





# Sportplane for the Masses?

**Inexpensive building and fast, fun flying make the Rand-Robinson KR-1 a builder favorite.**

BY DON DOWNIE

**A**nother first for KITPLANES is this two-part builder survey. When we queried Rand-Robinson KR builders, we found a truly dedicated group of builders who really like to talk about their aircraft. Usually, we get something less than a 50% return on our mailed-out builder questionnaires. This time, we sent out 14 queries to KR builders and received 13 answers plus follow-up phone calls offering more information.

Almost all the builders made interesting modifications to the basic plans and we received far more material than in any previous survey. Rather than omit or shorten these replies, we elected to publish a two-part report.

The KR design has been around since 1972. More than 15,000 sets of plans and kits have been sold and some 1500 are now flying, according to Jeanette Rand, who has headed the Rand-

Robinson organization for the past 14 years. She took over the KR operation when her husband, Ken, was killed in a KR accident in 1979. She studied business administration in college and has raised three daughters while learning the kitplane business. She had a pair of veteran KR builders show her how to build a complete fuselage. This learning tool hung in the stockroom for years.

The prototype KR was completed and shown at Oshkosh two years before Rutan's VariEze was built. The KR was awarded the EAA's outstanding achievement award and was recognition for the best application of new materials for its use of foam along with a basic wooden structure.

We chose to report on the KR-1 builders plus one builder of a KR-1<sup>1/2</sup>

(stretched) design in this initial compilation. As performance and gross weight have increased, the original retractable landing gear has been stressed beyond expectations, and mechanical brakes have become marginal. Most KR builders are opting for the factory option of the fixed landing gear with Cleveland brakes and wheels—in some cases lifted directly from a Cessna 150. The fixed gear is reported to be as much as 3 mph faster than the retractable and was developed by the first builder to be interviewed.

**Richard Shirley**  
Seal Beach, California  
Fixed Gear Developer

Richard Shirley is a wind-tunnel model builder for Northrop's Advanced Systems. His KR-1 took 1200 hours

**Sam Bailey uses his KR-1 to fly a light aerobatic routine at regional airshows in central Kansas. He is now working on his second KR.**





and cost only \$1500 to build back in the mid 1980s. He started out with a \$500 investment in a damaged KR-1 that contained complete metal fittings and other usable components. The 49-year-old builder pioneered the fixed-gear version. Shirley admitted that his gear design was influenced by the RV-4 and constructed it out of 7025 T-6 aluminum. He also made his own wing design, a wing that was 2 feet longer than the plans and tapered from 4 feet at the root to 2 feet at the tips for speed.

In other modifications, Shirley widened the fuselage 6 inches, dropped the bottom of the fuselage 3 inches to cover hydraulics, modified the cowling, and added gear fairings. Using a homemade 2180-cc VW with a Great American 52/49 prop, he has a top speed of 215 mph and a climb of 1400 fpm. Takeoff roll is 1000 feet and landing roll is 600 feet.

Shirley wrote that his next project will be a modified Mustang II. However, the Mustang project may have to wait a bit. As this report was being prepared, Shirley's modified VW engine failed at 7000 feet over the north end of Lake Klamath in southern Oregon. Fortunately, Kevin Kelly was alongside Shirley in his KR-100 at the time. Kelly dropped down quickly, made sure that the gravel road Shirley had selected was adequate and reported back by radio.

"It was one of the best landings I've ever made," said Shirley. He rolled out into a farmer's front yard, was invited to dinner and then was driven to the Amtrak station after storing the KR-1 in the farmer's shed. His VW had a 9.5:1 compression ratio and was flown on 100 octane fuel. It had about 300 hours total time when the crankshaft failed. When he trailered the KR-1 back to southern California, Shirley was looking for either a Continental C-90 or 200.

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**Jim Evans' KR-1 is the only one with turbocharging found in our survey. He said that he had flown his plane at 22,000 feet and could have gone higher.**

**Jim Evans  
Lewiston, California  
Flying Higher and Faster**

Only one of the builders we contacted was flying with a turbocharged powerplant, and the performance of his plane is spectacular. "To my knowledge, no other KR has climbed higher or flown farther than mine," said Evans, a retired 69-year-old former Air Force fighter pilot who flew 60 missions in Europe during WW-II in P-47s and P-51s. He chose the KR-1 because the construction techniques and materials were similar to building a model airplane and required no special tools. He is using a Turbo Revmaster 2100D that he purchased new and reports that the RayJay turbocharger has not given him a minute's problem. With a constant-speed Maloff prop, Evans indicates 170 mph at 12,000 feet (over 200-mph true) on 4 gph. "At 12,000 feet, I can still pull 35 inches of manifold pressure and more than 3000 rpm. That's not bad at all for an airframe—less engine and prop—that cost only \$5000.

