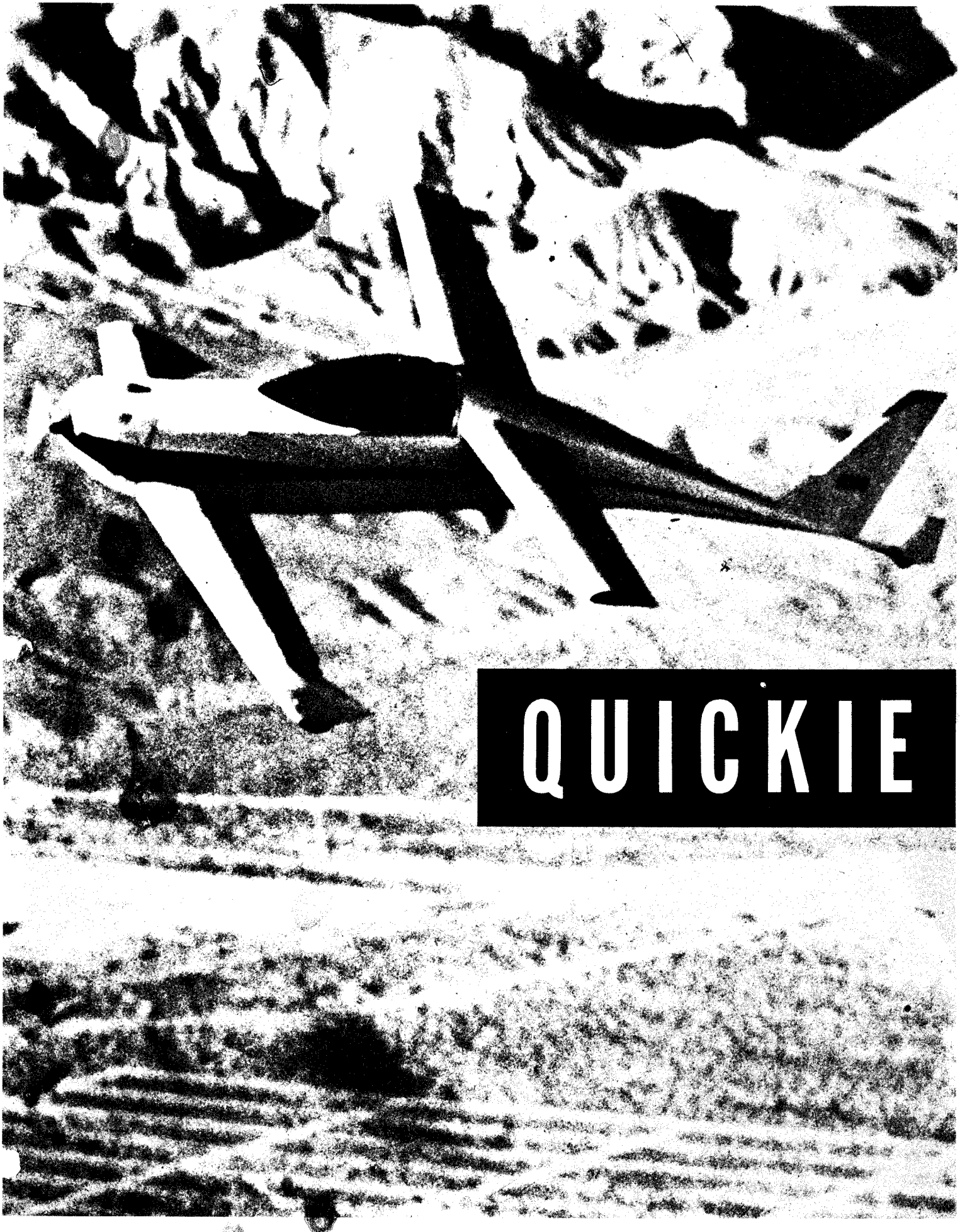


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BUILDING 68
MOJAVE AIRPORT

$6.00 per copy

## PUTTING THE QUICKIE IN THE PROPER PERSPECTIVE

The Quickie is not intended to be an aircraft for everyone. A Quickie will never win the World's Aerobatic Championship, and it should not be outfitted with wing deicer boots and complete avionics so that it can fly IFR; nor is it the perfect airplane for the pilot that weighs 270 pounds, unless he is willing to go on a strict diet while he is building one.

A Quickie is a fun aircraft; it is a reasonable aircraft for today; it is a creature that brings the exhileration of flight to individuals unable to afford the machines turned out by Wichita; it is an airplane that a pilot can measure himself against — it does not fly so high that man needs help breathing, it does not require an A&P mechanic to keep it in perfect order, and it does not require a 10,000 hour pilot to utilize its maximum capabilities.

It is sport; some people race boats, others race cars, some spend $20,000 for a motor home, others buy snowmobiles, some buy motorcycles that are capable of speeds more than twice the national limit, others collect rare stamps — we just like to fly airplanes.

It is inexpensive; while your earthbound friends struggle to obtain 30 miles-per-gallon at 55 mph, you triple that figure at twice the speed; instead of a torturous 9 hour drive from Los Angeles to San Francisco, you take 4 hours enjoying the California coast.

A Quickie is meant to go places and do things; faster than a speeding locomotive, able to leap tall mountains in a single bound, in great style, and always with much fun and amusement.

The "Quickiest" way to meet people in an unfamiliar town is to fly in to the local airport in a Quickie. People can't resist; their jealous, they hold you in awe for flying this strange airplane, they know secretly that in the game of one upsmanship, that they have been topped.

If you can accept the Quickie in this spirit, you will never be disappointed, and you will be hard-pressed to find a sport that will give you more fun for less money.

lt. to rt. - Gene Sheehan, Dan Sabovich (Mojave Airport Manager), Congressman Barry Goldwater, Jr., Burt Rutan. This picture was taken during the Congressman's visit to see the Quickie.

## THE ECONOMICS OF OWNING A QUICKIE

Many pilots who may be considering purchasing or building an aircraft look only at the initial purchase price when considering how much the aircraft will "cost" them. This is a fallacy since the owner will usually spend more on maintaining a typical aircraft than he spent to obtain it in the first place.

Most pilots will agree that it is difficult to find a production airplane cheaper to fly than a Cessna 150. Let's compare the cost of fuel and oil for one year of a Cessna 150 and a Quickie.

We will assume that each aircraft flies 200 hours a year. Since the Cessna burns 6.1 gallons per hour as opposed to the Quickie which burns 1.5 gallons per hour, the Cessna uses 4.6 x 200=920 gallons of fuel more per year than the Quickie. At current prices, that is over $800.00 more per year to operate the Cessna! In addition, the Cessna uses a quart of oil every 10 hours, whereas the Quickie uses a quart every 50 hours.

To overhaul a Cessna 150 engine will cost about $3,000; to buy a new Quickie engine will cost less than $1,000.

Since the Quickie lacks complex systems, and since the owner of a homebuilt can legally do all of his own maintenance, a large savings is realized in maintenance cost over the Cessna 150 owner who pays about $17.00 per hour shop rate, and maybe $200.00 to overhaul the carburetor. We all know about the inflated prices of components with "Aircraft" stamped on them. Remember, maintenance costs are proportional to the Initial purchase price, not the market value; and $17,000 is considerably more than $4,000, isn't it?

**THINK ABOUT IT.**

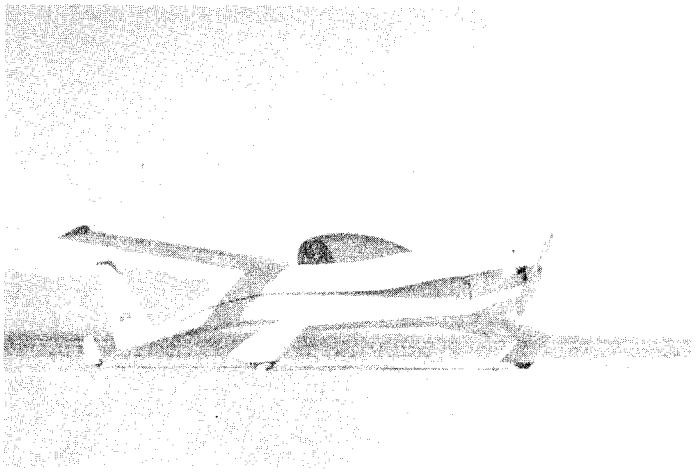
## THE CHINO, CALIFORNIA FLY-IN

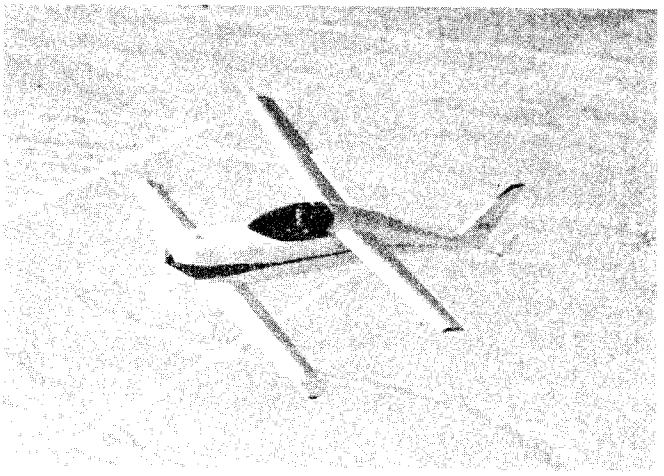
We recently attended the Chino, CA. fly-in. This event is the largest fly-in in southern California.

