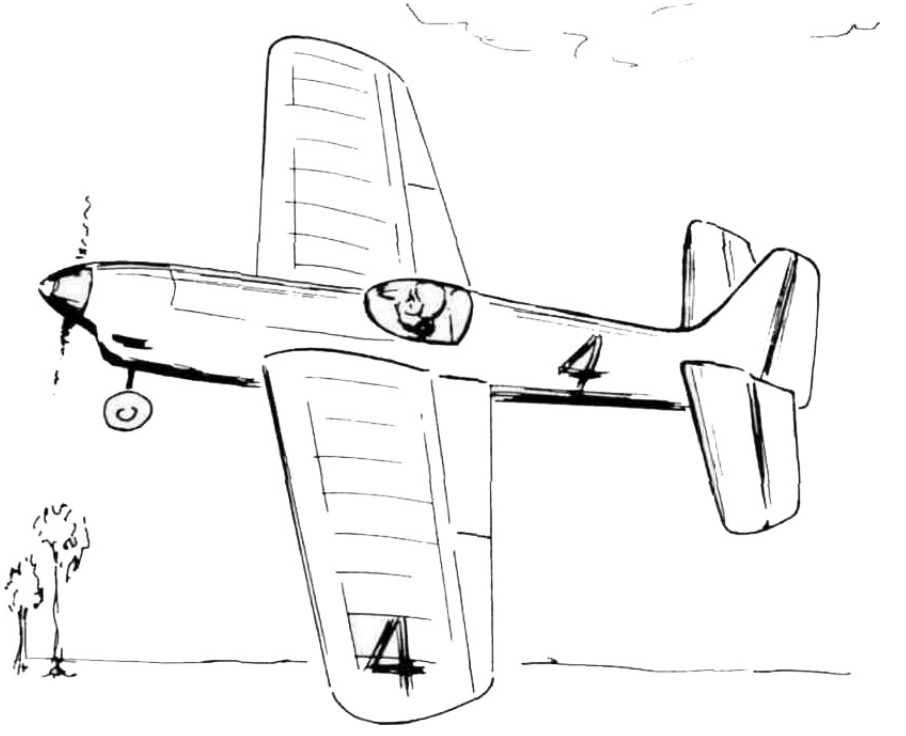
BUILDING and FLYING the

R/C NOBLER



INTRODUCTION

It has been suggested for several years that a control line stunter would make a fine radio controlled model The fairly recent advent of miniaturized radio control systems has permitted testing this possibility The Nobler is ideal for this conversion because of its airfoil planform and structure

The control line Nobler is the winningest of all control line stunters It was designed by George Aldrich and has been a Top Flite kit for many years The radio control version of the Nobler has been the project of Ed Sweeney with considerable technical assistance by Fred Marks Many models were built in developing the Top Flite R/C Nobler kit We think it will follow the winning ways of its line bound ancestor It opens up a new dimension in precision RC acrobatics

The airplane has a great airfoil with excellent stability, lift, smooth response, and gentle stall characteristics Thrust and drag forces are near both center of pressure and gravity It is a relatively symmetrical aircraft — high thrust line high stabilizer, deep fuselage cross section, and mid wing with symmetrical air foil This symmetry gives the plane its true neutral stability It will hold any reasonable flying attitude almost indefinitely

BEFORE YOU START—READ THIS!

These instructions have been carefully developed after building several prototype models We urge you, in your own interest, not to ignore them Our aim is to insure that the model goes together in a reasonably quick time and without annoying snags

Regardless of previous modeling experience follow the directions carefully, checking them off as you go

Notice the instructions often call for some items to be started before others are complete This is to allow time for important glue joints to dry properly, yet not hold up building progress Also in order to help modelers of less experience, we have tended to the easier jobs first, leaving those requiring more care **until** laterasskillincreases.

Do not seperate parts from die cut sheets until you need them This will save loss or breakage of some of the small or delicate pieces

We are often asked by less-experienced modelers which glues are best for model construction The answer to this depends upon the particular job However this is our normal recommendation For all hardwood to hardwood or hardwood to balsa joints use white wood glue Titebond is especially good, as it drys faster than other white glues and is very strong For balsa to balsa joints regular balsa wood cements are ample for the job although white glue can be used here too Whichever type you use, remember that excess glue is no substitute for a well fitting joint Use a minimum of glue at all times, and wipe off excess glue that squeezes out of joints before it sets hard when set it is difficult to remove, but if not removed it will spoil the covering job

For joints involving flexible items like foam rubber R/C equipment packing, contact cement is the only suitable adhesive this should not be used in construction however because it is not sufficiently strong and is very hard to sand down properly

One final word to newcomers to the hobby or modelers of limited experience Join a club! (You can write to the Academy of Model Aeronautics, 1239 Vermont Avenue N W Washington D C 20005, for the address of your nearest Club Secretary) Here you will find indispensable guidance and help from experienced and friendly fellow modelers should you encounter any small problem in building or flying this model We at Top Flite will do our best to insure your success, but it is fair to say that nothing can replace personal help or demonstration from a good modeler

SUB-ASSEMBLIES

To speed building, by cutting down "waiting time," it is recommended that certain components be sub-assembled first.

