smoothly managed the twin flight lines of R/C events for the 35 entrants.

● Results of the Wright Bros. Memorial Meet in Dayton, Ohio, have just been received and show that Bernie Williams—back once again to R/C competition after an absence of almost three years—won over a field of 13 Class I entrants! Miles Reed and Dallas Armstrong Jr. followed in 2-3 order. Bernie's ship was the Live Wire Cruiser he used to win the 1963 Nats while Miles and Dallas flew their well-known originals. An outstanding meet for all events, the early reports indicate. More

details on this meet next month. . . .

WHO SAID THAT?

Much has been said and written about contest flying and what it is that urges flyers to compete. Here's what one well known competitor had to say about his own motivation. Do you know who it is?

"Many people have asked why I continue to compete. . . . I do it simply because I get great enjoyment from the good fellowship that I enjoy with my fellow modelers. There was a time that I felt I just had to win or else my ego would be deflated. Believe me, the years have taught me that this is the least that can be had from a meet. Fly your best to win, yes, but it really makes no difference who is announced the winner if you enjoyed the meet, did your best, and went home with that honest feeling in your heart! When the years teach this to more and more of us, our contests will become even better than they are today. . . ."

These are the words of Harold "Pappy" deBolt as quoted in the first issue of RCM back in October 1963. The thoughts were sage then as they are now and as we realize that this is the third anniversary of RCM we voice a hope that all our efforts stand the test of time as well as Hal's comments.

KABBAZ SURVEY

Alex Kabbaz, editor of the Meroke Smoke Signals newsletter and secretary of the Meroke R/C Club, Inc., is making a survey of RC'ers to establish a consensus regarding a single channel class event for rudder-only. The idea is to make room for beginners using escapements, pulse, and the new generation of single channel servos and radio gear. Alex, and many others believe another event is desirable at this time to aid in attracting new RC'ers. The Contest Board wisely rejected a move earlier this year to have single channel replace the current Class I event, but it has yet to finalize action on several proposals to add a beginner's event. The poll should aid in acquainting the Board with a broad section of opinion on the matter and Alex would be happy to hear from all readers on this. His address: 16 Pettit Ave., North Merrick, N. Y.

MARK ONE FOR MARK I

Mention of the Meroke Smoke Signals recalls one of its product reviews by Alex on the Mark I contest ship.

"Another not so new item is the Mark I. This is probably the best Class I contest ship available today. (Ed. note: The Mark I—featured in RCM June-July 1964—is not kitted, however plans are available.) Strength is the key-note in construction . . . sides are 1/8" sheet balsa, and it is best to use 48" lengths. There are 1/2" doublers in the nose, which is the strongest part . . . wing ribs are 3/32" sheet, and (the wing) is STRONG. . . . The only bad (flying)

aspect of the plane is its poor rolling ability although it will do a good Immelman. The plane is a slow flyer, is extremely stable, and will loop by just applying high motor if you are using a .49. This is a great plane for the beginner or expert, and will stand up under the most rigorous beating. It is also a very quickly constructed airplane. . . ."

While Mark I's are not as popular now as when Courtney Smith was contesting with his design, it is still a plane recommended for those less experienced in Class I due to its low wingloading, stability, and construction advantages. Newer Class I contest design trends however are moving toward higher wingloading, larger rudder surfaces, and forward C.G. trim. The "Windmill," Dallas Armstrong's creation featured in the July/August American Modeler, is a fine example of latest successful Class I design concepts that is putting a new look in the Class I sky.

PHOTO HINTS

We would like to print more of the photos we receive and at the same time get more of your pics of R/C action for these pages. It's not necessary to know an f stop from a tripod to easily get good shots—but a few simple hints may help and encourage some to give it a try. (Chuck Cunningham, please take note!)

★ **ANGLE.** Taking shots with the bright sun on the side or in the back of your subject and using exposures for shade will give relaxed results with the contrast needed for reproduction. If you have a flash—they're so simple these days—use it on sunny days also to "fill" the shadows a little. With the flash, just use sunny day exposure and backlight the subject.

★ **AIM.** Get close—and keep the target simple. Don't try to get more than one "story" per shot and keep the background plain or uncluttered. Even Polaroid snaps or just regular prints are publishable if images fill the picture.

★ **SNAP.** Use a cable release if your camera takes one. Pressing the exposure button on the camera produces enough wiggle to fuz the image and limit its print value. The flexible cable release cushions the camera from hand movement and helps achieve sharp results.

★ **WIPE.** Keep the lens clean—it's surprising how much engine exhaust will find its way to this critical area and cloud up your picture. Lens cleaner and tissue made for this job are mandatory here!

CONTEST CALENDAR

Les Sanborn of 4100 Purdue Dr., Metairie, La., sends word of the Crescent City R/C Club's 5th annual fly-in. A full list of events is slated to be flown at their field at Waggaman on 10 and 11 September. Trophies through five places for Class III are promised while entry

(Continued on Page 53)

Buddy Brammer, class I trophy winner at Dallas, Longview, and Houston meets hefts his new "Oily Bird." Controlaire reeds and 3 blade propped ST 60 complete equipment story of 5½ lb. yellow and black bird.



Jane and Hank Walker, Austin, Texas RC team, prepare their Zeus fuselaged

original. Digimite propo, guided plane in winning class III expert at Houston



2nd annual Knights of Columbus Contest. Ship features propo electric brakes (RCM Aug. 1966).

RANDWAGON

(Continued from Page 50)

"Mm-hmm," wheezed Waggoner, in the first fuzz of sleep. "Some nut who keeps going up in an old Sopwith Camel trying to find a Red Baron or something . . ."

Walt slowly closed his drooping jaw and moved aside. Opening the door of the shack wide, he gave a defeated and courtly bow. "Enter, Sahib. Thou takest the cake."

"Chawmed, I'm sure," snorted Waggoner as he entered to view the venerable Goldbird.

* * * * *

"You see," said Walt, "I removed the trusty Dual-Adams that we used for the early experiments with the Tee-Dee-Bee system and installed the Rand LR-3 actuator. I removed the torque rod and installed these push-rods to the existing elevator and rudder. I then fastened hardwood strips to the inside of the fuselage, set the Rand into a piece of plywood, and fastened the plywood to the strips. Hook up the pushrods, fasten a few wires, and Pretzle! . . ."

