I FELT very honored when Don Dewey phoned me in Sweden and asked if R/C Modeler could publish the 'Spiggen,' and I'm very grateful that he, in this way, made it possible for me to contribute a design which I hope others will find interesting. The model is, perhaps, best suited for those who like to have something to play with between their contest models. The intention has not been to make a creation on one or another direction, but just to build an airplane. Mainly it is designed for sport and showflying, but it has also shown attributes which indicate that it can even be used for competition with only minor modifications. This doesn't mean that you have to be an expert to be able to handle it, but it calls for some experience. Not in flying, perhaps, but you do have to make a landing, and in that moment you must be bright and clear about what measures to take. One should at least know something about how the ailerons work. Thus, when one aileron is down its panel goes up and vice versa. Except for the elevator, however (as we have all learned at one time or another!) When **it** is down, the whole thing will go **down**! Otherwise this model is calmer, smoother and more stable to fly than an ordinary multi. The speed, however, is slightly higher. But with the flaps, at the forward wing, trimmed full down, and with compensated down elevator, it could be flown even at extremely slow speed. I'm sorry, that you can't experience the enormous thrill I felt at the first take-off with a brand new design. The question finally was — Could it fly at all? Maybe I was a bit scared in the beginning, evolving from test flights with models in smaller scale. Now I remembered all too well how tricky they could be. But, I'm sorry guys, this moment is gone. With flaps trimmed half down — full throttle — and the CG at the right position, she will, at about 1 – feet, first lift the nosewheel and go s for a while and leave the runway wit grace. This can't be described, it mus be seen. All you have to do on takeoffs is stick around and watch! This lucky sequence is entirely free. Not until a moment later, at a safe altitude will you have use for your transmitter.

Now, incline her just slightly — the speed will increase — and she will make a nice turn because of the front trim. Straighten her up and take in the forward wingflaps slowly and compensate in the beginning with the elevator. The plane shortly will achieve normal cruising speed. Now, you can start to play. But, don't do any outside loops at once. To be able to do that, you have to let the forward wing flaps go further up about ½". I will recommend that you arrange the linkage so that the flaps preferably cannot go negative in at least your first 20 flights. A mistake here, at low altitude, will be fatal. This ship is quite

SPIG

FROM SWEDEN, LEIF THELIN'S F

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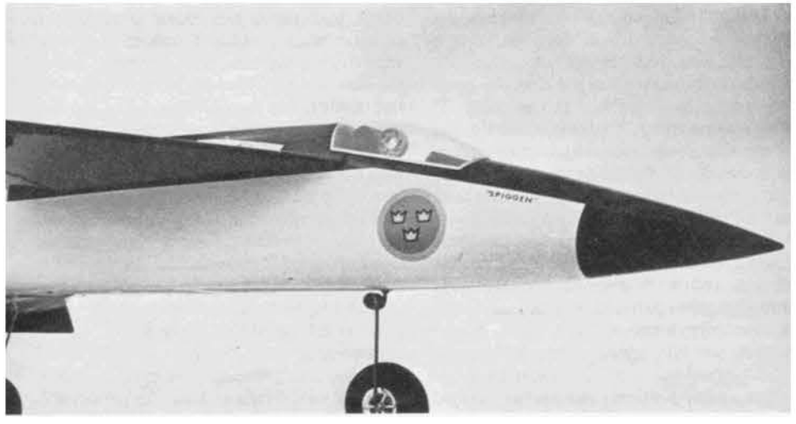
RSION OF THE SAAB-37 "VIGGEN"



easy to fly, although the landings can be a bit tricky in the beginning. When landing, trim the flaps half way down, cruise with ¼ throttle, make a wide approach and fly very flat. Keep the nose slightly down with the elevator, and at about 2 yards over the runway, take up the nose slowly. She will go down on the main gear with the nose high, and go so until you close the throttle fully. She is wonderful to watch, at this moment. In case of a motor cut-out when flying, take the elevtaor down, half way down with the front wing flaps, and keep the speed up. This type of airplane will not fall out as an ordinary plane, but it glides like a stone at slow speeds and with the nose high. (And the wheels make such ugly holes in the bottom of the wing. I know!) Otherwise, it is probably just this type of airplane which has the greatest advantages at low speeds, thanks to the added lifting capacity from the both wings.

