

## A licensed 15-meter sailplane is not unusual— except when it costs less than \$10,000

by DON DOWNIE / AOPA 188441

■ ■ Now there is another licensed sailplane production line in the United States. The latest entry is the 15-meter J-4 Javelin, FAA certified and now in volume production by Poly Industries, Inc., of Ontario, Calif.

The J-4 is the least expensive production sailplane on the market—\$8,975 will bring you a standard-equipped Javelin complete with basic flight instruments. The instrument panel contains airspeed, sensitive altimeter, compass and a sensitive Ball variometer (vertical speed). The panel is quickly removable either for maintenance or to take expensive instruments and radios home while the sailplane is tied down or stored on its trailer at the airport.

The new J-4 represents a series of compromises that produced a high-performance sailplane with a glide ratio of better than 30:1. The speed range is from 41 to 120 mph. Originally dubbed the "Easy Do" project some eight years ago by designer Max Peterson, the "J-4" designation came about only because the original drawings were submitted on "J" sized engineering drafting paper. Soon the sailplane picked up the Javelin tag and it stuck.

I had the opportunity to be the first general aviation reporter to tangle with the new, sleek single-seater. There was a check-out, of course, in an archaic Schweizer 2-33 two-placer with Holiday Soaring's majordomo Allan Turner (AOPA 281703) supplying some much needed dual brush-up on two flights. Then came a soaring flight in a single-place Schweizer 1-26C, the closest thing to competition for the Javelin.

A low-time sailplane pilot, I've been practicing sailplane techniques all my flying life, nursing low-powered trainers and "tired" four-placers over the Rockies, Sierra Nevadas and the Cascades of the West. When you can make the weather help rather than hinder you it's like having another 50 or 100 horsepower under the cowling.

It was a gusty, turbulent day at Holiday Haven Airport, Tehachapi, Calif., 90 miles north of Los Angeles. We intended to explore the area of lift that lingers downwind of Bear Mountain where the winds from Bakersfield and the San Joaquin Valley meet the desert winds of the Mojave.

Soaring here is a mixture of straight glides into a rising shear line, soaring the upwind side of a ridge, spiraling in desert thermals, or riding the record-

breaking elevator of the Sierra wave that is topped by distinctive lenticular clouds.

After two flights in the 2-33, Allen Turner of Turner Aviation suggested that I take up his higher-performance 1-26C, a single-seat Schweizer that has had the longest production run of any licensed sailplane in the U.S. Lift was good and we played with the weather for nearly an hour.

Then came the Javelin, all new and glistening with that subtle smell that comes with brand-new equipment. Designer Peterson and check pilot Turner consider the Javelin to be up to 50% more efficient than comparable sailplanes. They point out ease of assembly and disassembly estimating a quarter of the time required for this operation for the Javelin. There's ample baggage space and weight and balance problems are eased by locating the wheel on the center of gravity.

There are several unique features on the J-4. It has no ailerons, just two "spoilerons" mounted on the top surfaces, one toward each wing tip. The "spoilerons" do the job of ailerons but do not produce the adverse yaw common to almost all long-winged sailplanes. All three tail surfaces are full-flying, interchangeable and have anti-servo tabs to produce a control feel.

The canopy is a full five feet long. The cabin is 26 inches wide, has built-in arm rests and is very comfortable. The ship is designed for pilots up to 230 pounds.

I settled down in the cockpit and Turner helped me hook up the four-point-attach, airline-type harness with its twist-to-unlock central fastener.

We checked the tow release for proper action and Turner took a careful look at the 5/16-inch polypropylene tow line that showed signs of many a flight. He nodded approval. There are some mighty large rocks off the west end of the Holiday Soaring field and a right turn over more tolerable terrain is the order of the day.

