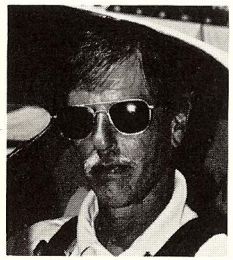
KIS

SPORT AIRCRAFT

TRI-R TECHNOLOGIES

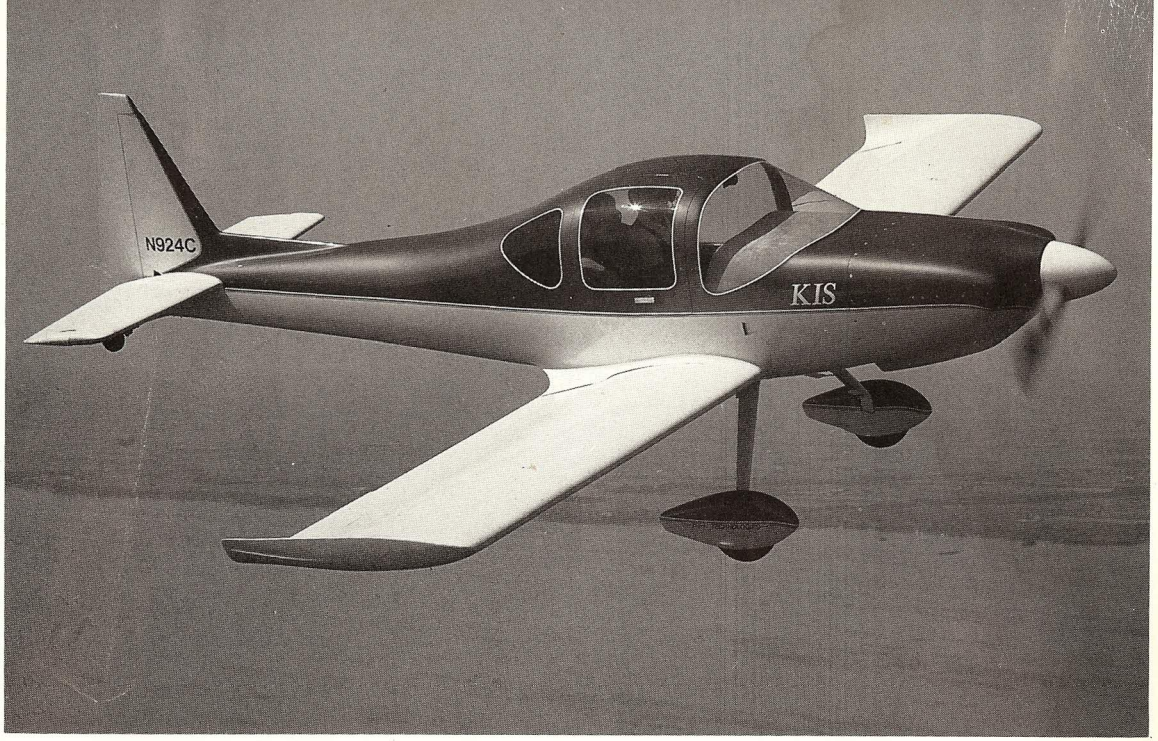


Rich Trickel

Having been a pilot since I was fifteen and a member of EAA since the mid-sixties, I have had the opportunity to see many changes in aviation. Starting High Tech Composites in 1984 allowed me to be a part of these changes and advancements.

I designed the KIS 2-place adding a niche to the homebuilt market. A versatile, aircraft that "builds up" in a fraction of the time that is required by other kits. Several different engines option make the KIS known for its great performance.

Subsequent to the development of the "2-place", I saw the need for larger sport aircraft. I chose a different approach, full of new ideas when developing the KIS Cruiser 4-place. The KIS Cruiser was created with the help of highly qualified engineers and composite technicians, resulting in a new class in 4-place kit built aircraft. The KIS Cruiser is a good performing, solid, stable airframe with a sizable, useful load that is economical to own and operate.



- **SIMPLE**
- **EFFEICENT**
- **AFFORDABLE**
- **2 & 4-PLACE**

Tri-R Technologies sport aircraft models are developed to make personal flying more accessible to pilots. KIS (KIS is an acronym for Keep It Simple) aircraft are designed to be built by the amateur builder utilizing simple assembly technics. Fixed landing gear, fixed prop and all high temperature premolded composite parts keep our aircraft simple saving on cost and build time. Designed for a variety of medium sized engines for there types offer a wide range of performance and realistic useful loads. KIS aircraft are Efficient easy to fly designs for comfortable local and cross country flying.

We have made assembly as easy as possible for the builder, while staying within the FAA's 51% Rule. KIS aircraft are suitable for experimental category certificate in the U.S.A. and similar amateur built programs through out the world.

KIS aircraft are a mile stone in personal flying. Tri-R Technologies offers an exciting alternative to what was previously available. Somewhere between the tight fitting, pricey, go fast only kit jobs and the highly over priced, ill performing and ageing factory iron, the value of a KIS stands out.

In modern aircraft design composites yield not only an extremely efficient, smooth surfaces but also stronger airframes that weigh less than most other types of aircraft construction. Assembly time of a KIS aircraft is greatly reduced taking into account the high state of completion in every kit. Special skills are not required to work with composites. It is easy to learn and work with.

KIS TR-1

TWO-PLACE

In the spring of 1991 Richard Trickel unveiled a new two-place homebuilt airplane. He called the aircraft KIS TR-1. It was his concept that the attractive composite aircraft should be simple to build, simple to fly, and affordable for the homebuilder.

With these ideas in mind Rich had elected to configure the prototype with a small engine (the 80 horsepower Germany type-approved Limbach), tricycle landing gear, and composite construction. However, from a design standpoint allowances were made for the later incorporation of larger engines and a tail wheel type landing gear for the more sophisticated pilots. The object is to offer the builder a configuration most suitable to his performance requirements and piloting ability.

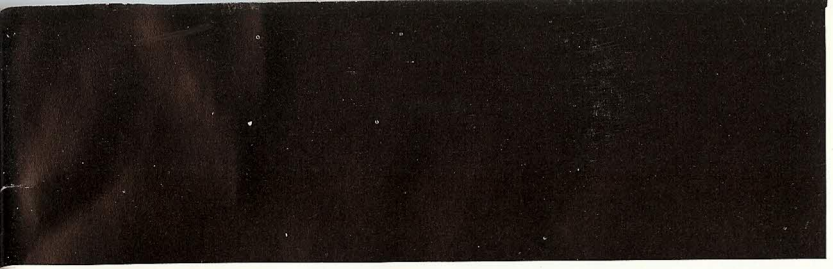
STRUCTURAL INTEGRITY

Engineering stress analysis of the KIS primary airframe structure was carried out by Aircraft Designs Incorporated and composite design expert Martin Hollmann. Strength requirements and design airspeeds (flight envelope) were calculated in accordance with selected paragraphs of FAR part 23.

The KIS primary structure meets the maneuver load factor for Utility Category aircraft. Its design limit service load factors are +4.4 and -2.2 g. (A factor of safety of 2 was applied to all calculations effecting the primary structure thereby giving +8.8 and -4.4g ultimate load factors.) Design weights (up to 1400 pounds gross) and design airspeed calculations reflected utilization of engines including the Continental 0-200, Continental I0-240 and the Lycoming 0-235 engines.

TEST AND EVALUATION

During its flight test period KIS was subjected to all anticipated service conditions. The envelope was slowly expanded until airspeed, weight, and center of gravity design limitations were reached or exceeded. Tests included dives to beyond redline to verify that the 100% balanced control system was flutter free. Data were gathered to assess performance of the Limbach-powered tricycle gear configured aircraft and to feed computer simulations being used for performance predictions for aircraft with alternative power and landing gear configurations.