"That's Presto," moaned Waggoner. ". . . Pretsol!" finished Walt. "Galloping Ghost for larger aircraft, with trimmable throttle to boot!"

Waggoner, scrutinizing the interior of the Junior Falcon, brushed his nose on one of the parts. As the airplane

jumped, so did Waggoner. "Ye gods!" he yipped. "What's that piece of scrap iron strapped beside the Rand?"

Walt defensively rescued the aircraft before it rolled off the bench and replied, "That scrap-iron, ground-round hound, happens to be my relay! The relayless superregen receiver we've been using for the Tee-Dee-Bee will not run a servo motor in both directions; therefore, I used my engineering know-how to hook a relay in place of the escapement or magnetic actuator. Since a 50 to 100 ohm relay is ideal as a load for the receiver, I scrounged through the junk box and found a relay from an old weather Radiosonde unit. Single pole, double throw, and 50 ohms in the bargain. Clever, wot?"

Waggoner's bleary eyes widened in amazement. "Radiosonde? You mean one of those units in the white plastic box that the Army and Weather Bureau send up under balloons to radio back the weather soundings? It never occurred to me to check the resistance of one of those relays, even though I am a licensed Radio Amateur or 'Hambone' as they call us. I'd really rather see you spend \$4.00 or so for a Jaico Standard Gem with 50 to 100 ohm coil, or better yet buy a receiver that contains a modern relay such as the Min-X. Oh, well, Edison's dog did it, why not you?"

Walt beamed proudly and pointed out

the relay mounting. "Notice that I mounted it firmly to the plywood; no damage from hard landings!"

"If I remember Walt Good's vibration report," Waggoner mused, "the engine should send that into horrible buzzing fits thereby sending the aircraft into various and sundry unpredictable maneuvers. I also notice you are using the same size surfaces that you used for the Bee magnetic actuator system. Won't that be a little violent with the power of this actuator?"

"Waggoner, old fiend . . ."

"That's friend," groaned Waggoner.

"... you have no faith," replied Walt. "Come with me to the baseball field and I shall demonstrate one of those 'off the drawing board' flights for you." So saying, Walt gathered the Junior Falcon and the toolbox under his arms and headed out the door of the shack. Waggoner, however, turned the other way and trotted toward the garage.

"Waggoner! Heel, boy! Where are you headed?" Walt cried.

"Be right with you, Walt," Waggoner cast over his shoulder. "I just remembered that we hadn't taken the litter basket out of the car since the flight of the Vacuform Vampire. I want to be prepared to leave a clean flying field." Sure enough, the Bassett soon returned and joined a chagrined Walt who trailed the swinging litter basket to the field.

SUNDAY FLIER

KEN WILLARD



A COUPLE of issues ago, I reported on some of the new single channel developments in "GallopLESS Ghost" and "kicking duck" units. Notably there were the Rand LR-3 "GallopLESS Ghost" as Herb Abrams tabbed it, and Airtrol's RE-1 and CHRE-1 units, the latter, using a decoder, gives rudder and elevator control without any interaction. Also, there are the Tomoser, World Engines, Miniplex, and Go-Ac units, and by the time this appears in print, there probably will be others!

All I can say is "Hallelujah!" Single channel fans, arise! Our "liberation" is at hand! The multi boys no longer can say "get out of the air and let some real fliers perform." Anything they can do, we can do — maybe not better, but certainly more economically, smaller, and easier. Sure, we'll have to practice up a bit to learn to use these new units for maximum results. And, we'll have to learn their limitations. But our mistakes won't be nearly as costly or time consuming to recover from. (And if some English composition nut complains that I ended that sentence with a preposition,

I did it on purpose. For emphasis. And complaints like that are the type of "non-sense up with which I will not put," as Winston Churchill once said.)

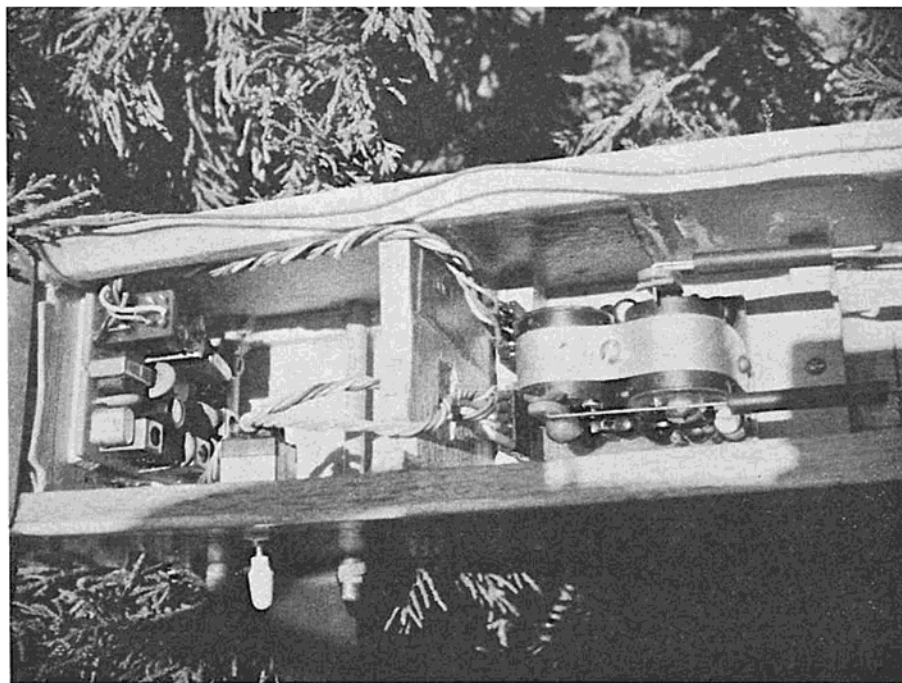
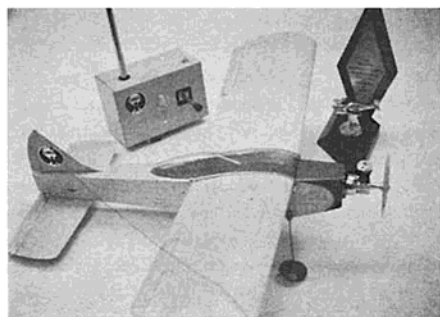
Now let me tell you about testing Airtrol's RE-1 system. The first one I received disappointed me a little due to intermittent operation. So, back to Dave Gray at Airtrol for a checkout. Diagnosis: bad capacitor. Fixed. Came back to me and worked fine . . . until the epoxy bond between the control arm and the motor shaft let go. Complained to Dave. He agreed it was a problem, but the solution turned out to be quite simple. Scrape the protruding portion of the shaft to scruff it up, then apply HobbyPox glue to the hole into which the shaft fits on the control arm. Thus, when you push the arm back on to the shaft, the excess HobbyPox oozes out away from the motor casing, preventing the arm from getting stuck to the motor, yet increasing the strength of the bond between the motor shaft and the control arm. My unit has worked perfectly ever since.