The forward wing is, of course, interesting and amusing to use. In fact, I use it so often, that I have chosen to maneuver it with the throttle lever. This also gives more receptive control. The forward wing is an effective working trim panel and, in that respect, a subtle regulator of the speed. You cannot, for instance, make a loop with the front flaps alone. In that case, the plane will take an angle of attack which corresponds to the angle of the flaps and the speed. Of course the flaps are also very effective in combination with the elevator. The roll is enormously fast with full turn on the ailerons, but is very smooth and controllable in normal conditions. The rudder has, however, very little effect in high speed, but beware, it is sensitive in lower speeds, above all when the front flaps are down. The effect of the elevator is, however, quite normal. Then, when you are satisfied with all the "ah-ah ah-ah ah-ah's" and "oh-oh oh-oh oh-oh's" from the spectators behind you, you can load your ship up with rockets — and let go. It's very impressive.

Here I should perhaps give you another reason for not decreasing the speed too much at low altitude. Earlier planes have made you used to the propellerstream over the rudder surfaces, but here, in its absence, the effect of the rudders decreases faster than usual at slow speeds. In return you have a clean and neat model to exhibit when landed.

And that was why it all began. Since my first R/C model I have been contemplating over the possibility of building something with the engine in the tail, just to get rid of the propeller stream and the fuel and oil over the entire model. Not to mention all the wiping off it causes. In the course of years I have made a lot of experiments with small planes in balsa or cardboard. The new creation was on the whole quite clear to me, when I saw a picture of what our

Leif Thelin fuels up the Spiggen at the start of a morning's flying session. Take-off sequence photos on opposite page

Tired of R/C "look-alikes?" The "SPIGGEN" is an exciting first in a series of challenging new designs to be published in RCM . . .

new jet-fighter SAAB-37 "VIGGEN" was going to look like. Then it was decided. The design I had up till then was more like your XB-70 (but smaller) but, being a patriot, the choice was not hard. I only had to move the front wing back and give it delta-form, break the leading edge of the main wing and modify the fuselage, similar to the shape of "VIGGEN." Then the smaller scale model experiments started all over again. That was last winter. We had more snow than usual here in Sweden at that time, but thanks to the snow I could make several more tests with each model than expected. The models were almost indestructible with that soft, white mattress on the ground. But, gosh, what a flopping and what searching for that small strip that indicated the place where the model had gone down. But, perhaps it was the smallest model of them all, which really persuaded me that the project would be possible. It was only 2" long and completely of wood, and made in as exact scale, after my latest version, as I could. It flew like a dream. The other models were in 1:2 ½ scale and had a Pee-Wee in the tail.

In the end of April the new plane was ready. And then, as a contrast to the winter, followed one of the warmest summers we can remember, and the productivity went to zero. But, to be honest, just the appearance of this new plane scared me a little. I wasn't used to it yet, and a strong suspicion started growing — could it fly at all? The radio outfit had previously been installed in another plane, which I was to compete with during the summer. Anyhow, when the last competition for the year ended the outfit from the old plane was moved over to the new one.

At last, the day had come when there was no excuse and not one thing left to test. She had to be taken up. And it is those feelings prior to this moment that you, unfortunately, never can experience, at least not with this design. **IT FLIES!**

The engine I use is a Merco .61, with a reversed crankshaft. It may not be necessary in the USA, but here in Sweden, you can't find any 9" pusher props in wood or 3-blade nylon. Alternately, I had to change the rotation of the crank-

