VELMA AND MEADE HALLOCK

The NOVA

BY MEADE HALLOCK

● No matter what phase of our hobby a modeler pursues, he will, at times, come to a standstill in his activity, reflecting upon the things he would most desire in the "perfect" model. From his own experience, he will sort out the bad ideas and characteristics and retain the ones he knows are desirable for this particular model. Then he will begin to design that ship which he feels will provide the top performance for a certain job to be done. Out of these efforts may come many failures, but persistence will usually lead to success.

In effect, the foregoing thinking led to the development of the Nova design. Too many times wings came apart, nose gears caved in, fuselages split apart, rudder movements weren't adequate to keep control, engines broke out, ad nauseum, in the usual commercial kits. It was finally decided that, just as a better mouse trap could be built, so could a better radio control plane!

Thinking back through many years of modeling, we decided to set down the points we felt were needed in an ideal RC model. The following are the characteristics we felt every modeler wants in an RC plane:

1. Easy and economical to build and operate.
2. An easy, stable flier with built-in recovery tendencies, yet outstanding in contest performance.
3. Rugged and dependable — built to take punishment, but without excessive weight.
4. Maintenance free — leaving more time for flying instead of repairing!

These are the main reasons behind the Nova design — but we were also thinking about a versatile design — one that could be built and flown by beginner or expert alike, yet would be able to perform exactly the way the flier desired. It would also have to be adaptable to any number of channels or to any type of radio gear. Sound impossible?

It was felt that, in order to accomplish all of these prerequisites with one model, a design was needed that would fly well on rudder-only equipment, yet with the area and room to accommodate the addition of any number of control surfaces and extra equipment necessary for their operation.

In order to determine if the first characteristics (easy to build) would meet the test, it was decided to let another person build the first model from the original plans. For this we wanted a person with very little modeling experience, and decided upon my wife, Velma, as a good choice for the test. She had built only one RC model prior to this attempt and had required considerable help in order to get it built and flying.

With only the plans and materials for the Nova before her, she began the task, and in short weekend had the plane ready for painting. One more day, and she proudly produced the completed model for approval — it was a beauty! All red, trimmed with white and black, and as professional looking as might be expected of a far more experienced modeler. A couple of days later we installed the radio equipment and prepared the model for the first test flights.

Now satisfied that the first requirement had been met, we went on to test the second. (Is it stable? Does it have built-in recovery tendencies?) We loaded the plane and flying gear into the car and headed for our club field, northwest of Fresno, California.

After getting the plane ready and checking the prevailing wind direction (about 12 to 15 mph — really too much for a first flight), we started the motor and checked the controls. Velma released the model and the test began. The big question in my mind at that moment was, "Would it be stable enough to control in such a breeze?", but it was too late to worry about that as the plane roared straight down the runway into that small gale! It lifted off the ground and continued to climb straight out into the wind with only a slight turn, noticeable about 200 feet after lift-off. It continued to climb steadily, even down wind. After throttling back to cruising speed, we made a couple of turns around the field and the nentered into the approach pattern for a landing. It set down smoothly and with ease. After adjusting the clevis on the rudder horn to stop the slight right turn tendency, we filled up the tank, revved up the motor, and took off again —this time to find out just what the Nova could do maneuver-wise.

We found the Nova to be highly manuverable in the stunts as well as very smooth and easy to handle in the procedure turns. Above all, we noticed three outstanding characteristics that most rudder only jobs lack:

1. On turns it continues to groove gently until a tap of opposite rudder was used to straighten it out.
2. The nose does not drop in sharp turns but remains high enough to keep the plane at the same altitude —and with just a a little more motor speed, it will continue to turn and climb gently upward at the

THE NOVA

SPECIFICATONS

SPAN:	58"
AREA:	456 SQ. IN.
LENGTH:	34"
CHANNELS:	1 to 8
CONTROLS:	RM REM REMT
CLASS:	I, II
ENGINE:	.15 — .23
THRUST	2° DOWN 2° RIGHT
INCIDENCE:	
STAB	0°
WING	+3°

same time.

3. And, we found it had a very fast penetration rate into the wind, even on high motor, which is not found in most rudder only jobs.

Now the time had come to find out if a less experienced flyer could handle it as well. Again, Velma was chosen for this test. Having flown only a few times, she was a bit skeptical about trying out a new plane in such a breeze. But, this was the only way to find out if "anybody" could fly it! (Ed.'s note: That will get you in trouble, Meade!) We started the engine, and when she was ready, released the plane. Following a nice take-off, Velma executed the few basic maneuvers she knew, then brought the plane in for a smooth landing. She was excited and jubilant over the ease with which it could be flown. We packed the gear into the car and headed for home. We both felt we had a potential winner!