1. Glue F-2 (ply) doublers to F-l sides — make a left and a right side. See Fig.1.

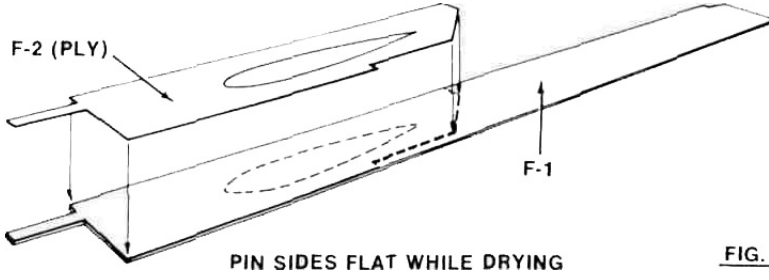
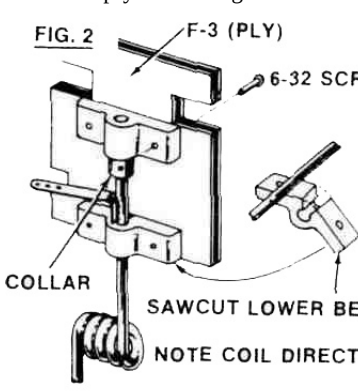


FIG. 1

2. Make sawcut in one nylon nosewheel bearing as shown and snap bearing over the formed noseleg between the tiller-arm and the coil. Slip the collar over the leg from the top, followed by the other nylon bearing. Screw the bearings to 1/4" ply F-3 using the 6-32 screws provided. Fig 2 shows assembled unit



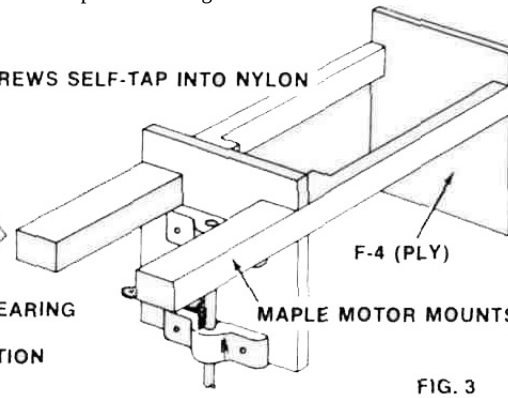


FIG. 3

3. Glue **F-3** and **F-4** (ply) to the shaped motor mounts. See Fig. 3.

4. Glue two F-20 pieces together as in Fig. 4. Use balsa cement for this joint, Not white glue.

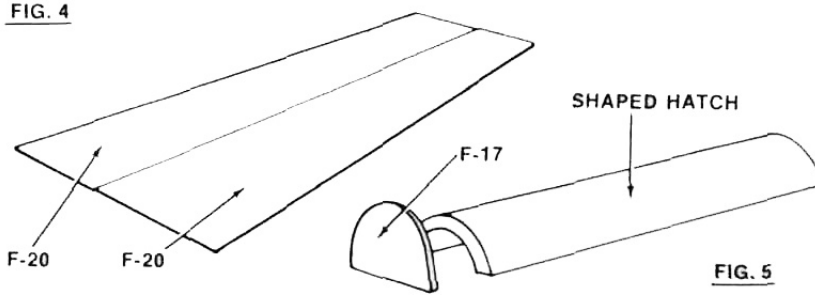


FIG. 5

5. Join elevators with 1/4"x1/2"x4" hardwood strip.

6. Glue F-17 to one end of shaped hatch block. See Fig. 5.

7. Join parts of wing plan to make one-piece plan. Use scotch tape and lots of care.

FUSELAGE

8. Pin F-ll in position on top view of fuselage. Pin both fuselage sides over plan upside-down, and glue to F-ll. Use Tri-Aids as shown in Fig. 6 to keep sides vertical.

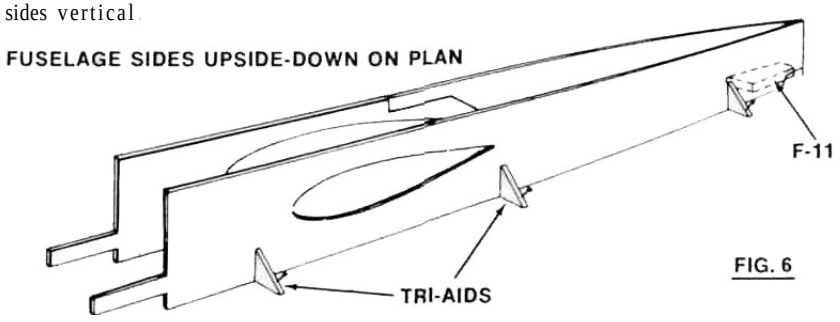


FIG. 6

9. Glue shaped tail block between sides at rear end. Glue F-6 thru F-10 in place.

10. Glue motor-mount sub-assembly between sides See Fig. 7. Glue 1/2" x 2-3/4 x 11-7/8" block between sides and to F-3 and F-4.