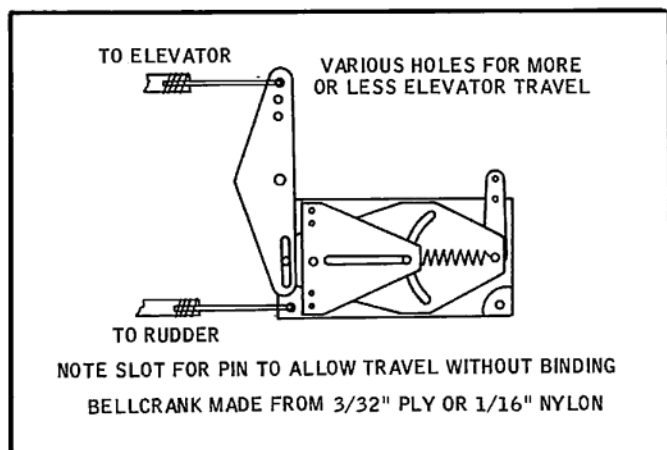
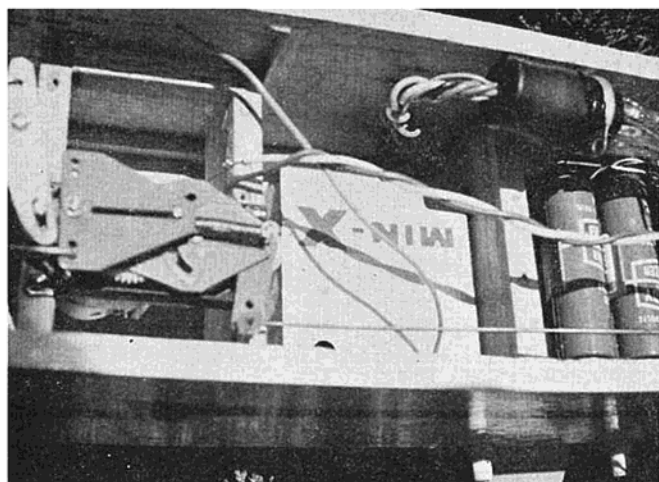
For a flying test bed, I resurrected my

old "Scorcher" 1/2 A pylon racer. It's pretty hot, and I wondered if the RE-1 could handle the air loads it would generate, particularly on the elevator. It does — and spectacularly so! I'm still learning how to fly proportional after years of button pushing, yet I've been able to do things with the Scorcher that it never did before . . . slow rolls (axial, not barrel rolls), inverted flight, and even outside loops! The outside loop has to be started either inverted (to go up, over, and back to inverted), or from a climbing speed just above stalling. Otherwise, as the model picks up speed in the dive, it will be going too fast, and although it will tuck under, the air load on the elevator exceeds the torque of the elevator actuator motor, and the nose will not come up to achieve inverted flight. But this is due to the very thin wing on the Scorcher, intended primarily for high speed rather than aerobatics.

A truly spectacular stunt results if you press either "full-on" or "full-off." This sends full voltage to the RE-1 actuator, which gives hard over rudder and full-up elevator simultaneously, and you

Below: Dave Gray's .049 powered Roaring 20 complete with coupled ailerons and rudder. Trophy attests to system performance and fliers guts! Right: Typical RE-1 installation in .049 powered aircraft. System provides less "wiggle" due to high pulse rate. Very little interaction between rudder and elevator.





Excessive "up" can be reduced by an intermediate bellcrank.

should see the snap roll it causes! The same technique, in a model with higher aspect ratio (the Scorchers is 4:1) could be used for spin.

One more item on the RE-1. It was installed in a Top Flite "Roaring Twenty," and ailerons were added and coupled with the rudder. Then (shudder!), an .049 was installed up front! The model, as you probably know, has a 20" wingspan and was designed for .010 and .020 power. Well, I didn't see the flights at the Cincinnati fly-in, but they were really something according to reports — as well as the trophy which Dave and his Roarin' 20 won!

To sum up, the RE-1 is terrific for the small airplane enthusiast!

Now, let's talk for a moment about the Rand LR-3. This is another winner in my book. Although, as with all Galloping Ghost units, extreme rudder movement introduces some up-elevator action, this is not objectionable to most Sunday fliers, and the motor control feature compensates for it. Due to the linkage, up-elevator is obtained with the control oscillating in the full-aft position. This means that, on models like the Top Dawg, which have the stab and elevator on the bottom of the fuselage, the linkage to the control horn has to

travel below the fuselage, or alternately, a bellcrank has to be utilized to reverse the action. I prefer the latter method. It is not only neater, but you can vary the distance from the bellcrank axis to increase or decrease the elevator throw. The photographs show the simple arrangement I'm using in the Top Dawg.

There was an interesting model at the field recently, with an LR-3 installed. It was a Schoolboy, powered by a Medallion .049 with motor control. This was another example of the practicality of overpowering these small compacts while still retaining good control through proportional control. The model flew well, but even at low power it would climb, and this led to an interesting sound. The LR-3 is a very "busy" unit, and also is comparatively noisy as the gears mesh back and forth. So, with the engine idling and fairly quiet, the Schoolboy would fly overhead sounding like a startled bird as the actuator could be heard — "Chirree, chirree, chirree" over the motor hum!

Be that as it may, the LR-3 does an excellent job, so long as your pulser meets the rate requirements. In that regard, the Phelps pulser is excellent. You might check one thing, though, and that is the spring tension on the LR-3 motor.