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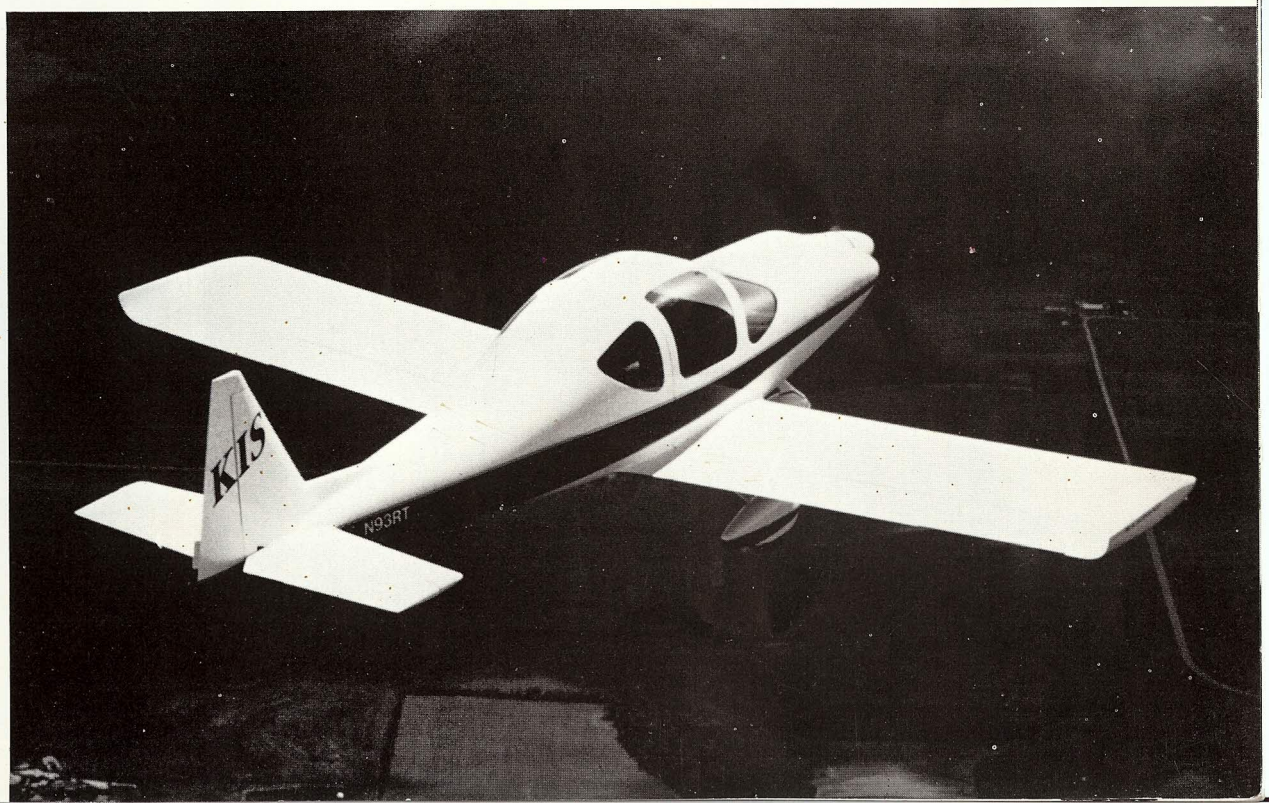
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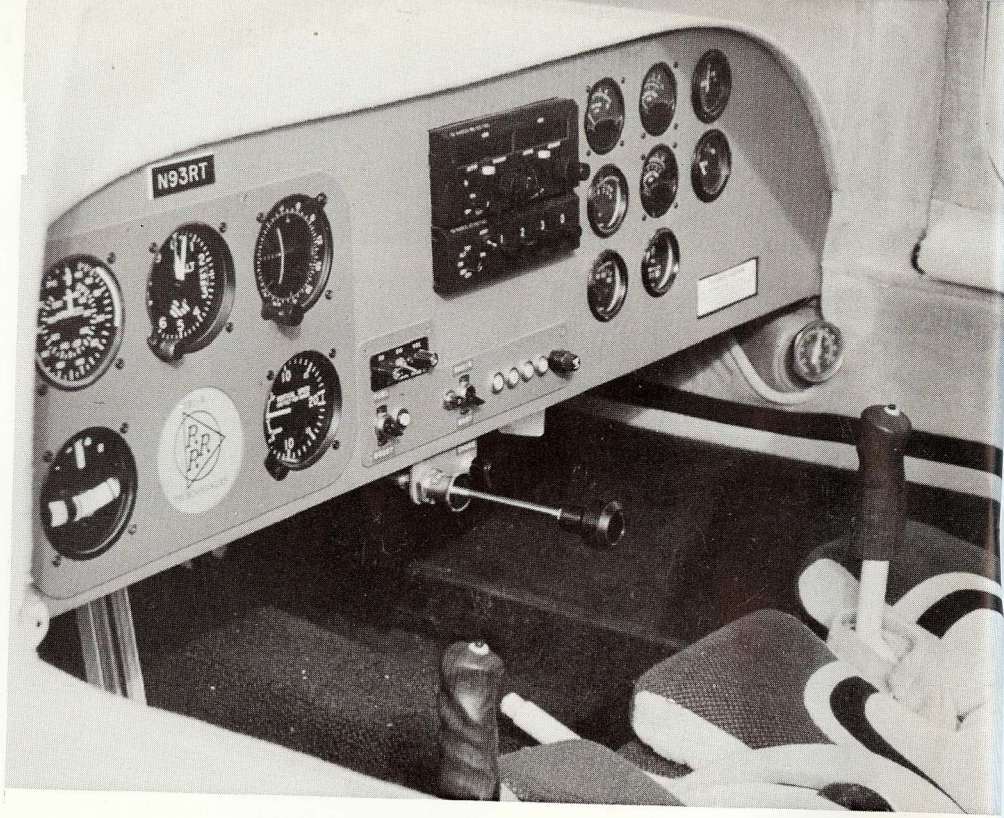
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EXPERIMENTAL

Few kit planes provide the prospective builder with the variety of production configuration alternatives available in the KIS. The object is to offer the builder a configuration most suitable to his performance requirements and piloting ability.

LANDING GEAR

Kits are available in either TR-1 tricycle landing gear or TR-1C tail wheel configuration. Both use a rugged, one-piece aluminum alloy main gear and full size 5:00 x 5 main wheels and tires with standard Matco brakes to facilitate unpaved field operations at maximum gross weights. Tricycle gear nose strut assembly consists of steel fabricated construction and the nose wheel is free-castering. During ground taxi, either configuration directional control can be maintained by differential toe braking

Kits for the tail wheel configuration (TR-1C) include a rugged full-swivel aircraft tail wheel assembly and matching tire in lieu of the nose strut assembly and tire. Wheel fairings are available for either configuration as a kit add-on option.

ENGINE OPTIONS

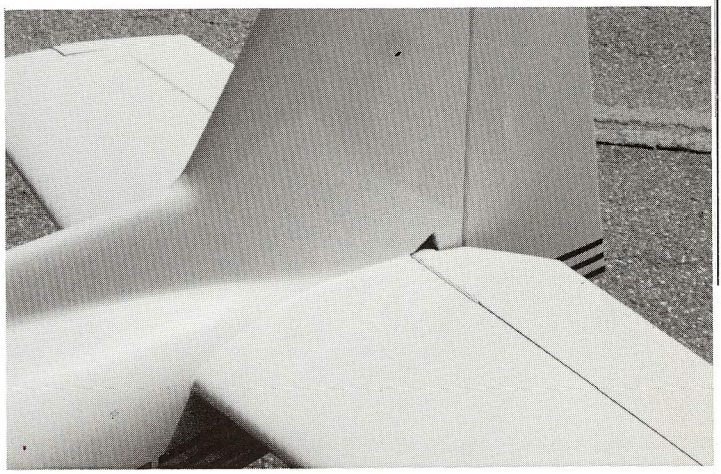
Recommended engines include the Limbach 2000 (80 hp) or 2400 (92 hp), the Continental 0-200 (100 hp) or recently introduced I0-240 (120 hp), and the Lycoming 0-235 (118 hp). Other engines of similar weights and power may be suitable for use in the aircraft. Tri-R Technologies has engineered installations for the recommended engines but is unable to provide details of all possible engine choices. KIS TR-1 aircraft are flying with many different engines.

Engine Possiblities

CAM 100	
Continental	C-85
	C-90
	0-200
	I0-240
Frankin	235
Limbach	L2000
Lycoming	0-235
	0-290
Mosler	80 hp
Subaru	135 hp

Factory new engines for the KIS TR-1/1C (Limbach, Continental and Lycoming) can be purchased directly from Tri-R Technologies. These engines will be offered to kit buyers at large savings. Good sources of used and rebuilt engines are rebuild facilities and published advertisements in aviation magazines and periodicals. *Trade-A-Plane* is an excellent source of ads.

Engine mounts for several different installations are available from Tri-R Technologies as an option. Please see the options list on the inside back cover.

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KIS TR-1 PERFORMANCE

KIS performance capabilities are a function of many variables such as engine size, landing gear configuration, and propeller specification. Three series of computer generated performance curves are pictured for the reader's perusal. The first series contains power required versus power available curves. These show top speeds for the aerodynamically unclean configuration (tri-gear/no wheel fairings) and the cleanest configuration (taildragger with fairings). The second and third series of curves show climb performance for the Limbach-powered aircraft and the Lycoming-powered aircraft. Performance of other configurations can be extrapolated based on the curves presented.

Also included in the rate-of climb curves are fuel economy in miles per gallon versus airspeed. It may be seen that the Limbach powered unfaired tri-gear version peaks at about 38 mpg (at 90 mph). The Lycoming powered tail-dragger with wheel fairings is clean enough to show 45 mpg (at 95 mph). The fuel economy at more realistic cruise speeds can be determined from the same curves.

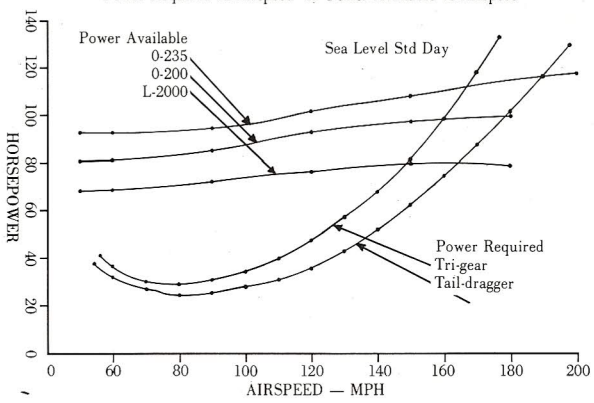
Builders who wish to transition from a Cessna 152 class trainer to a docile sport aircraft may wish to select the prototype configuration (i.e. Limbach-power tricycle gear). This will be easy to fly but provide almost half again the speed at far less fuel consumption. In fact, the prototype aircraft (tricycle/80 hp Limbach/no wheel fairings) demonstrated a top airspeed of 150 mph at sea level. Wheel fairings should improve that speed by about 10 mph. With 525 pounds of fuel and occupants its sea level rate of climb is about 600 fpm. Solo climb rate is about 900 fpm.

For the more adventuresome pilot who is able to handle the tail gear, the tail wheel configured airframe with optional wheel fairings and Continental 0-200 may be applicable. As seen in the curves, such a builder may expect a top speed of almost 180 mph. Solo climb rate will be about 1300 fpm at SSLC.

