

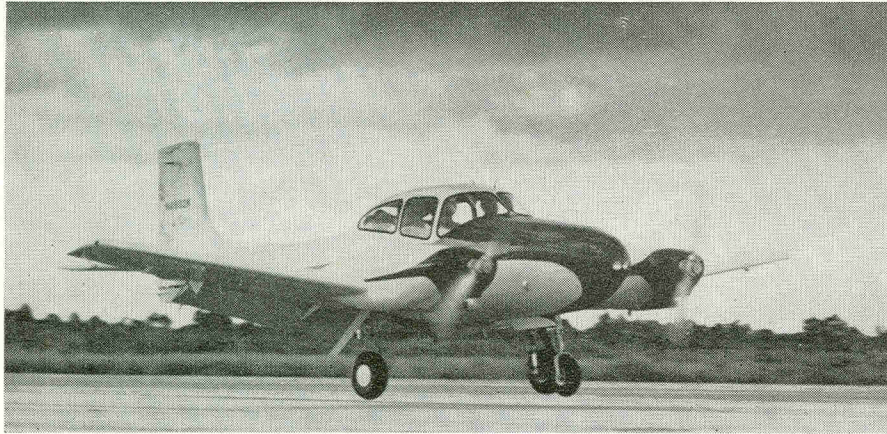
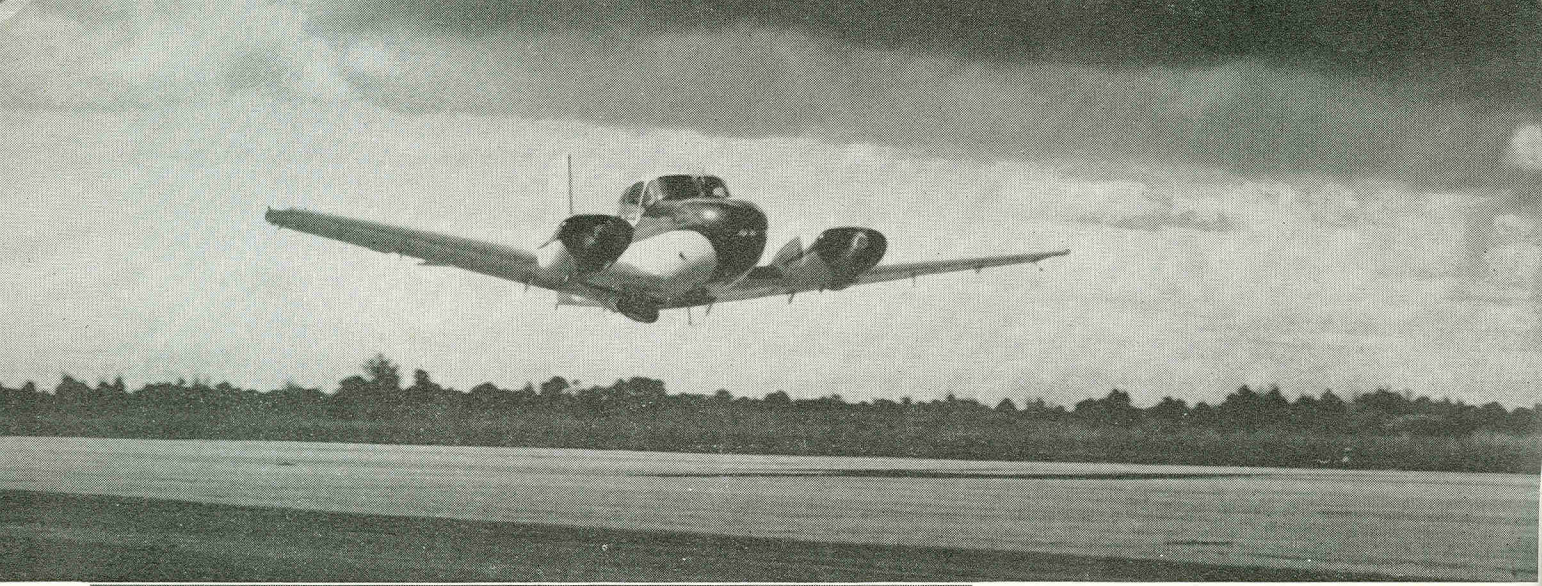
Small and Familiar

Jack Riley's Twin Navion Conversion wins admirers and orders on demonstration tour

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Take-off (above) and landing shots were made beneath threatening clouds at Stuart, Florida, where we showed the Riley Twin to Zack (Smilin' Jack) Mosley, famous comic strip author and long-time aviation booster. Zack's home and studio are just off the runway, as are Florida's finest fishing, boating and golfing.
—(FLIGHT MAGAZINE Photos by the author.)

