Amazing "Hydroski-Foil" Air Boat...it's fast, fast, fast!

- When the countdown reaches zero for this hydroski-foil air boat, one push unleashes a 3/4 hp booster engine which jumps the boat up on damp-air with vapor-trail speeds! The design proved "A-O.K." over half-foot waves, on land using wheel attachment, across ice using runner attachments—with tether line, free-running, and radio control as well. Most people who have witnessed "damp-air flights" of the ski-foil air boat were quite inquisitive.

Several years ago an article I read about the U.S. Navy's hydrofoil boats spurred me into constructing a conventional "foil model. Performance tests of my surface-piercing hydrofoil air boat revealed two problems: airborne stability and control. Hydrofoils which support a model hull an inch or two above water require perfect angular adjustment to prevent surface diving or air seepage along wings which results in loss of hydrofoil lift.

Remember, a hydrofoil (similar to an airplane wing) produces tremendous lift as it speeds along submerged in water. This is accomplished by a partial separation of water over the top of the curved hydrofoil. With water pressure underneath the "wing" and a partial vacuum above, tremendous lift is achieved.

All hydrofoils require some means of adjustment for regulating their running depth in rough and in smooth water. On large Navy or pleasure boats hydrofoil depth is controlled by patented electronic or mechanical devices, but model hydrofoil boats are extremely tricky to control by any means because of their small size and water conditions. After making several wood and aluminum hydrofoils, I combined the hydrofoil and the water ski. Result: exceptional versatility and performance.

Operating a hydroski-foil air boat successfully can be done most easily by the following means: First, adjust forward ski-foils anywhere, between 14° to 16° angle of attack on water and the stern ski-foil between 3° and 6°. Second, pivot the stern ski-foil straight ahead as you would a rudder. Clip your tether line leads on the stern and forward strut and start engine. Hold boat slightly in the water and give it a 2 or 3-mph push. Under its own power the hydrofoil sections will raise the hull clear of the water at 6-mph; as speed increases to 15-mph, the hydrofoil sections break clear of the water also. The high angle of attack and speed now permit the hydroski sections to support your craft for high-speed skip-planing at approximately 1 3/4 " above water.

Hydrofoil/ski (left) is made from 1/16" soft aluminum. Angle adjustment and fin attachment is set for free running.
The foregoing description applies for relatively calm water conditions. By dropping the inclined stern ski-foil to a horizontal position, the boat will scoot over waves 6" to 1 foot high in open water, depending on engine size. The stern ski-foil submerges itself about 1/2" under the surface, which stabilizes the boat, causing it to follow the wave contours in rough water at 15 to 20-mph.

Attachments for expanding the versatility of the hydroski-foil boat include fins for free running in any predetermined direction, wheels for parking lots, and ice runners for frozen lakes and ponds. These attachments can be added in a matter of minutes for year-round operation. It is also possible to adjust steering and speed by radio control.

Advantages of a hydroski-foil air boat include excellent stability, control, versatility and a broad engine selection from a .049 to a McCoy 29 engine on the same craft! As to the vapor trail speed mentioned earlier, you can expect over 25-mph from an .049 Thimble-Drome engine with a copy of my 1-1/4 pound boat (which could be made much lighter for racing competition). With a McCoy 29 engine tests indicate unusually high speeds—between 55 and 88-mph. Another advantage of a ski-foil air boat is bypassing floating debris by adjusting the ski-foils to the inclined position as outlined for smooth water use . . . the ski-foils climb up and ride over seaweed, leaves and small twigs.

Materials and specifications for construction include a solid balsa wood hull, 18" long, 2-7/8" beam, 1-5/16" high. The cross strut of Honduras mahogany, 16-1/4" x 1-1/2" x 1/4", is mounted at an 8° negative angle to prevent model from taking off at high speed.

The engine stand can be 1/4" plywood or 1/16" aluminum reinforced with stainless steel at stress points to conform with the engine assembly. All three hydrofoils are 1/16" soft aluminum 3-5/8" long by 5-1/8" wide. Skis are 1" wide and must be stiffened lengthwise by riveting or other means to prevent metal fatigue. All hydrofoils measure approximately 13/16" wide. Angle of attack for the bow ski-foils may be permanently assembled between 14° to 16°. The stern ski-foil must be pivotable for steering and also vertically adjustable for angles from zero to 6°. Other construction details are indicated by the photographs. For propeller clearance above the hull, I suggest mounting an .049 engine high enough to swing a 6-3 prop and an 8-8 prop for a McCoy 29 engine.

This development started several years ago during my junior year at Millersville State College, Pennsylvania, while majoring in Industrial Arts education. Hours of research were required to pioneer and perfect the hydroski-foil concept. I built and operated 7 different models using 15 ski and foil combinations powered by 5 different engines. Two models plus U.S. patent copies of this invention have been studied by officials in the National Inventors Council, Office of Naval Research, and the Bureau of Ships.

If the reader is interested in obtaining model-size plastic or aluminum hydroski-foils, wheels and ice runners, send me a card expressing your thoughts. This will help decide the advisability of having the hydroski-foil boats mass produced by a toy and hobby manufacturer. Send your cards to: Harold E. Follett, c/o American Modeler, 420 Lexington Ave., New York 17, N.Y.
Ice runners (right) offer winter fun.

1/4" plywood or 1/16" aluminum-reinforced with stainless steel at stress points to conform with engine mounting.

Total weight must not exceed 1-1/4 lbs. with an .049 engine.

Hydrofoil sections support craft alone at high speed with very little wetted surface.

Hydrofoil wing sections give high lift at low speeds; they surface as speed increases.

NOTE: Wheels or ice runners may be mounted in place of ski-foils.

Stern ski-foil must pivot for steering and adjust vertically from 0° to 6°.

Bow ski-foils mounted at 14° to 16° angle of attack. Could be made adjustable between 11° to 16°.

Mahogany cross strut mounts at 6° negative angle to prevent "take-off" at high speed.

Mahogany steps glued to aluminum with plastic aluminum glue. These prevent surface-diving in rough water.