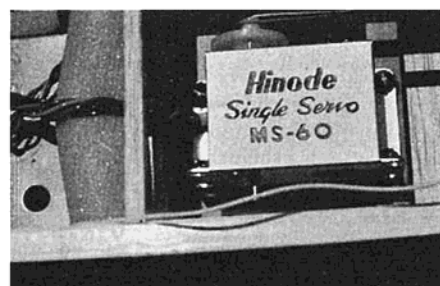
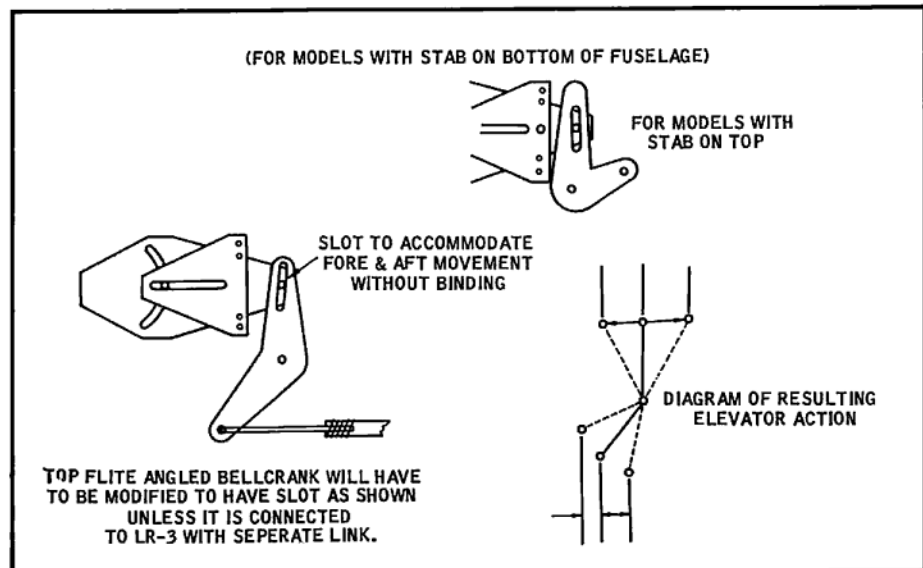
The motor should oscillate almost 180 degrees at the 6 pulses per second neutral to avoid excessive up-elevator when rudder is applied. I had to return the first unit I received from Rand because the spring tension was too great. The replacement unit has been excellent.

That's enough for now on these new, single channel proportional units. I'll have more, later on.

Now for you servo users, let me report that the Hinode for rudder and motor control on single channel, does a fine job. I put one of these units in the Top Dawg prototype without the motor control, since I was using a Tee Dee .049, and it was a real pleasure to go back to button pushing again, following a period of proportional single channel flying. Note that action in the launch photo!

It may seem to some of you that I've given up escapements. Not so. As I've said before, there will always be a place for them, but their operation is pretty well established, so I'm just trying to keep you abreast of flight tests with the newer developments in single channel. One thing you can keep in mind — every design I come up with will be suitable for escapement or single servo

(Continued on Page 60)



Note less "up" than "down," if neutral oscillation of motor is 180 deg. Thus you can have slightly faster neutral pulse with oscillation of, say 120-140, still have plenty of up and down action, but reduced danger of unwanted cycle through with up elevator command. An added plus is elimination of excessive up motion when cycle-through is desired for motor control!



DR. STRANGETHUMBS

OR

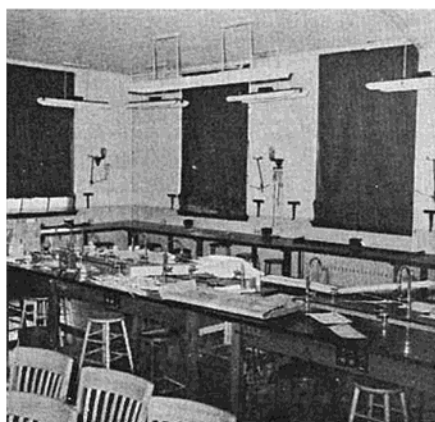
HOW TO GET INTO R/C THE HARD WAY

By JOHN A. HINCHEY

You say, Bunky, that you're going to start with a full-scale jet with eighty-seven integrated functions from an escapement? That this R/C bit is a breeze and these old-timers don't know the score? Then, Bunky, this is for you . . .

MANY articles have been written on beginning R/C but these have been authored by prominent and experienced flyers. In the '66 RCM Annual there is a particularly fine article on this subject by Chuck Cunningham. You may be asking; these are very interesting reading but are they for real? Read on further and go back with me as I relate my entrance into the R/C field. Keep a copy of the above mentioned article handy and from time to time cross reference the factual instances below with the "abstract" advice offered by Mr. Cunningham! The parallels will be striking and you may get the impression that his precautions were derived from a crash-by-crash account of my initiation. The story below was pieced together from notes in passing and from actual flight logs that I maintained for analysis.

My entrance onto the remote control scene goes back to the fall of 1959. Previously, I had built and flown several control line ships and developed some small flying proficiency in this area. These were all of the profile variety, mostly Ringmasters. I never did get tired of this type flying but when I entered college in September of 1959 my modeling activities dwindled to a vicarious association with model airplanes through the magazines. In my leisure hours, reading these journals was a most relaxing change of pace from my academics, and during these sessions I would find myself spending more and more time in the radio control sections, and albeit I had never witnessed an actual radio flight, the pictures and commentaries were very exciting and stimulating. Escapement driven rudder ships were the mode of the day but it was the uprising of the multi control aircraft which I intensely followed. Somehow I could never visualize a rudder ship stunt. In my mind, turns were perfectly feasible but the idea of an aircraft with rudder control performing anything resembling a loop was beyond belief (as you will discover, I have long since extended my image of rudder only flight). At this time I began to consider the possibilities of a radio ship of my own, and experienced several cases of mild hyperventilation as I imagined myself at the radio controls of a P-51. Although I had never constructed a built-up model I reasoned that with care and an accurate set of plans I could, in time, assemble a good model of my choosing. As far as I could see, then, there were but two obstacles to my goal. One, a serious lack of money and two, my knowledge of radio and electronic matters was zilch. My next move illustrates how dramatically a man's hobby influences his life. To gain a working comprehension of electronics I made the momentous decision to switch my college major to electrical engineering. Since I was presently enrolled as a Physics ma-



major in a liberal arts college this required not only a change of schools but I was forced to repeat my entire freshman year. Since I enjoyed the courses I was taking and not knowing how I would take to more practical courses, this was not an easy decision. In the final judgment my desire to become a knowledgeable and proficient radio control hobbyist won out. An engineering career is not the worst thing that can happen but this was, I assert, only a secondary motive. I stress this fact only to emphasize how intent was my ambition to fly by radio and that my starting in multi was backed by some semblance of preparation. The account of my actual flying experiences to follow may seem like folly and some, I must admit, appear as random processes, but this will highlight the need to adhere to experienced opinion. It will be apparent that the driving fervor to become airborne can crumble a logical and careful plan and lead to disaster.