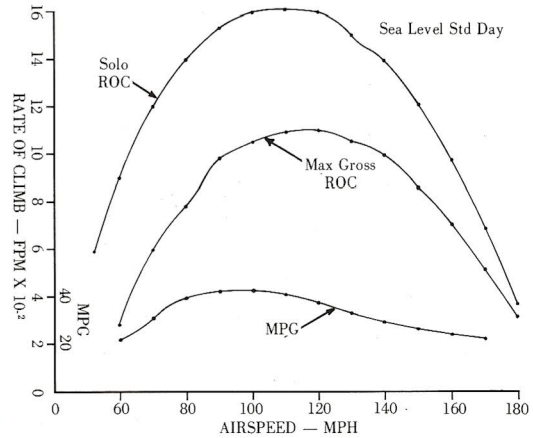
Highest performance of those versions shown on the enclosed computer curves will be realized with the Lycoming 0-235 engine installed in a tail-dragger configured airframe with the optional wheel fairings. Some might look on this as a sport pilot's fighter. The curves show that such an aircraft will "top-out" at almost 190 mph and have an SSLC rate of climb approaching 1600 fpm when flown solo.

Other performance figures may be found in the Table of Specifications included with this package. Estimated performance figures for the Continental 0-240 powered KIS are not available at this time.

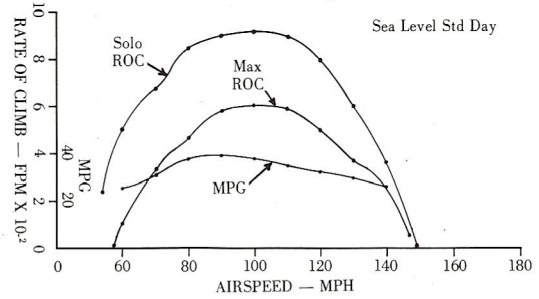
Power Required vs Airspeed & Power Available vs Airspeed

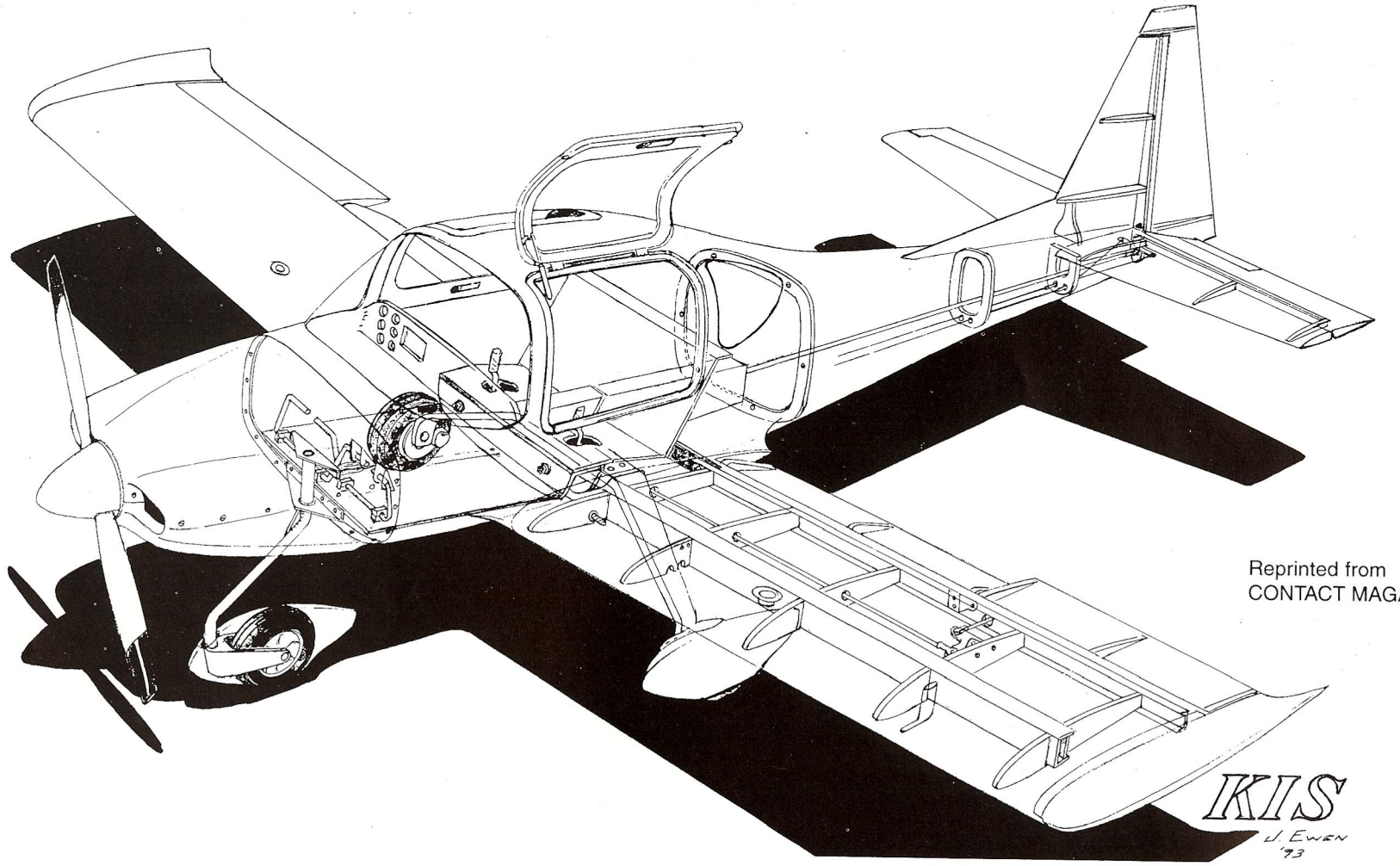


Rate of Climb vs Airspeed & Miles Per Gallon vs Airspeed
Lycoming 0-235 Tail Dragger
No Wheel Fairings



Rate of Climb vs Airspeed & Miles Per Gallon vs Airspeed
Limbach Tri-Gear Version
No Wheel Fairings





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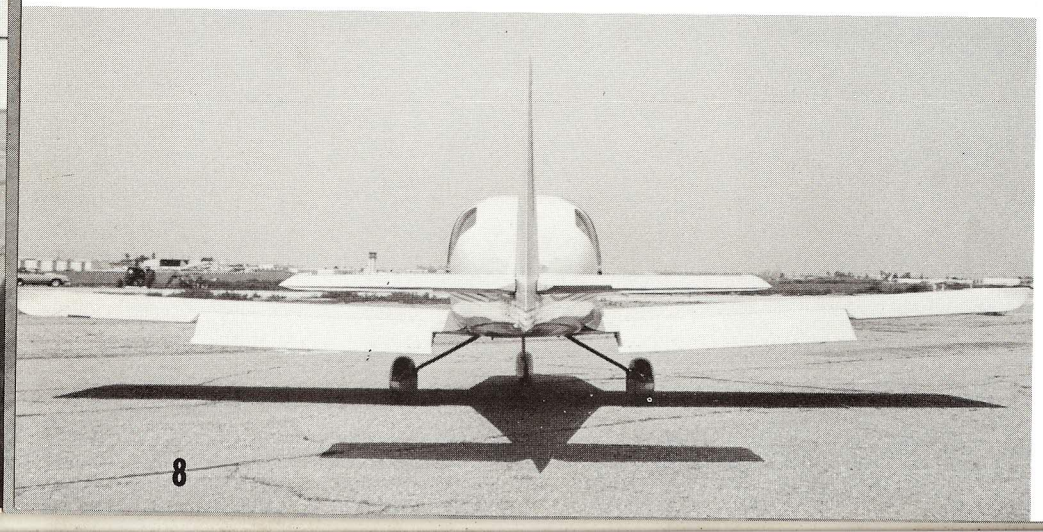


Excerpt from
U.S.AVIATOR
by J.R. "Zoom" Campbell

"For a flyer on a tight budget, the KIS is one fantastic deal. Pretty fast, generously proportioned interiors, delightful behavior and docile manners make this a very attractive design. For the scroungers among us, the ability to put one of these together with even an 0-200 for under $20K may be too good a deal to pass up."

Excerpt from
SPORT PILOT
by John Conrad

"I believe Rich Trickel has achieved all his design goals. The KIS is simple to build and simple to fly. It gives a remarkable turn of speed on very little horsepower. I would highly recommend the KIS to a pilot who doesn't want low-and-slow, but doesn't have the financial resources, pilot skill, or time to commit to the fast-glass."

Excerpt From
SPORT AVIATION
by Jack Cox

". . . the KIS is the much needed entry into the mid-range area of the homebuilt spectrum. Both in performance and cost . . . it is good to see something like the KIS come along . . . an airplane that is in the price range and piloting capability of a much greater number of people.

Excerpt From
KITPLANES
by Nate Rambo

"As I taxied back to the hangar I mused over a few points. I really liked the KIS . . . a lot! It not only looked good, it handled well in the air. Its performance and flying qualities were ideal for the average pilot like me. The KIS fits nicely into a void in today's home-built market. It is a sensible approach to flying that lies midway between the high-tech, big-buck, go-fast machines, and the ho-hum slow puddle jumpers. Based on my flight time in it, the KIS appears to be a real winner."

Excrept from
PRIVATE PILOT
by Keith E. Beveridge

"Finally—the last nail in the coffin of my dreams—you call on your expansive knowledge of aircraft design and tell me that even if I could find the new aircraft at my price, airplanes just can't get 130 knots out of an 80-hp engine."

"You should have told that to Rich Trickel," I reply smugly. "He's selling them."

