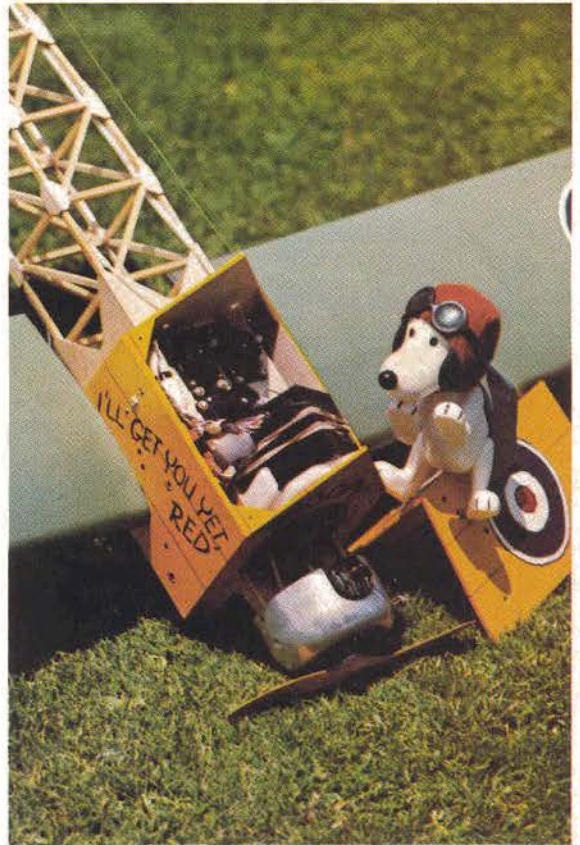


A Club Project
For Public
Demonstrations,
Or Just For
Fun

SNOOPY

BY NICKOLAS J. LINARDOS



A few years ago, my two sons and I had finished flying our free flight and "U" control models at Mile Square and decided to pack up and drive over to the Radio Control area to do some spectating. My kids went wild when they saw that someone had seated Snoopy in the cockpit of an "Antic" (Lou Proctor's kit) and lettered "Curse You, Red Baron" on the side. That's when I got carried away, and I told the boys it might be possible to build a flying doghouse with Snoopy sitting on it. The design would incorporate the lifting surfaces as part of the house, while also simulating as much as possible of the mythical Sopwith Camel used in the comic strip. Now we could fly their hero on his doghouse and associate it with the imaginary aircraft he flies in. Yet, it had to fly like a standard R/C aircraft. The boys were delighted but just couldn't believe it could be done. After we reached home we sketched for hours, and I finally convinced the boys it could be done.

I had an older Orbit proportional system and was approximately 50 percent finished with the construction of a slope soarer. I promised the boys that I would start the design of Snoopy's doghouse after the glider was flying. Early the next year, after many crashes and repairs, I finally earned my R/C wings on the sailplane and was promptly reminded of my promise to build Snoopy.

Design work on Snoopy began. After purchasing a plastic Snoopy doll, I sized the doghouse. It was difficult to retain the aspect ratio of the doghouse used in the comic strip and fit the radio gear within the doghouse envelope. Since the old radio equipment is somewhat larger and heavier than the present "state-of-the-art"

equipment, I slightly expanded the fore and aft dimensions of the doghouse to accommodate the avionics.

After a few sketches of the wing and tail planform, and an estimate of the weight of the finished model, it appeared that a .19 cubic inch engine would do the job. I purchased a McCoy R/C .19 engine so I could start the layout, and found that making accurate three-view drawings of all the airborne radio equipment was invaluable during the preliminary design period.

Now, I had another problem. My sons had sworn me to secrecy about this project. They knew I was a slow builder — and a big talker — and were concerned that someone else would beat us to the punch, especially if I started talking about it. I had a convenient place to work on the layout, but it was hardly secret. It was my drawing board at Northrop, where I am employed as an aeronautical engineer, and this was to be my lunchtime project. Every noon, when I unrolled the drawings, my gallery would come over for comments and general kibitzing. All my model building associates at work were aware of the Snoopy design program and, of course, I was becoming concerned that the project would leak out before I finished the design. If this did happen, I would be in the doghouse at home!

The airfoil selected was a Clark Y, modified to retain a flat forward lower surface for ease of fabrication. I referred to my Aircraft Profile publication on the Sopwith Camel to reproduce the tail surfaces and wing tip shape. The vertical and horizontal tail were built from 3/16" balsa sheet and the wing tips were formed from laminated 3/16" balsa strips shaped and rounded to fit the Clark Y modified airfoil. I believed that if I covered the trusswork fuselage, it would have the tendency to overpower the doghouse and obscure it, so I decided to leave the fuselage exposed and show all the detailed gussets and diagonal members for effect. The fuselage longerons and diagonals were all made from 3/16" square spruce, and all the gussets were 1/16" sheet balsa. The shear panels on the fuselage were made from 1/16" plywood. The wing hold-down and engine mount panel was made from 1/16" plywood. The upper fuselage shear panel was made from 1/16" plywood doubled with 1/8" plywood in the area of the servo mounting cutouts. The front face of the doghouse, the firewall, was made from 1/8" plywood, and when I bored the hole through the firewall for the fuel tank my wife thought I was building a bird house, not an airplane.