At this point, then, I had fully committed myself to the goal of making one big step to a high performance multi equipped model on the first try. To this end I established a savings plan that would allow me to buy the paraphernalia of my choice within three years. By that time I felt I would be in good shape, radio theory wise, and could make a fairly rational selection of system components.

In the spring of 1962 fully transistorized equipment became available and about the same time deBolt's Live Wire "Viscount" hit the market. I decided this was it, and with little concern for the written word against this, I jumped right in! I had remained faithful to my budget and with the four hundred dollars I had to play with I bought Kraft ten channel equipment, four Transmities, one Atlas (an experiment within an experiment) servo, the Viscount kit, and a Magna-Jig. At this time I was working for the Physics department (very ironical) at the University of New Hampshire as a technician and arranged to use a lab bench as my building area. With a fully equipped shop one floor below, I felt conditions were ideal and

with mounting anxiety I commenced building on July 5, 1962.

I was becoming aware of a growing R/C activity in my hometown area, and in mid August of 1962, witnessed my first wireless controlled model flight. It was executed by Harrison Morgan and his development of the potential available in rudder only control stunned my first concepts and I experienced my first doubts as to my chances for success. However, by this time I was beyond the point of no return.

Although I worked steadfast the whole summer under excellent working conditions, my progress to September is shown in Picture 1, and with the start of my junior year only weeks away, it became disappointingly obvious that I must pack away for the winter.

When the spring semester ended that year I again plunged wholeheartedly into construction, and finally, toward the end of the summer of '63 I was finished. Picture 2 shows the end result and Picture 3 the equipment layout. The placement of the radio gear and the lineup of the engine and surfaces consumed about 60% of this building time. Although I had studied many of the better known reed installations, I had some ideas of my own, and worked diligently to get everything fitted correctly. The reason for all this time spent in equipment allocation was due to building oversights. Even with the detailed construction booklet included with the model (which was one of the reasons I chose this kit), I still committed make-work errors of omission, and since I had never viewed an operational multi system, the correct integration of radio and balsa parts came painfully slow to me.

During the interim winter, I had gotten in a lot of practice button time and now felt everything was indeed ready. I felt I was prepared to test the ship myself but decided to play it safe and thus asked Mr. Harry Morgan to recommend a test pilot for me. Since he had never seen my outfit and knew nothing of my preparations he was somewhat reluctant. But upon my assurance that all was well he prevailed upon Mr. Harvey Thomasian, a fellow New England Club mem-

ber, to give it a try. So, on September 8, 1963, more than a year after building began, we journeyed to Northboro, Massachusetts, for the initial flight.

Although I had worked very hard to insure that everything was correct, it seems as if nothing went right that day. In checking the controls Harvey discovered that the elevator and aileron movements were reversed (see Chuck Cunningham's article for a comment on relative occurrence of this blunder). The remedy was simple enough, the reed bank wires were transposed; however, the consequences of this oversight were far reaching. It seemed natural to me to push the elevator lever up to initiate a climb. The standard technique, however, is analogous to real plane control, i.e., you pull back on the stick to climb. With all my practicing I had the false method pretty well ingrained and it was only after many lessons that I could overcome this tendency. Again, an experienced advisor early in the game would have eliminated a lot of unnecessary confusion. This one small item contributed to the final demise of my first ship and nearly caused me to wash out several hundred dollars of equipment.

There were many other problems that day; the tires peeled off the hubs on movement and taxiing was impossible, thus the first flight began with a hand launch. This is a difficult take-off for a heavy multi ship but with Harvey at the controls and Harry Morgan supplying the muscle it went off fairly well. Another problem developed once the ship climbed to altitude. When the engine leaned out vibration set in (I was guilty of still another common error — tight foam to receiver packaging) and the flight had to be terminated. Harvey managed a beautiful landing, however, right on the field but still the series of horrendous events was not ended. Upon touchdown the not so "Perfect" tires again stripped from the casings and the exposed struts caught in the grass cartwheeling the ship a complete revolution wing tip to wing tip. It seemed hard to

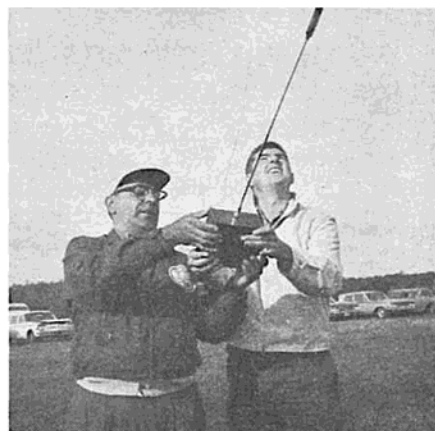
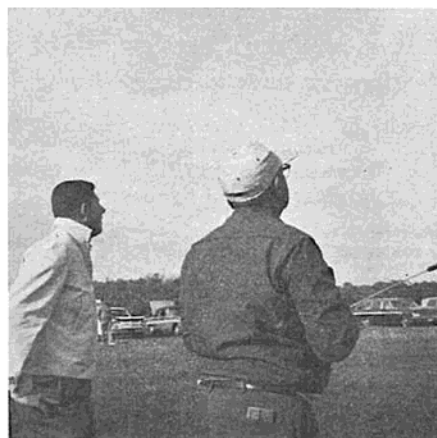
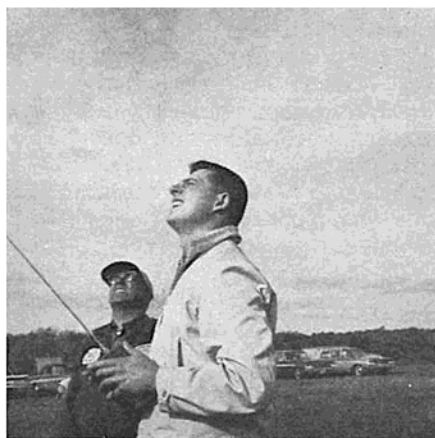
(Continued on Page 59)

