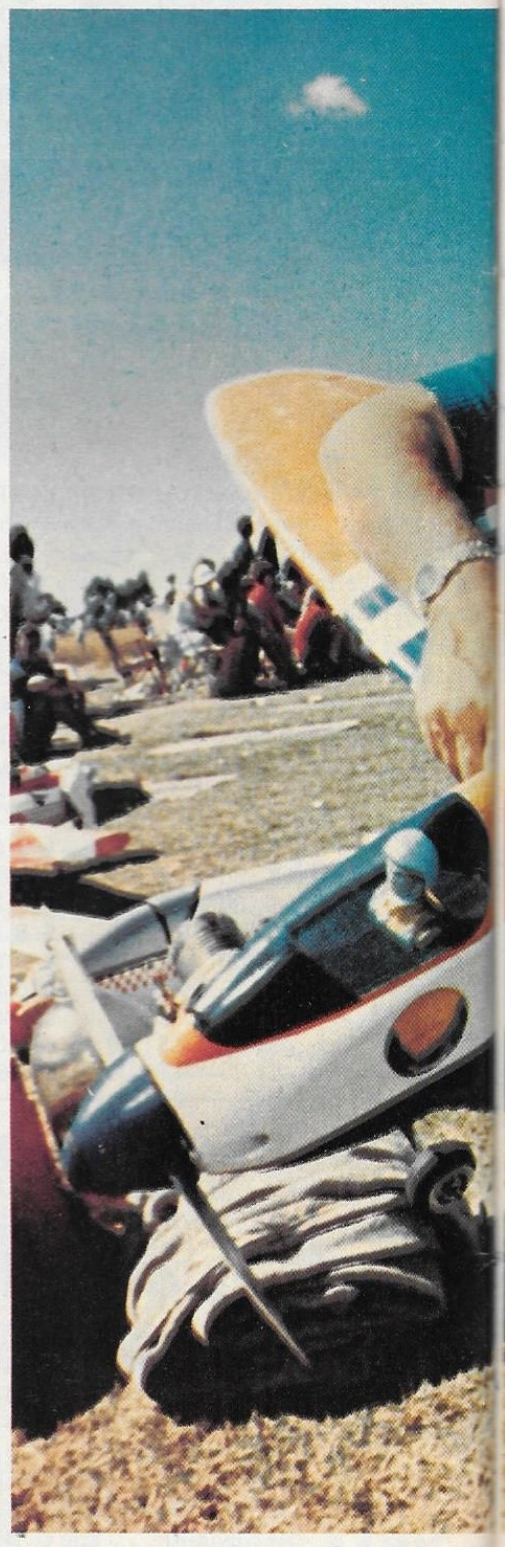
NOVI

From South Africa, where the art forms are expressed in strikingly elegant lines, comes the Novi Arrow. This internationally renowned FAI pattern bird flies with a gazelle's gracefulness, yet it's a lion in competition.
by John Brink



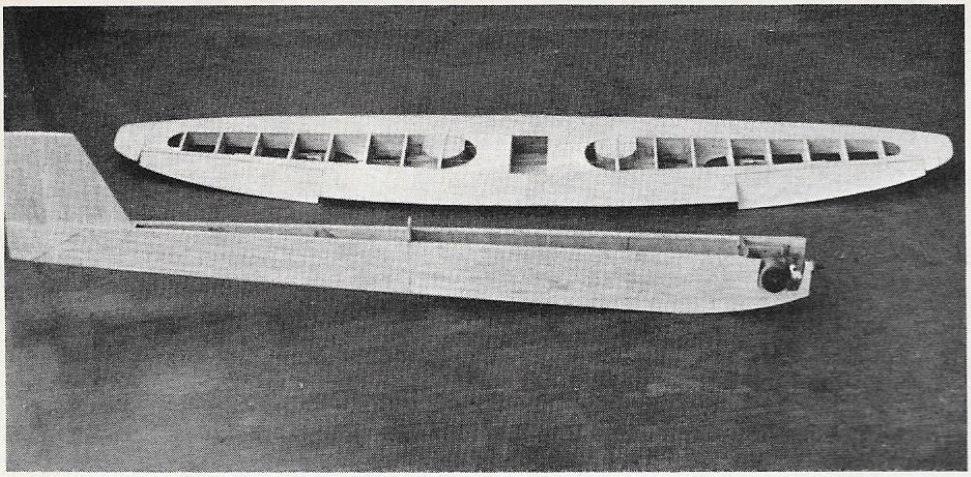
Successful pattern flying consists of four major elements: the pilot, airplane, radio and the engine. With the Novi Arrow, the airplane element is taken care of—the rest can be bought or developed with practice.