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Jack Riley's Twin Navion Conversion wins admirers and orders on demonstration tour

RILEY Aircraft's Twin Navion Conversion program was gathering momentum in late October, with Jack Riley on tour with his first demonstrator and with his conversion line in Florida working on four for delivery in November and five for delivery during December, after which 8 a month will be the schedule.

We covered 1,200 miles in the first demonstrator with Riley, winding up at Fort Lauderdale, Florida, where he has established his conversion center. During our five-day trip and visit there, three Twin Navion conversions were sold by the enterprising Riley, who has sold over \$2,500,000 worth of de Havilland Doves in less than two years for a record.

Navion owners are the prime prospects, since they already have an airplane for the re-work. Riley's first sale

By **TOM ASHLEY**

was made in Dallas (to an Oklahoman), where he demonstrated to thirty or forty people. His second sale was in Miami to a business man whose wife also flies their Navion. Sale No. 3 went to a Chicagoan who has a Lodestar but who likes to fly a Navion personally. Each sale was closed with a \$5,000 deposit. The total price for a conversion is \$20,000.

In a demonstration, a prospect usually is already an admirer of the Twin before he ever steps into it. More than a few people were heard to repeat the same thing about the airplane's appearance: "It just looks good with two engines." In fact, after being with the airplane a week, it reached the point where single-engine Navions were the ones that looked unusual to us; the

Twin Conversion seems to have a natural look.

What impresses prospects on a demonstration hop are such things as 1,400-fpm. rate of climb, 150-mph. cruising speed, the ease of single-engine trimming, and the airplane's ability to hold 2,000 ft. with one propeller windmilling. Excellent soundproofing and the lack of vibration are also impressive.

Private plane owners and pilots have yearned through the years for "two fans"—two *small* engines, that is. When they walk up to the Riley Twin Navion Conversion they find its "fans" exactly as they have anticipated—small and familiar. These are the widely-used 4-cylinder Lycoming engine, which powers the Piper Pacer. In the Twin Navion Conversion, the Lycoming O-290-D2 is rated at 140 hp. for

take-off, with 135 hp. at 2,600 rpm.

With all this in mind, it is understandable that the Riley Twin began attracting enthusiastic admirers from the start. Both the basic airplane and its power plants are familiar around airports, there being more than a couple thousand Navions and Pacers in use today. Pilots and owners familiar with these airplanes usually form the same opinion when they see the converted twin: "It's practical and makes sense," they tell each other. If we heard this statement once, we heard it fifty times during a couple of days of demonstrating.

Another interesting point about this airplane's first appearance is that people aren't inclined to compare it with other airplanes. To them, it is still a Navion and is obviously much smaller than any twin-engine craft they have seen. If it were larger, they might be tempted to compare it with types beyond its size, power and capabilities. Moreover, it is the first demonstrator of our knowledge that somebody in the introductory crowds didn't berate and run down. Maybe the cut-throats were elsewhere; we didn't find them around the converted Navion.