accept the crumbling of a year's work, especially after a three point intact landing had been executed. Upon examination, however, no damage was done and two weeks later, after installing a set of Air Span wheels on the main gear and repacking the receiver, three flawless flights were made. The ship required only minor trimming and thus the technical problems were successfully met. There were still some physiological and psychological questions unanswered, i.e., could I learn to fly? On the fourth flight Harvey handed me the transmitter and I lasted no longer than six seconds. In this short period I had the ship completely disorientated and only Harvey's capable thumbs averted a disaster. At that moment I fully realized how fortunate it was that I had not attempted the initial flight tests myself. This was my original intent but there is absolutely no doubt in my mind as to what the results would have been. At the speed the Viscount flies, thinking is impossible, and emergency situations demand reflexive action. I remembered then, that I had read this somewhere before but it didn't quite sink in! In a few minutes I regained composure and asked for the box again. In Picture 4, Harvey has the airplane flying straight overhead and directed away from us. This is, perhaps, the easiest heading to assume control. In Picture 5, he is casually handing me the Tx. In 6, I have had it for about ten seconds. In another ten seconds Harvey is hurriedly coming to the rescue (notice the blurred right hand in Picture 7). In 8 he has it straightened away again. This sequence was typical and after several of these attempts I returned home to do some further ground practicing!

About a month went by and we had another lesson. This was a windy contest day and we only managed two flights. By now it was late October and so this was the final session of the year.

The following summer, I was unable to get together with Harvey at all, and thus until August of '64, I had made only eight flights on equipment I had owned over two years. By this time I had graduated from college and was off to Syracuse University for my master's degree. I arrived in Syracuse in mid September, and in less than twenty four hours, had made inquiries at the local hobby shop, found the flying field of

Harvey Thomasian acts as flight instructor for author Hinchey. In photo sequence Harvey gets the ship airborne, hands the transmitter to John, and our intrepid pilot gets his first flight orientation. A few seconds later Harvey hurriedly recaptures the transmitter.



the Syracuse ARCS, and met a fellow by the name of Myron "Red" Mathewson. That very afternoon my plane was again flying after a year's layover and my new instructor was helping me as if we had been long time friends. The hospitality that this club extended to me and the willingness to help a stranger was a pleasant characteristic of the modelers in the Syracuse area.

But I digress. After six or seven flights I learned to aim the old Viscount pretty well without aid. I was beginning to develop confidence and by the tenth flight I was able to fly for six or seven minutes without difficulty. On the eleventh flight things began to get fairly routine but on one pass I got too close to the ground, became confused, reverted to my old pulsing technique and joined the down elevator club. So that was it! With a grand total of nineteen flights I totaled my first ship.

Luckily, the equipment was not damaged and by the start of the '65 season I was back in business with a new Sr. Falcon. With the lessons I had learned from my first ship and under the guidance of the club members this went together smoothly and flew right off the board. After six flights on this plane I was, at last, soloing. On the fourteenth flight I pulled around a tight corner and the wing broke in half (as on the Viscount, I had the wing center section fibre glassed but have since discovered that this was a structural defect in the first Sr. Falcons. The newer ones have been properly stressed to prevent this, I believe). It didn't fly very well that way and landed about one hundred and fifty feet up, lodged in a tree over a swamp. It cost me ten dollars to hire a tree climber to bring it down but again the equipment was not disabled. In Picture 9 the "Squirrel," as he was so aptly tagged, is descending with the remnants, and Picture 10 displays the resting grounds for this rapidly aged assemblage! The scoreboard now reads: thirty-three flights = two aircraft. I am definitely losing!

Since I was in the process of writing my thesis I didn't have time to build another model so bought a used V. K. Challenger for thirty-five dollars. This was the best investment I made, as to date, I have racked up over one hundred and fifty flights and it is still with me (about one hundred were solo).

So finally, after four years from inception, my experiment is completed. While far from a contest flyer I can now go out to the field by myself with confidence of returning with an airplane.

Would I do it again this same way? I don't know for sure, but I think so. Although at certain times I became very discouraged, I learned many valuable lessons and it was always exciting. I have learned to respect rudder flying and have great admiration for a proficient rudder only pilot, but I remain an aileron-elevator man. Some would say I have missed a great deal in not progressing through the rudder ranks and that I have nothing to look forward to now that I have flown multi. This is possibly true, but multi has always been my game and I derive no less fun from completion that I did from anticipation four years ago. My exposure to the whole has not dulled my fascination for the thrills of R/C flying, as some have warned.

Many object to multi for the beginner, pointing to the fact that pilot-trainees do not begin with supersonic fighters but rather with slow trainers. That this is accurate is undeniable but it is also true that new pilots are not subjected to the unnatural experience of an airplane equipped with **only** a rudder! Perhaps, with this in mind, an extension of the rudder trainer is the optimum for today's **mature** beginner. This had been my contention and my actual experiences has not altered my viewpoint. From the onset I have been a proponent of full multi for the serious beginner, and remain so, but add that a measure of dedication is needed for success. Each individual must weigh the alternatives. As I have learned, there are disadvantages to this approach. A person who must travel a great distance to R/C civilization may find that the timetable to enjoyable soloing will be extended considerably. Building can be pleasurable but without prior experience a loner's attempts can be tedious and frustrating, and once finished great patience will be needed to avoid flying without a qualified teacher at hand.

For someone who must have full house to begin with and is willing to admit to these realities I say go to it and offer the following comments for consideration:

1. A shoulder winger with plenty of area is hard to beat for a multi trainer. I experienced learning pains on both a high speed low wing ship and a medium speed

shoulder wing airplane. With the Sr. Falcon the fun was still there but the crash potential was greatly reduced.

2. Join a club somewhere even if you have to travel a hundred miles or more to attend meetings. A club will help you learn how to use your equipment properly and thus you can avoid developing faulty technique. Button pushing exercises are worthless if they are not realistic. Also, questions will arise when constructing your first aircraft and the pooled knowledge of a club is hard to beat. The sizable reduction in assembly time for my two ships I attribute to club participation.
3. With today's plug-together radio-equipment the manufacturer's brochure should be adequate so don't be too concerned over a technical deficiency in this area.
4. Read and heed whatever you can get your hands on. I feel that the small effort expended in fiberglassing the center section of my Viscount saved it on its initial flight, and it was only from following suggestions from the literature that I included this re-enforcement. A good topical index of pertinent material can be found in the July issue of RCM.
5. Have someone test fly and trim your ship for you. Learning to fly a multi trainer will come fast if you have ground practiced and have a qualified instructor to tutor you. I have found that the majority of experienced flyers are more than glad to pitch in and help if they detect a serious and responsive attitude from the novice.

