

PIONEER II-D

(This was originally written as a part of a letter to Jim Gray, then Editor of RC Soaring Digest. It appeared in RCSD as an article.)

We flew our 1/4 scale Pioneer II-D in Richland Washington over the weekend and thought we'd drop a note to you letting you know of our success.

This was really an "un"contest - a fun fly. In fact, it was advertised as the "1988 National Mid-Columbia RC Soaring Scale Fun Fly and Soaring Social." It took place over three days, the 27th, 28th and 29th of May. The site was probably one of the best slope soaring sites in the United States, a hill with a face of about 40°, a height of several hundred feet and a length of over a mile.

It rained Saturday, but Friday and Sunday were great days for flying the ridge lift, with a wind speed of about 25mph across the lip of the ridge both of those days. The air was fairly turbulent against the hill, but even 50 feet out the air was very smooth with tremendous lift at all times. When the wind slowed down at all it was because of the large amount of air backfilling a thermal. Visibility from this site is 30 miles to the horizon, and three major thermal streets were visible at all times on Friday. The wind blew steady all day Sunday.

Sixty plus fliers had entered over 100 sailplane and "power scale" (F-16, P-51, F-111, Mirage, "Dago Red", etc.) models. Most of the sailplanes were constructed from kits produced in Germany - fuselage of fiberglass, wings of foam with a covering of balsa, obechi, plywood or fiberglass. Models included ASKs, a Twin Acro, DG-400, Sisu, Discus, Schweitzer 1-26, etc. The power scale ships were primarily of foam, with a fiberglass and epoxy covering. Erich Eike, of Canada, had a beautiful German primary glider, complete with pilot, and covered with an antique white fabric, and a Reiher. The primary and our Pioneer II-D were just about the only rib and fabric structures at the meet, and the only ones to fly.

Our Pioneer II-D was flown in the "blueprint" configuration, without the modifications of John Irwin's N86TX (which will be added as soon as possible). We tried to get acrylic to conform to our canopy mold, but without success, so \$13 in materials later we decided to cover the mold in plastic wrap and just get the shape in fiberglass and epoxy. Several people with molding experience talked to us at the meet and we'll soon have a clear canopy so our future instrument panel and pilot show. We had the fiberglass seat done already, and it was a simple matter to wrap the receiver in foam and seat belt it in place with a strip of velcro.

On the Wednesday before the meet we finally had some decent weather here in western Washington and we took her out for a test glide at the Little League field. With just a bit more weight in the nose she was flying fast and straight from a hand launch.

In Richland on Friday we were a pretty anxious pair. Wind at 22 to 28 mph, first soaring flight, etc., etc. Since we had built the whole airplane together, Bill's half was forced to follow Bunny's half when she decided to fly it. We straightened out a few minor problems and were ready. Many people had inquired as to whether a "real" Pioneer II-D actually exists, if our model was an assembled kit, if it had flown before, and just how scale it really was. We were able to tell them about N86TX which was (hopefully) being flown this same weekend, that our model is certainly was not a kit, that we had three hand launched glides on her (only the last being a true success), and that it was indeed scale, airfoil and all. Bunny had constructed the rudder single handed and it's a work of art which a lot of people appreciated - the 1/64" plywood gusseting and 1/32" plywood cap strips can be seen through our still clear covering.

Mike Bamberg, a member of the Portland (Oregon) Area Sailplane Society was drafted into launching her in front of an audience of about 100. Probably half felt she wouldn't fly at all, predicting she would just tumble through the air into the gravel "like all flying wings"; the other half were hoping we had done everything right and she would fly

at least well enough to land again in one piece. Mike aimed her down at about a 20° angle, an effective angle of attack of zero, and pushed her gently into the air. She continued down for a few feet and then rotated into a beautiful climb - a maneuver which was met with a genuine cheer from everyone in the crowd.



Mike's a good coach, and he soon had us exploring the flight envelope with gentle turns, attempted stalls, tight turns with full up elevator and later with crossed controls. We tried the airbrakes, too. She simply dropped her nose and slowed down, maintaining altitude. Mike flew her for a while, of course, and he remarked she was a very smooth flying machine. He did a couple of big graceful loops and a nice gentle roll, too!



This site has a gentle roll at the top with a slightly angled grassy landing area behind. There is no rotor and just a bit of turbulence during the last few feet before touching down. Use of the airbrakes was not necessary as her flying speed was just a bit faster than the wind velocity over the crest of the hill, and she settled right in with no problem.

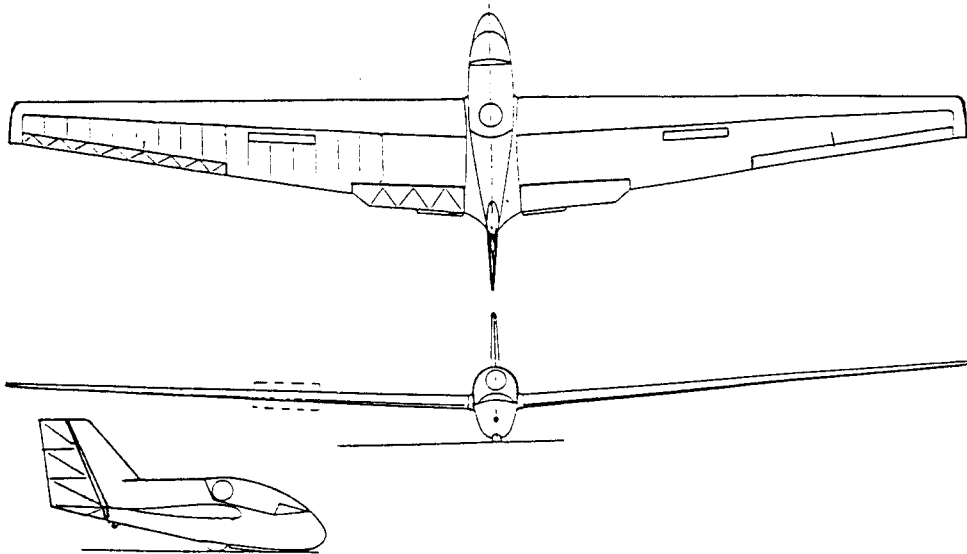
The second flight on Friday was relatively anticlimactic following that initial performance, but more and more people came over for a closer look after each of the two flights. Now they asked about fuselage molds, airfoil templates, and construction plans. It was amazing.