Over 40,000 people had the opportunity to inspect the prototype Quickie up close, ask questions, and see the aircraft demonstrate its unique abilities in the Sunday Airshow.

The routine flight to and from Chino was made at 7,500 ft. and 110TAS. The aircraft required only 6 gallons of fuel for the whole weekend of flying!

Incidentally, we had planned to arrive at Chino a day early but were delayed by the 45-70 knot surface winds that blew for two days at Mojave. Nevertheless, we did fly the Quickie Friday, May 5, in 45 knot winds for about 30 minutes. The aircraft handled the moderate turbulence and gusty winds better than a Cessna 150 would have; the only other aircraft to fly at Mojave that day was a twin Beech. The Quickie required no assistance in taxiing to and from the runway, and felt more secure than most tricyle gear light airplanes.





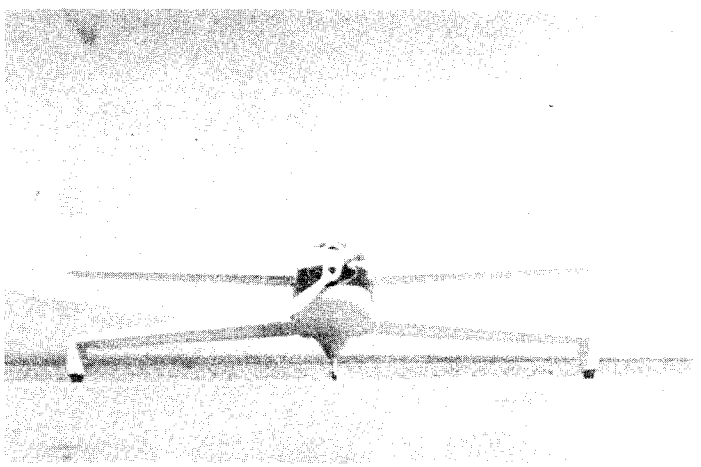
## WHAT IS A QUICKIE?

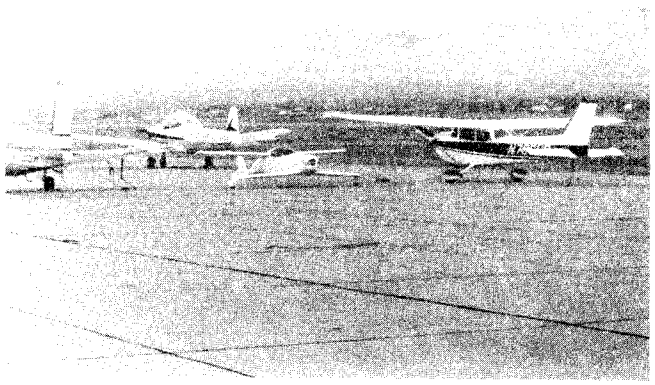
Today, it is becoming increasing difficult for the average pilot to fly for his own recreation and pleasure. Basic airplanes like the Cessna 152 cost $17,000 new, fuel prices are nearing the $1.00 per gallon mark, and aircraft maintenence costs have soared.

The Quickie was designed to counter this trend. It is a lightweight, single place sport aircraft featuring a rugged all-composite structure and efficient aerodynamic design. It is an airplane that combines a low initial cost and a very low operating cost with reliability, safety, and exquisite flying qualities. Those were the ambitious design goals. Just how well we have succeeded is detailed on the following pages of this Information Package.

The Quickie is an aircraft that you can create in approximately 400 manhours. It is powered by a rugged four-stroke, direct drive engine of 18 h.p. that results in performance comparable to popular general aviation aircraft with several times the horsepower, while providing unequalled fuel economy. The roomy cockpit can handle a pilot 6'5" tall weighing up to 210 pounds, and the 8 gallon fuel tank can take him over 700 miles.

We respectfully invite you to carefully compare the Quickie to its competition. We think you will agree that it is more fun for your dollar than any other aircraft.





Quickies resemble X-fighters.
(Darth Vader, eat your heart out)

Quickies don't have any problem finding a place to park.

## BACKGROUND

When the development of a new homebuilt aircraft is undertaken, it is often closely followed by the public, and can even be viewed on static display at fly-ins and airshows during its construction period, at which time its performance and cost estimates are echoed by the developers. This is not the policy of our little skunk works at the Mojave Airport. The development of the Quickie was one of the best kept secrets in aviation. Until its first flight on November 15, 1977, its existence was known only to a handful of people.

The Quickie story began in early 1975 when Gene Sheehan and Tom Jewett began looking for a reliable 12 h.p. to 25 h.p. engine that would be suitable for powering an efficient, single place, sport aircraft. The search included two-stroke and four-stroke engines used in chainsaws, garden tractors, motorcycles, and automobiles. It was very frustrating because engines that were light and powerful lacked reliability, and those engines that promised reliability were either too heavy or not powerful enough.

Finally, in January 1977, Gene located an engine that appeared to be reliable, possess sufficient power, and be possibly light enough to serve our purposes. It was an opposed two cylinder, direct drive, four-stroke engine that produced 16 h.p. from 40.3 cubic inches of displacement and weighed 104 pounds in stock configuration. It was used in various industrial applications at a continuous 3600 r.p.m. Deciding to thoroughly investigate this engine, Tom purchased one and Gene set out to strip off the unnecessary weight and convert it to turning a propellor on a ground test stand.

By early April, the engine was ready to run on a test stand. For the next two months, Gene and Tom sorted out cooling, induction, and vibration problems associated with the aircraft application while building running hours to verify its reliability.

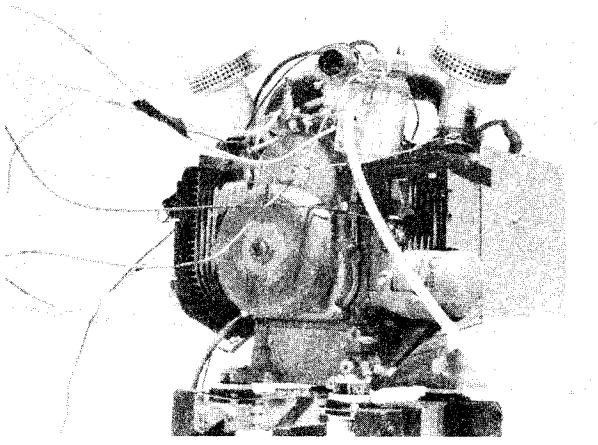
By early May, both individuals were convinced that this 16 h.p. engine was a viable powerplant for aircraft. The problem at hand then was to design an airplane that was light enough and clean enough to provide good performance and unequalled fuel economy using this engine. It was a considerable challenge to combine the required low drag aerodynamics with a structural weight of less than 100 lb.

Tom and Gene contacted Burt Rutan, an old friend, who was noted for developing efficient designs and lightweight structure. Burt was impressed by the demonstrated reliability of the engine and set out to develop a suitable airplane configuration. Early attempts were unsuccessful because obtaining low enough drag necessitated a retractable landing gear that increased the weight and the complexity. Most pusher configurations analyzed would balance properly only with a narrow range of pilot weights. Finally, the tractor canard/tailless biplane concept was discovered. This solved many problems. The pilot sits near the center of gravity, and the combined canard and landing gear is simple, has low drag, and is weight efficient. This configuration allows a design goal of safe stall characteristics. Its compactness allows a "glue together" airplane, saving weight on wing attachments. It was decided to place a full-span elevator/flap on the canard, inboard ailerons on the rear wing, and to use the tailwheel fairing as the only rudder.