CONCLUSION:

Much can be done by yourself, but having been the long way around, I can testify to the inefficiencies and dismay of a loner's stand, so don't be afraid or too proud to seek counsel. In closing, I submit a final thought: "Experience keeps a dear school, yet fools will learn no other."

Which is an old Chinese proverb that I just made up myself.



SUNDAY FLIER

(Continued from Page 56)

control unless I specifically tell you otherwise. Small multis are great fun, but they will never be able to compete with the larger models as long as competition rules stay like they are. So, there's not much sense in designing a small plane strictly for multi or proportional control in the competition area. Design them for sport flying, and that means rudder only as well as full house, for us Sunday Fliers.

Speaking of small multi's brings to mind a letter I recently received:

Dear Ken: —

I am just reading Sunday Flier in the February '66 issue and I want to show that even here in Sweden we have tried to get small multi's. The photos show up my biplane that has a span of 36 inches. In the front an O.S. .15 R/C and inside an eight channel Grundig with Bellamatics for R.E.A. and a Servo-Automatic for motor.

It was flown last summer about thirty flights but I am sorry to say that after every flight I felt like a Jell-O pudding. If you have seen such one you know what I mean. So I went over to a bigger, slower plane to get more experience, but another day it will fly again. It is still in good condition. Thank you all on RCM for a very good magazine! Excuse my English. It was learnt 20 years ago in a very short time.

Harry Lungdahl
Orebro, Sweden

Isn't that a nice looking biplane? But I believe Harry when he says it makes him feel like Jell-O. Note the zero-zero setting on the wing and stab plus the low dihedral! Definitely a multi design — and a good one for that purpose. Sunday in Sweden must be pretty lively when Harry sends it up! Wish I could be there to watch. Wouldn't you, too?

Keep writing. And keep flying.



RADIO CONTROL

OCTOBER 1966



DON DEWEY, Editor & Publisher

In October 1963, Don Dewey and Chuck Waas published the first edition of R/C Modeler Magazine. Since that first issue RCM has grown from a modest circulation of 7,000 copies a 32 page periodical to 75,000 monthly copies of a 92 page magazine. On this, its 3rd Anniversary, Radio Control Model Magazine is the largest and most widely read model aviation publication in the world. Whatever success it has achieved was achieved by you . . . and for you—the R/C enthusiast—for you



ED THOMPSON, Technical Editor



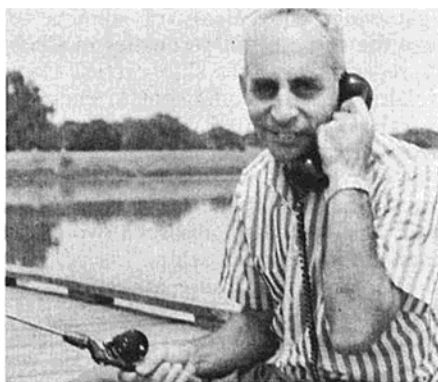
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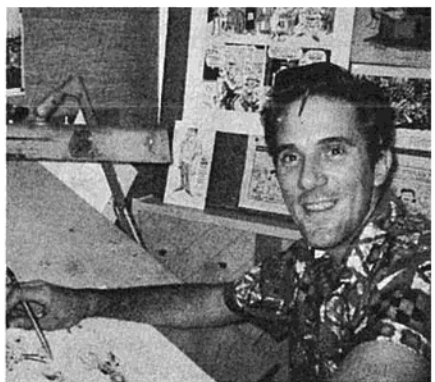
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MODELER MAGAZINE

— OCTOBER 1966

contributions, cooperation, and support. Since we, the staff of RCM, may never have the opportunity of meeting all of you personally, we take this opportunity to share our Third Anniversary celebration with you, and to pledge to you, the reader, our continuing effort to provide you with the finest RC material available. You'll always find it in RCM first. — The Staff of RCM



CHUCK WAAS, Production Editor



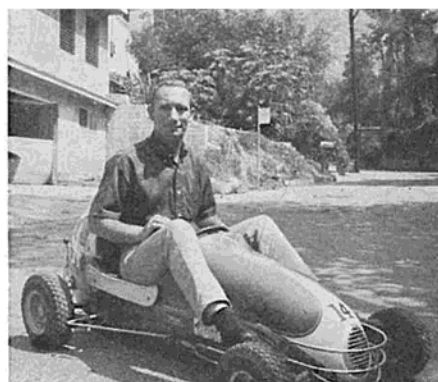
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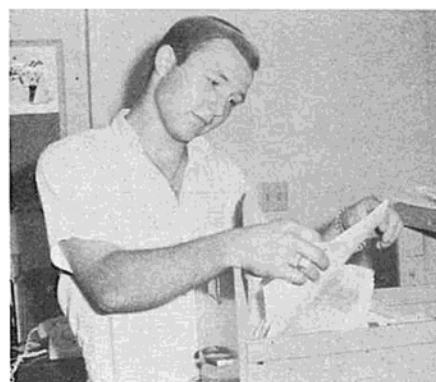
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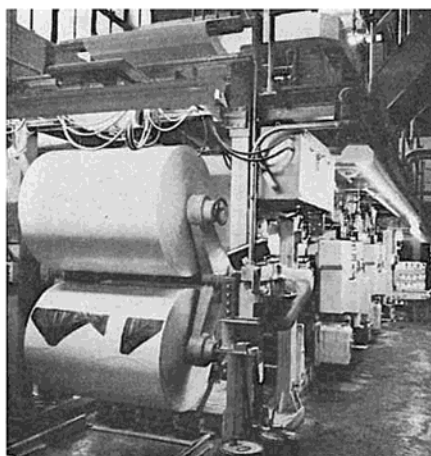


SALLY DEWEY, Editorial Ass't.



STEVE RIFE, Editorial Ass't

Right: Two views of a portion of R/C Modeler Magazine's press facilities at Kalmbach Press, Milwaukee, Wisconsin. RCM's reputation as the pacesetter for the "new look" in model magazines is due in great part to these unique and advanced facilities, and to the close working relationship between publisher and printer. In addition to the art and press facilities, Kalmbach is also responsible for the distribution of RCM to hobby shops throughout the U. S. and Canada.