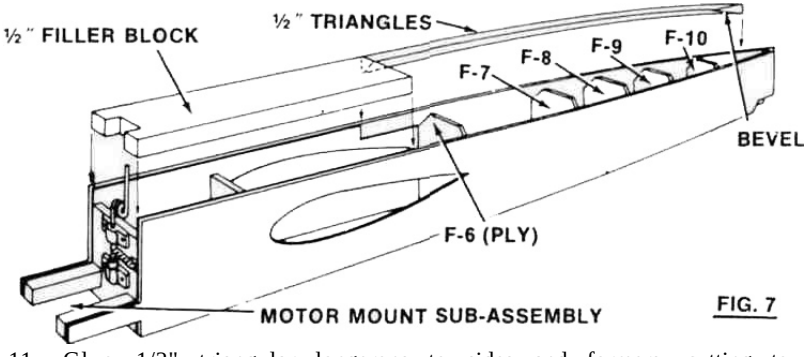


FIG. 7

11. Glue 1/2" triangular longerons to sides and formers, cutting to scarf-joint at rear end.

WING

12 Pin Tri-Aids to plan in pairs to support mainspars. Slip spars W-18 between Tri-Aids but do not pin to Tri-Aids or to plan. Glue spars together at center joints only. See Fig. 8.

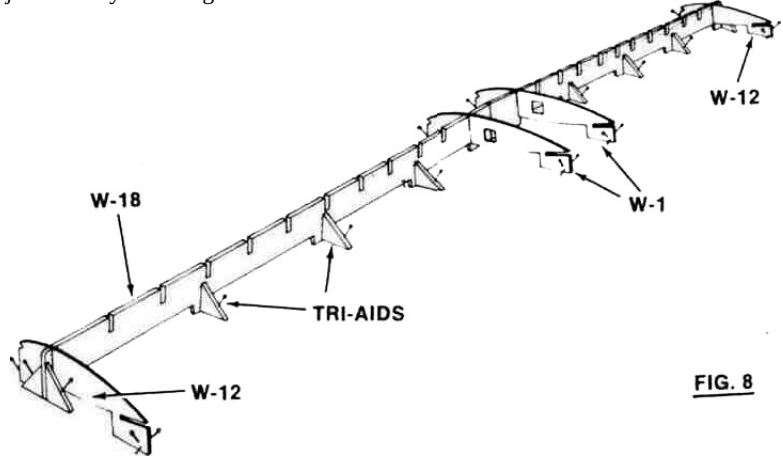


FIG. 8

13. Slip all ribs W-l thru W-12 into spars egg-crate fashion. Do not glue joints at this time! Pin all ribs over plan in correct alignment.

14. Glue 1/4" sq. L.E.'s into ribs, glueing center joint well. Slip bottom T.E. sheets into slots in ribs. When satisfied with position, glue to ribs. See Fig. 9.

15. Use weights to hold structure down, making sure that all rib and spar tabs are contacting table surface on plan properly. Run glue onto all rib-to-spar joints.

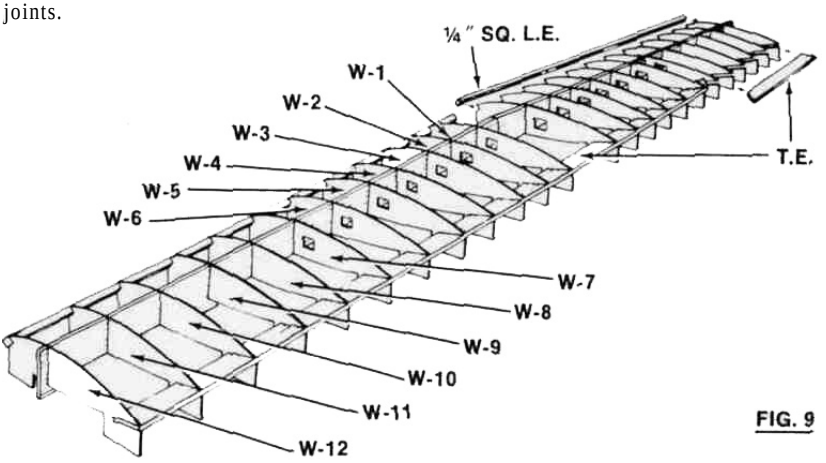


FIG. 9

FUSELAGE

16. Remove fuselage from plan. Glue F-12 (ply) thru F-16 in place, then 1/4" sq. stringer. See Fig. 10.

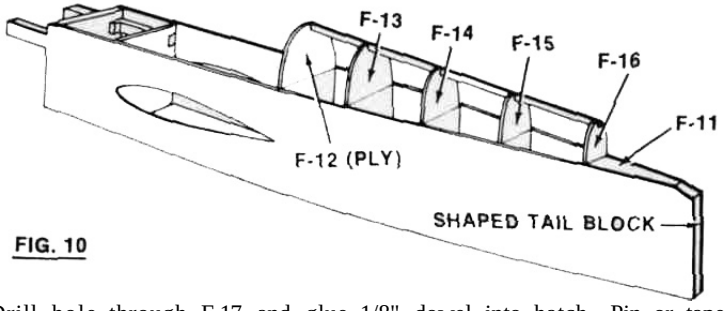


FIG. 10

17. Drill hole through F-17 and glue 1/8" dowel into hatch. Pin or tape hatch in place on fuselage with dowel projecting through F-12. Drill F-18 (ply) with 1/4" drill at punchmark and slip over the dowel. Glue to **F-12,** making sure not to get any glue on the dowel itself.