What is so special about the elliptical wing? Does the extra trouble in construction warrant the results? Well—build one, and be convinced it does!

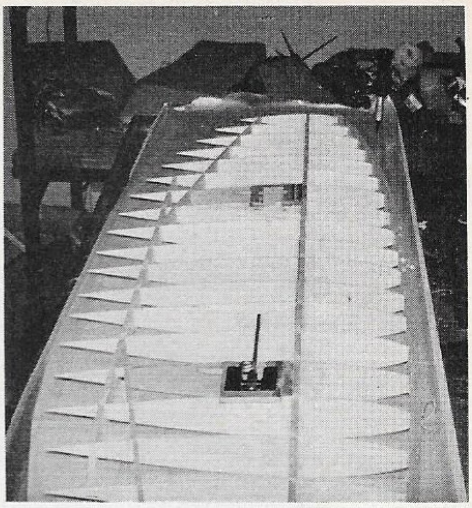
For a start, it looks nice. All men like curves, and this includes those hard-to-please judges. But the elliptical wing has far more going for it than this. Theoretically, it is supposed to represent the ideal planform from a distribution-of-lift point of view; also it is an effective way of packing in maximum wing area within a given span.

This extra area helps to maintain a reasonable wing loading, especially with the additional weight retracts have brought to pattern planes. Most of our flying in South Africa is at altitudes of 6000 ft., in temperatures of 80 to 100°F. . .so keep it light for similar conditions.

ARROW

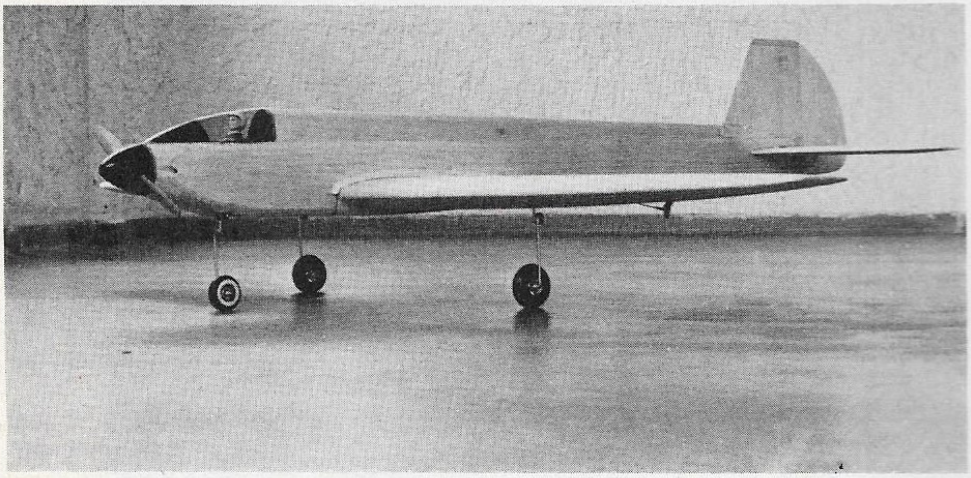


It really doesn't take long to get the construction to this stage. Nor does it take much longer to. . .