And so we did! That same weekend we entered the Nova in its first contest. Velma entered the "Buddy Event," (in which beginners are helped by an experienced flier), and I entered Open Rudder Only. All went well on Saturday, but on Sunday morning Velma informed me that since she had done well in the Buddy Event the day before she had also decided to enter the Open Rudder Only event! (Of course she was only doing this to beat me — then she would have something to hang over my head!) Anyway, this made three events the Nova was entered in that day. With both of us flying the same plane in two different categories, and with only ten minutes between flights, we found barely enough time to change an occasional broken prop, wipe off the excess grease, and fuel up the tank! In both days of competitive flying, the only damage was a few broken props and one blown tire! All this flying and very little damage pointed out that the Nova really was rugged and maintenance free!

That contest came to a happy close for both of us—not only had we proven that the plane could meet the remaining tests of an "ideal' 'model ,but we walked off with three wins; Velma placing 2nd in the Buddy Event and tying for 3rd in Open Class I, and my own attempts rewarded with 1st place in Open Class I. We truly had a winner!

Since that first contest, the Nova has placed 2nd in the Fresno Radio Modelers June Open, and two more wins in the West Coast Championships at Turlock during the last weekend in August. All this represents less than a year of contest workout for the same Nova, as well as many hours of weekend sport flying. At last we know we had a design that was built to take it, and one that was able to compete with the best of them!

Shown on the plans is an optional, hotter version with a clipped wing and stab. We used a Supre Tigre .23 and two servos in this version, but the plane flies equally well in its original size using any engine and equipment combination as shown on the plans. For Class I contest work we recommend the smaller, hotter version with either a .19 or .23 engine. The Nova has also been flown six channels — it is like flying rudder only, but when you want elevator for some of those more difficult maneuvers — there it is! It would also be a simple manner to add an additional servo for trim—there is ample room in the fuselage.

Enough said about what the plane will do for you. Now, let's sharpen the X-Acto's and get down to the easy task of building a dream of an RC plane .

Construction

Wing and Stabilizer

First, carefully select matched, medium grade balsa. Then, carefully make templates of the wing and stab rib patterns. Trace these on to 1/16" sheet as many times as required for the number of ribs needed, plus an additional two wing ribs of 1/4" stock. Be careful in cutting out the ribs and sanding will not be necessary. Pre-cut all leading and trailing edges, and spruce and balsa spars to the correct length. Select the sheeting material and cut to length. With this step completed, construction can begin.

The wing can be built in two ways: (1) in one piece on a Magna-Jig, adjusted to the correct dihedral, or (2) each wing panel built separately on a flat work surface. In either case the wing is built from the board up by the following method:

Pin the bottom sheeting in place on the plans, then glue the spruce and balsa spars directly to the sheeting at the correct locations. After the spars have dried enough to remain in place, continue by checking the spar positions in relation to the ribs. Place a rib at each end and one in the middle of each wing directly on to the spars, but **do not** glue these ribs in place. Re-pin the sheeting after alignment and proceed to glue in all cap strips between the sheeting and at the rib locations. Place center sheeting in correct position at center of wing. Follow by gluing in all ribs, making sure to glue one of the 1/4" ribs at the correct location on each panel. Then plue on leading and trailing edges.

Next, glue the spruc and balsa spars together before placing them into the notches on top of the ribs. Allow this much of the construction to dry thoroughly. Re-glue all joints which will be covered by the sheeting.

Cut the 1/16" sheet for the number of pieces needed for webbing the spars. Make sure the grain of the wood used for webbing runs vertical to the spars. Glue in webbing between all ribs. Then glue on front and back top sheeting and complete the sheeting at the center of the wing. Finally, glue on cap strips. Shape wing tips and glue top into place. Then, after entire assembly is dry, remove from the board and sand structure to final contour.

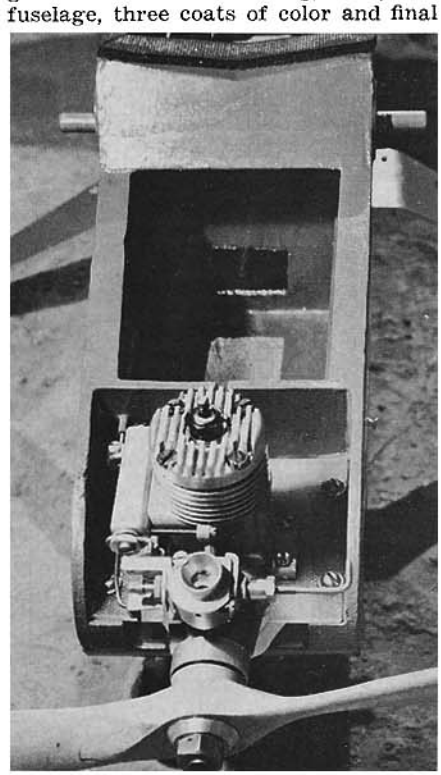
If wing panels were built separately, the correct angle for the dihedral joint is cut by passing each wing panel through a table saw and carefully sawing a slight angle on each of the 1/4" thick ribs. For first cut, set the saw blade at about a 2 degree angle. Check for correct dihedral angle, and if not enough, repeat until the correct angle for 6" dihedral under one tip is obtained. Then coat each side of the joint with white glue, allow to dry slightly, then re-coat. Pin one wing down flat on the building board, press the joint firmly together and prop the other wing up to the correct dihedral. Pin the joint together and allow to dry. Then, remove from board and sand, as above.