KIS TR-1 SPECIFICATIONS

DIMENSIONS OVERALL

Length	22 ft.
Wing Span	23 ft.
Height (top of tail)	7.25 ft.
Height (top of cockpit)	5.65 ft

FUSELAGE DIMENSIONS

Frontal Area	9.0 sq. ft.
Cockpit Width	42 in.
Cockpit Height	39 in.
Cockpit Length	65 in.

WING DIMENSIONS

Wing Area	135 sq. ft.
Chord	3.83 ft.
Aspect Ratio	6
Spar Location	30% of Chord
Airfoil	NACA 63(2)-215
Dihedral (per panel)	2.5°
Tip Wash Out	0°
Wing Loading	13.6/14.8/15.6/16.3

FLAPS

Flap Type	Plain
Area/Wing	12%
Length (each)	65 in.
Chord	12.5 in.=28%c

TAIL DIMENSIONS

Horizontal Tail Span	7.33 ft.
Horz. Tail Chord	2.08 ft.
Horz. Stab. Mean Chord	1.33 ft.
Elevator mean chord	.75 ft.
Horz. Tail Area	15.2 sq. ft.
Horz. Tail Aspect Ratio	3.5
Horz. Tail Thickness	12%
Vertical Tail Height	4.09 ft.
Vertical Tail Mean Chord	.83 ft.
Dorsal Fin	.33 X 2.5 ft.
Vertical Fin Thickness	10%

CONTROL MOVEMENT

Elevator	+25° -16°
Ailerons	+12° -12°
Rudder	L 24° R 30°
Flaps	0/12/28

LANDING GEAR AND WHEELS

MAIN LANDING GEAR

Type	One Piece Alloy Alum.
Wheels	Matco 6 X 6
Tires	Goodyear 6 X 6 (13.5 in. dia.)
Brakes	Toe Actuated Disk/Caliper Hydraulic Piston

NOSE LANDING GEAR

Type	Fabricated Steel Free Swiveling
Wheel	Matco 5 X 5 Alloy Alum.
Tire	Goodyear 5 X 5 (11.5 in. dia.)

POWER SPECIFICATIONS

	Limbach 2000	Continental 0-200	Lycoming 0-235	Continental I0-240
Power At T.O.	80 hp.	100 hp.	118 hp.	125 hp.
Displacement	1994 c.c.	200 c.i.	235 c.i.	240 c.i.
Propeller	56 X 44	-	-	-
Power Loading	12.5	11.0	10.5	10
Weight W/Oil & Accces.	180 lbs.	230 lbs.	275 lbs.	285 lbs.

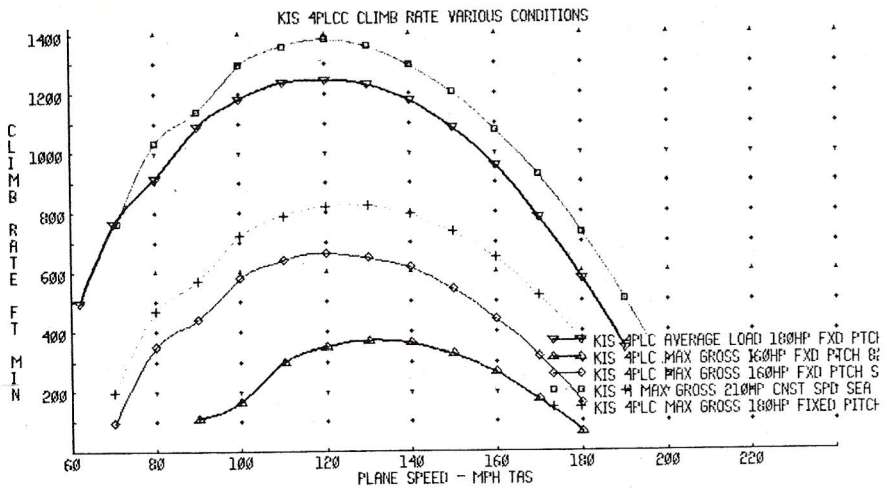
AIRCRAFT WEIGHTS

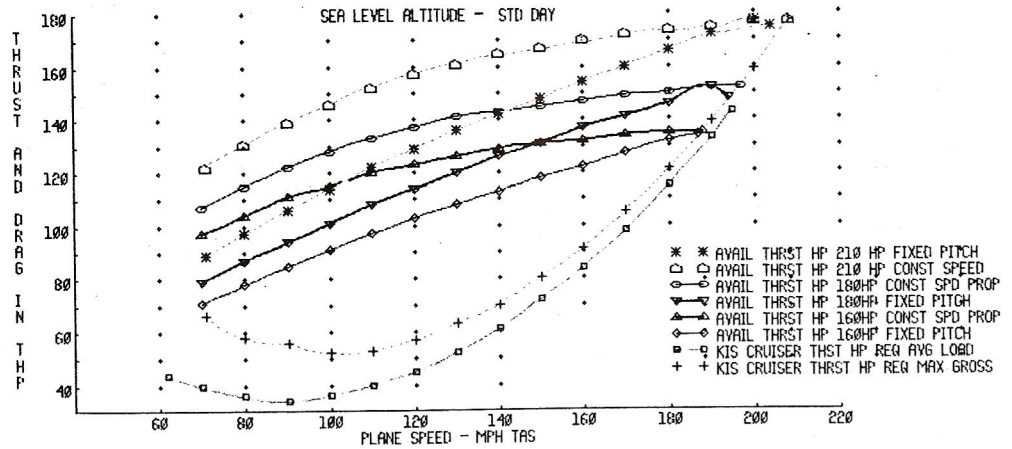
Empty Weight (typical)	680 lbs.	750 lbs.	788 lbs.	798 lbs.
Fuel Load 20/20/25/34	120 lbs.	120 lbs.	150 lbs.	200 lbs.
Max. Gross Weight	1200 lbs.	1300 lbs.	1400 lbs.	1500 lbs.
Useful Load	520 lbs.	550 lbs.	612 lbs.	710 lbs.
Pilot/Passenger	400 lbs.	400 lbs.	400 lbs.	400 lbs.
Baggage	60 lbs.	60 lbs.	60 lbs.	60 lbs.

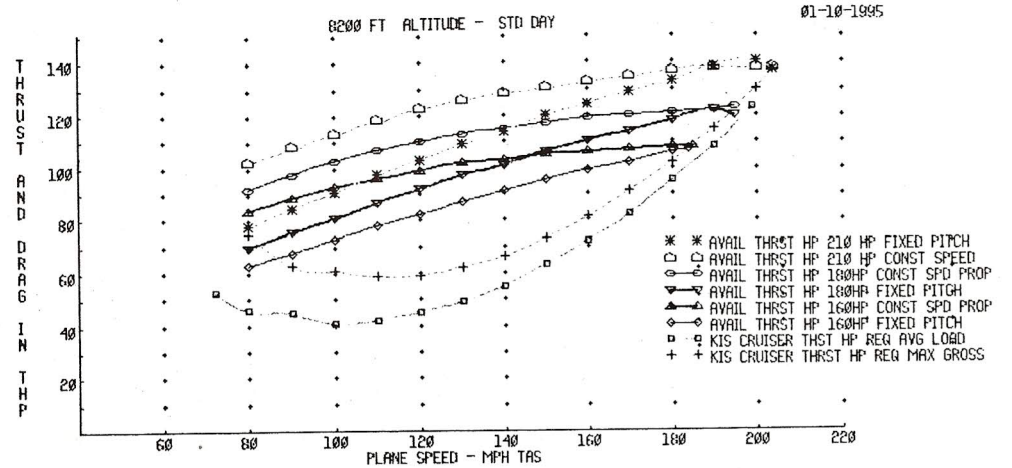
PERFORMANCE

Maximum Speed-SL	150 mph	170 mph	190 mph	200 mph
Cruise Speed-SL(75% Pwr)	135 mph	155 mph	170 mph	180 mph
Stall speed (clean)	55 mph	57 mph	58 mph	58 mph
Stall Speed (Land Config.)	50 mph	52 mph	53 mph	55 mph
Rate of Climb (gross weight)	650 fpm	900 fpm	1100 fpm	1200 fpm
Rae of Climb (solo)	900 fpm	1300 fpm	1600 fpm	1700 fpm
Range at Cruise (+res.)	550 mi.	500 mi.	575 mi.	800+ mi.
Service Ceiling	14000 ft.	14000 ft.	14000 ft.	15000 ft.