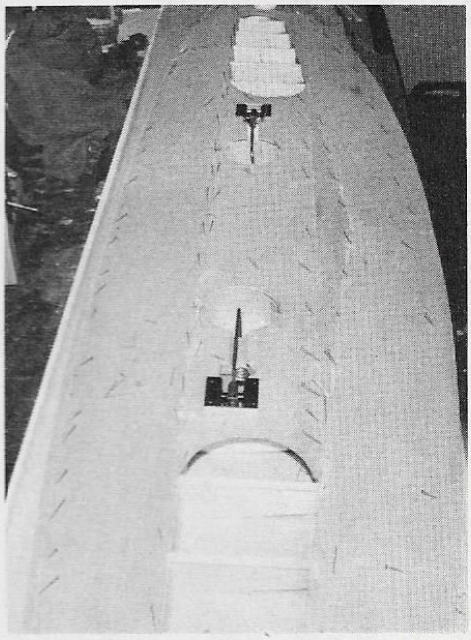


Wing construction is flat on the board. Egg-crate construction keeps things aligned. Retracts should be fitted at this stage.

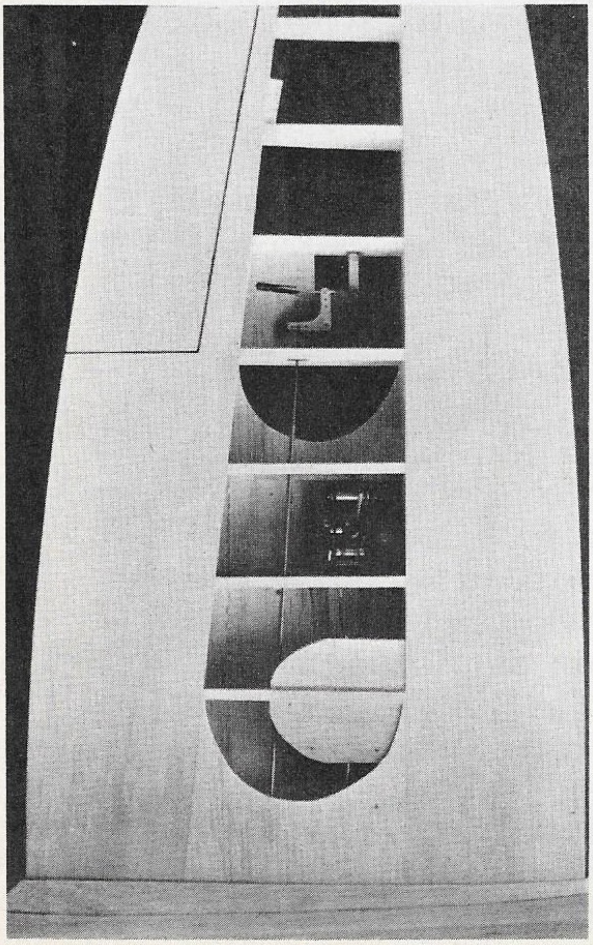
get it to this stage, ready for covering.