The Roostertail



The Official Publication of the
International Model Power Boat
Association
General Office:
3638 S. 61st Court, Cicero, Illinois

NOTICE to all members and model boaters: The address of the IMPBA General Office has been changed to — International Model Power Boat Association, 3638 S. 61st Court, Cicero, Illinois 60650. Address all correspondence to this address, no matter what the nature of the letter. Any mail sent to the old address will be delayed due to the

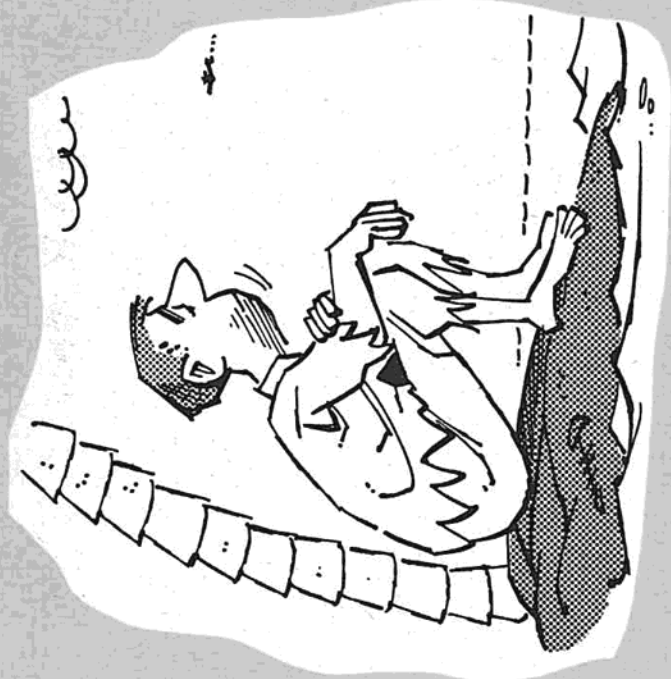
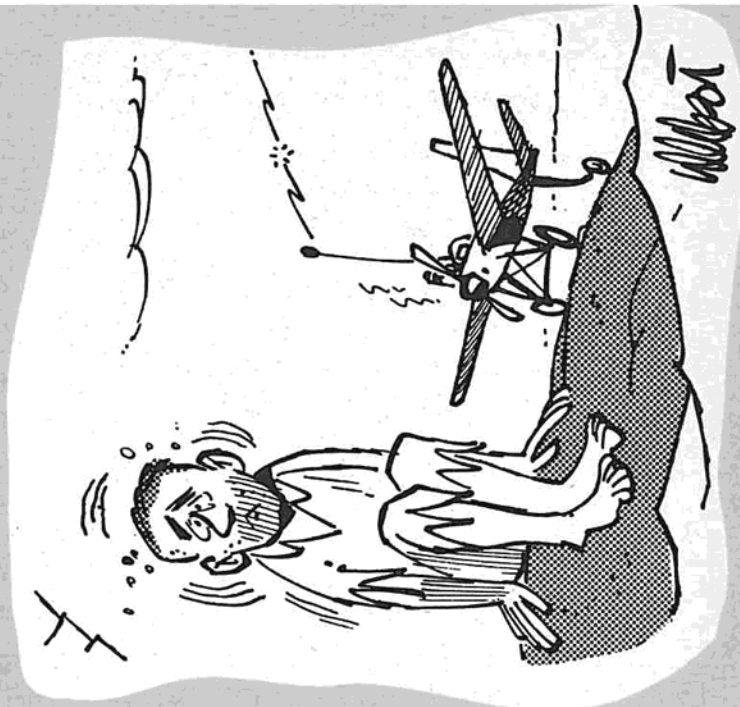
necessary remailing by the present resident at the old address.

There have been a few comments regarding the newly proposed "Sportsman" Class. Some were valid, constructive points for consideration, while others were just plain old squawks. But — that is the reason for asking for comment. After all, the IMPBA is run by the modelers, not by any small group who attempts to dictate to the membership. The only way we have of communication is through the ROOSTERTAIL, and by your return letters. Let's have more of them! If you like what is proposed, holler YEA! If you don't like it, holler BOO! Even in this age of rockets, satellites, and glow fuel, crystal balls that predict your reaction to proposals are hard to come by, so we have to resort to the next best thing — the ROOSTERTAIL.

To comment on a few of the questions which have arisen: The class is designed to give the beginner and experienced modeler competition in a multiple boat event. It was not designed around any one boat, or any one manufacturer's line, rather, it is an attempt to include models which are available over the counter, to give the novice a fair chance. The size of the hulls were chosen to keep the boats stable in rough water, and in

competition, where collisions frequently occur. The engine size allows the boats sufficient power to move right along in almost any kind of a hull. The $3\frac{1}{2}$ c.c. limit of the Europeans was not chosen simply because it has proven to be too small for most purposes. Here again, it is not impossible to build a fast boat with a .19, but it is quite a trick for the novice, and even trickier for the novice in rough water! However, you must note that only the maximum engine displacement has been chosen, not the minimum. If you think you have a hot engine, or hull design, go ahead and use it. It was mentioned that the "Taplin Twin" with 8 c.c. was omitted by some .0175 c.i. True. Also, accidental. Perhaps it should be included. What do you think? Next, what about water cooled engines? Some of the smaller ones are water cooled, especially the English engines. The larger engines must be water cooled after you buy them. You can make an efficient jacket out of some $\frac{1}{8}$ " copper tubing held on with a hose clamp, or you can cool almost any engine with a "Kool Klamp." Contrary to the skeptics, this little cooling device works quite well in enclosed boats, but obviously, provisions must be made for air to the carburetor.

A final word about the course for the "Sportsman" Class. It has been suggested that the European triangle course be used for this event because it is easier to see from the shore. The "back side" of the oval is supposedly too hard to see. Maybe it is. Perhaps we should try the triangle course before a decision is made. One point to consider — who has a triangle course set out to try? The oval was the handiest, has been practiced by all racers, and was chosen because it is available. How about you? What would you like to see? Our crystal ball is still a little foggy, so you will have to write your comments to the general office. Don't forget about the new address.





Airport Xanthi 1



Airport Xanthi 2



Airport Xanthi 3



Airport Xanthi 4



Airport Xanthi 5



Airport Xanthi 6



Airport Xanthi 7



Pilots (Hlsat,Savvas,Kostas)