After the wing is sanded, place a 3" strip of Celastic or fibreglass over the center joint, both top and bottom. Now silk the entire structure. If you wish to use a hidden antenna, this can be placed inside the wing before silking.

At this point, give the wing two coats of clear dope mixed with talcum powder. Next, construct the stablizer using the same procedure as you did with the wing. Silk, and give two coats of the dope-talc mixture. Set wing and stablizer aside and go on to the fuselage construction.

Fuselage

Motor mounts, parts 6 and 7, wing mount stiffeners, all 3/16" square bracing, and tail section doublers, as well as servo rails, are glued directly to the sides of the fuselage. Then formers 1 and 2, along with keel plate 8 are glued into both sides for alignment of the nose section. Allow to dry thoroughly. Next, glue in former 3, tail block, and former number 4, in that order. Glue on landing gear plates. Sheet the top and bottom of the fluselage, with the wood grain going crosswise to the fuselage. Glue on fin and rudder. Silk entire structure and give two coats of clear dope and talcum mixed together. Then give entire model — wing, stab, and fuselage, three coats of color and final



Hallock's NOVA
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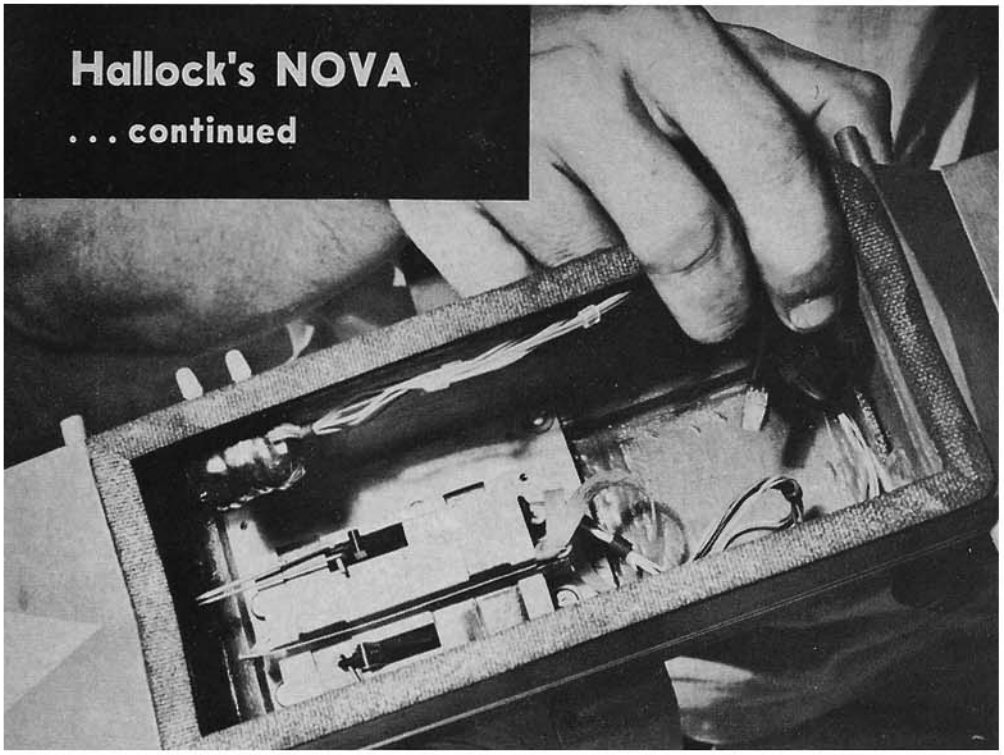

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trim as desired. Wing and stab tie down dowels are not cemented in place, but are only snug fit through the body for easy replacement in case of breakage.

Landing Gear

The free-swiveling, caster action nose gear as used on the original Nova was turned from aluminum bar stock. If you do not have access to a lathe, it can easily be made to square dimensions and the corners rounded with a rasp. A straight-bent wire for the nose gear is as functional as the coil-bent type, and some may find it easier to fabricate. Also, if a steerable gear is desired, this can be accomplished by either extending the wire into the fuselage and placing the control horn inside, or a control horn can be mounted below the aluminum strut.

The main gear is of dural aluminum (DeBolt RC-6 blank), and it, along with the servo board, is held to the fuselage by two 4-40 bolts.

Through all this I am certain that you will agree it is much more difficult to put these instructions down than it is to actually build the Nova. Once you've finished yours and have flown the paint off it, the Nova will still appear to be a "bright and shinning star" against the deep blue sky.

Write us c/o R/C Modeler and let us know of your experiences with the Nova!