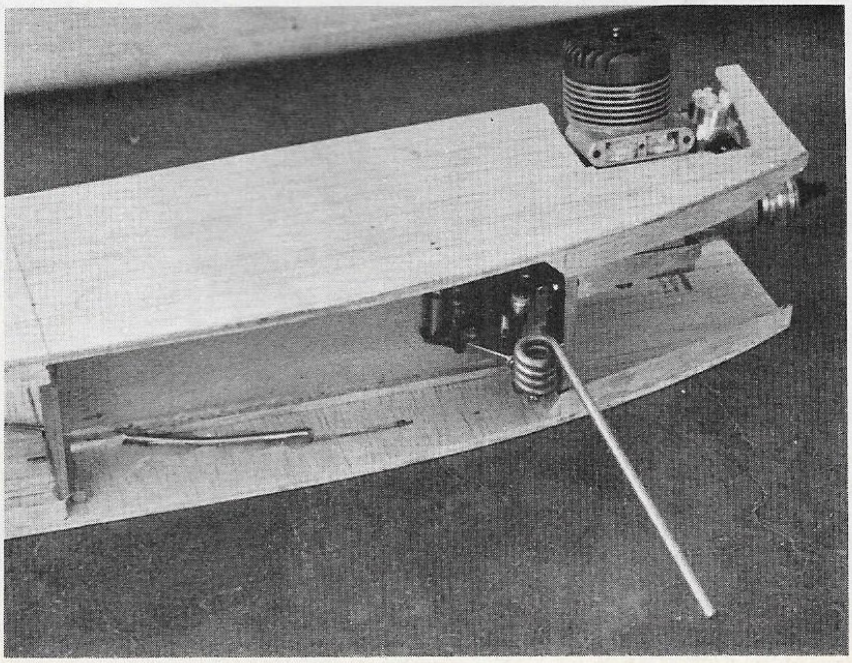
NOVI ARROW



Rob a pin factory prior to applying the wing sheeting.



Detailed shot of the aileron linkage and retracts reveals standard operational procedure.



Fuselage structure is elementary—all straight lines and right angles. The engine area is simple and spacious.

The thin wing tips smooth out flying in turbulent air, without going to excessive weight to achieve the same results. Where this wing really excells is in the rolling maneuvers. The small area at the wing tips means less air resistance when rolling. The low weight towards the tips reduces the inertia of the rolling wing, resulting in precise stops, without overshooting. The forward position of the ailerons on such a wing planform moves the rolling moment nearer to the CG; truer axial rolls are apparent. With the new FAI Pattern, all the high point maneuvers have rolls in them, so the advantages of this wing cannot be overlooked.

This airplane is not a snap rolling demon, but can be dragged in, nose high, at walking pace, without any tendency for a wing to drop. The stall is predictable, and results in the nose dropping cleanly at the entry of the spin. A lot of credit for this must go to the Goettingen 459 airfoil, as it displays similar characteristics on different wings. The 12.75 percent thick airfoil section is maintained throughout the wing and, coupled with the large area, gives an excellent speed range.

The fin and rudder are kept low along the vertical axis to give a pure yaw effect, without rolling tendencies when applying rudder. This enables the stall turns in the Figure M to be completed, even when leaning the wrong way.

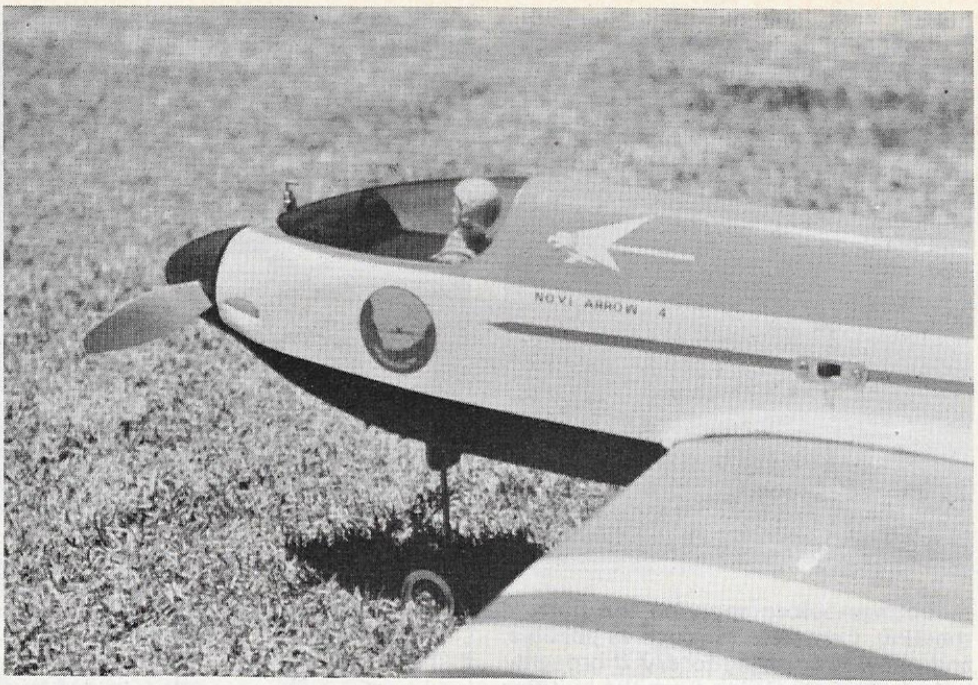
CONSTRUCTION

The one-piece wing is built flat, upside down, so a straight six-ft. long building board is essential. All the sheeting should first be cut to shape, but left slightly oversize, to facilitate precise fitting later on. In order to prevent warps from developing, all sheeting, spars, etc. should be straight, and nothing should be force fitted. Use only the lightest wood, if the whole wing is to be sheeted. Where necessary, curve the sheeting by dampening the outside surface.