18. Glue the F-20 sub-assembly onto 1/4" sq. stringer centering the joint on the stringer carefully. See Fig. 11.

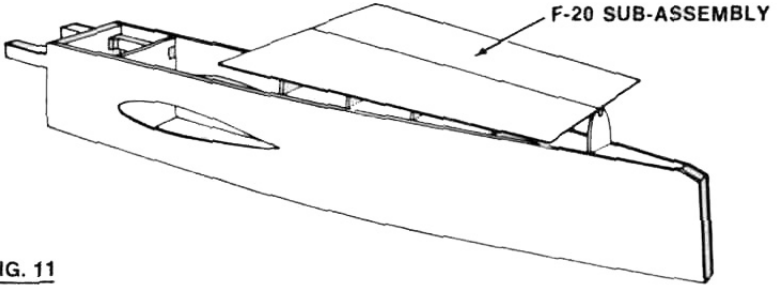


FIG. 11

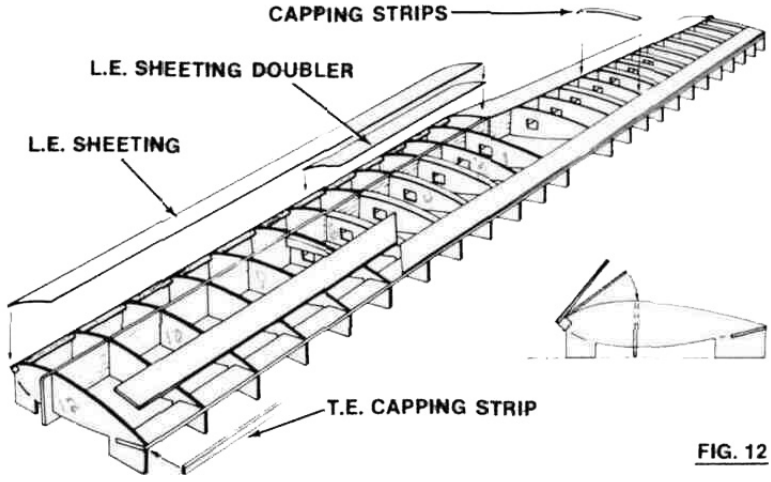


FIG. 12

WING

19. Cut L. E. Sheet doublers from 1/16"x3" sheet and glue in place on wing from center to W-5. Glue 1/16" x 3" L. E. sheeting to L. E. first, using spring clips or pins to hold L.E. joint while it dries. See Fig. 12. Then glue and pin other side to spars and ribs.

20. Glue upper T.E. sheet in place. Glue in W-15 and W-17, followed by all l/16"x 1/4" rib capping strips.

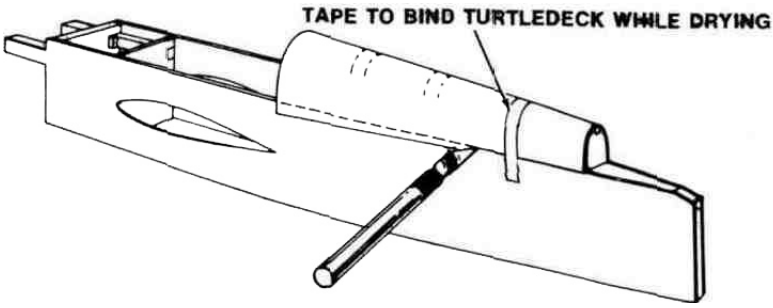


FIG. 13

FUSELAGE

21. At this time the rear turtledeck sheeting is attached. Follow the instructions closely and you will have no trouble:

a) Dampen top of sheeting with water and let soak for a minute or two.

b) Bend sheeting down against formers.. Mark the sheet where it overlaps the sides and trim for exact fit.

c) Run white glue into formers and sides. Pull sheet down each side and hold with pins and tape while it dries.

d) Trim front and rear flush with F-12 and F-16. See Fig. 13.

22. Glue 1/8" ply patch F-21 into hatch as shown in Fig. 14. Drill 3/16" hole and mount nylon plate. Glue 1/2" x 3/4" x 1-3/8" hardwood block between motor mounts: drill: and epoxy nylon ball fastener into hole. Adjust for proper fit.

FIG. 14

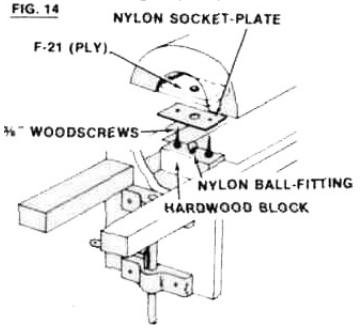
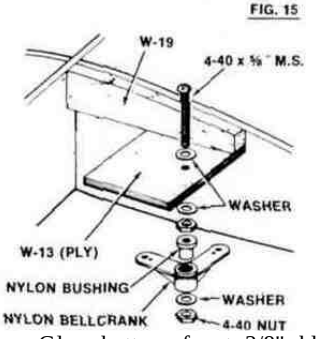


FIG. 15



23. Install engine. Glue top cowl block in place. Glue bottom front 3/8" block to fuselage, then F-5 (ply), and F-5A (ply). Glue rear bottom 3/8" shaped block in place.

24. Glue cowl side blocks in position, center F-19 around engine crankshaft and glue. Remove engine. Glue servo tray mounts in place.