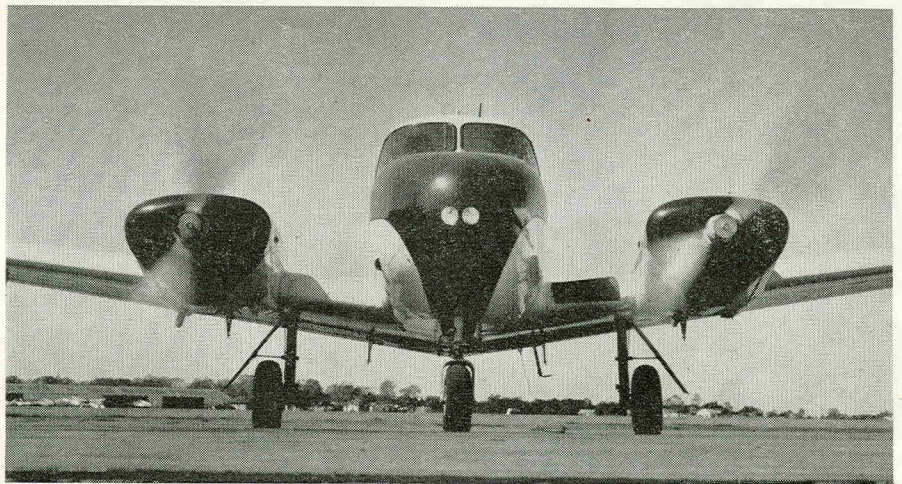
In this it appears the Twin Navion

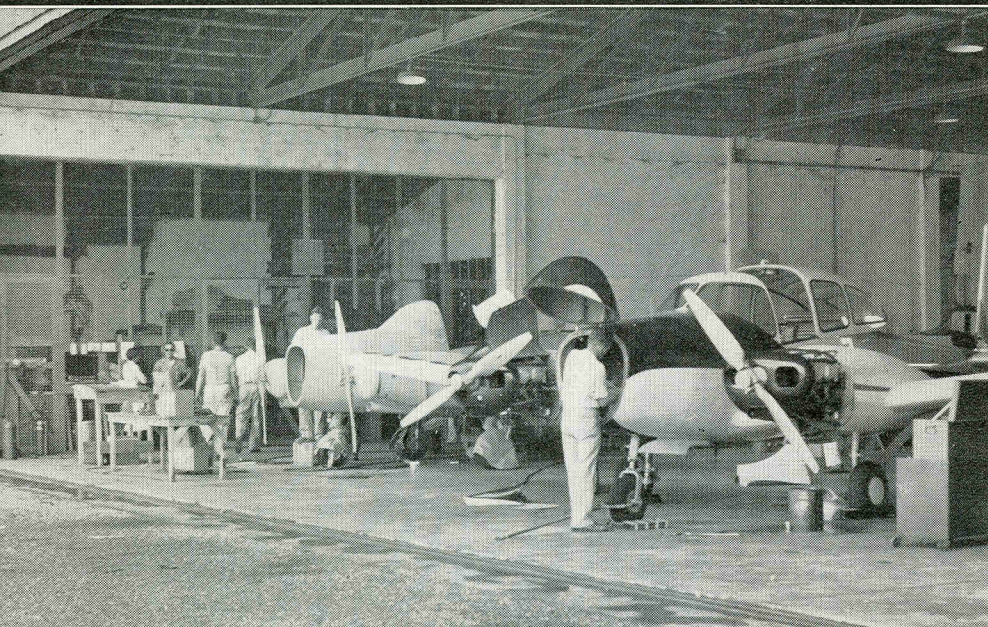
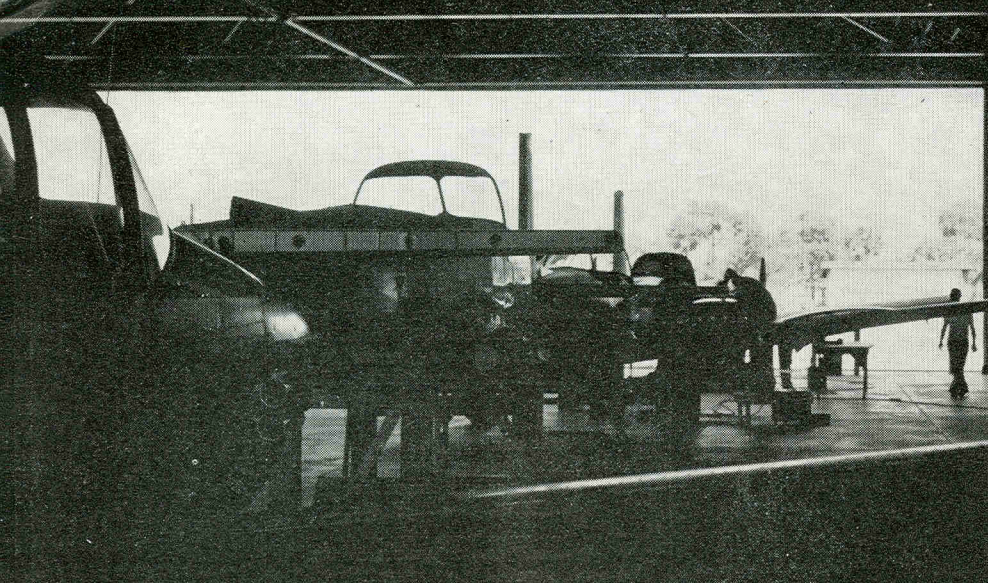
Conversion scores a bull's-eye as an idea. If somebody had started from scratch to design and manufacture a small, new, all-metal, 4-place, twin-engine airplane, they would have faced a more difficult sales campaign; something new would undoubtedly have met far more resistance. But when somebody converted the Navion into a twin, they struck a responsive chord among lots of people who were ready to ask themselves why not.