The spars are full depth, with the ribs slotted in, egg-crate fashion, until the top of the ribs rest on the building board at their main spar position. When pinning the spars to the building board, cut off the pin heads to ease removal of the wing later. The small figures on each rib pattern, e.g., 22.2, indicate the height in millimeters that the centerline of each rib should be above the building board. This height, for each rib, should be marked on the LE, and the spars should be notched down to this height above the building board. Accurate fore and aft alignment of the ribs is thus ensured.

Before gluing anything, trial fit the ribs to the spars and sight along the TE to check the alignment. In order to obtain a straight hinge line along the top surface of the aileron (remember the wing is upside down) a little washout may be required from rib 9 to 13.

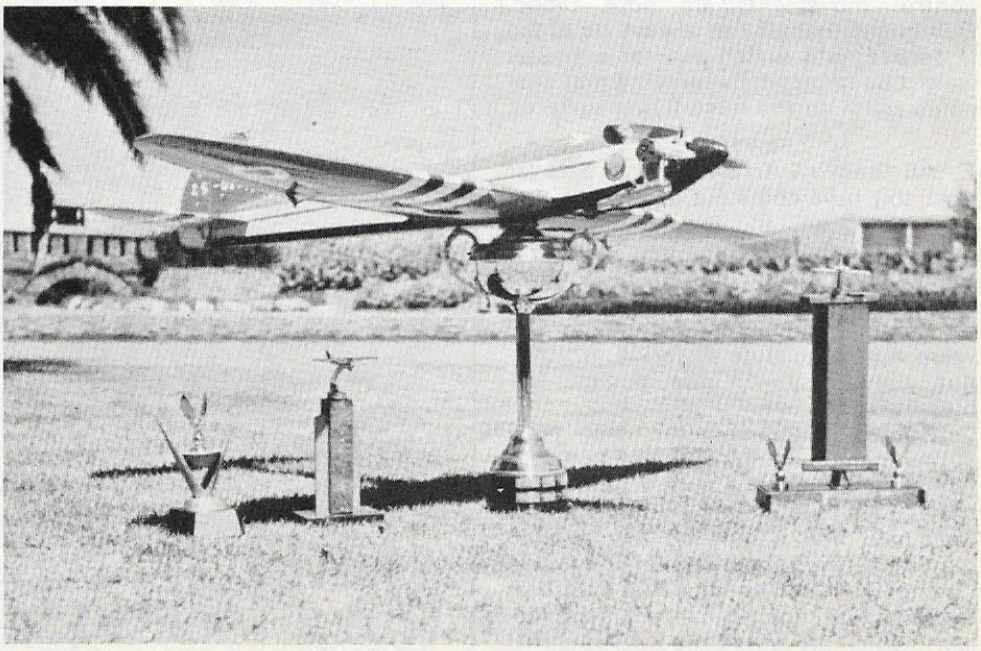
Now glue the ribs to the spars and the pre-formed, laminated LE. When dry, the excess spar material may be trimmed off flush with the bottom of the ribs. Fit the wheel wells and retract



The Novi's proboscis, pointed like an arrow, is in the current FAI style, with forward cockpit. This aesthetic detail is dictated by the aerodynamic necessity of getting more lateral area ahead of the CG.

Webra Speed provides the motivation, while Silencaire muffler keeps things legal and quiet.