WING

25. Lift wing from plan. Turn upside-down, remove tabs and repeat instructions 19 and 20 (use parts W-16 and W-17). Glue 1/8" x 1/4" T. E. capping strip in place. (Fig. 12). Trim and sand excess wood outside of W-12 until flush with rib and glue on wingtip blocks.

26. Assemble aileron bellcranks to ply parts W-13. Glue W-19 and W-20 to ribs W-7 and W-8 respectively. Glue W-13 in place in wing. See Fig. 15.

27. Run 1/16" music wire pushrods through wing ribs and assemble to bell-cranks. Glue W-14's in position. Do **not** assemble connecting-links to bellcrank yet.

FINAL ASSEMBLY

28. Try popping fuselage batch into place. Make any adjustments required for a perfect fit.

29. Carve and sand fuselage blocks, cowl and wingtips to sections shown on plan.

30. Slip metal clips onto main L. G. unit. Hold in position on F-5 and drill holes for mounting screws. Bolt L. G. in place, coating nuts inside with glue.

31. Slip flap horn into wing slots in fuselage sides and push to rear end. Slide wing into slots and center the wing in the fuselage. It may be necessary to trim away the front end of the wing slot on one side a little, to achieve this.

32. When satisfied with position, glue wing/fuselage joint using plenty of cement. Fill any oversize holes with vinyl-spackle (from hardware store) and sand carefully.

33. Sand stab and elevators to section and pin stab temporarily on fuselage, lining up with the wing in front view. Glue tail blocks to fuselage over stab using the fin temporarily as a 1/4" thick spacer. It will be easier to carve these blocks to conform to fuselage lines without the stab and fin in place. After carving blocks, sand fin and rudder to section and glue fin between block, and then glue stab in place.

34. The R/C equipment is now installed. Screw the aileron servo in place and hook up to pushrods. Sand ailerons and hinge onto the wing with Mono-Kote. These hinges are only temporary and will be removed before covering. Install aileron connecting-links and horns. Check for movement using the radio.

35 Sand flaps and drill for flap horn **(note offset — see plan).** Install flaps and hinge temporarily to wing

36 Mount three servos Make all pushrods as shown on plan Hinge rudder and elevator Check all controls for free movement

37. Remove engine, R/C gear, landing gear main struts and all control surfaces This model may be covered with Super MonoKote (follow instructions on enclosed leaflet closely) or alternatively may be covered and finished using silk and dope Hinge all control surfaces permanently **after** covering

38. Install fuel tank receiver, battery, wheels, engine and spinner, and cockpit canopy Check CG (see plan for correct position) and if necessary move equipment fore or aft to get CG correct

FLYING

With a good 35 to 45-size engine the airspeed is a relatively constant 70 to 80 mph Automatic speed control is an advantage during maneuvering This is achieved by propeller selection, airfoil, and flying weight of under 6 lbs

The planform of the plan, wing shape with swept leading edge and fuselage profile provide excellent yaw stability and accurate roll response

The stunt flaps, which will be described later, contribute excellent lateral stability

A nearly symmetrical plane and neutral stability coupled with efficient or large control surfaces produce the Nobler s maneuverability The rudder and elevator are unusually large for a model airplane The ailerons are reflexing trailing edge sections with sealed hinge gap giving rapid accurate linear response with little drag Normal control surface movements are ailerons ± 10 degrees, elevator ± 15 degrees, and rudder ± 30 degrees The coupled flaps move ± 5 degrees

For many years control line planes have had mechanically coupled flaps and elevators to give them smoother flight and more lift in sharp corners The same advantages apply with RC planes Control line models used equal coupled flap and elevator movement, while the RC models should have much less flap movement than elevator movement This is because of the inferior power/weight ratio of RC models compared to CL models, and the consequent necessity to hold down the drag to maintain flying speed

A radio controled model gains other advantages with flaps For example, with more pitch axis power, we can have a more forward CG location for groovier flying When deflected downward, the centersection of the wing is operating at a higher angle of attack than the wing tips ensuring against tip stalling during high g maneuvers or low speeds With the additional lift of the flaps the plane needs less rotation about its pitch axis for a given response, thereby causing less drag speed changes, and showing a smoother flight path The symmetrical airfoil is, therefore, infinitely variable to obtain optimum performance

When landing or taking off, the flaps allow slower and more stable flight. Even in gusty or windy weather, the Nobler seems to fly as if on rails The flaps keep the wings extra stable because the wing tips are flying at a lower angle of attack while the other features keep it tracking accurately Even though the flaps are not sharply deflected, they provide a tremendous amount of additional lift, even at low speeds