All of which brings up the interesting story of the conversion's origination. It came about a year ago when a Los Angeles business man, C. J.

Interesting details are highlighted in these two photos showing nacelles for 4-cylinder 140-hp. Lycomings; enlarged vertical tail having 35 per cent more area than conventional Navion; nose landing lights and entry step behind wing trailing edge. Propellers of 74-in. diameter have 14-in. ground clearance. Nacelles are airfoils, contribute lift.

—(FLIGHT MAGAZINE Photos, top by Tom W. Collins, bottom by the author.)





Daubenberger, who owned and flew a Navion, asked the same question. But let's hear the story from Roger Keeney, fixed-base operator of Acme Aircraft at Torrance, California. We were with Keeney and his customer, Daubenberger, the other day.

"I'm fiddling around the hangar one day when Dauby strolls up and we start shootin' the breeze," Keeney recalled. "Dauby always wants me to tinker with his airplane. I believe I have hung everything on his Navion that can possibly be hung onto it. He and I are always trying something different.

"This time when he walks up, I wonder what gadget he has heard about now. He wants to know why I can't take the engine off the nose and put a couple of little 'uns on the wings! I had expected almost anything from him, but never this. I should have chased him away then and there. But I made the mistake of trying to laugh it off. I say sure, we can even hang jets on the wings. Why not? And then I make an excuse so I can walk off and get away from such nonsense. But ole Dauby stops me. Let's do it, he says. Is he serious? I almost bust my sides laughing at the idea. But he doesn't find it funny. In fact, he tells me to forget about jets but to start right now splittin' up that horsepower and hanging it on the wings. That's where it belongs, he adds."

"I was putting up the dough, wasn't I?" Dauby interrupted. "I had done some figuring before I went to Keeney. He hadn't even thought of such a thing. So it caught him unprepared. When he said he could do it, I really threw it at him."

Keeney recalled the idea was so unique that he was still joking about it months later when most of the engineering had been accomplished and the conversion was being made in his hangar. Few outsiders would take it seriously, anyway. But Dauby knew what he wanted. And it was no backyard job, either. Some very capable

Shop scenes show activity at Riley Aircraft's conversion center on Broward County International Airport at Ft. Lauderdale, Florida. Four Navions were being converted on the line (top) when we were there. Final assembly is shown in the center. Some of the conversion shop's crew are shown at bottom in front of the demonstrator and a de Havilland Dove, for which Riley is distributor. Bert Peterson, general manager, is second from left. At extreme right is C. J. Daubenberger of Los Angeles, who originated the Twin Navion Conversion.

—(FLIGHT MAGAZINE Photos by the author.)

Riley Twin Navion Conversion Data Supplied by Riley Aircraft Co.

Powered by two 4-cylinder Lycoming O-290-D2 engines, each rated at 140 hp. for take-off at 2,800 rpm., and at 135 hp. at 2,600 rpm. Equipped with two Sensenich controllably-pitch propellers.