Once this concept was established, a detailed plan to develop the Quickie was agreed on. It involved Tom and Burt doing the detailed design work in June and July while Gene conducted further engine development. Construction work on the prototype began on August 13, 1977. The construction phase, including tooling for the cowling and the canopy, took 400 manhours over a three month time period. First flight occurred on November 15, 1977. Burt, Tom, and Gene all flew 77Q on the first day, and it compiled over 25 flight hours within the first month.

**The Quickie design was frozen on 14 April 1978, after the successful completion of the entire flight test program. At that point Burt became inactive so that he could pursue other projects.**

**Quickie Aircraft Corporation has been formed by Tom and Gene to market the Quickie and to support all of the builders. The Quickie is being offered as a complete kit including engine.**

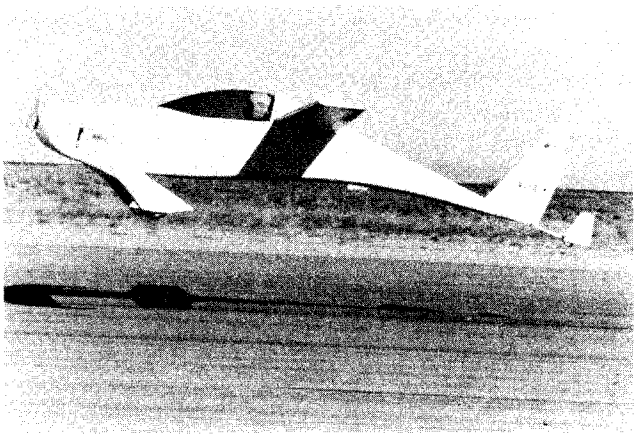


The Onan engine running on the test stand during the early development program.

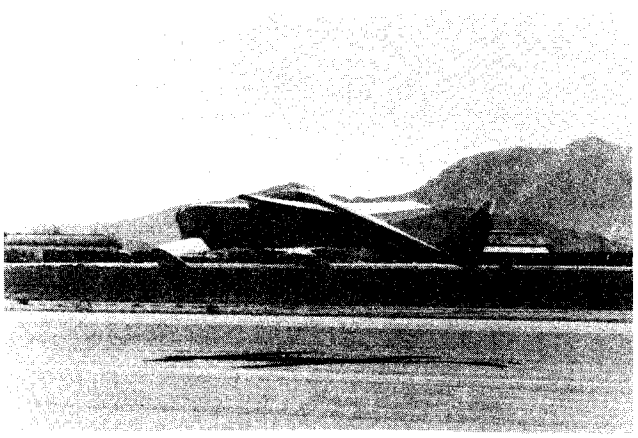
# FLIGHT TEST PROGRAM

The basic Quickie design has been frozen, as of 14 April, 1978. All basic flight testing has been completed, with engine/airframe testing now exceeding 150 hours. Testing has been completed in the following areas:

1. Basic performance and stability & control testing throughout the entire center of gravity range at gross weights ranging up to 515 lb., which is 35 lb. over the design gross weight.
2. Flutter testing to 162 IAS at 6,000 ft. (about 180 TAS).
3. Fuel economy measurements with a very accurate fuel totalizer have confirmed that at maximum cruise speed (121 mph), the fuel economy is 80 mpg. At economy cruise, the fuel economy exceeds the magic 100 mpg figure.
4. Stall/departure/spin testing; the Quickie prototype could not be made to spin during any phase of the test program.
5. Engine and system durability and reliability; except for normal maintenance, no work has been necessary on the modified Onan powerplant. Further, no powerplant failures have occurred.
6. Landing gear energy absorption tests to FAR Part 23 certificated aircraft standards.
7. Static load testing of the entire airframe to FAR Part 23 standards in the Utility category.
8. Crosswind and turbulence testing: the aircraft has been operated in 50 knot winds and moderate turbulence, including takeoffs and landings with a 12 knot, 90 degree crosswind component. Taxiing and takeoff and landing has been accomplished in 50 knot winds.
9. Independent pilot evaluations: Both Peter Lert of Air Progress and Peter Garrison of Flying have evaluated the Quickie.



One of the first liftoffs of the Quickie



An early runway flight to verify basic stability and control predictions.

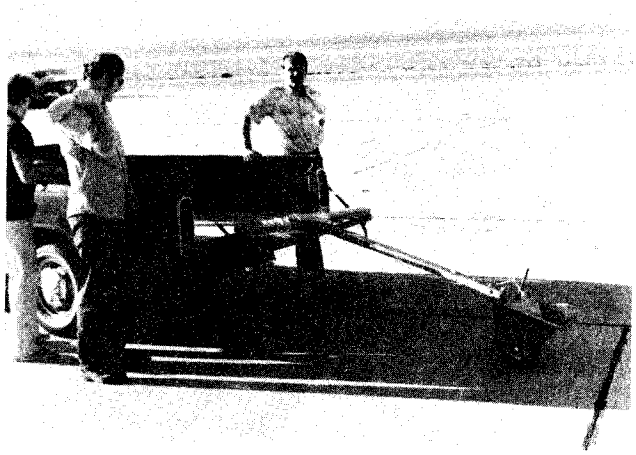
Up, Up, and away

The maximum speed obtained to date has been 123TAS at 3,000 ft. Extrapolating this data to sea level yields a speed of about 126.5 mph. Since our prototype is "dirty" in many areas, a well built Quickie might very well exceed these figures.

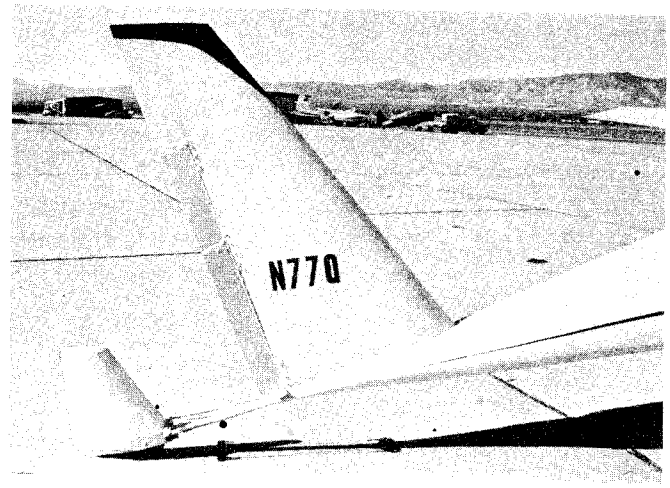
All of our performance data is based on the average of many flights and test points.

It is interesting to note that an airplane that obtains 1 mph cruising speed per 1 h.p. (e.g. the Mooney 201 goes 195mph on 200 hp) is considered to be a very efficient design. The Quickie obtains nearly 7 mph cruising speed per 1 h.p.!

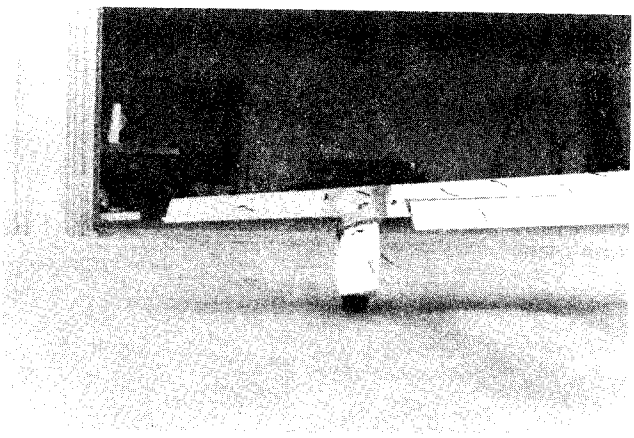
Think about it.

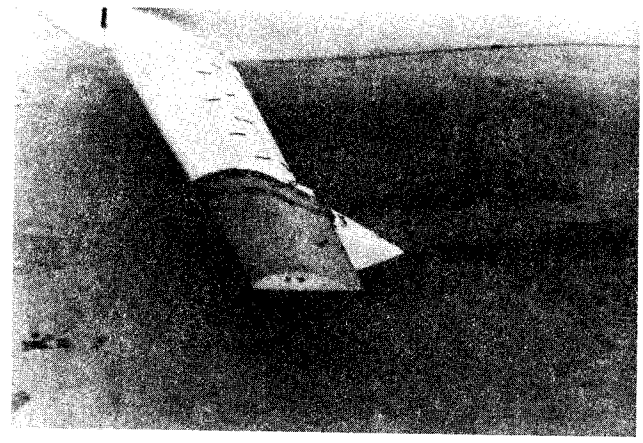


Much ground testing was accomplished, including this picture of our brake system test. Actually, Gene is practicing lifting lead shot bags while Tom holds down the side of the truck.