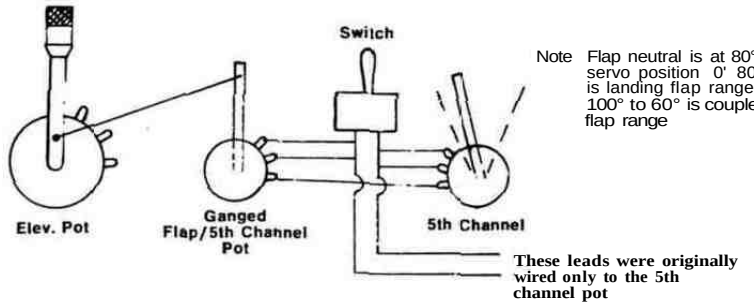
The technique of using flaps coupled with the elevator function is relatively new to RC flying A detailed investigation of the performance with the flaps and without the flaps has been made At the 1969 DCRC Symposium, Fred Marks and Ed Sweeney presented a paper describing the technique showing the results of tests and experiments with several airplanes To make their findings meaningful,

a system of in-flight uncoupling of the flap function was devised Maneuvers with these planes, including of course the RC Nobler, could be made with and without coupled flaps When uncoupled, the flaps were positioned at neutral Without question, maneuvers with flaps are smoother, can be tighter, can be slower, the plane is definitely more stable, and safer The Nobler is a fine stunt plane without coupled flaps, but like all the other models, it is noticeably better and more enjoyable with flaps

One finding of the study was that since the coupled flaps offer very little drag during flare out for landing, the models would generally float in ground effect With a slow idling engine or with the 10x5 Top Flite and 10x6 Top Flite or Power Prop on the Noblers, this is no problem, but can be a nuisance with higher pitch props or a fast idle By uncoupling the flaps, the models landed as usual at a high sink rate and higher speeds We could also lower the flaps independently 25 degrees for landing In gusty or windy conditions we use only 15 degrees deflection for landing Extra flap movement gives higher lift at slow speeds with adequate drag for precise spot landings This feature is worthwhile if you have a five channel system and five servos.

Uncoupling may be achieved in the transmitter by adding a switch and potentionmeter in the fifth channel circuit The pot is ganged with or rotated simultaneously with the elevator stick movement, the switch transfers the fifth channel control to the ganged pot for coupled flaps and elevator or to the normal fifth channel control pot for independent flap operation Set linkages in the transmitter to give the ganged pot one third the rotation of the regular pot. Now, when ganged, the flap has ± 5 degrees movement, and when operated independently, it has 25 degrees movement downward See Fig. 16.

ELECTRONIC COUPLING



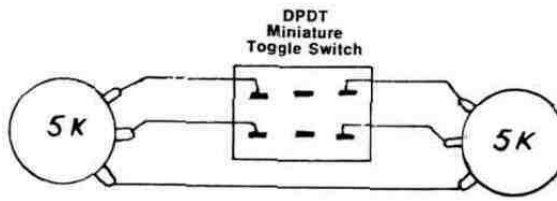


FIG. 16

Another method to get landing flap operation with a 5 channel system is use a linkage in the plane similar to the elevator trim arrangement of reed control systems A five servo installation is needed Make a "trim bar" between elevator and flap servo See FIG. 17. Landing flap mode can be set up with four channel systems by coupling with the throttle servo, but it has not been proven out yet

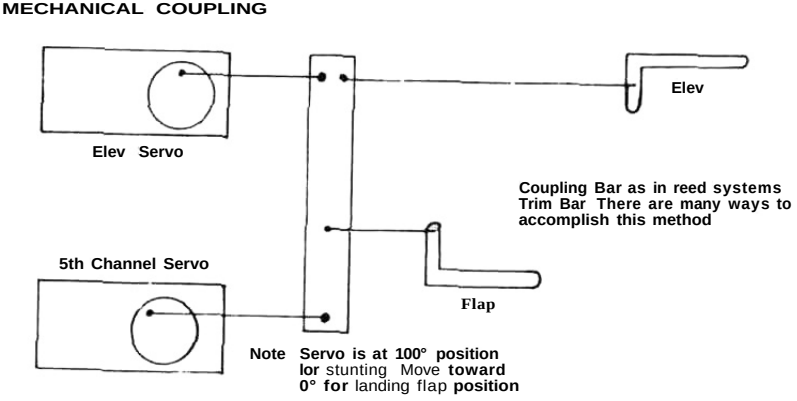


FIG. 17

PREPARATION FOR FLYING EXPERT

As mentioned earlier, the control surfaces should have the following movements ailerons ± 10 degrees, elevator ± 15 degrees rudder ± 30 degrees, and flaps ± 5 degrees. This flap/elevator coupling is the same whether mechanical or electronic systems are used If landing flap mode is available, the flaps should go down to 25 degrees.

The Center of Gravity should be measured (without fuel in the tank) at 6 to 7 inches forward of the hinge line on the wing Move the battery pack around to achieve this Set up the surfaces with transmitter trims in neutral, then apply up-trim at the transmitter to hold level flight or give a slight climb

Although the engine is well cowled, it is adequately cooled even with a muffler Have a full fuel tank on the first flights Use a 10 x 5 Top Flite propeller, after a few flights accomplished, go to a 10x6 Top Flite Power prop

As the model sits level on the ground, a positive rotation is required for lift-off From grass use a slightly oversized nose wheel to have a positive angle of attack As an expert flyer, you already know how to trim a model Make several short flights adjusting the clevises to move the transmitter sticks back to neutral The model should be adjusted for level hands-off flight upright and with down trim applied for inverted flight Make these checks at *3/4* throttle

At take-off, propeller slipstream effect gives a left yaw Compensate with rudder keeping the wings level with ailerons, if necessary Once you have accelerated well past stall speed, the yaw disappears Side thrust can introduce more problems than it is worth on stunt ships With the Nobler, it is easily accounted for by the effective rudder

When landing, the model is stable and amazingly slow Avoid the floating in ground effect by closing the throttle during the downwind leg of your landing approach when the plane is exactly opposite the landing area. Full stall landings are best.