Maximum gross wt., lbs.	2,950
Basic empty wt., lbs.	2,050
Empty wt., fully equipped, lbs.	2,175
Maximum cruising speed (rated power S. L.), mph.	164.2
Normal cruising speed (70% hp., 8,500 ft.), mph.	154.2
Stalling speed (gear retracted, no flaps), mph.	67
Stalling speed (power off, full flaps), mph.	60
Stalling speed (power on, full flaps), mph.	54
Rate of climb (S. L., gross wt.), fpm.	1,400
Service ceiling, ft.	19,500
Service ceiling (1 engine, windmilling prop), ft.	2,500
*Service ceiling (1 engine, feathered prop), ft.	5,100
Fuel capacity, gals.	60
Fuel consumption (62% hp. both engines), gph.	11.4

*Estimated. All performance figures are for gross weight.

people were brought into the project, engineering the conversion in their off-hours when not working at several of the top aircraft plants on the West Coast. These people include such notables as Walter Feller and Will Bowman, aerodynamics; Fred Anderson, stress; Ross Beattie, wind tunnel; M. K. Oleson, consulting engineer; and John Martin, flight test. Fullest possible co-

operation was given by 6th Region CAA people in engineering and general inspection. Seven months from the start, John Martin made the first flight in the twin. Twelve months from the start, CAA approval had been obtained.

The first conversion had 125-hp. engines. It was flying with these when Jack Riley, the de Havilland Dove distributor, heard about it. He negotiated for the rights and began plans to market the conversions in a big way. Acme Aircraft then turned out Conversion No. 2 for him, this being the demonstrator which made its first appearance last month with 140-hp. engines, a different nose, and a beautiful and expensive upholstery job.

More than a few changes and 1,700 man-hours of work are involved in converting a Navion into a twin-engine airplane. Perhaps the best way to visualize these changes is to glance at the list of work specified in a contract covering the work done.

Conversion, says this contract, shall include the following:

- Removal of original power plant, complete with controls; cowlings, propeller, brake controls and 1-in. brakes, instrument panels, vertical fin and rudder, landing lights, entrance step and wing fillets.

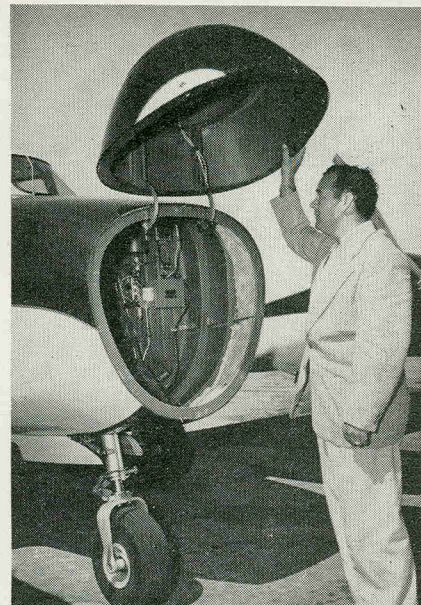
- Removal of wings, re-inforcing wing structure, overhaul of wing internal structure, fuel tanks and system, and re-installation of wings.

- Installation of modified-type vertical fin, dorsal fin and rudder.

- Installation of nacelle structures.

- Installation of Lycoming O-290-D2 140-hp. engines.

- Installation of Sensenich CS3FM4/C374E controllably-pitch propellers.



Jack Riley shows how the nose door opens to provide a large baggage compartment at waist level. Interior of this one had not been finished.