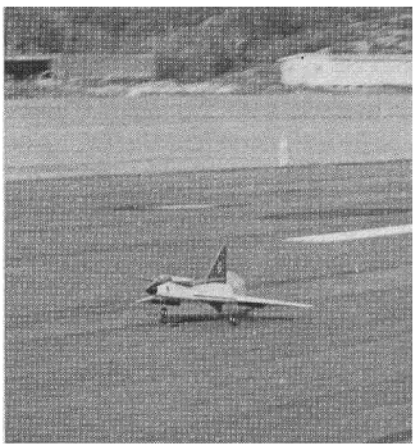
shaft. Now I can use Tornado's 3-blade 9-6 propeller, or inlet and glue two 9-7 or two 9-8 wood propellers together to 4-bladed. Hobbypoxy works fine here. The fuel system gave me some problems initially, due to the feeding length, which results in great differences in level in varied situations. With one more needle valve from an OS-throttle as a restrictor and a small reserve tank on the fuel line behind, the fuel system now works perfectly. As a consequence the throttle now works surprisingly well. The air bleed hole for the extra air intake is sealed. The tank is placed in the wing and has two air intake tubes, one up and one down. From the clunk goes another shorter tube with a brass tube at the end to be connected in the fuel line. The tank is filled through the upper tube, and if you compress the lower tube when the tank is full, you can easily get the fuel back to the engine.

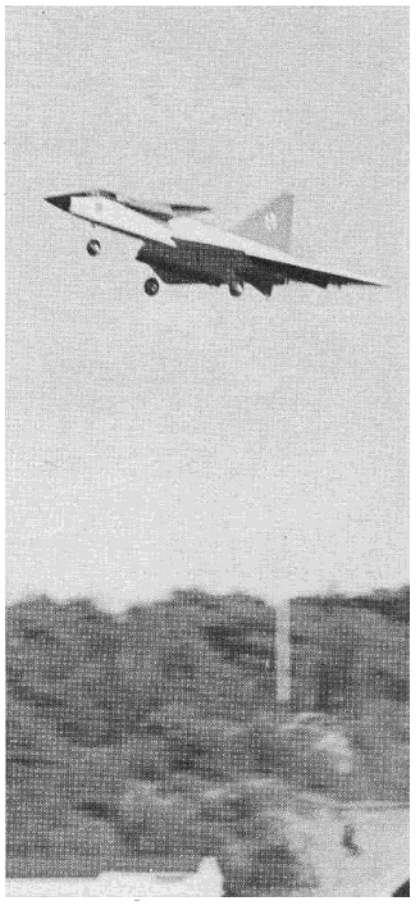
The flying tests with the smaller models have clearly shown that it would be a great advantage if you could retract the gears. I am going to try this on my next model, but I haven't found a good solution yet. I think that in the USA you have better possibilities for solving this problem. But be careful that the flying weight doesn't exceed 7 lbs.!

I am not going to render a detailed construction description. As far as I know there are not many who build in the same way, and I have a feeling that you in the USA have directed the development and led the race from the start. (But we have not reached the goal yet.) With experience from the prototype I can, perhaps, help to make the construction easier by telling something about the assembly sequence. Begin with the forward wing and the fin. They are much more tedious to do later when you really need them. Note the grain direction of the planking. In the meantime, cut out the ribs for the wing and the formers and glue on the doublers.