The new rudder/fin configuration.





The effect of increasing the aspect ratio of the canard and reducing its loading was investigated with these canard extensions, which have since been removed. The tufts of yarn are used to determine the airflow patterns around the wing.

## CONFIGURATION CHANGES

The flight test program has resulted in several configuration changes since the Information Package was published. After testing a slotted flap arrangement on the original canard, it was decided to build a new, higher aspect ratio(i.e. skinnier) canard of greater area, using a plain flap. This change set the flight test program back about 30-45 days. While the slotted flap on the original wing did lower the stall speed by about 6 mph, it resulted in rather abrupt stall characteristics, which we felt were undesirable in light of the excellent stall characteristics that we had enjoyed with the original wing and the original plain flap. The slotted flap also reduced the basic stability margins, resulting in an aircraft that was more sensitive than the original configuration had been.

In addition to the higher aspect ratio canard, 16" of span has been added to the rear wing. The resulting reduction in induced drag, and increase in wing area from these two changes, has resulted in a dramatic improvement in performance with the 18 hp engine:

1. The current aircraft at 5,000 ft MSL will climb 160 ft/min at full power at minimum speed. The corresponding value at sea level would be 300 ft/min. Max climb is 425fpm.
2. The aircraft will still climb at minimum speed at 9,000 ft MSL.
3. The Quickie was still climbing at 12,000 ft at gross weight without a mixture control.
4. Fuel economy of 80 mpg at 120 mph and over 100 mpg at a slower speed has been verified.

## PILOT EVALUATION OF FLYING QUALITIES

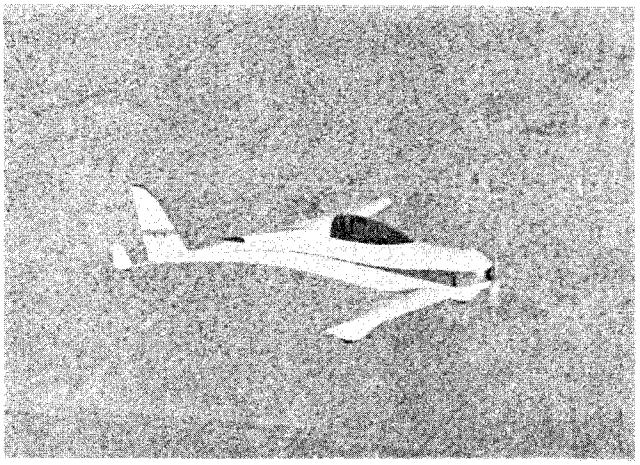
Cockpit entry is easy because the main instrument panel is part of the canopy and is, therefore, out of the way when the canopy is open. The fuselage longeron is only 34 inches above the ground (about the same height as the seat of a motorcycle), allowing even short pilots to climb in without a step. Once in, the pilot finds a very comfortable semi-supine seat with good thigh and lumbar support, and a headrest. Throttle and sidestick locations allow the pilot to rest his forearms on the side consoles(armrests) to further reduce fatique on long flights.

Ground handling is a real pleasure. The Quickie's very positive tailwheel steering together with its wide landing gear stance allows a pilot to make zippy taxi turns that would tip over the average light plane! Since the tailwheel is not forced off the ground during the takeoff roll like a conventional taildragger, positive tailwheel steering is available all the way to lift off speed. Still, the Quickie's handling characteristics are enough like a taildragger that the Owners Manual will recommend some taildragger time before flying one. However, the Quickie is possibly the most docile taildragger around and has little tendency to ground loop.

Flight handling is the Quickies most attractive feature. In spite of its unique configuration, the handling qualities are superior to conventional aircraft. For example, the Quickie has less adverse yaw, better stall characteristics, and improved visability over the average lightplane. Its control harmony and dynamic damping are superb, which makes it an easy aircraft to fly, even for low time pilots. There is no portion of the flight envelope that can be considered "sensitive" in any way. The Quickie will hold airspeed within 5 knots when flown hands-off-the-controls, even in turbulence.

Takeoff is a bit different than the conventional taildragger or nosegear aircraft. Because of the location of the elevator, the airplane does not rotate for takeoff. If the pilot holds full aft stick during the takeoff roll the airplane will lift off at about 53 m.p.h. If pitch control is held neutral, the airplane lifts off at about 58 m.p.h. In both cases, the pilot has the impression that the airplane "levitates", or rises level, rather than "rotating". If the pilot holds the stick full forward during the takeoff roll, the tailwheel will raise at about 50 m.p.h. and the aircraft will not takeoff. With the tailwheel raised(not a normal maneuver), the directional sensitivity is increased, but it is still easily controlled as it is very similar to a Piper Cub during its takeoff roll.

Attitude reference is much better than other small airplanes since the canard and long nose are in the pilots peripherial vision. This makes the Quickie easier to land than other small airplanes since the height above



ground as well as the roll attitude are very obvious to the pilot during the flare. Each person who has flown the Quickie has remarked on how comfortable and confident he felt, even on the very first landing.

Smooth turns can be accomplished with ailerons, rudder, or both - all giving more than adequate roll rate. Sideslips are conventional. Even though the Quickie has low horsepower, it can perform continuous 60-degree bank turns without losing altitude, something a 108 h.p. Grumman Trainer has difficulty doing.

The Quickie's lift-to-drag ratio of 13 is better than conventional lightplanes, giving it a relatively flat approach without a high sink rate, even with power at idle. The recommended final approach and best climb speeds are the same - 70 m.p.h. indicated. We generally fly the pattern at 75 m.p.h., slow to 70 m.p.h. on final, and touch down at 55 m.p.h.

Stall characteristics are safer than a conventional aircraft. With any power setting, the airplane can be flown at full aft stick without a departure from controlled flight. The airplane generally exhibits a mild to moderate "pitch bucking" (a up and down pitch motion) when near full aft stick. The airplane will drop a wing if the rudder is uncoordinated while at full aft stick, but recovery is easy and immediate. Trim change with increasing power is a mild nose up tendency. Roll and yaw trim changes are negligible. Peter Lert, an experienced test pilot, was unable to make N77Q spin. The June, 1978 issues of Flying and Air Progress contain feature articles and independent pilot evaluations

## PERFORMANCE IMPRESSIONS

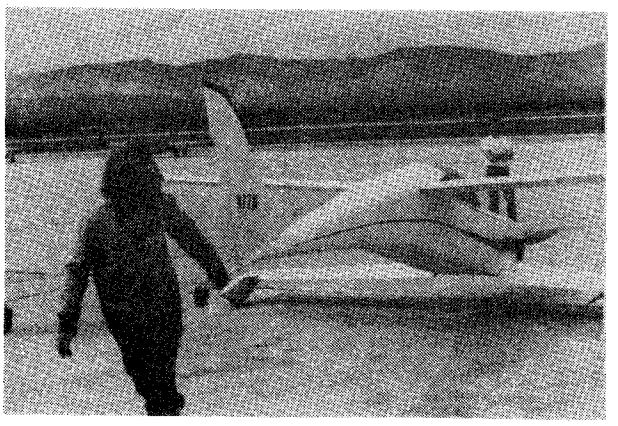
Takeoff acceleration is initially quite normal but bleeds to somewhat lower than youre used to with high-horsepower airplanes while accelerating from 40 m.p.h. to the liftoff speed of 50 m.p.h. This, combined with the relatively low climb rate, is the only indication the pilot has that he is flying with only 18 h.p. Once he accelerates out to above 100 m.p.h. indicated, he has the feeling that he is flying a 100 h.p. lightplane! Even though the climb rate is low, the airplane will climb at a very wide range of speeds. At gross weight, at sea level, with the 18 h.p. engine, the airplane will climb at any speed between 53 m.p.h. and 127 m.p.h.

## INDEPENDENT PILOT EVALUATIONS

The Quickie has been flown by six pilots: Tom Jewett, Gene Sheehan, Burt Rutan, Peter Garrison (Flying), Peter Lert (Air Progress), and Dick Rutan.

Peter Lert, who is an experienced test pilot, as well as the individual who performed the flutter and spin testing on the VariEze, has made five flights in the Quickie to date. The June, 1978 issue of Air Progress has a pilot report by him, as well as a feature article on the Quickie. Peter has been very enthusiastic about N77Q, indicating that he felt it would make a significant contribution to the homebuilt aircraft movement by virtue of its low cost, excellent operating economy, safe flight characteristics, and fun-to-fly feeling.