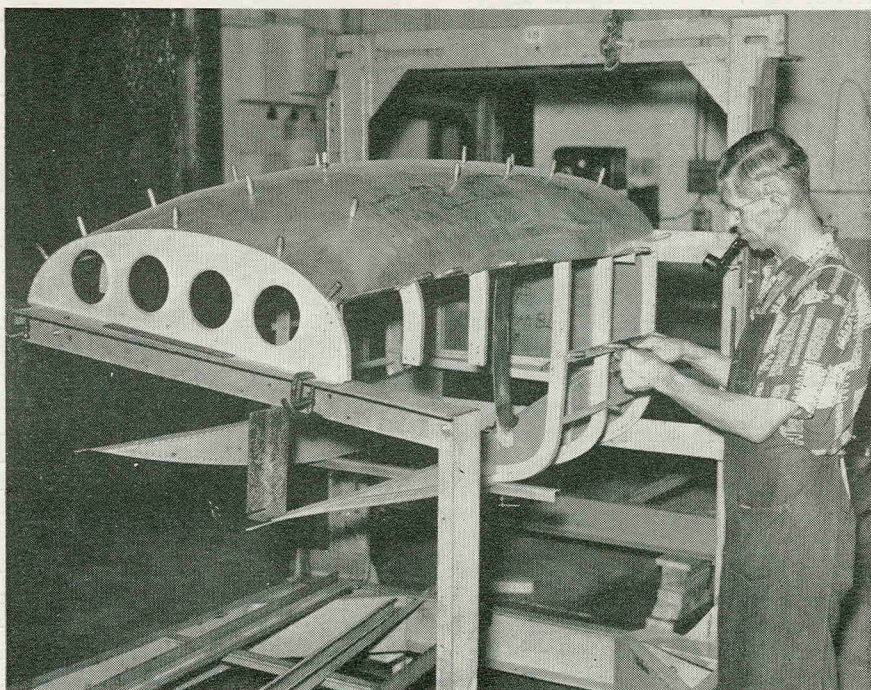
—(FLIGHT MAGAZINE Photo by Tom W. Collins.)

- Installation of all engine controls and control pedestal with throttle, mixture, propeller and air intake. Installation of fuel system valves, fuel cross-feed, electric booster pumps and underseat 20-gal. fuel tank.

- Installation of engine electrical circuits, with two 12V generators, circuit breaker panel and relocation of battery in nose.

- Installation of landing lights in fuselage nose. Installation of nose section with hinged nose door.

- Modification of hydraulic system, installation of toe-operated hydraulic



brakes on left pilot's side, and installation of 1½-in. brakes and parking brake control.

Installation of rudder trim control system. Provision of rear entry step. Installation of new and larger wing fillets.

Soundproofing of cabin and baggage compartments.

Installation of instrument panel with lighting shroud panel. Instruments to include air speed indicator, electric-driven turn and bank, sensitive altimeter, rate of climb, gyro horizon, outside air temperature, magnetic compass, directional gyro, 8-day clock, dual tachometer, dual manifold pressure gauge, dual cylinder head temperature gauge, two oil temperature gauges, two oil pressure gauges, two fuel pressure gauges, ammeter and selector switch, fuel quantity gauge (main), fuel quantity gauge (auxiliary) and suction gauge.

Installation of new deluxe upholstery and interior.

Installation of two exhaust-muff heaters with controls for cabin heating.

Aircraft to be repainted to customer's specifications with special trim (excepting insignia).

To accomplish this on an assembly-line schedule, Riley has acquired an impressive operation from Granere Aviation on the Broward County International Airport at Fort Lauderdale. The hangar itself has 12,000 sq. ft. of floor space, with 6,000 sq. ft. for shops, 1,500 sq. ft. for stores, 1,487 sq. ft. for offices and a 900-sq. ft. lounge.

At the time of our visit last month, 51 persons were on the payroll, with 4 Navions on the conversion line, the first of which was rolled off the day we left. The payroll was being increased daily, with 80 to have been hired by November 1 and 100 by December 1. Production schedules called for 3 to 4 conversions for November and 5 a month by December, after which 2 a week will be the goal.

Two twin brothers, Bert and Frank Peterson, are in charge of the operation, Bert handling the administrative end as general manager and Frank the engineering and production end. Both are engineers, having obtained their training with Vickers in England. The Peterson twins have been in aviation since 1931. They joined Riley Aircraft last May.

Performance data for the Twin Navion Conversion as issued by Riley Aircraft includes 164.2 mph. maximum cruising speed at rated sea level power, and a normal cruising speed of 154.2 mph. at 70 per cent of sea level power at 8,500-ft. altitude, with fuel consumption for this cruising speed

placed at 14 gals. per hr.