PREPARATION FOR FLYING NOTICE

R/C Nobler is a full stunt plane but because of certain features it is a pretty good trainer too It is always best to have an expert help you learn to fly.

Before going to the flying field, adjust the control surface movements for ± 5 degrees on ailerons, ± 10 degrees on elevator, and ± 20 degrees on rudder. Set the flaps at a fixed position 25 degrees down from neutral. Do these settings with transmitter trims at neutral Then before flying, apply full down trim This compensates for the extra lift from the flaps

Set the Center of Gravity at 7 inches forward of the hinge line on the wing (with the fuel tank empty) Use a 10x5 Top Flite propeller

Flying hints Hold a bit of up elevator on the stick to make the takeoff, use full throttle After takeoff throttle back to 1/2 speed and climb in very wide shallow bank turns to gain altitude Now, trim the ailerons and rudder for straight flight adjust the elevator trim for level flight if necessary Make slow gentle movements on the control stick Remember, you must bank into a turn and when you want to fly straight again, you must bank out of the turn Keep all banks at less than 10 degrees angle Make wide turns in both directions The R/C Nobler will keep a slow steady stable flying speed with those flaps down If it stalls, it will drop forward Let it drop a few feet then apply a bit of up elevator to level flight and release the elevator pressure Next time, before the stall, apply a quick dab of down elevator to prevent the stall

Try a few short power-off glides in the first flight while well up in the sky. In level flight, throttle back slowly to idle Notice the speed and angle at which the Nobler glides The model should be slow, verv slightly nose down and steady To climb up again, open the throttle Repeat the glide and climb several times Try some gentle turns while gliding If the engine stops unexpectedly, concentrate on a landing with wings level letting it assume its normal glide speed

It is now time to land It would be nice to land back on the runway, but don't try too hard to get on the runway Just keep the wings level at touchdown wherever it is Use the same power off glide as when up high Steer around while gliding trying to land nearby When the plane gets below 10 feet in an approach, it is best to land no matter where you are The R/C Nobler is pretty slow in the glide with flaps down so it will be safe In other words, if you want to try the landing again, apply full throttle before getting to 10 foot altitude

R/C NOBLER ACROBATICS

The quality of acrobatics depends upon the pilot much more than on the plane With the Nobler, you will probably enjoy stunting more than with most other planes This is because of its linear responses, neutral stability, and ability to fly through smaller maneuvers at slower speeds It has all the ability to win contests, but winning is up to you

If you are planning on contest work, we suggest you set elevator trim for slight dive This prevents ballooning after each maneuver and strings out the rolling maneuvers Very little down elevator is needed during the inverted portions of the rolls If you are just sport flying, trim for level flight

LOOPS: Enter with full throttle and adjust size for constant flying speed throughout Big loops or small loops can be done

ROLLS: Use slight down when inverted during consecutive rolls and a bit more during slow or point rolls Nobler does not need top rudder during any rolls.

WING OVERS: Make the climb at half throttle and do the turn at l/4th throttle Turns easily either way

CUBAN EIGHTS: In any Cuban eight maneuver use large loops so that the half rolls can be accurately placed at the intersections, use full aileron for the rolls Ease off the elevator coming over the top before starting the roll Just for fun, try two-point rolls with full top rudder in the Cuban eights

KNIFE EDGE: Enter from level fight and apply rudder simultaneously with the quarter roll Hold full rudder The Nobler will not drop its nose or loose altitude If you enter with a climb, the plane will climb throughout

SPINS: Due to the extra stability with flaps, use ailerons in the direction of the spin The rate of rotation is not fast but can be controled with the ailerons To regain normal flight release either or both rudder and elevator, recovery is instant

LENCHEVICK: Nobler does it but it takes timing Enter from climbing right (or left) turn at 45 degrees climb and bank Use full throttle throughout While climbing make left (or right) aileron/rudder/up-elevator snap roll so that the plane is spinning and still going up After one good spin move elevator stick to down position while maintaining rudder and aileron directions Plane will begin to tumble a moment later The tumble is not necessarily head-over-tail but probably diagonal After tumbling which is the desired maneuver, release the sticks and recover If the stick positions are held, the model will exit the tumble in an inverted spin

SNAP ROLLS: Use rudder and aileron together For inside snaps, use left / left combinations but for outside or inverted snaps use left / right or right / left combinations of rudder and ailerons Precision snaps can also be done with Nobler, including half snaps

SIDE SLIPS: Rudder is powerful and fuselage offers plenty of side area so the side slip is effective in checking a landing overshoot In flight, you can do a flat turn by applying full rudder one way and keeping the wings level with aileron Nobler will make a wide turn, looks strange, but works.

SQUARE AND TRIANGULAR LOOPS: Because of ths airfoil and flaps, the Nobler is safe in "high G" maneuvers as at corners of square loops, top hat, and triangles, etc There is no wobbling because of no tip stalling during high lift demands On the decending side of the square-type maneuvers throttle back to low speed The corner will be just as sharp as when going up at full throttle

We wish you all the best of luck with your Nobler.