KIS CRUISER PERFORMANCE





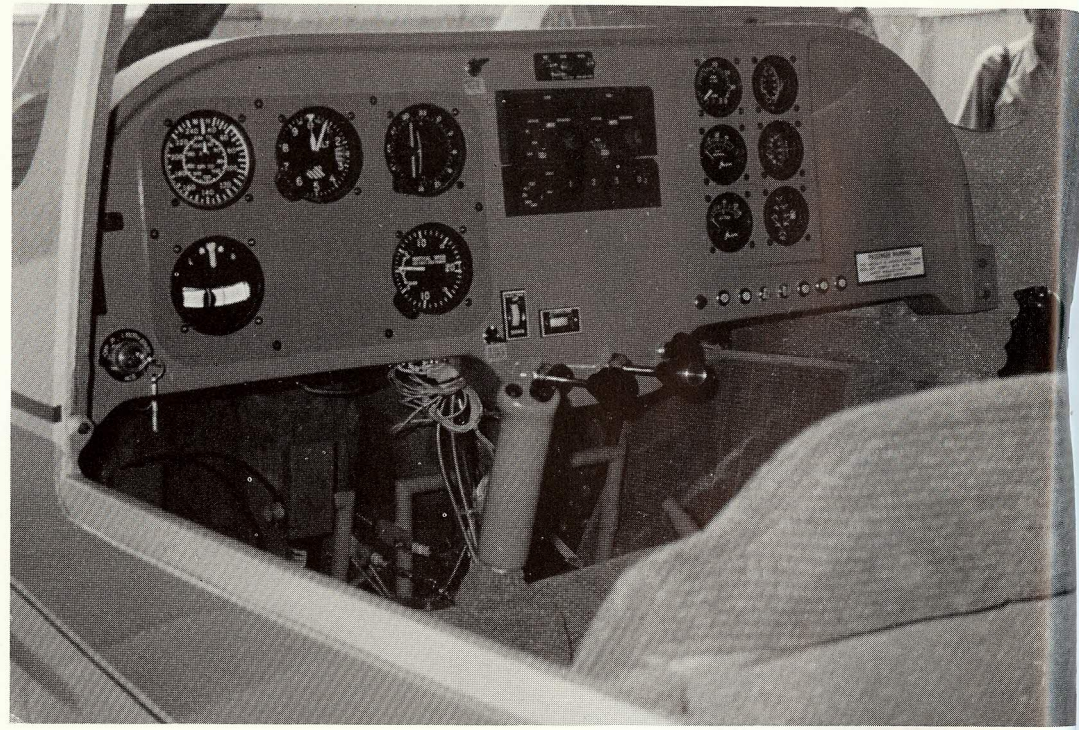


KIS CRUISER's performance will vary based on engine size, propeller specification and aircraft load. The series of computer generated performance curves use 160, 180 and 210 horsepower equipped aircraft for a good cross section of the Cruiser's versatility.

The first series shows Rate of Climb verses Airspeed, the second and third series of curves show Thrust Horsepower verses Airspeed (sea level and 8200 ft.) with Power Required shown.

You can see that a 180 hp. engine will give you 625 fpm climb at gross weight, with an average load 825 fpm climb. Top speed is 195 mph and cruise speed is 175 mph. A more modest 160 hp engine at gross weight gets you 650 fpm climb at sea level. The 160s top speed is still almost 185 mph with a 150 mph cruise speed. For the performance minded, powered with a 210 hp. engine and constant speed prop the climb rate is 1400 fpm at gross weight, top speed of over 200 mph and 185+ mph at cruise.

With the use of a constant speed prop climb rates can be increased. Constant speed props provide extra available power for take off and climb. A 160 hp. KIS CRUISER with a constant speed prop will out climb one with a 180 hp. engine and fixed pitch prop. Top speed is set when thrust required equals thrust available. Total thrust horsepower minus thrust horsepower available gives you extra horsepower for climb. There is extra horsepower available when there is slower speed of climb. With a 160 hp. engine, a 104 hp. is needed to maintain a climb speed of 120 mph. This leaves you with 56 extra horsepower, which a constant speed prop can take advantage of. A constant speed prop does not increase top speed but greatly improves climb performance.




EXPERI

THE KIS CRUISER EXPERIENCE

Excerpt from
AOPA PILOT **January 1994**
by Marc E. Cook

"Alacrity is always welcome, but the Cruiser mixes that with docile, predictable handling. Pilots having flown their whole careers in Archers will feel right at home in the Cruiser. Control forces are conventional, with response and authority as good as or better than most production airplanes in this class. As its true of the two-place KIS, roll forces are greater than those in pitch. Trim stability is good, and the airplane will readily pick up a wing with a rudder.

Stall characteristics are almost absurdly benign. With power off, the airplane offers substantial aerodynamic warning and culminates with the nose bobbing and the airplane sinking moderately. Power on, the pitch attitude more resembles an atlas rocket than a mom-and-pop conveyance, but there's no apparent nasty break or tendency to drop a wing.

Back in the pattern, the Cruiser continues its friendly ways. Two notches of flaps - for 13 and 26 degrees extension - are available to add drag and lower the pitch attitude. Good touchdowns from the slightly stiff solid aluminum main gear come after 60- to 70-knot approaches. Positive nose wheel steering makes tracking the center line a snap."

Excerpt from
KITPLANES **March 1995**
by Keith Beveridge

"We made eight landings and flew more than 2100 n.m. on the trip in varying weather. We saw rain, gusting landing conditions and severe clear, calm skies. GPS-measured ground speeds ranged from 119-170 Knots in varying wind. If your looking for a flying machine that will get you from A to B in comfort, style, and at economical speed, you may not have to look any further."

Excerpt from
SPORT AVIATION **Dec. 1994**
by Jack Cox

In comparison with a 172, Cutlass and Archer II . . . "the four airplanes are in the same general ballpark, with the Cruiser having a significant performance advantage due primarily to its overall smaller size, lower weight and lower drag. Its cabin is comparable to the Cessna and Piper models, they cannot fly as fast, as far or as economically on the same engine as the KIS Cruiser. With its slightly higher wing loading, KIS Cruiser should produce a little better ride through turbulence, also. In terms of cost, there is no comparison if you are willing to chalk up the labor you would put into building of a KIS Cruiser as recreation and/or education."

KIS CRUISER TR-4 SPECIFICATIONS

Dimensions Overall

Length	25.46 ft.
Wing Span	29 ft.
Height (top of tail)	7.5 ft.
Height (top of cockpit)	6.23 ft.

Fuselage Dimensions

Frontal Area	10.02 sq. ft.
Cockpit Width:	
Front Seats	44 inches
Rear Seats	42 inches
Cockpit Height	46 inches
Cockpit Length	78 inches

Wing Dimensions

Wing Area	106 sq. ft.
Wing Aspect Ratio	7.2
Chord	49 inches
Spar Locations	28% & 71% of chord
Airfoil	NACA 65-415
Dihedral (per panel)	2.5°
Tip Wash Out	0°
Wing Loading	17 lbs per sq. ft.

Flap Dimensions

Flap Type	Plain
Flap Area/Wing	15 %
Flap Length (each)	83 in.
Flap Chord	15.3 in. at 28%

Tail Dimensions

Horizontal Tail Span	10 ft. 3 in.
Horz. Tail Chord	3.08 ft.
Horz. Stab Mean Chord	2.83 ft.
Elevator Mean Chord	1.21 ft.
Horz. Tail Area	19.3 sq. ft.
Horz. aspect Ratio	3.5
Horz. Tail Thickness	12%
Vertical Tail Height	5.91 sq. ft.
Vertical Tail Mean Chord	2.35 ft.
Dorsal Fin	0.33 by 2.5 ft.
Vertical Fin Thickness	10 %

Control Movement

Elevator	+25° - 16°
Aileron	+12° - 12°
Rudder	L 24° - R 30°
Flaps	0 - 12° - 24° - 36°

Landing Gear and Wheels

MAIN LANDING GEAR

Type	1 Piece Alloy Alum.
Wheels	Matco 5.5 X 6 Alloy Alum.
Tires	Goodyear 6:00 5.5 - 15 in. dia.
Brakes	Toe Actuated Disk/Caliper Hydraulic Single Piston

NOSE LANDING GEAR

Type	Steerable Oleo Strut
Vertical Deflection	3.5 in.
Wheel	Matco 5 X 5.5 Alloy Alum.
Tire	Goodyear 5:00 X 5 - 13.5 in. dia.

Powerplant (prototype)

Type	Lycoming 0-360-C1B3
Horsepower	180
Maximum RPM	2700
Fuel Grade	100LL

Weights

Spar Location	28% of chord
Empty Weights	1200 lbs.
Gross Weight	2300 lbs.
Useful Load	1100 lbs.
Fuel Capacity	52 gal./312 lbs.
Baggage	65 lbs.

Performance

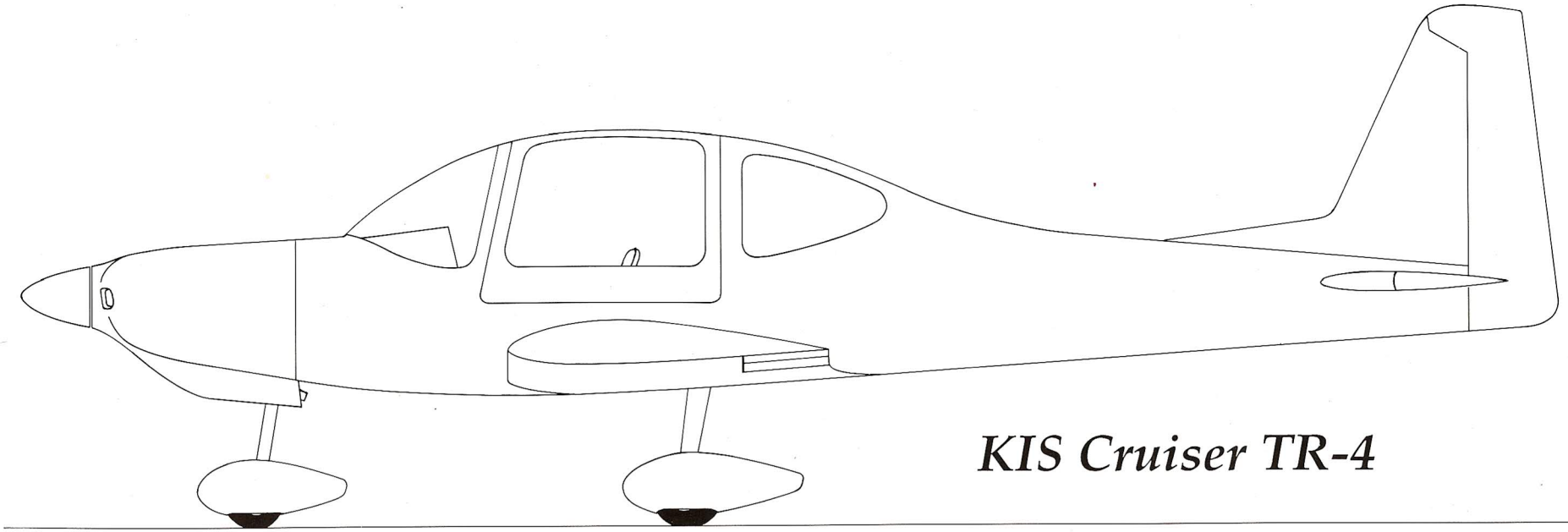
Top Speed (sea level)	195 mph
Cruise Speed (sea level)	175 mph
Stall Speed (clean)	52 mph
Stall Speed (land. config.)	48 mph
Range W/Reserve	950 miles
Rate Of Climb	
Average Weight	1300 fpm
Gross Weight	1100 fpm
Take Off Roll	1000 ft.
Over A 50 ft. Obstacle	1200 ft.
Landing Roll	1300 ft.
Ceiling	21,000 ft.