Peter performed the aft CG spin testing on the Quickie prototype on 1 April, 1978. Using the standard entry techniques (coordinated, uncoordinated, and cross-controlled entries using full control inputs from both normal 1g flight and accelerated stall maneuvers), he was unable to make N77Q spin. In fact, all that he could induce with crossed controls and full rudder deflection, was a steep spiral that resulted in an airspeed of about 130 IAS after a 360 degree turn. On the basis of his independent testing, we have concluded that N77Q has very safe low speed flying characteristics and is not susceptible to spinning, even when provoked.

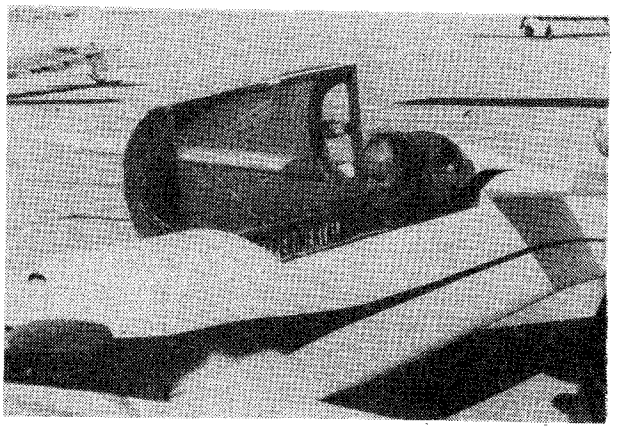


Peter Lert was having so much fun that he wouldn't let anyone else move the Quickie around!

Peter Garrison of Flying has also flown the Quickie. His feature article on the aircraft appears in the June, 1978 issue of Flying. When asked after his flight if he could compare the ease of piloting a Quickie with another light aircraft, he replied that he didn't think that he had ever flown an easier to fly airplane.

Peter began feeling at home in the aircraft so "quickly", in fact, that 10 minutes after his first takeoff, he was back doing 150 mph passes at 3 ft. AGL outside the test center! He reported later that the excellent low speed characteristics made him feel so confident, that he felt that he could do no wrong in the airplane!

We have believed all along that the Quickie is a remarkable airplane. It is very gratiflying to have independent confirmation of that fact.



Peter Garrison

## QUICKIE NEWSLETTER

The Quickie Newsletter is published quarterly(January, April, July, and October) by Quickie Aircraft Corporation. It will be the official means of communication on the Quickie program including:

1. Plans changes.
2. Dates and locations of seminars, visits, and open houses.
3. Newly developed options to the basic Quickie.
4. Future developments.

The subscription rate for one year is $6.00 for the U.S. and Canada, and $8.00 for Air Mail overseas(U.S. funds only).

We have been receiving a considerable number of letters that require a personal reply. We will continue to try to answer these, but please include a SASE.

## QUICKIE AVAILABILITY TO BE SEEN BY PUBLIC

In order that the maximum number of people will have the opportunity to see the Quickie, we plan to make ourselves and the aircraft readily available for the next few months.

To start with, our normal hours at our Mojave Airport, Building 68 facility will be 9:30 to 5:30, 7 days a week. On Saturday and Sunday, weather permitting, we will give flight demonstrations whenever the interest warrants it. Although we cannot promise it, visitors will probably be able to see the progress on Quickie s/n 0002, our production prototype currently being built in Building 68.

We also intend to participate in some flyins within reasonable distance of Mojave, including Oshkosh. We may have to close Building 68 on these occasions. Therefore, please call first if you will be traveling far.

## CONSTRUCTION DETAILS

The structure of the Quickie is a sandwich of high strength fiberglass, using low density, rigid foam as the core material. This structure is fabricated directly over the shaped foam core so that expensive tools and molds are not required. Composite sandwich structure offers the following advantages over conventional wood or metal: less construction time requiring fewer skills, improved corrosion resistance, improved contour stability, better surface durability, a dramatic reduction in hardware and number of parts, and easier to inspect and repair.

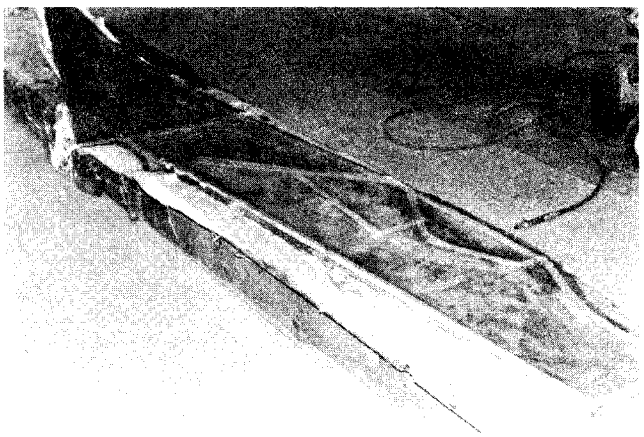
Keeping the structural weight of the aircraft to a minimum was necessary because the Quickie uses an engine of low horsepower and relatively heavy weight. While other designers have obtained low structural weights, it has usually been necessary to compromise the durability of the surfaces by using very light gage aluminum. This results in an aircraft that can become wrinkled and dented within a short time of entering service unless extraordinary care is taken during the ground handling operations. In fact, it is not unusual in an ultralight aircraft to find that the ground handling loads are far in excess of the loads seen during flight.

The Quickie was designed to provide durable outer surfaces that would remain intact for years with only normal precautions. For example, the canard can be walked on without damaging the structure in any way! Try that on any other lightweight airplane. Composite construction necessitates only a small weight penalty be paid to gain this important feature.

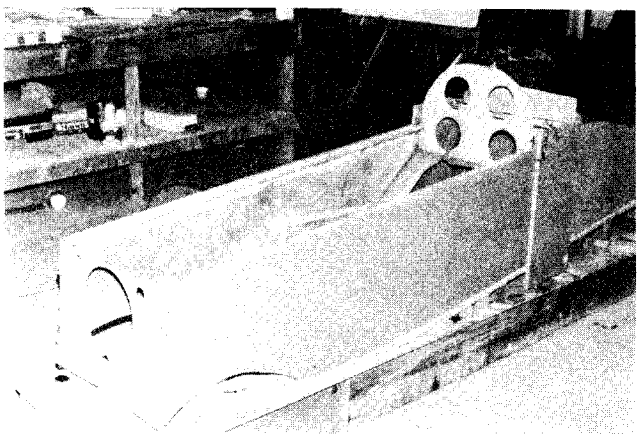
The techniques used in the construction of the prototype are detailed in the following series of photographs. Those of you familiar with the VariEze will notice that the methods are quite similar to, and generally simpler than, that aircraft due to fewer fittings, fewer jigs, and the generally smaller size.

Only 400 manhours were necessary to complete the prototype Quickie. This included the prototype engine installation, as well as making the tooling for the cowling and the canopy. It is conservative to say that building a Quickie requires only one-half to two-thirds of the manhours necessary to build a VariEze. This is because the Quickie is smaller, lighter, and simpler in concept.

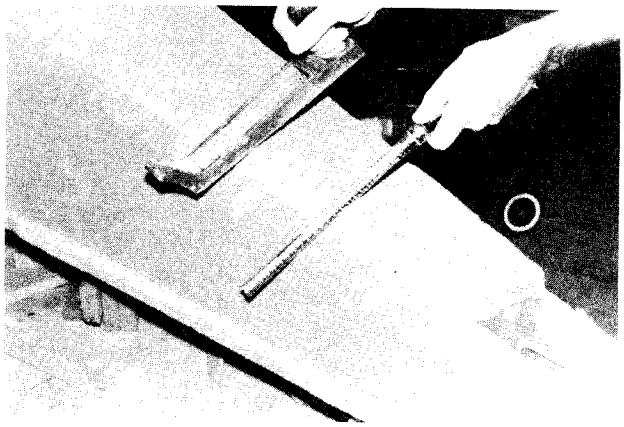
Gene Sheehan, who did most of the work on the prototype, had no prior experience with composite construction. He rapidly acquired the necessary skills, thus demonstrating that the first time builder is at very little disadvantage to the experienced composite worker.



This is the left side of the fuselage after it has been contoured and glassed on the inside. The two fuselage sides and the bottom are all cut from 1" thick foam and glassed on the inside to provide rigidity during the final assembly of the fuselage. This fuselage side took about 4 hours to prepare and glass.