"I can get 45 inches of manifold pressure on takeoff, but I use only 30-35 inches so as not to overboost. I've climbed to 22,000 feet MSL with oxygen aboard and could have gone higher. I weigh 200 pounds and my plane is overweight too. I call my KR-1 the *Bondo Bomber* because I have dinged it so many times and used several pounds of Bondo to make repairs. I don't want to compete with other builders in the quality of workman-

ship, but I am very competitive in the area of performance," he said. "My KR-1 is flying and available to race any homebuilt with up to 150 hp."

With no qualms about basic airframe modifications, Evans said, "I added 1.5 feet to each wing and improved climb, glide ratio and speed. I installed 17-gallon fuel tanks in each wing, which, with the 5-gallon header tank, give me almost 40 gallons of fuel. The longest nonstop flight I have made was from Weaverville, California, to Chamberlin, South Dakota, in 8 hours and 40 minutes." While he admits that his aircraft is a bit crowded in the cockpit, Evans says he can carry a tent, sleeping bag, baggage for a trip and a camera bag in his KR-1. A mini tool kit is taped to an engine mount on these trips.

Evans is almost a first-time builder. Before starting his KR-1, he helped build a Pitts S-1 in his barn and later raced it at Reno. During the latter part of the KR project, he developed an allergic reaction to epoxy and suffered through it with the help of medicated cream. One of the building aids he depended on was to glue strips of sandpaper to a 6-foot length of aluminum extrusion and use this straight-edge to sand away the high spots.

With over 7000 flight hours and a certified flight instructor rating, Evans had some sage comments about the plane: "The KR-1 is not a plane for the neophyte or low-time pilot. Get some dual in a KR-2 with an experienced pilot, fly often enough to maintain pro-







Kenneth Cottle decided that the KR-1 wasn't exactly what he needed so he stretched the fuselage and made other modifications. He has designated his aircraft a KR-1<sup>1/2</sup>.

## KR BUILDERS

continued

iciency, and install hydraulic brakes."

For his next project, Evans wants to build an ultralight that he can fly out of his 900-foot meadow and store easily, perhaps a Kolb because of its folding-wing capability.

### Tom Bagnetto Wichita Falls, Texas Porsche-Powered Speedster

"The first flight in my KR-1 has to be the greatest thrill of them all," reported Tom Bagnetto. "Ken Rand, you did one hell of a job!"

Bagnetto, another ex-military pilot, is 47 and a stock broker. He has logged more than 4000 hours in everything from a 325,000-pound C-141 to his 550-pound (empty weight) KR-1. Bag-

netto chose the KR because of its attractive design, ease of construction, speed and cost. Prior to the KR-1, he helped on a Starduster project. Building the KR-1 took over 2000 hours, including the landing-gear conversion and hydraulic brakes. Total cost was less than \$10,000, which included very basic avionics. He uses a Bendix/King KX 99 radio transceiver strapped to his leg to communicate with air traffic control.

"It would be nice to have all the

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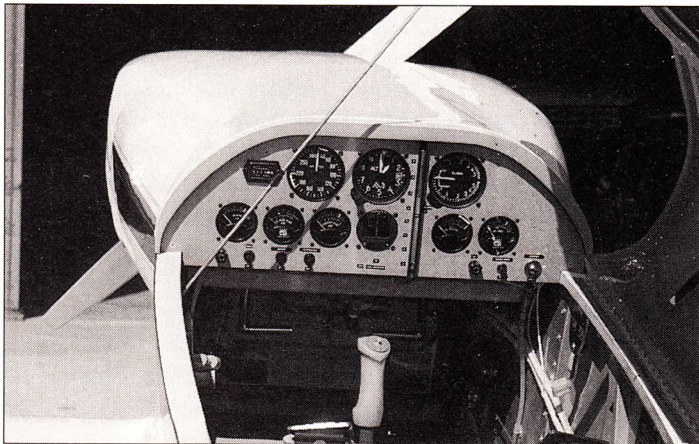
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Tom Bagnetto said that the most exciting moment of his flying life was the first flight in his homebuilt KR-1. The entire project cost less than \$10,000, including engine and basic avionics.



latest gadgets but, let's face it, Ken Rand designed a small sport plane," Bagnetto wrote. "All the high-tech stuff takes up space, weight and money."