The big canopy came closed and the two canopy latches were locked. It was a little lonesome but stimulating as we made a final cockpit check. The tow line uncoiled into a straight line and I waggled the rudder, indicating to the tow pilot that I was ready to go. Turner held the wingtip, though spring-mounted wingtip wheels make this operation unnecessary.

pilot flight check:

# JAVELIN J-4

The tug started to move and I applied a little back stick to get the skid off the ground. The "spoilerons" worked well, even at slow speeds. The Javelin will fly in ground effect between 50 and 55 mph. After first going up to about five feet to trim out the sailplane, it's up to the sailplane pilot to come back to one or two feet off the runway and give the tow plane a chance to struggle into the air.

The first 500 feet of the climb were quite challenging as we chased the towline through choppy turbulence that demanded almost full control to stay in a reasonable tow position. Above that altitude, it was easier to zero in with the target tug at a 12 o'clock low-tow position. From a field elevation of 4,220 feet we stayed on tow to 6,700 feet and released in what was hopefully an area of rising air. It didn't rise much, but I had a chance to feel out the J-4's flight characteristics.

The full-flying tail surfaces are sensitive enough to keep an expert happy during tight thermaling and prolonged fighting for the best lift. At the same time, it is a simple matter for a low-time soaring pilot like me to take advantage of the system and overcontrol the J-4. The Javelin takes such abuse with well-mannered tolerance.

Visibility was much better for me than in the 1-26 I'd just flown. At times on the high side of the tow in the older ship, I'd have to stretch my neck to keep the tow plane in sight. With the J-4



Javelin J-4 near Tehachapi, Calif. Latest 15-meter sailplane has better than 30:1 glide ratio, is now in volume production.

you'd be almost on top of the tug before losing him from sight.

The Javelin and I made a few passes back and forth across the shear line with little or no loss in altitude. It was a time to relax a little and take note of the slippery silence of the J-4. Nary a whistle could be heard that would denote drag. There was time to make turns and watch the "spoilerons" op-

erate. You can put your feet on the floor, away from the short-coupled rudder linkage that invites overcontrolling, and do a fairly coordinated turn with spoilerons only since the drag of the spoiler both drops the wing on the inside of the turn and slows it down.

There is a feeling of flying the spoilerons out of a center detent or slot because you must apply some stick force



Instrument panel of J-4 is removable for storage or security. Standard instruments include airspeed, altimeter, variometer and compass.

## JAVELIN J-4

Basic price \$8,975

### Specifications

Wing span	49 ft 2 in
Length	24 ft
Height	50 in
Wing area	126 sq ft
Wing loading	6.3 lb/sq ft
Passengers and crew	1
Empty weight	570 lb
Useful load	234 lb
Gross weight	804 lb
Baggage capacity	12 cu ft

### Performance

Maximum speed	120 mph
Maximum aero tow speed	86 mph
Minimum sink rate (53 mph)	2.8 fps
Sink rate (85 mph)	6 fps
Glide ratio	30:1
Lift/Drag ratio	32:1
Stall speed (clean)	43 mph
Stall speed (spoilers extended)	44 mph

to activate them. On the first hop or two, there is a consciousness of applying stick pressure, but this would seem to disappear after a few flights.

The cockpit was roomy and warm in the desert sun. There was no need for the light jacket I'd worn. Behind the seat is ample room for oxygen, barograph, and even a proposed jump seat for one of the youngsters to go along within the 230-pound crew-weight limitation. There are no plans to stretch the J-4 into a full two-place sailplane—designer Peterson said that this much stretch would call for a whole new design.

Efficiencies of the J-4 show up when you have time to soar and wring out the turns. Rate of roll from 45 degrees left to 45 degrees right bank is somewhere under six seconds. Rudder is effective for slipping approaches and there is no tendency for the full-flying tail to "nibble" or flutter. A three-quarter-inch steel tube is fastened inside the leading edge radius of each of the tail control surfaces for a counterweight while the servo tab, covering 10% of each surface, adds a built-in feel to the tail controls.