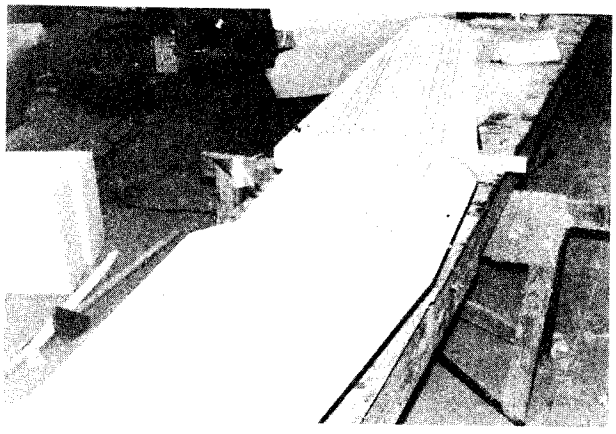
The two fuselage sides and bottom are held together with fiberglass tapes and the fuselage bulkheads, which are also made out of a foam core with glass on each side. Note that the fuselage outside has not been carved to shape yet.



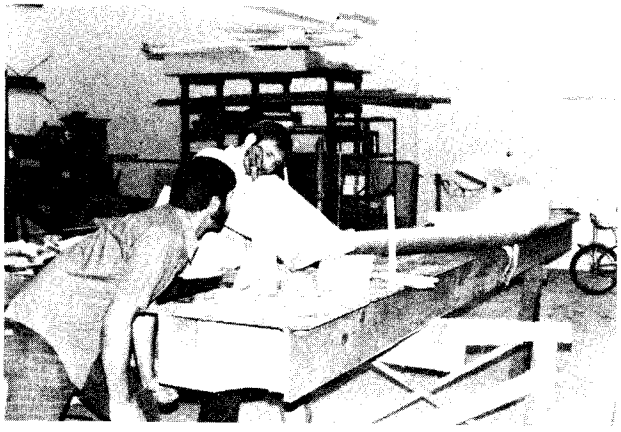
This picture was taken as foam was being removed from the top rear fuselage to contour it. Other tools used included a butcher knife and a hack saw. Contouring the entire fuselage took 6 manhours.

After the fuselage is carved to the desired shape, it is glassed on the outside. The fuselage is upside down in this picture to facillitate glassing the bottom.

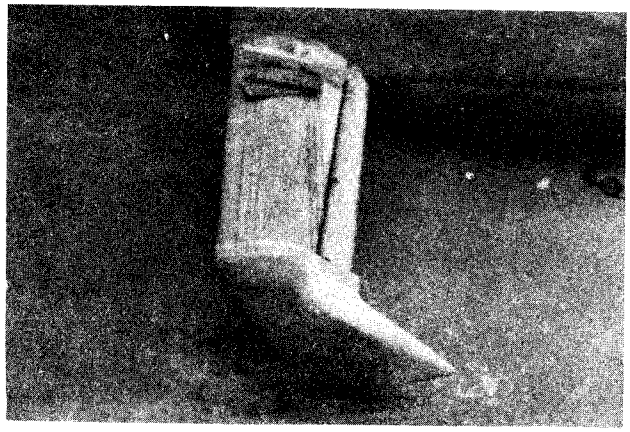
The wheel pants are of built up composite construction. Here the right one is being contoured prior to being glassed and mounted on the canard.

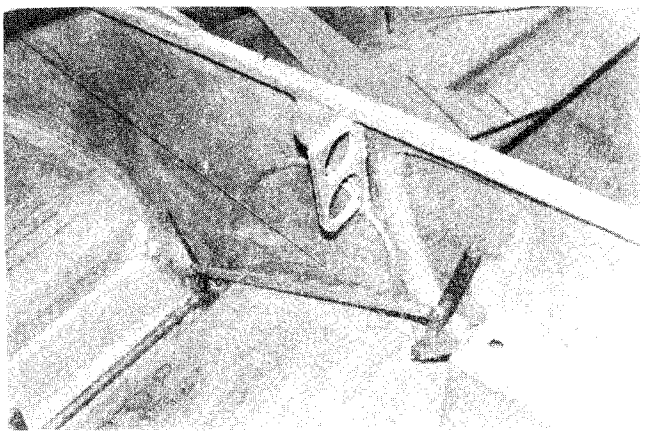


Here is a picture of the solid foam core of the canard prior to glassing the top skin. The core is jigged on the table and the bottom skin is already on. The lines running spanwise represent the locations of the unidirectional glass spar caps that are added after the glass skin is put on. Approximately 25 manhours are in the wing at this point.

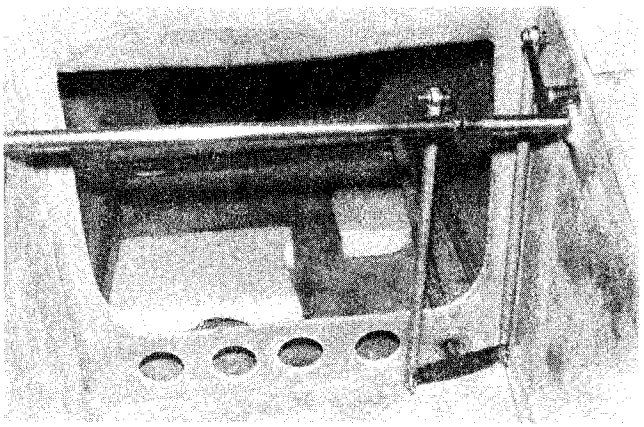


This is a picture of Burt lining up the wheel pants on the canard, which is upside down here.

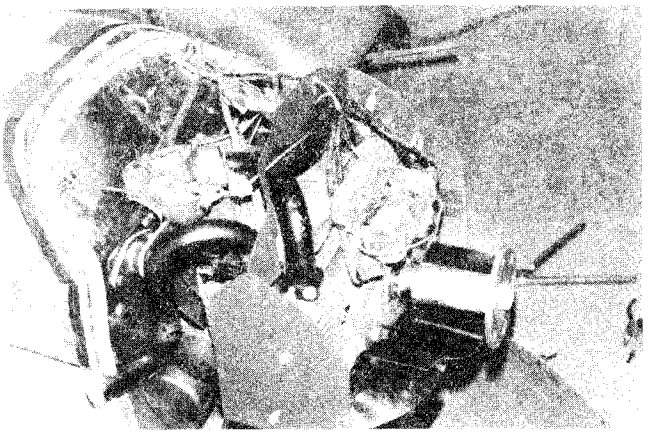




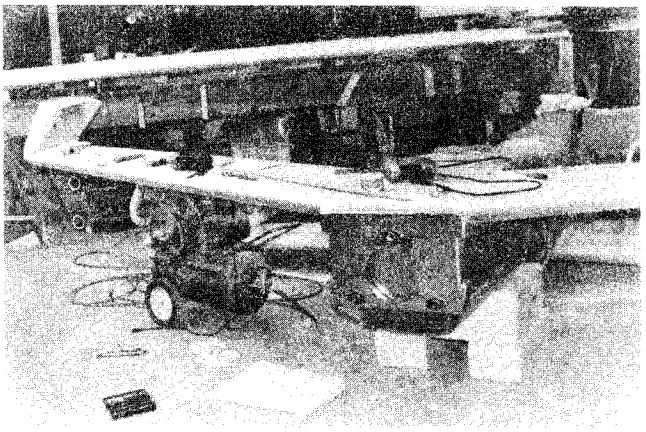
Complete pitch control system installed.



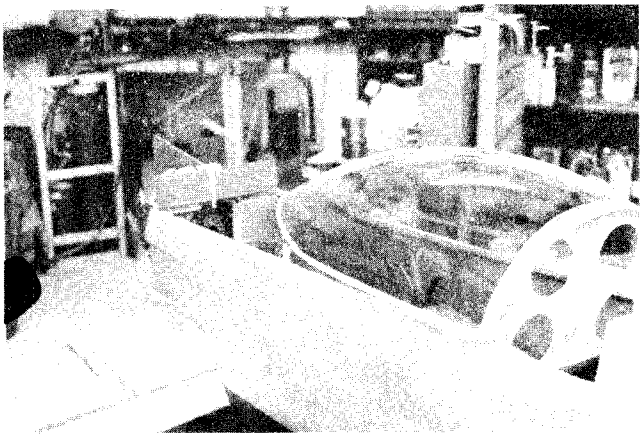
The complete aileron system installed.