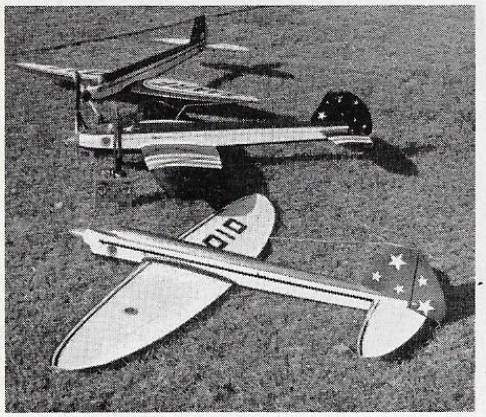
Mr. Brink gives some idea of the impressive size of this big bird. The wing looks like it came from a P-51.

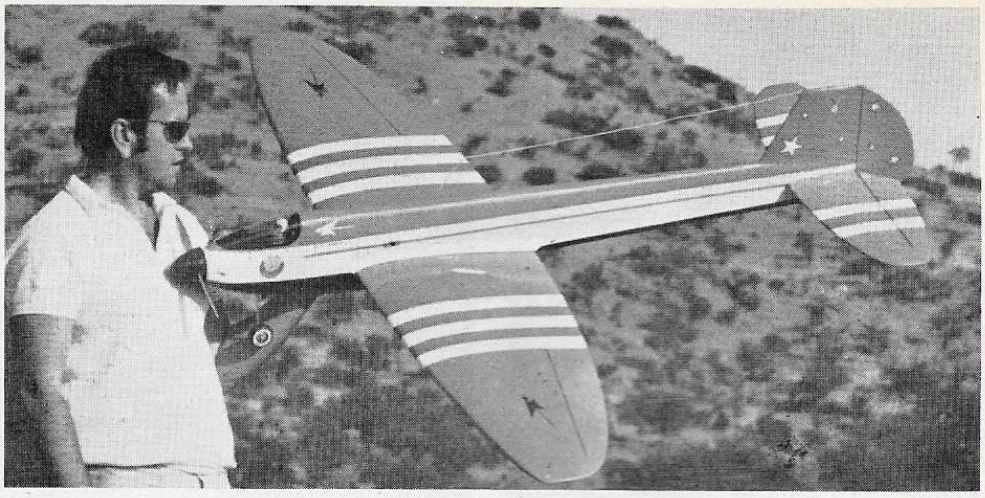


Check the CG by placing the model atop a trophy. . .no, check the CG, then go out and get a trophy.

RIGHT: The author admires the elongated fuselage profile of his winning design.

BELOW: A trio of arrows. The one in the background has the original wing from one of the earliest prototypes.





mountings before applying the bottom sheeting. Complete as much as possible, and allow everything to dry thoroughly before lifting the wing from the building board. Turn the wing over and fit the locating dowels, hold-down screw reinforcements, aileron and retract mechanisms, hinge blocks, etc. Then complete the top sheeting. Trim off the excess LE material, cut out the ailerons, fit the wing tip blocks and sand to shape.

Now that the difficult part of the model is completed, the remainder is totally standard construction. Here are a few notes on some of the details.

To avoid compound curves, the fuselage is rather narrow—so plan ahead for the radio installation, and there should not be any difficulty.

Due to the size of the model, transport over long distances may present a problem, which the removable stab and rudder take care of.

Fin and stab constructions may be varied to suit individual tastes. The method shown is quick, accurate and light.

Keep gaps at the hinge lines to a minimum. Either sloppy or too stiff control movements are both taboo. Build light—ballast can always be added if desired, and watch out for excessive weight build-up when applying that concours finish to the large flying surfaces.

FLYING

All the Novi Arrows built to date (at least six) have come out under eight lb., fully equipped, and they all fly like a dream. Trimming on the first flights has always been within the transmitter trim range. This is a graceful flying machine, so don't jerk it around the sky. Develop a flowing style of flying, which is not only easy on the nerves, but pleasing to the eye.

Contest successes for the Novi Arrow include a third at the 1972 South African Nationals, a first at the team trials, a first at the 1973 South African Nationals, and a spot on the team to represent South Africa at the World Champs in Gorizia. This last effort, at Gorizia, was dogged by engine problems, which prevented the true potential of Novi Arrow from being demonstrated.