Limitations

Limit load Factor (pos.) ..... 2.9 3 G
Design Limit Load Factor (neg) ..... 2.2 G
G Loading ..... Normal Category
Vm Maneuver Speed ..... 145 mph
Vf Flap Extension Speed ..... 110 mph
Vne Never Exceed Speed ..... 215 mph

Placarded Airspeed Limits

Green Arc ..... to 164 mph
Yellow Arc ..... 164 to 216 mph
White Arc ..... to 110 mph
Red Line ..... 216 mph



KIS Cruiser TR-4

In each area of our kit we've taken the time to save the builder time hunting to find those odd, special little parts. This allows you to concentrate on kit assembly and overall shorter completion time.

Buying in kit form eliminates the need to shop literally dozens of different suppliers, a lot of phone calls, waiting until your order arrives and possibly receiving the wrong item(s).

Every major airframe component is broken down into manageable parts that are easy to understand. Each KIS aircraft kit contains all parts and materials to complete each assembly step of the basic airframe.

Composite Airframe Parts

More than 65 High Temperature Pre-molded Composite parts are the basis for quick KIS assembly. They are strong, light weight and easy to work with. These parts are constructed of high temperature epoxy resin pre-impregnated E-fiberglass cloth and carbon fiber laminated with either Divinycell foam or honeycomb core, cured under vacuum pressure at 250° (F) in a FAA certified oven.

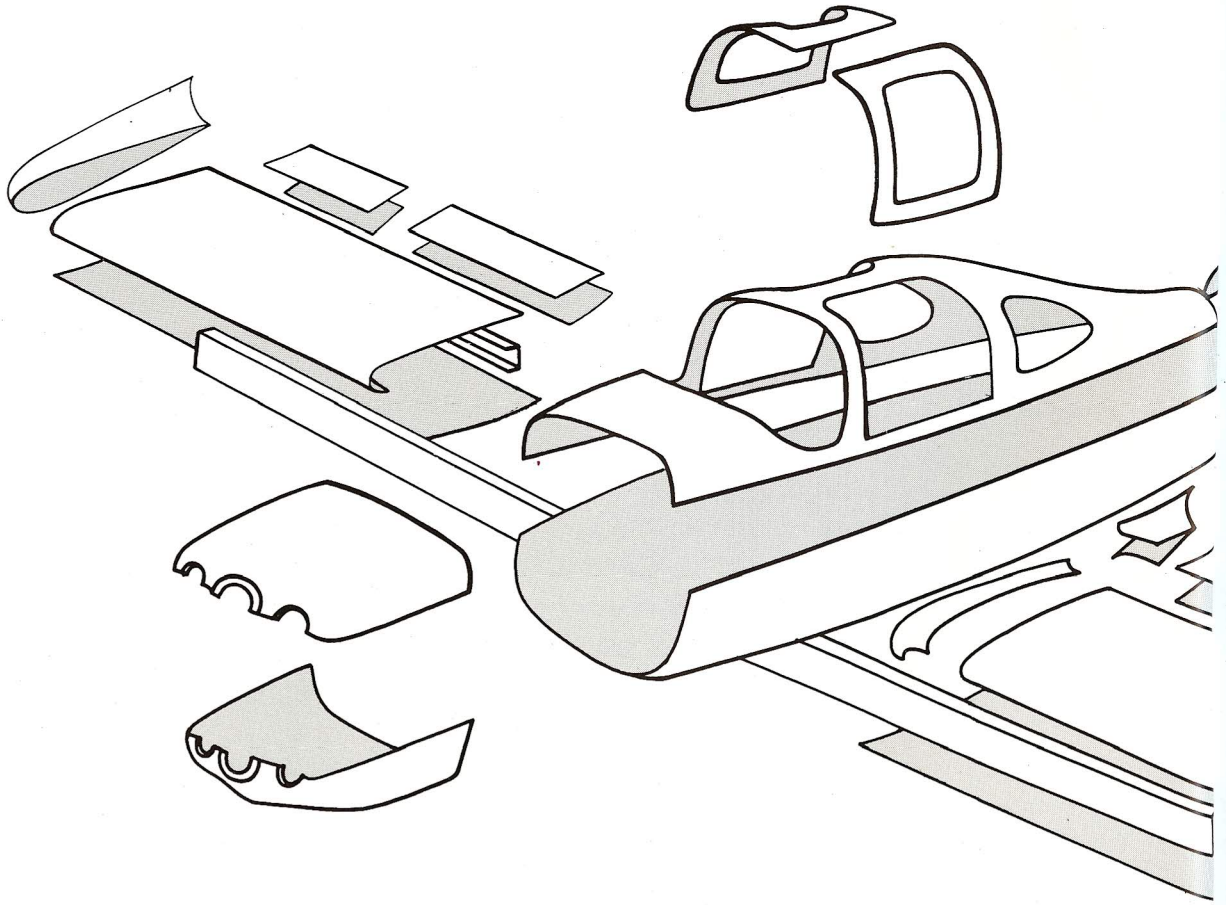
An important foot note here, concerning the fiberglass/resin system used in the making of these KIS aircraft pre-molded parts. Pre-impregnated means the epoxy resin content in the fiberglass is critically controlled for the right amount during its manufacturing process. This achieves a much more consistent resin-to-glass ratio than wet lay-up methods used by other kitplane manufacturers. The precise amount of resin in the fiberglass means that high temperature composites are lighter, stronger and can better withstand exposure to higher outside temperatures.

All parts are manufactured under strict quality guide lines by High Tech Composites, Inc. Pre-molded airframe components are inspected carefully, initialed, and given part and kit numbers.

Composite Materials

To assemble the pre-molded parts and do preliminary wet lay-up fiberglass steps, every KIS aircraft kit contains a more than adequate supply of composite materials.

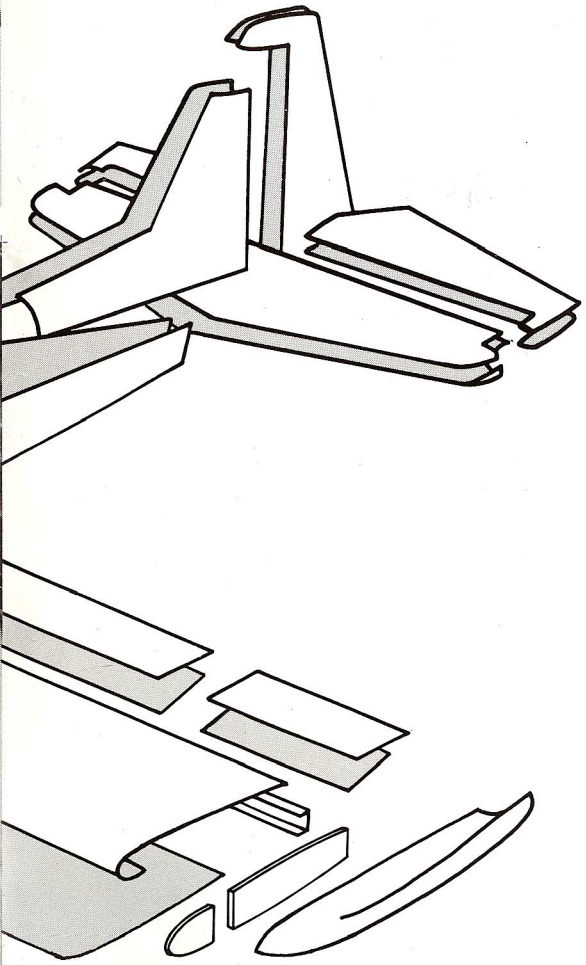
Each kit consists of: special adhesive for the pre-molded parts, low toxicity two-part epoxy resin used for composite lay-up steps,



Resin additives, micro balloons and cotton flox, 9 oz. fiberglass cloth. It also has two-part 5-minute epoxy to temporally hold parts in place while fiberglass lay-ups cure. Mixing cups and sticks, brushes, squeegees and protective gloves in also provided.

Prefabricated Special Components

More than 60 parts are custom pre-fabricated to save the builder time, and in many cases the expense of extra tools. Not to mention the expertise of cutting, bending, welding and precision metal machine work.



Many of these components are ready to bolt on.

The pre-fabricated parts include the main and nose landing gears, control system parts like bellcranks, control horns, control sticks, special mounting brackets and related sub-assembly parts, rudder peddles and motor mount.

Windshield, side door and rear side windows are preformed and trimmed, ready to install. All windows are precision molded to maintain KIS's smooth, efficient lines and have excellent optical qualities.