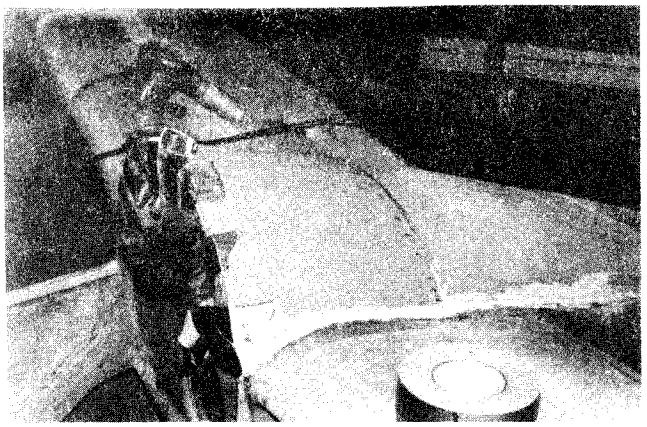
Original prototype engine installation.



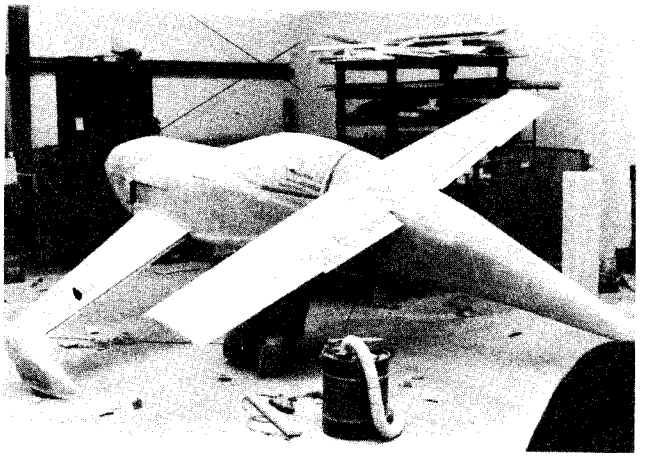
Composite airplanes make good work benches.

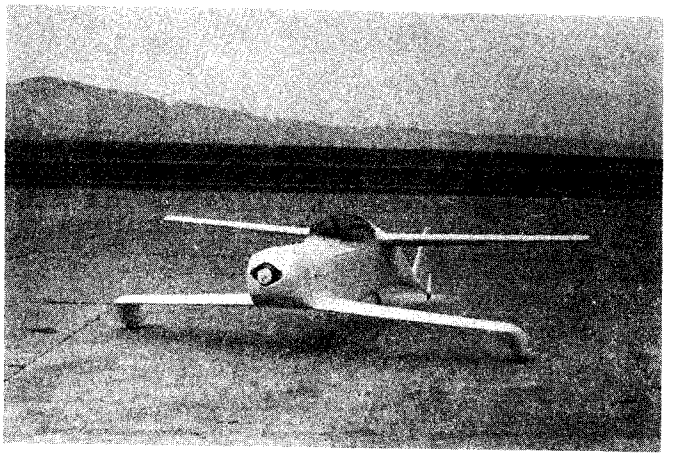


Quickie canopy after trimming being trial fitted on the fuselage. The cardboard templates help to visualize the contouring.

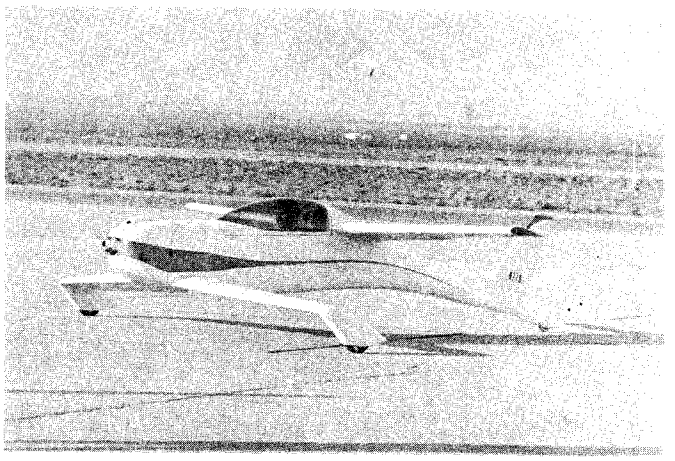


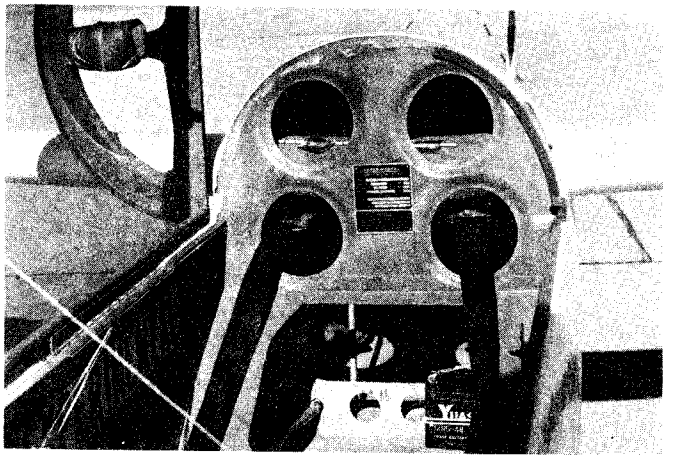
If you look closely you will see the chief inspector looking over the installation of the upper fuselage cover. He is very versatile and doubles as the lightweight test pilot.



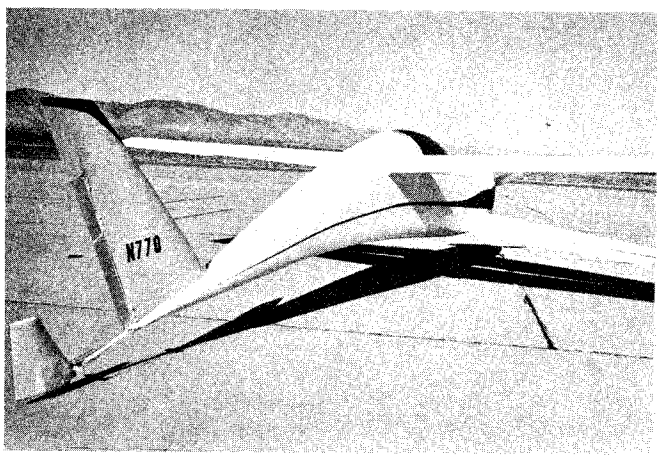


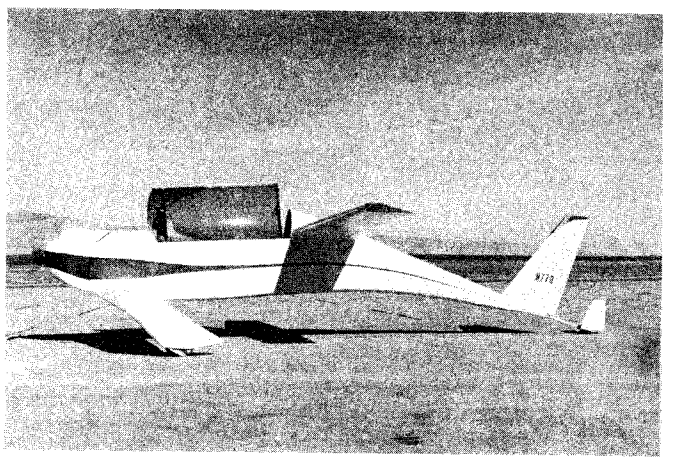
Two photos taken during the finishing process





The finished product



## ENGINE BACKGROUND AND DEVELOPMENT

The origin of the Quickie began with the search for an engine suitable for powering an efficient, lightweight, sport aircraft. This search required over two years. Until it was completed, no serious thought was given as to what the aircraft should look like because the aircraft was to be designed around the engine.

The requirements for the engine were simple enough:

12 h.p. to 25 h.p.
Lightweight
Small size
Low fuel consumption
Reliable, Reliable, Reliable

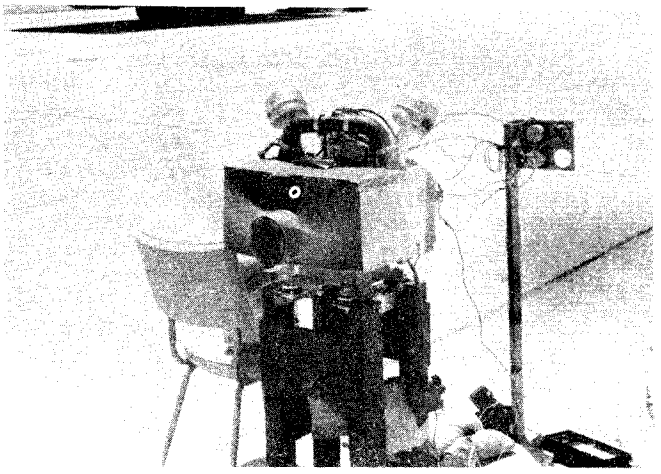
The engine selected is a four-stroke, horizontally opposed, two cylinder, direct drive type used in various industrial applications at a continuous 3600 r.p.m.