Everyone has their own principles for gluing, but I glue all doublers and the cross joinings with Hobbypoxy Formula II after the mixing has been thinned out with 20% thinner. I don't know what the Pettit people say about that but it gives good results and the glue is in this way easy to spread with an ordinary brush. Apply pressure with a plank and some weights, and you will have a joint which never warps. The hardening time is also much shorter than the time of drying for ordinary balsa glue. Therefore, I generally use balsa glue only when joining smaller surfaces which are always double glued. Ribs, formers and all gluing edge-to-edge is made with "white" glue, except in the engine room and in the tank location. Epoxy glue has shown to be most resistant there. And thinned, I brush it on all over in these rooms. Even all glassing is made with Hobbypoxy. Join the lists for the leading edges to their correct form. Lay out the bottom flakes between the stretch dotted lines with the attachment for the landing gear and the bottom spar in the right place. Put the ribs on, and glue the reinforcements in the servo and the tankrooms, as well as the plywood sheets under and behind the aileron bellcranks. The plywood sheets are divided in two pieces in order to protect the aileron bellcranks if the wheels, for some reason or other, should come up through the bottom. Then, you only have to insert the spars in the leading and trailing edges and over the ribs and start to apply the planking. But, don't forget, before that, the reinforcements for the fastener have to be put in place. First, on the rear sheet on the bottom side, parted in two, and after that, forwards on the upper side. Use #16 jig in the plan. Its object is to give you an exactly straight trailing edge. Put in the front bottom sheets quite early, so you can get all the bellcranks in place, complete with pushrods. Don't have the rods sticking outside the wing, as it will make the sanding and covering difficult. Solder threaded couplings and guide them in short tubes. Mark the location with a knife, and cut deep enough so it will not be removed during sanding. The antenna is installed inside the leading edge of one side of the wing and a ground wire inside along the other. This results in a cleaner model and additional field strength of the receiver. Don't forget to put in the connectors for the rockets if you desire. Furthermore, it will be an advantage if you lay in a strip of fiberglass inside, to protect the wing. Later on you will grab right there, when you lift her. You don't need to remove the wing before the entire upper surface is covered. When the underside is planked, just sand the front edge straight and glue the leading edge. I always add a thin spar of fir to protect the leading edge from marks. The front plate with the locating dowels, is better left until later on, when the whole fuselage is ready. At that time glue it in with the wing in place, and you will thus have a better alignment.

In the meantime, when working with the wing, crossjoint not only the fuselage sides and the top sheet, but all rudders, etc., then cut them out. Draw a centerline along the top sheet and if also the bulkheads and formers have a center line drawn, it will make the whole assembly match easier. No, maybe it doesn't but it **is** easier for you to control the warping in the fuselage. When the triangular longerons are in place at the fuselage sides, trim them at the top to proper angle to fit, and then glue the sides in place together with formers 4-7. Have bulkhead 3 ready with the nose wheel brackets in place. Now bend the sides together and glue in the bulkhead. Here it is to





From RCModeler May 1967

be noted that the cut-out in all formers depend on which side of the engine the throttle arm is located. Fasten the blind nuts on the engine mounts and glue them in together with firewall 8, keeping the support blocks and gluing it all in at one time. The next day, remove the fuselage from the construction board and have a go at getting the right curve on the nose. If you succeed, join the hardwood noseblock, and glue on the bottom balsa block. Former 2 is moveable and is held in place with the canopy only. Fit in the triangular filling-out spars in the nose room and glue them in place. Join the hollowed block at the top. Don't look at the fuselage now. It's ugly. Shape and sand the top **right now.** It would be almost hopeless to make the top beautifully curved with the forward wing and the fin in place. When the top has been shaped, fit the wing and turn the fuselage upside down.

Slide in the wing halves from each side with the wire hinges in place. The wing tips shall now reach the board. Complete everything else inside the fuselage before you lay on the bottom sheet. I waited to cut out the hatch until the fuselage was glassed and doped. The cockpit is made of just the top part of a 9" deBolt canopy which is forced on a plywood frame. I hope you will find a ready-made landing gear which will suit. I have used a Bonner Digimite 8 which has given me 1½ years of trouble-free, intensive service. That has also been the touch which made this project look more realistic. It gave me further freedom to put in brakes, rockets and later retractable gears, and thus have use for all the controls on the transmitter.

I'm absolutely not the right guy to explain how to get a nice finish, and there is too much written already. I finish in a new way every time, anyway. But whatever method you prefer, this I know: Give her, in every case, a protective cover of cloth or tissue. Don't experiment on a new good-looking ship!

When the bird is ready for flying, please take a picture of her (before takeoff), together with something characteristic of your part of the world and please send a single copy to me, Leif Thelin, Nordmannagatan 8 G, Kungalv, Sweden.

Don't you worry — she will take off all by herself!