Bagnetto reported excellent support from the factory. "Jeanette Rand always had time to answer questions, and if she didn't have the part or supplies I needed, she would put me in contact with several sources who did."

Bagnetto had not planned a larger engine when he started his project, but he added plywood sheeting in the fuselage forward of the main spar for added strength. When he saw a 2600-cc Porsche 914 Type Four engine advertised in a local newspaper for \$200, he made the purchase and sent the powerplant to Steve Bennett of Great Plains Aircraft Supply Co. for conversion. The engine was fitted with a Diehl Supercase, 20-amp alternator, engine-driven fuel pump and Force One hub. The larger engine required a new cowling because none of the pre-molded cowls would fit. As a result of these space limitations, his exhaust stacks stick straight out the cowling.

attachment and alignment...Whew!"

While making an engine test run before the aircraft was completed, the original retractable landing gear collapsed and the builder promptly purchased a fixed-gear kit and a new prop. A round-bottomed keyway to the forged crankshaft had been installed during engine assembly and saved the crankshaft from prop-strike damage when the gear failed. With the fixed gear, his prop clearance in level attitude is 9 inches compared with 6.5 inches with the original gear.

Bagnetto made his turtledeck with quarter-inch Clark foam glassed on one side, scored on the other, bent and glued to the foam formers above the longerons. When the glue cured, the turtledeck was severed from the fuselage and glassed inside, resulting in a strong, lightweight structure with a lot less dust generated than would have been caused by carving it out of foam planks as suggested in the plans. The canopy was constructed in the same manner.

This builder added auxiliary fuel

"The cowling was by far the most difficult task," he explained. "None of the prefab cowlings would fit so I had no choice. Shaping, glassing, installing hard points for

tanks in the wing roots and still came out with an empty weight of 550 pounds.

Bagnetto noted, "The guys and gals who really know about building airplanes might be impressed with your workmanship, but everybody is going to see the paint. I used Sherwin-Williams Akrylid—that's acrylic enamel. It's less toxic than Imron, has more pigment, costs a lot less and can be repaired easily when you pick up a ding. The formula is to mix eight parts paint, six parts reducer and one part hardener; it goes on easily and is dust free in 30 minutes."

Bagnetto uses a 56x60 Sterba prop—4 inches longer than the one that was destroyed. He said "The prop is a work of art. Even the box it was shipped in was pretty!"

Bagnetto reports a top speed of 215 mph and a rate of climb at 75 mph of 2750 fpm. Fuel consumption is 5.1 gph. The former military pilot noted that, "With the bigger engine, my KR-1 takes every bit of available rudder during takeoff—lots of torque—and it is not recommended for the novice. Aileron rolls and wingovers are the only aerobatics I have attempted so far. I haven't done any over-the-top maneuvers yet, mainly because the speed builds up like crazy when you put the nose down."

Bagnetto says that he will probably build a Glasair or Lancair next, but not right away. In the meantime, he says that calls, questions and comments about his KR project are always welcome. For more information about Bagnetto's project, contact him at 4817



# KR BUILDERS

continued

Reginald Dr. Wichita Falls, TX 76308; call 817/691-1902.

## **Sam Bailey Pratt, Kansas**

### **Aerobatics and Airshows.**

Now working on his second KR-1, Sam Bailey has built an enviable reputation with a light aerobatic routine at regional airshows in central Kansas. His routine includes four-point rolls, knife-edge flight and an inverted fly-by with 4-g loads. "That's about as much as my body can stand," said 63-year-old Bailey, who added, "My canopy can be released with one hand for a quick departure.

"I have built or remodeled everything from houses and cabins to boats, furniture and clocks, so I figured that building an airplane would be a great challenge but not much of a problem," said Bailey.

He has logged more than 4000 hours of flight time in the past 24 years. Bailey owns an auto parts and equipment sales business and chose the KR-1 because of its size, speed and responsiveness. "Basically, I would rather work with wood than metal. The most difficult job for me was the cowling that I made by hand. The airframe took 1200 hours and \$3000 to complete.