ED SWEENEY

FRED MARKS

Top Flite Models recommends that any newcomers to RC model flying join the AMA (See Page 1 for details) Among the many benefits, the member will receive a Rule book describing with diagrams the competition maneuvers, and will be insured against any peisonal liability claim as a result of flying mishaps mishaps

The covering with the built-in finish

MONOKOTE

MonoKote, acclaimed the greatest advance in covering and finishing in model building history, will give you a professional looking finish in a fraction of the normal time, eliminating the usual tedious work of sealing, doping, sanding and polishing.

LIGHT . . . Is 2/3 lighter than an equivalent silk and dope finish.

STRONG . . . has a tensile strength of 25,000 Lbs. per Sq. In.

PUNCTURE RESISTANT . . . has many times the tear-strength of silk and dope finishes, yet should it puncture, Instant, almost Invisible repairs can be made on the field.

ODORLESS . . . Completely odorless, eliminates irritating smells and dangerous fumes.

MOISTURE PROOF . . . STAIN PROOF . . . FADE PROOF . . . FUEL PROOFI

Just lay on MonoKote.

Seal edges with **an** *electric Iron.*

Shrink skin tight with heat.

SUPER MONOKOTE

This material has a totally dry adhesive, activated by the heat of an Iron. For best results use the MonoKote. Sealing iron shown. Recommended for all basic covering of the model.

Opaque Colon:
Missile **Red**
Int. Orange
Piper Yellow
Jet White

Mustang Alum.
Sky Blue
Insignia Blue
Midnight Black

Metallics:
Emerald **Green**
Electric Blue

Transparents:
Solar Red
Sunset Orange
Sunrise Yellow

REGULAR MONOKOTE

This material has a sticky adhesive and is recommended for trim areas color scheming, etc. No ironing required; it's just pressed down on basic covering.

Large Sheets: Missile Red, Int. Orange, Piper Yellow, Jet White, Mustang Alum.

Trim Sheets: Insignia Blue, Forest Green, Aztec Gold, Midnight Black

Self-Stick — Die Cut

MONOKOTE MARKINGS

FA-770
FA-770
U.S. AIR FORCE
U.S. AIR FORCE

Series of fuelproof, authentic aircraft markings; correct proportions and colors. Die-cut from self-adhesive MonoKote. Simply peel from backing and press down on model. Adheres to dope, plastic, fiberglass and, of course, Super MonoKote.

AMA-N-12
3456789 0

NAVY NAVY NAVY

U.S. Navy (Black or White)
U.S. Air Force
1″ Numbers
2″ Numbers
3″ Numbers
Vintage insignias, 2 sheets
Modern insignias, 2 sheets

MONOKOTE Sealing Iron

WITH TEFLON COATING

STAND INCLUDED

Especially Designed To Simplify Model Covering

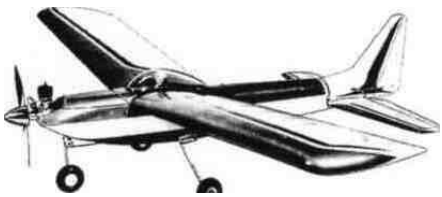
- LIGHTWEIGHT—weighs only 8 oz.
- SPECIAL SHOE—makes compound curves, fillets and other tight spots easy to handle
- TEFLON COATED—prevents scratching of Mono-Kote and adhesive build-up on shoe
- THERMOSTATICALLY CONTROLLED — Maintains constant heat, simply dial to proper working temperature
- VERSATILE—ideal for all other 250° - 450° heat sealing applications

R/C MODELS

FOR MODELERS WHO INSIST ON

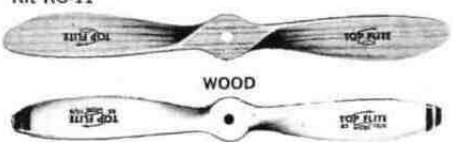
THE VERY BEST!

S. E. 5. a
Never before has an R/C scale model been designed with such attention to the most insignificant detail Wing Span 52" Eng **45 to** .60 Kit RC-13



TAURUS -
NOW includes ailerons & fittings Multi channel trainer Span 57' Eng 15.45 Kit RC-4

HEADMASTER
Wingspan: 49" Engine: .09-.35 T.A.C. construction Kit RC-11



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KWIK-FLI III
World and twice Nats winner Designed by Phil Kraft Span 60 Eng 45 to 61 Includes T A C —Ready made wing fixture Kit RC-12

WINNER OF THE
1962 NATIONALS

TAURUS
Most precise and complete R/C kit ever produced.
Span-70 Eng 45 Kit RC 7
TAURUS WING KIT-RC 7W 13.95

TOP DAWG
Suitable for escapement, servos galloping ghost, reeds or even proportional gear T A C construction Wingspan 39 5"—Length 32" Engines 049 15 Kit No RC 10

SCHOOLGIRL
One wing or two Span 32 Engines 020 049 Kit RC 9

SCHOOLMASTER
Single or multi channel with rudder elevator and engine control Span 39 Eng 049 090 Kit RC 8

Top Flite model airplanes must meet the most rigid standards before they are made available to the public. Every Top Flite model goes through a series of experimental design and performance tests. Production line models are constantly tested both in the engineering department and in the field for quality of materials, workmanship and manufacture, precision engineering and "fly-a-bility." It is, therefore, no accident that more Top Flite Models have won more Nationals and World Championships than any other models.

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