Standard Fasteners and Components

This heading contains most any of the shelf hardware items. The many different fasteners would be hard to locate at any one source. All hardware needed for assembly is packaged and marked clearly for easy identification. You'll find bolts, nuts, screws and rivets, anchor nuts, control system bearings and rod ends. All items are aircraft quality.

Assorted Construction Materials

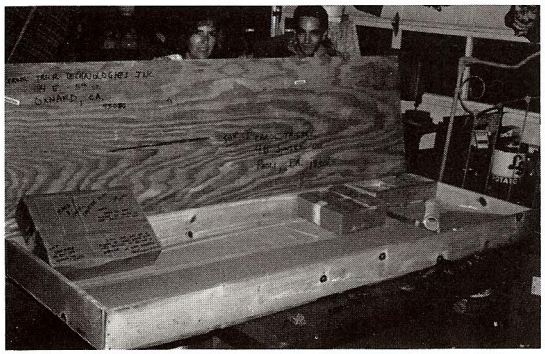
In this group you'll find the raw stock materials required to fabricate different pieces for component or final assembly.

These items include: steel tube, used to make balance control arms and flap control push-pull linkage; flat stock, for flap hinges and brackets; stainless steel sheet and Fiberfax paper for the firewall; soft aluminum tube for fuel and pilot static lines; ridged aluminum tubing for aileron, elevator and related control system push-pull tubes. Also, you'll find materials for the door attachment and latch fittings; assorted angle stock for fabricating brackets.

TAKE THE TEST BUILD

AVAILABLE FOR

- *TR-1 KIS*
- *TR-4 KIS CRUISER*



Tri-R Technologies now offers tail starter kits for those who are not sure just how simple a "Keep It Simple" aircraft really is. The starter kit is helpful if you're perplexed about composites in general.

Purchase only the horizontal stabilizer/elevator kit to see if you are capable of building a pre-molded aircraft. This limited kit will expose prospective builders to most all phases of composite construction.

You will learn composite assembly techniques: how to cut out foam and fiberglass, mix resin, apply lay-ups to pre-molded parts, trimming to fit skins in place, and closing the skins. You'll also learn how to attach metal fittings and installing control surface hinges.

Take the test build and answer any question you may have about KIS composite aircraft and how to build them.

THE ASSEMBLY EXPERIENCE

The time you spend assembling a KIS sport aircraft will be rewarding right from the start. Rich's vast experience in the kit plane business guarantees a quality product, featuring the latest composite technology with simple building steps and easy to follow instructions.

Emphasis was put on simplicity when we put our KIS kits together. We anticipate many of our kit buyers will be first time builders. We have made assembly as easy as possible while staying within the FAA's 51% rule. We estimate the building time between 1200 and 1500 hours to complete the KIS Cruiser Kit, install the engine, basic instruments and avionics. KIS TR-1 will go together in 800 to 1000 hours.

Building Space Requirements

Assembling a KIS aircraft will require at least a two car garage. All major components (ie-wing panels, horizontal tail, rudder and cowl) should have enough room to temporally fit in place, although components are not necessarily built in place. You could technically roll it outside for some assembly steps and test fitting.

Tools You'll Need

Common tools found around most households will be needed, such as a small hand grinder like a dremel with assorted bits, sand paper, razor blades. Required standard garage-found hand tools: wrenches and sockets, assorted pliers and screw drivers. Required small power hand tools: drill, jig saw, sander, screw driver and soldering iron (for electrical). A band saw would be helpful cutting out composite parts. You'll also need a small selection of celos.

Builders Manual

Each step of the assembly process is described in detail with text and illustrations. Major sub assemblies are divided in easy to follow sections from start to finish. If you should need further help during the building through flying stages factory assistance is only a phone call away.

Getting started

Assembly steps involve adding parts to build up a sub-structure inside the pre-molded skins. A steady table large enough to assemble the horizontal stabilizer (about 3' X 11') would be very handy. Control surfaces (aileron, flaps, elevator and rudder) will also be assembled on this table.

The lower main pre-molded fuselage tub is fixed to cradles mounted on saw horses for preliminary fiberglass lay-ups.

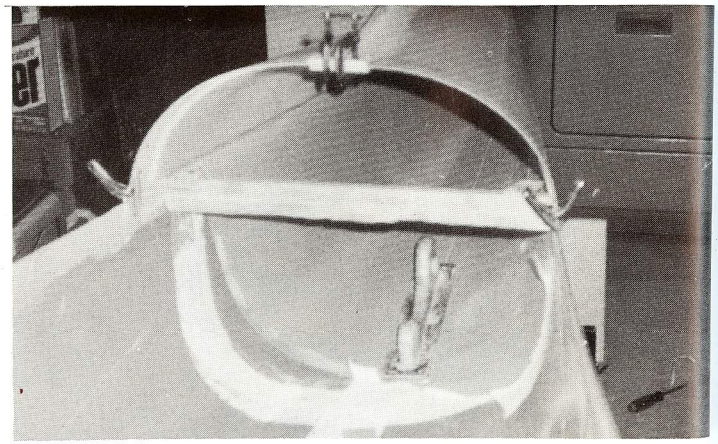
For the 4-place, wing center section, front and rear spars, top and bottom wing fairing are bonded to the fuselage. The outer wing panels are assembled on table-like jigs supported by saw horses.

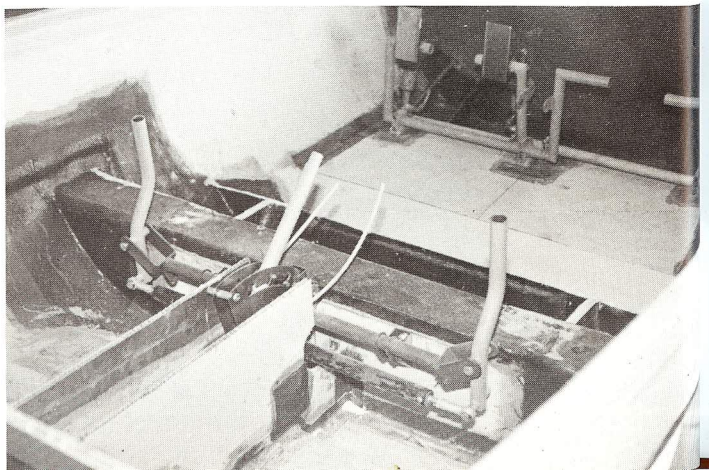
Many of our builders utilize the shipping crate materials to make up the required jigs.

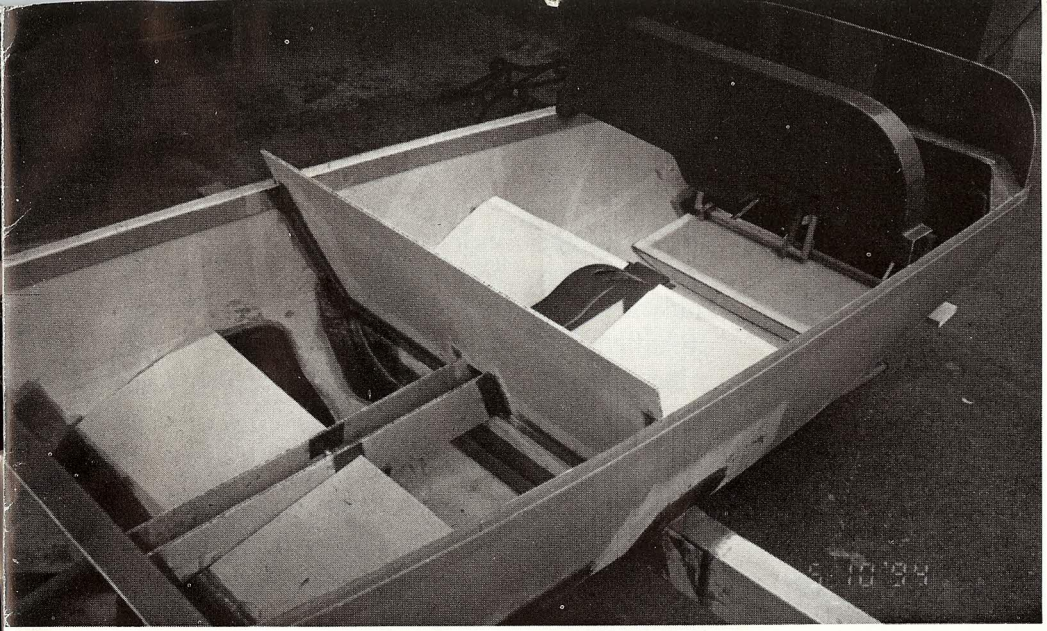
Horizontal Stabilizer and Elevator

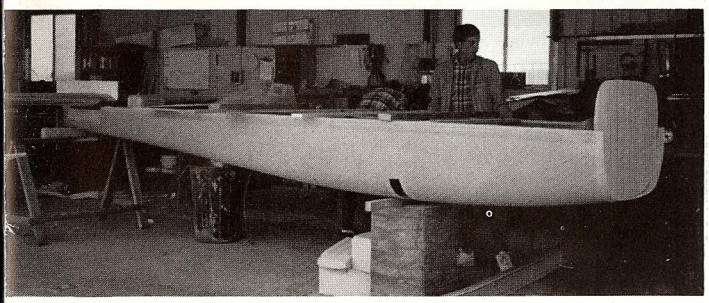
This is a good place to begin KIS aircraft assembly as it's a relatively small component and is good for gaining all around composite experience.