Riley figures also include a 19,500-ft. two-engine ceiling and a 2,500-ft. single-engine ceiling with one propeller windmilling. The use of feathering propellers and the 150-hp. version of the 4-cylinder Lycoming is expected to double the airplane's single-engine ceiling. The feathering propeller will be a new constant-speed Hartzell with hydraulic power and metal blades. Hartzell is scheduled to supply the first to Riley in December. Riley is scheduled to receive the first 150-hp. engine next February or March.

The Riley demonstrator has been flying with Sensenich controllable-pitch propellers. Even without feathering, and with one propeller windmilling, the Twin displays impressive single-engine gliding characteristics. From 8,000 to 10,000 ft., for example, Riley claims a single-engine glide ratio of better than 50 to 1, with which the nearest airport could be reached on most cross-country trips.

Rudder trim is by spring load on rudder control cables, this load being cranked by hand instead of being applied by foot pressure. Vertical fin and rudder area have been increased 35 per cent over that on single-engine Navions. The fin, incidentally, is a horizontal stabilizer turned up on end.

A small quadrant with propeller, throttle and mixture controls was mounted on the instrument panel of the demonstrator, but all conversions beginning with the No. 2 airplane will have a floor-mounted pedestal for these controls. This simplified the routing of control cables and provides needed space on the instrument panel. Toe brakes replace the familiar hand-operated brake, and the front seats are mounted on tracks for full fore-and-aft travel to facilitate entry.

Stalling speeds for the Twin Navion Conversion at gross weight are 67 mph. with no power, no flaps and gear up; 60 mph. with power off and full flaps, and 54 mph. with power on and full flaps. The airplane retains the single-engine Navion's excellent stall characteristics.

Its 1,400-ft.-per-min. rate of climb at sea level and gross weight is at an unusually steep angle. Holding this down to about 1,000 ft. per min, or less on take-off is much more practical and results in rapidly building up higher control speeds. However, gear retraction limits this initial speed build-up and quicker gear retraction is being provided.

As could be expected from a conversion, weight has been added. But surprisingly little has gone into structure. In addition to the nacelles, which are full monocoque of the DC-3 type,

the wing center section box structure has been extended one bay outward on both sides. This was done with 4 small shear webs and one rib on each side.

But while some weight has been added, an increase in gross weight has also been obtained. The basic empty weight of a Riley Twin Navion Conversion is stated as being 2,050 lbs., with a gross weight of 2,950 lbs. Fully equipped according to the contract for conversion, and with radio and 20-gal. auxiliary fuel tank (total fuel capacity 60 gals.), the empty weight is 2,175 lbs. Riley expects to have the gross weight up to 3,100 lbs. during 1953, after the new 150-hp. engines become available.

The Lycoming 0-290-D2 engines currently used are rated at 140 hp. for take-off at 2,800 rpm., with a normal rating of 135 hp. at 2,600 rpm. Forward of the firewall, these engines and their mounts, accessories and cowl are literally "power packages" off the widely-used Piper Pacer. On the Pacer, the engine has a 3-degree downward angle from the line of thrust and on the wings of the Navion it has a 4-degree downward angle. Ground clearance for the 74-in. propeller is 14 inches.

Fuel consumption for the 4-cylinder Lycoming is 7.7 gals. per hr. at 75 per cent of power. At 60 per cent of power, consumption is less than 6 gals. per hr. per engine. Either engine can be operated off the total fuel capacity.

Because of the small Lycoming's low-cost maintenance, Riley is planning to offer an airplane rental or leasing service in which a business firm can obtain a Riley Twin with no capital investment and at a cost of only 12 cents per mile, or about \$18 per hour, the customer to pay for his own fuel, oil and 100-hr. checks. Riley would furnish the airplane and overhauls. Minimum rental would be for 50 hours monthly.

He is enthusiastic over the possibilities opened up by the Twin Navion Conversion program.

"Twin-engine operation at an economical cost brings safe day-or-night flying within the reach of many aircraft owners who could never afford the costs of larger twin-engine airplanes, and to owners of large planes who need an auxiliary twin," Riley said. "Safe flying will greatly increase the airplane's usefulness and more usefulness means that flying will take on added value to many people. The Twin Navion Conversion will prove itself by offering the user 40 per cent more utilization—at economical costs."

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