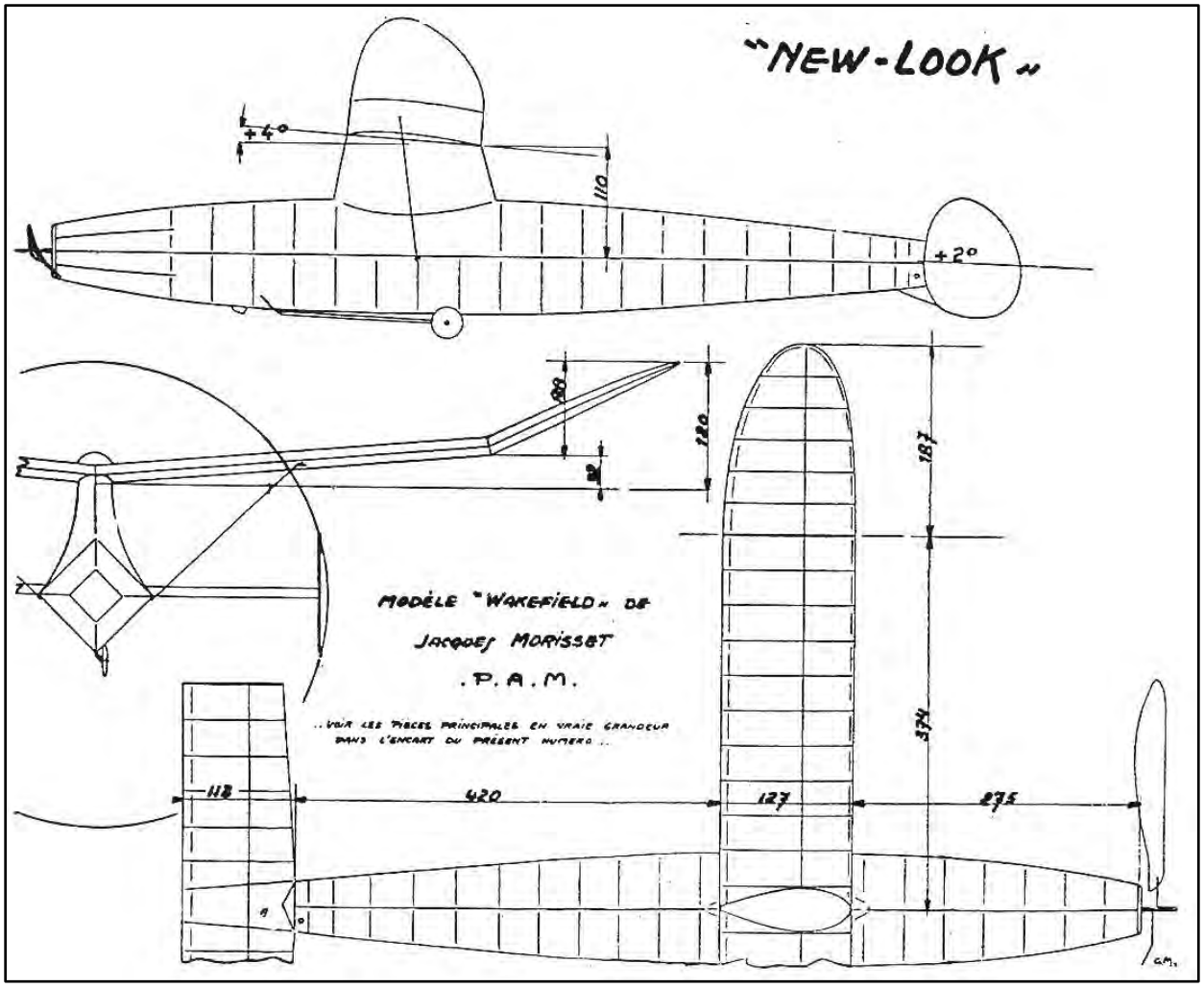
Jacques Morisset's "New Look I" - Vintage Wakefield.