The trim tab for the elevator is a simple bungee spring adjusted by a window casement hand crank mounted on the face of the instrument panel. The action is left to right and I had anticipated a problem with this movement at 90 degrees to the reaction. However, in flight, trim changes were so slight that no problem developed.

Ventilation is through a scoop in the fiberglass nose and is controlled by two intake vents on the panel. Air exhausts out the rear of the tail cone. The only time the interior became too warm for me was when the big canopy was down and locked before the tow plane started moving.

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We explored the conventional flight regime as altitude allowed. Stalls were at an indicated 38 to 43 mph, depending on the rate of deceleration. Tight turns call for a definite nose-down spiral, hopefully in air that's rising faster than you're going down. Visibility is great with that king-sized canopy. Elevator forces are comfortably light and we shied away from the 120-mph red-line speed because of the turbulence.

There's an almost intangible difference in flight between conventional ailerons and spoilerons. You can make feet-on-the-floor "spoileron turns" that are almost completely coordinated. Conversely, a wings-level skid with the powerful rudder accelerates the advancing wing and requires some spoileron correction.

To come down in a hurry, you pull the spoiler handle at the left of the cockpit and two four-foot-by-four-inch spoilerons rise from the inboard section of the wings. These are independent of the spoilerons which act only to replace the ailerons. Rates of sink were compiled by designer Anderson and check pilot Turner since I didn't have enough altitude to spare to work with the spoilerons except on final approach.

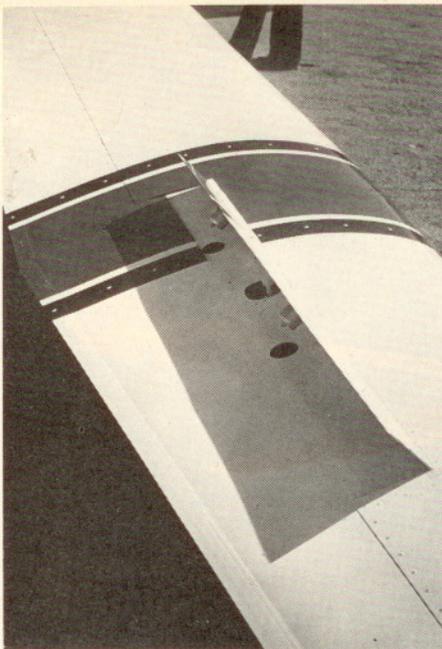
At 60 mph in calm air, the J-4 should drop 400 fpm with full spoilerons; at 70 mph, this should go to 700 fpm. A conventional slip with spoilerons hanging out is even more effective and you can really drop because aerodynamically, you have three spoilerons hanging out when you include the spoileron on the wing-down side of the slip.

Allan Turner has an "I.P." (initial entry point) whitewashed in a circle midway along his parallel runways. He wants an altitude of 800 feet agl (5,600 feet indicated) at that point. Then it's 400 feet at the middle of the base leg so that ample altitude remains to convert into an extended glide to make the field.

I slid toward the I.P. making terrific groundspeed downwind. With a gusty 25-knot wind on the ground, I planned my base leg quite close to the road crossing the end of the runways. I had 400 feet and a solid 75 mph indicated turning final and was obviously high. I pulled open full spoilerons. There was a subtle rumble of disturbed air and the J-4 sank rapidly toward the runway.

A tow was waiting to depart on the normal north runway, so we picked the center dirt strip just in case of an overshoot of the chalk lines at mid-field which indicate the starting point for tows. A sailplane, with its center-mounted landing wheel, is not designed for a stalled landing so there's no appreciable flare before touchdown.