The engine was attached to the forward end of the 1/16" plywood engine mount and wing-attach platform with machine screws, lock washers and nut, then soldered in place. A 3/16" square spruce stiffener was glued directly under each engine mounting flange, terminating at the front face of the doghouse. These



stiffeners were required to add more rigidity to the engine mount platform.

The aluminum alloy engine cowl was purchased from a local model shop. The proper cutout was made to accept the engine cylinder head, and a hole was drilled on the left hand side for the needle valve adjustment screw. The cowl is secured to the engine mount platform by four small wood screws. A plastic bowl could also be used.

The propeller selected for the first flight was a 9/4, and was based on the engine manufacturer's recommendation.

The wing design is shown in detail on the plans. The wing is removable and secured to the wing hold-down platform with Tatone wing hold-down fittings and nylon screws. The main wing box carries through the doghouse and fuselage, and the wing aft of the main spar butts up against the side of the doghouse. Structural provisions have been made to allow the cantilevered portion of the wing to carry torque by using a plywood end rib and by sheeting the complete airfoil section at the inboard bay. The structure is defined thoroughly in the detailed drawings.

The item of most concern is the aerodynamic characteristics of the overhanging doghouse roof and, of course, "good old Snoopy" sitting on top, completely exposed to the airstream. It is obvious that the drag of these components will be substantial, although this is relatively minor when compared with the pitching moments caused by this drag. The geometry of this configuration led me to believe that, as the airplane speed increases, a nose-up pitching moment will occur and adequate elevator trim will have to be applied if this pitching problem develops.

The control system consists of three servos — rudder, elevator, and throttle control. R/C craft "snakes" were used for the control rods and secured to the fuselage longerons with monofilament fishing line and epoxy. The rudder area selected was somewhat larger than a more conventional airplane because the rudder effectiveness would be reduced due to the doghouse configuration directly in front of this control surface. The elevator area was also sized larger than that of a more conventional airplane in order to handle the predicted large pitching moments associated with Snoopy and the doghouse roof.

The roof of the doghouse is held in place by four flush machine screws. Snoopy is secured to the roof with epoxy and dowels through his bottom and feet. The peak of the roof is shaped to fit his bottom. Removal of the roof allows accessibility to the servos and receiver for maintenance and/or repair. The wing must be removed if access to the battery is required.

To ensure that the doghouse would stand out, Cub Yellow was selected for its color. Black was used for the doghouse entrance, lettering, and bullet holes. The board joints were drawn with a Rapidograph pen and India ink, then coated with clear dope. The roundel on the doghouse was purposely painted irregularly. The roundel is an RFC (Royal Flying Corps) WW I insignia and has a red center, white and blue band and is bordered by a thin band of white. The upper surface of the horizontal tail and wing were painted olive drab. The stock color olive drab was too dark, so I mixed about 25 percent white into it to produce the color desired. The vertical tail was also painted with this color, and the rudder was striped with red, white and blue. The lower surface of the wing and horizontal tail were painted off-white. By adding a portion of olive drab paint to the white, the desired color was obtained. The fuselage truss structure was left unpainted to simulate the natural color of spruce, and then coated with clear dope. The aluminum cowl was left unfinished.

Roll-out ceremonies were held on May 11th, and on May 30 the first flight was attempted. Many photographs had been taken to document the project in case "good old Snoopy" got shot down on the initial flight. My good friend and expert R/C pilot, Carl Weyl, had consented to try the first flight. The field was level hard dirt but with many ruts and soft spots. As I expected, after examining the field, Snoopy's little William Bros. vintage wheels couldn't hack it and, after two attempts we gave up and decided to fly it from an asphalt or concrete runway at a later date. The first flight attempts indicated that the landing

gear was too flexible; it developed a galloping action over the rough terrain. Although a smooth runway surface would probably eliminate this problem, I didn't want to risk having the galloping action occur again. A brace was added to the existing landing gear, picking up at the axle and extending aft into the lower fuselage longerons. This modification added ample stiffness to the landing gear and is incorporated into the detail design plans.

On June 25th the second test flight was attempted. Carl Weyl had asked Don Barton to take over the controls since Don had learned to fly on the same radio set as Snoopy's. This time we selected a fairly smooth asphalt strip for the runway.