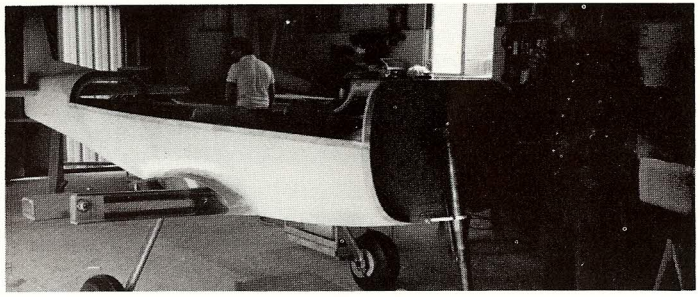
With the upper skin secured to the assembly table, the pre-molded spar is bonded in position. Rib and end filler pieces are cut from supplied molded panel (KIS Cruiser),

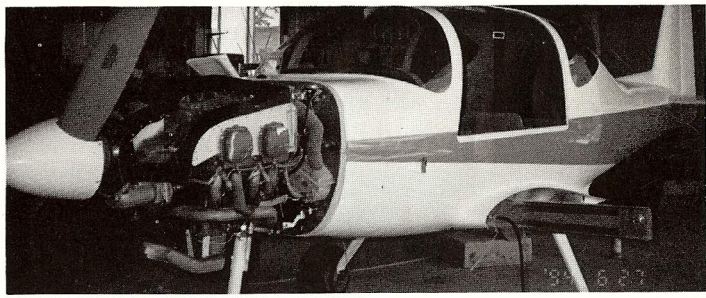












trimmed to fit and tack glued in place (KIS TR-1 Foam core is supplied for spar and ribs). Fiberglass lay-ups are applied to both sides of each rib. Once cured ribs are trimmed to fit the contour of the lower skin. The lower skin is bonded in place, fiberglass lay-ups are applied to the leading edge and along the spar, reinforcing the hinge line.

The elevator, rudder, aileron and flaps are all built up on the assembly table in the same manner as the horizontal stabilizer.

Fuselage

Tri-R's standard system of building up inside the tub is a much easier way, eliminating a lot of crawling around inside. There is plenty of access to build up the inner structure. One of the last fuselage assembly steps is to add the top half to the fuselage.

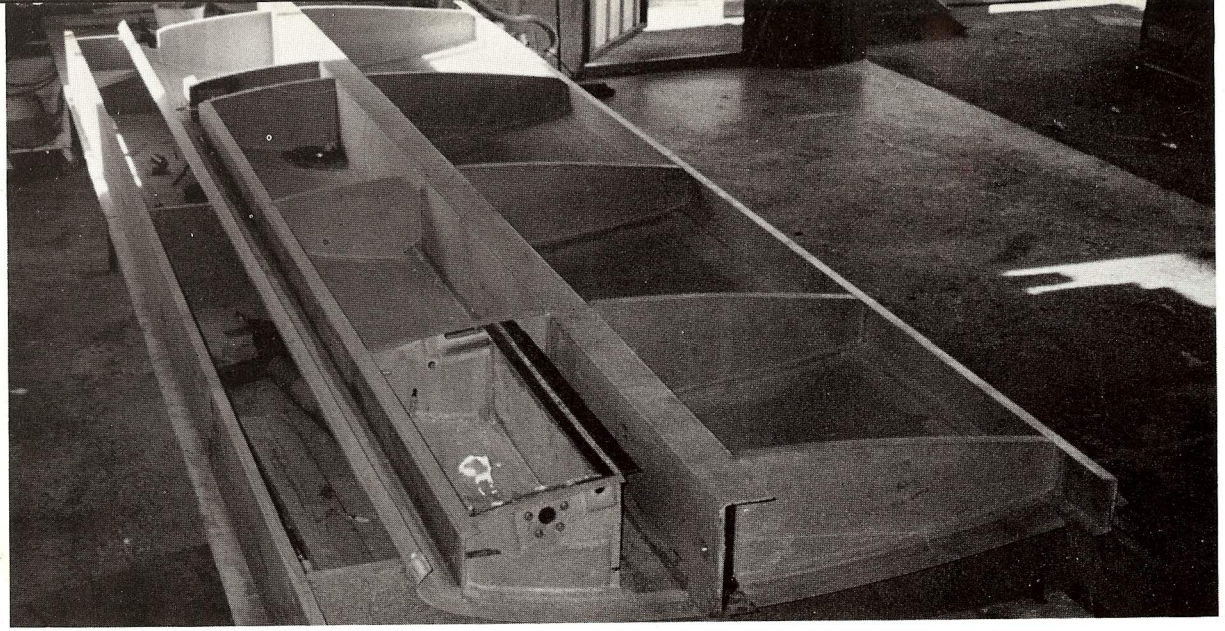
After securing the tub level and square, layout positions of each component from factory reference lines. The firewall, landing gear box, wing spars, bulkheads and vertical fin spar post are cut out, fit in place and fiberglass lay-ups applied, securing each structure member in place. Most of the flat parts are cut from special molded composite structural panels. Panels are pre-marked to cut out easily.

The horizontal stabilizer can then be lined up level and in position and fiberglassed in place along with vertical fin spar post. At this point the fuselage is ready for landing gear installation. On wheels, the fuselage will be more manageable to move around. All interior parts and systems can be installed with ease. They include the control system, pilot static and fuel lines, firewall connections, avionics and instrument hook-ups, the electrical system and interior.

When everything is ready and checks out okay, the fuselage top is installed. Areas where the windows will be installed are trimmed on factory molded lines and windows installed. Side doors are molded in two pieces (inner and out skins). The door window is sandwiched in between the two skins along with door latch components.

Vertical Fin

One side of the vertical fin is bonded to



the fuselage and vertical fin spar post. Ribs are cut to fit and fiberglass lay-ups applied. After curing ribs are trimmed to fit the other molded skin and bonded in place.

Wing

With the bulk of the parts pre-molded, KIS wing panels assemble in short order. With the upper skin secured in the jig, positions for all component are measured out.You'll start by simply gluing in place the pre-molded aft spar, and mid span ribs. The main spar is bonded to the skin and ribs. Leading edge ribs are bonded in place. Components for the control system (aileron and flaps), fuel tank filler, fuel gauge and lines are then installed. The bottom skin is then bonded in place. Fiberglass lay-ups are applied along the aft spar.

Painting

Upon the completion of all the major airframe, parts should be primed (UV enhibiting) and top coated with a good paint. Standard automotive finishes are suitable to paint KIS composite aircraft and are readily available from local suppliers.

FAST BUILD OPTION

All KIS kit models are available as a fast build kit. Many assembly steps are completed for the builder adding key structural elements to the fuselage. This option will expedite an already fast building project by savings 200 to 250 hours of building time.

Having the fuselage prepared professionally eliminates doubt You'll know important steps are completed correctly, ensuring confidence in your aircraft project.

A factory jig is utilized to perfectly line up and square important items like the firewall, wing spars and bulkheads.

Fast build kits includes: preparing and laying out component positions; installing the firewall with landing gear and motor mount hard points; main and rear wing spar boxes are fabricated and installed in position; the main landing gear attach to hard point and reinforcement lay-ups; front seat back bulkhead and seat bottom supports; rear seat back bulkhead. Center consul sides are also installed.

All assembly steps are carried out by qualified personnel experienced in composite aircraft construction. Attention to tolerances and maintaining quality standards are high priorities. All work is fully inspected at each stage.

Purchasing the fast build option requires that additional time be added to aircraft delivery date. Time must be reserved to prepare your order.

The fast build option can also be added to a finance package. For any additional information feel free to call the factory.

KIS KIT ORDERING

Basic kits are currently being produced in the KIS TR-1 tricycle gear, TR-1C tailwheel versions and the KIS CRUISER TR-4. These basic kits include everything needed to complete an airframe except for the engine, mount, avionics, upholstery, and paint. A cowling for your engine is provided with each kit. The cowling can be shipped at a later date if you are undecided about your engine. Windshield, side and rear windows come in two colors—light gray (standard) and medium gray. These too may be selected at a later date but prior to kit shipment.

Options available for KIS kits:

- **ENGINE MOUNT**— For approved installations of Limbach VW, Continental, Lycoming and CAM 100 Mount standard with KIS CRUISER

- **WHEEL FAIRING KIT**—For KIS TR-1 Tri-Gear or TR-1C Conventional Gear and TR-4 KIS CRUISER

- **CUSTOM INSTRUMENT PANEL**— Premolded replaces self-fabricated panel

In the near future additional options will be added to the list. Options are an extra charge.

We offer the KIS kit two ways to fit your building requirements as well as your financial resources. The KIS Complete Basic Kit allows you to purchase the entire package at one time. The KIS Basic A Kit/B Kit is purchased and shipped in two packages. The A Kit contains enough materials and parts to complete the fuselage and empennage. The B Kit consists of all materials and parts to complete the wing and final assembly. The A Kit/B Kit packages allow you to concentrate on each major component while making the KIS Kit more affordable. A full deduction will be allowed for previously purchased horizontal stabilizer starter kits

KIS kits can also be financed including factory new engines. There are several lending institutions specializing in aircraft finance. Rates are generally competitive. The minimum loan is $10,000 and the maximum term is 5-years. Builders insurance is required during the balance of the term.

All kits are shipped via common carrier (F.O.B., Oxnard, California, U.S.A.). There is an additional charge to crate your kit for shipment. The KIS Complete Basic Kit is crated/shipped in one operation. The shipping/crating costs for the A Kit/B Kit run slightly higher since they are shipped at different times.

Current pricing for KIS Kits, Options, Shipping/Crating can be found on the Kit Order Form in this package. Please call the factory if you require additional information. We will contact you as to the earliest possible delivery date once we have received your Kit Order / Purchase Agreement Form along with a 10% deposit.

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