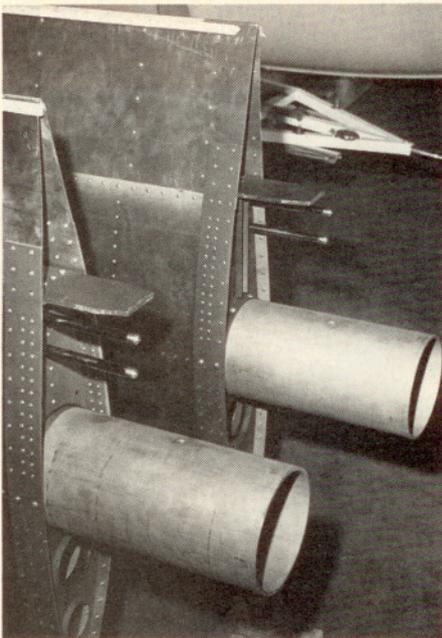
This is the point in the flight where it seems easiest to overcontrol and it would be possible to build up a P.I.O. (pilot induced oscillation) that could leave you 30 feet in the air with no flying speed. Thus, you land on the



J-4 has no ailerons, uses instead "spoilerons" mounted on top of wings. They do job of ailerons without producing adverse yaw.

single wheel at speeds substantially above stalling. We touched down indicating 70 mph, and when the seat of your pants is just 10 inches above the gravel, the impression of speed is vivid.

We landed with a substantial thump but the spoilerons kept us from rebounding. The brake for the main landing wheel is linked to the spoiler handle, so activation of full spoilerons also applies wheel drag. When it appeared that we would stop short of the mid-field opera-



Wings incorporate tubular main spars, and push-pull tubes for spoilerons that need no adjustment during assembly.

tions area, we eased off of the brake (and the spoilerons) and the J-4 promptly hopped right back into the air. Instinctive reapplication of spoiler and brake dropped us back on the gravel with considerable authority. My head hit the canopy just to remind me that it was there and I had to settle for rolling only part way toward the starting line.

During flight testing, emergency stops using full spoiler, full brake and forward stick on touchdown to force the steel-covered ash skid onto the runway for additional braking showed that the J-4 will come to a complete stop from a 52 mph touchdown in just 200 feet.

The size of the J-4 was dictated by the six-inch-diameter tubular wing spar, similar to that on the Grumman American lightplanes. A straight wing was used at first, but flight tests quickly proved that the resulting high drag was unacceptable and the wing was tapered beginning at two-thirds of the span.

There are three basic units to the fuselage; a 24-foot, canoe-type polyester fiberglass bottom section with a built-in ash stiffener below the cockpit area and sections of rigid polystyrene to provide more rigidity. The steel frame is made from one-inch square tubing for easy cut-and-fit joints. It included the truss that holds the landing wheel, wing and tail attach points with all controls right out in the open for easy fabrication. An aluminum sheet "turtle deck" completes the assembly and all three sections are riveted together.

When you buy a sailplane, you can expect to either purchase or build a trailer both for storage and for retrieving your bird when you don't land it at the home airport. A trailer for the J-4 has been designed for easy assembly and dismantling. The ship is mounted on the trailer with the rudder in place and elevators removed. A complete trailer lists for \$1,292, but prefab kits for welded or bolted assembly will be available shortly.

The J-4 can be fully assembled by two people in 10 to 15 minutes, except for a brief moment when a third person or a simple tripod is needed to hold the fuselage vertical while the wings are slipped into the center-section tubes.

All spoiler fittings are the breakaway type and require neither adjustment nor fastening. The small rear spar fits into a retainer in the center section while the main wing tubes are secured by a single shear pin and a safety pin fastener that handles all vertical loads.

Since competition is the name of the game, both on the production line and in the sky, it will be interesting to watch the acceptance of the J-4 into the field of motorless flight. With its 30:1-plus glide ratio this new, sleek sailplane is a fine compromise between 22:1 production trainers and exotic 45 or 50:1 competition sailplanes that can cost in excess of \$30,000.

Knowledge of soaring basics can make you a better powerplane pilot. The new Javelin represents one way to go. □