"Our single-car garage is heated and is just outside our kitchen window, which made it easy to work even 10 minutes at a time," he explained. "I would work on my plane instead of watching TV so I didn't feel that I was neglecting the family or friends.

His first KR-1 has the original retractable landing gear and is powered by a 1835-cc VW engine that Bailey and his brother built up. Length is 12.5 feet, span is 16.7 feet and empty weight is 449 pounds. The follow-on KR-1 will have a 2332-cc VW with a stroked crankshaft and a starter-alternator. The first KR has a top speed of 175 mph while Bailey expects to cruise at more than 200 mph with his next airplane. The newer airplane has tri-

cycle gear and a 3-inch prop extension. It will not have the blunt cowling found on most VW-powered planes.

In 1986, Bailey's first KR-1 was chosen for the Wright Brothers Invitational Award at Dayton for the best-built KR-1 in the nation. He is shooting for the same award on his second KR-1.

Bailey said that he has changed the angle of incidence on his second KR from 5° to 2.5° by raising the trailing edge of the wing 1.5 inches. The seat on the original was adapted from a Grumman Yankee that he owned for 18 years while the new one has an upholstered cushion on the floor, permitting a lower canopy. He reported that it was much easier to build the follow-on KR and that he is improving the streamlined fairings in the process. When the new KR-1 is flying and shaken down, Bailey is considering donating his first plane, now with 450 hours total time, to the EAA Museum in Oshkosh, Wisconsin. After flying airshows for five years, Bailey says that he will restrict his flights in the new KR-1 to his own pleasure.

## **Kenneth Cottle Columbia, Missouri The First KR-1½**

If a KR-1 is too small for your needs and a KR-2 is too big, what do you do? Why not build your own in-between version KR-1½? Kenneth Cottle started out with the original KR-1 plans and made the aircraft larger. Cottle's jumbo-size KR-1 was used in Dan Diehl's instructional video to demonstrate wing-skin installation and Diehl commented, "It's larger than a KR-1, but it isn't a KR-2, so it must be a KR-1½." The KR-1½ designation is on Cottle's FAA and insurance company paperwork.

Cottle, 57, chose to build a KR because it looked sporty, had good performance and could be built with minimal tools. "I knew I would be comfortable working with the materials required, and it used a VW engine, which was what I wanted," he said.

Cottle's extensive list of major modifications includes using a fixed landing gear from a two-place Sonerai. He also lengthened the fuselage 5 inches ahead of the main spar and 17.5

inches aft. He used premolded wing skins from Dan Diehl, shortened the wing center section to 4 feet and finished up with a span of 20.7 feet. He widened the cockpit area to 24 inches and maintained that width straight forward to the firewall. The canopy was modified from a Starlite, and a speed brake was added below the fuselage. Building time was 27 months, and total investment was around \$13,000.

Cottle is secretary/treasurer of a general contracting firm and a commercial pilot with more than 1000 hours of flight time. Cottle's other hobby is drag racing. Prior to building the KR-1½, Cottle had modified a VP-1 and flown it for 210 hours. Concerning builder support, Cottle said, "The good people like Dan Diehl, Steve Bennett (Great Plains Aircraft), Jeanette Rand and others always had time for me—time they didn't have to give, but did."

The original engine for his KR was an 1835-cc VW. After 120 hours of flight, this was upgraded to a 2180-cc unit from Great Plains that Cottle built using an Ellison throttle body injector with fuel pumps. The propeller is a 52x52 Sterba. Performance on the KR-1½ is slightly below specifications because of the many modifications.

Were he to do the project again, the Missouri builder would prepare a good place to work, keep it clean, make a schedule and work at it regularly. He would construct the new stretched version of the KR-2, buy all the premolded parts and stick strictly to the plans. "This way it could be completed faster and assure performance and safety," he said. "A good completed project is very rewarding."

## **Next Month**

As you can ascertain, no two KR-1s are the same. What about the two-place model KR-2? Look in next month's issue of KITPLANES and find out what these builders have to say. □

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*FOR MORE INFORMATION, contact Rand-Robinson Engineering, Inc., 15641 Product Lane, Ste. A5, Huntington Beach, CA 92649; call 714/898-3811.*