Our third flight was on Sunday afternoon. Many people had arrived on Saturday and so had not seen the Pioneer fly previously. We were again inundated with questions both before and after our flight.

Our Pioneer flies just like it's full size. Turns can be made flat and gentle, or can be very steep and tight. Use of up elevator in a banked turn not only makes it tighter but the airplane accelerates noticeably. The nose doesn't drop below the horizon in a stall, it just comes down a bit and the airplane immediately starts flying faster. Full up elevator in a combination of slope and



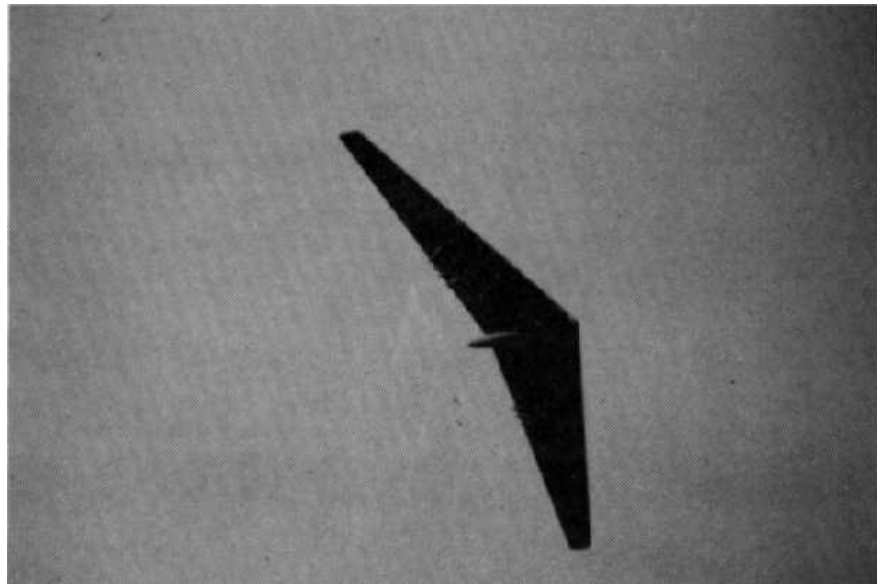
thermal lift makes for an interesting experience. The nose goes up to about 20° and she lifts straight up. After a while the nose comes down, but if you're still holding full back it just rises again and the whole airplane goes straight up again. We climbed over 800 feet in four "steps" this way and stopped only because the thermal we were in got stronger with each step and we were unsure of getting her down if the thermal became more intense. With just a small amount of down elevator she can move extremely fast.



WINGSPAN	42.6 ft
ASPECT RATIO	12.6
WING AREA	144 sq ft
PAYLOAD	240 lbs
EMPTY WEIGHT	350 lbs
GROSS WEIGHT	630 lbs
WING LOADING	4.4 psf

L/D max	35 @ 60mph
MIN SINK	2.3fps @ 45mph
2 mps SINK @ ..	97 mph

There were three flying wings at the meet - our Pioneer II-D, a foam and fiberglass (sort of a) Horten IX of 12 foot span, and a true to scale 14 foot span Northrop YB-49, constructed of foam and fiberglass with fences and fins of lite-ply. It used the same airfoils as the original (NACA 65₁3-019 and 65₁3-018), and the same wing twist (4°), but the only controls were elevons - no flaps or drag rudders. The Horten was launched twice and just did not do well at all; a controlled crash and a noncontrolled crash, probably due to a combination of interference, being tail heavy, and suffering from tip stall. The YB-49 had an abortive first flight due to being launched straight out. It stalled and fell, suffering some minor damage. The launch for the second attempt was great (three people and the nose down). It rotated just like the Pioneer and was off. It looked to be flying at about scale speed, but there were a couple of really close passes for the cameras which were unbelievably fast. The turns were graceful and wide, and the whole flight could have been scenes from a late fifties sci-fi flick. This airplane flew just once, but definitely "stole the show".



One thing which impressed us was that the failure of the Horten was nearly disregarded, and the flight of the YB-49 and the three flights of our Pioneer II-D turned a lot of people on to flying wings! They were at first curious, then intrigued, and then genuinely interested. We saw a number of people there become converts. In three flights our Pioneer was flown by both of us, Mike Bamburg, Alan Halleck (the builder of the Horten), and Wil Byers (contest director). Wil has extensive slope experience, he lives just a couple miles from this site, but he had never flown a 'wing before! He said, "This things flies like it has a tail! It's really smooth. This is great!" Alan has designed and flown several flying wings for aerobatics and racing; he commented on how well she flew also. We're wondering how the flight characteristics will improve once all of the hinge gaps are sealed. We've got releasable tow hooks mounted under the wings, so our next flights may be off the winch.

It is unfortunate you couldn't be there in person, as the entire weekend was a great experience. By unanimous vote of those in attendance, there will be a repeat next year over the same weekend. Perhaps you will have better luck in attending next year's event.

(Yes, Jim did make it to the event in 1989!)



J.P Chevalier's full sized Pioneer II in flight.