"New Look 0" was built, flown and lost at Easter '48 Team trials. It had an inverted vee tail. "New Look I" was built with the following ideas. High motor weight of 120 g, hence a long fuselage to keep the motor section down to 100 sq mm. An old rule said not to go past 50% increase over the nose to rear hook length, so this was fixed at 800 mm.

With nose and tail the overall length is then 1000 mm, which meant a 100 sq cm cross section. With a 71 x 71 mm square fuselage plus a 35 cm sq pylon and a 15 sq cm wing cover the cross section total is 100 sq cm, with a saving in covering area and cross member length of 30% over the fuselage proper.

This largely offset the extra weight of the pylon, especially since the cross members could be made thinner, being shorter or stronger for the same size which I chose to do. The friction drag is reduced 30% and the wing/fuselage interaction is lessened.

The wing was given a higher aspect ratio so as to have a large span to improve lateral stability against the torque of 100 sq mm of rubber. The airfoil was chosen and only mildly under-cambered since expected flight Cz was 1.0 to 1.1, at best Cz3/Cx2. Of course the leading edge strip (3 x 3 mm on angle) was left un-sanded and a slight flattening of the airfoil due to slightly too wide spar slots decreased the camber to just over 4% instead of the 4.7% intended (with a thickness of 5.5%). Yet “New Look 1” remains the slowest sinking speed Wakefield I have ever had. A fairly high polyhedral proved a sound choice in view of the high torque.

The tail has two tip-fins plus a lower central one, the bottom of the three being in the same plane to allow the model to stand on them and the take-off leg. Only the right fin is removable, the other having to withstand the torque at take-off. The airfoil is thin and under-cambered. Camber was thought necessary to raise the spar for a sufficient rigidity combined with a low L.E and T.E. Camber also raises the slope of the lift curve hence stability is better. Twin fins also help to give the tailplane a high efficiency.

With a high wing, these combinations allow a rear C.o. G. of 85%, a lifting stab to prevent nose-up during the power run, causing a fast climb at low angle and lastly, the rear C.o.G. prevents having to move the wing back too much. Even then the safety margin at 85% remains adequate.

The airscrew is a single bladed folder of diameter 461 mm, 61 mm blade width and 545 mm pitch (P/D = 1.21) giving at 70% radius, an angle of 28 deg (triangle of 100 mm base and 53.2 mm height). It is carved from a 44 x 50 mm block. The airfoil is slightly under-cambered. It runs fairly fast (700 turns in 55 seconds approximately) but the model climbs to the end of the run.

The model was built as light as possible and when new it weighed 124 g plus 120 g motor. Now it weights 145 g plus 125 g motor. Performance did not really improve with the 21 g overweight, of course, due to repairs, lubricant and for at least half of it, an unnecessary coat of undiluted banana oil which did render it quite waterproof for a 10 g penalty – not again!

At the normal 244 g weight, the relative pitch could be increased slightly to 1.3 (30 deg pitch, 587 mm) to give an improvement of maybe 30 secs. Presently, wound to 800 turns, a 60 sec motor run yield a 120 sec glide, giving “on order” a flight time of 180 secs which is very little influenced by the weather due to the fast rate of climb.

Because of the 4 deg wing angle and 2 deg tail angle and the rearward C.o.G., no down-thrust is required. The model tends to fly slightly right naturally due to the twin fins so that a little bit of right fin is used in conjunction with 0.5 to 1 deg left thrust so as not to spin in to the right.

The climb is then almost straight or very slightly to the right. The model, even in high winds, can climb into the wind without problems. In no wind condition, the model takes off instantly, but required one or two seconds to get up to speed and stays close to the ground. Mind the grass or onlookers!

Maximum turns with an 85% safety margin on 120 g of 1200 mm length are 1020. Taking into account the 130 pre-wind turns (100 – 110 for a new motor), i.e. 65 turns on the full motor cross section, max turns is then 1020 – 65 = 955 turns. In practice, 850 is a practical limit, perhaps 900 with a well used motor. To give an idea, I use 8 strands of 1/4 x 1mm or 10 strands 1/4" x 1/32" pre-wound then folded in two for 16 or 20 strands on the complete motor.

Jacques Morisset (translation from "Le Modele Reduit d'Avion" #134 May '50 by J.M.Piednoir)

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