This test confirmed my suspicion. The model was too heavy for 360 square inches of wing area and .19 cubic inches engine displacement. Snoopy started down the runway, raised his horizontal tail and reached a top speed of approximately 15 miles per hour but just wouldn't go any faster. Don did not want to risk applying up elevator; Snoopy would probably have stalled out and been damaged. The rudder was quite effective. Don kept Snoopy going straight down the runway finally throttling back after about a 75 yard run.

All of Snoopy's fans and my R/C model building associates were bound and determined to get Snoopy in the air. Carl Weyl loaned me his K & B .40 engine and it was installed in a couple of days. However, the engine and some minor fixes now increased the wing loading to a relatively high level. Don Barton got on the phone and helped alleviate the wing loading problem by obtaining the loan of a Kraft Systems Micro airborne system thanks to Chuck Hayes of Kraft Systems. The equipment consisted of three KPS-10 servos, a KB-4C 225 MAH battery pack and a KPR-4B receiver. Don and I installed the equipment in an evening and it was quite surprising to see how little room was required in the doghouse for the Kraft avionics. The total weight was now 3 pounds, 12 ounces, giving us a wing loading of 20 ounces per square foot.

Snoopy was now ready for his third attempt at flight. Thursday afternoon,

a few Snoopy fans met at the dirt field where we had attempted the first flight. I fired up the big .40 and, with Don Barton at the controls, Snoopy taxied down the hard packed runway. Don only used approximately three-quarters throttle and after about a 50-foot run, Snoopy was airborne. The bright yellow doghouse and Snoopy overpowered the rest of the plane, and Snoopy with his scarf streaming and his head turned toward the onlookers, appeared as if he was giving us the Raspberry! Don said that he had insufficient rudder control and showed me that the rudder stick on the transmitter was against the stop-at-full-travel. After barely completing a large left turn Don tried to line up on the runway with the engine throttled back and landed without a scratch. My boys were screaming, "He flew, he flew."

An analysis indicated that, when Snoopy became airborne, flying at angle of attack, the vertical tail and rudder were completely blanked out by the doghouse and the doll. The airstream separated and became turbulent around the doghouse and was not rejoining to flow smoothly over the vertical tail surfaces. This would reduce the dynamic pressure on the vertical tail surface and render the rudder almost useless. I had also noticed that the plane had oscillated from right to left continuously which further verified my analysis. The easiest fix was to enlarge the vertical tail and rudder surface.

Saturday we were ready to try again. Snoopy had a vertical tail and rudder approximately twice the size of the original one. Don Barton was at the controls again. The rudder control during take-off was great but when Snoopy became airborne, Don called out "no rudder control, same as last time." Don went to full throttle because he thought the reduced angle of attack with more power would reduce the airflow separation over the vertical tail surface. Apparently the increased engine torque rolled the model sharply to the left, causing Snoopy to lose flying speed and dropping steeply to the ground. The Red Baron won again, and this time Snoopy had sustained considerable damage. I now know that Snoopy needed ailerons to turn, and some lower fins for directional stability.

About a month later Snoopy was ready again. Don had purchased four KPS-10 servos, and returned the borrowed equipment to Kraft Systems. He also had a KB-4B battery

pack and KB-6B receiver. I had added the aileron servo and strip ailerons to the wing assembly and 2 vertical fins were mounted outboard on the lower surface of the horizontal tail, clearing the aerodynamic envelope of the doghouse.

Ron McGaffin and Russ Drake of Northrop Corporation convinced Jim Brown of CBS television's Channel 2 to come out and film Snoopy's next flight. I tried to get a Fokker DR1 to fly at the same filming but couldn't locate one in time for the filming appointment. Thanks to Paul Umrisek of the North American Eagles, he showed up the Saturday morning of the filming with an R/C monoplane all painted up bright red and with WW I German markings. Snoopy flew well. Don was making a low level pass by the T.V. camera and inadvertently hit the ground raising a cloud of dust. The effect was perfect; Snoopy was hardly hurt but nosed up in a typical crash position. Bill Halpin of the North American Eagles flew the Red Barons plane supplied by Paul Umrisek.

Jim Brown and the Channel 2 television crews artful film editing turned the event into a realistic "dog-fight" between Snoopy and his arch foe the Red Baron. The feature was aired that evening in the Big News ending with Jim Brown kneeling over the shot down Snoopy saying "Curse you, Red Baron" as Bill Halpin (the Red Baron) pulled a beautiful victory roll over Jim Brown and Snoopy.

If you want something different that will please the crowds and keep their attention at public R/C demonstrations, build something they can identify with ---

--- build Snoopy. It will be worth it. □

**From
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