Many different types of engines were evaluated prior to making that selection.

TWO-STROKE - These engines have several desirable features including high power, light weight, and few moving parts. The disadvantages include poor fuel economy, high r.p.m., high vibration level, poor mixture deviation tolerance, and questionable reliability for an aircraft application. Several small aircraft are using the McCulloch chainsaw engine. It is interesting to note that all of these airplanes are either powered hang gliders or powered sailplanes, and not intended for cross country use. Two-strokes are very mixture conscious; Throttle back with the mixture leaned, descend and forget to richen the mixture, and as soon as power is added the engine is likely to seize. Failing to lean the mixture at altitude, however, may lead to plug fouling. Most dirt bikes powered by two-stroke engines have two spark plugs for each cylinder so that the rider can switch plug wires when the first one fouls.

ROTARIES - The small Sach's wankel rotary engine has many of the desirable features of a two-stroke, and it is certainly smooth running. However, these engines have had seal problems when run for long periods at high power settings, and the fuel consumption characteristics are poor in the r.p.m. range necessary for good propellor efficiency. Besides, the engine is no longer produced.

FOUR-STROKE - These engines are the best ones for aircraft use. They have good fuel economy and tend to be very reliable. In the low horsepower examples, however, they tend to be heavy, or to require a high r.p.m., in order to produce sufficient power. One of the four stroke engines that Quickie Enterprises tested was a Honda CB-175 motorcycle engine. Initially, it was too heavy, but after removing the transmission with a bandsaw and deleting all other non essential parts, the weight was reduced to about 65 pounds. This engine produced about 18 h.p. at near 9,000 r.p.m. While Honda engines have a reputation for being very reliable, the drastic surgery required to reduce size and weight could very well have weakened the crankcase and, therefore, reduced the reliability.



Original engine on test stand in early May 1977. This picture was taken during a continuous 15 hour run.

One might ask at this point why not use a reduction drive system with a light weight, high r.p.m. four stroke or two stroke engine? There are several reasons not to including complexity, cost, and torsional vibration. Given enough time, money, talent, and luck, these problems can be overcome. Often, however, the solutions only complicate the aircraft further. For example, a clutch is often used to solve the torsional resonance problem, but then the engine must use an electric starter, which adds about 25 pounds of weight.

VOLKSWAGON ENGINES - A number of home-built aircraft have flown using VW engines. However, a stock VW typically requires considerably more maintenance than a normal aircraft engine. This is most probably because few automobile or motorcycle engines are designed for the type of continuous, high speed operation necessary for an aircraft.

INDUSTRIAL ENGINES - These engines tend to be very reliable, but also heavy. Most are designed to run near rated power for extended periods and usually are so dependable that oil temperature and oil pressure gauges are omitted. They have reasonable fuel consumption and frequently operate under extremely harsh conditions. Until recently, they were prohibitively heavy, and the single cylinder models have excessive vibration for an aircraft.

The Onan company has made over 1,000,000 two cylinder, hoizontally-opposed, four-stroke direct drive engines in the last thirty years for applications from electric generator sets to snow plows. They recently introduced some aluminum versions of their cast iron series of engines. These aluminum engines weigh 98-106 pounds in the stock configurations, some 50 pounds lighter than their cast iron counterparts.

After careful examination, it was determined that we would reduce the weight to slightly more than 70 pounds dry. While this may seem excessive for the amount of power produced(16 h.p. and 18 h.p.), they are very well built. Further, if the aircraft is carefully designed around the engine, as was the Quickie, the results are most satisfying.

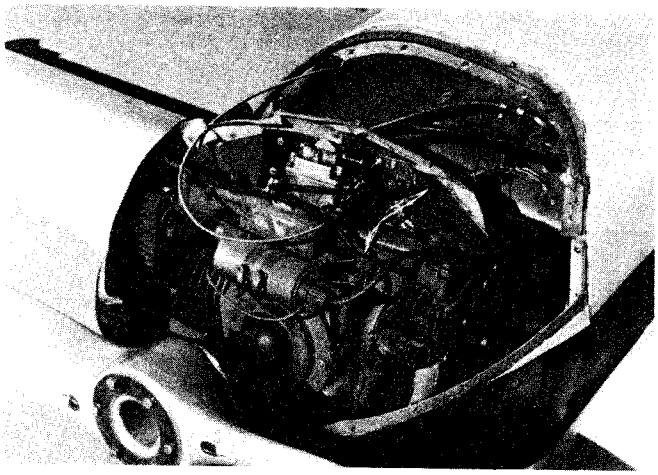
Some design features are as follows:

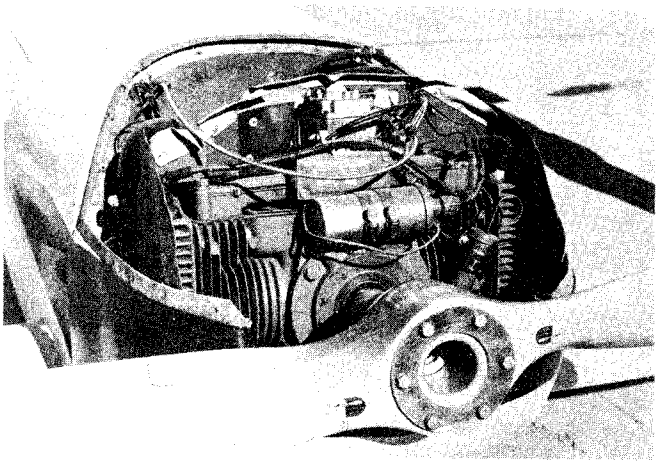
| | | |
|---|---|---|
| H.P. | 16 @ 3600 rpm | 18 @ 3600 rpm |
| Type | 2-cylinder, horiz.-opposed, four-stroke | |
| Bore | 3.250" | 3.250" |
| Stroke | 2.625" | 2.875" |
| Displacement | 43.4 $in^3$ | 47.7 $in^3$ |
| Compression | 6.0:1 | 6.6:1 |

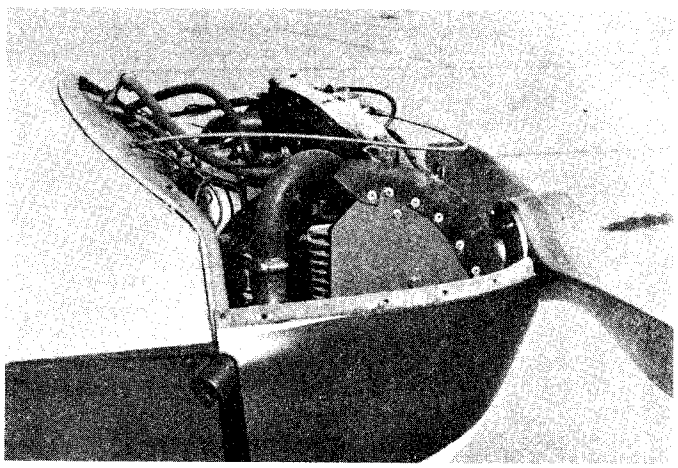
The manufacturer recommends up to 1000 hours between major overhauls for a normal industrial application. At this time, there is not enough data to state what the TBO in an aircraft application for a Quickie engine will be. However, it should be noted that in comparison with most industrial applications, the aircraft environment is cleaner, and owner maintenance more regular.

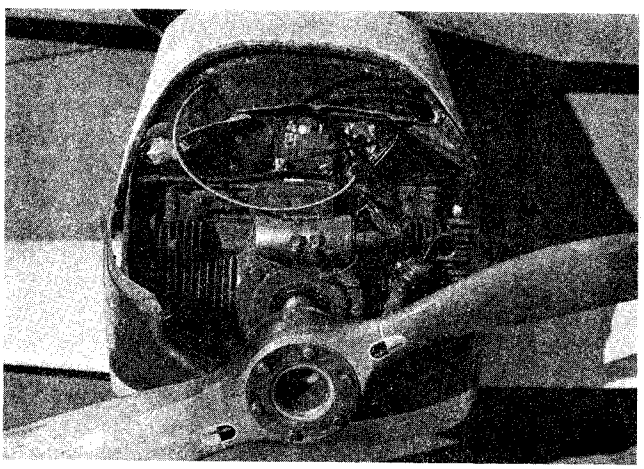
A thorough development program has been undertaken by Quickie Aircraft Corporation to develop this basic Onan engine into an aircraft powerplant specifically for the Quickie. Much testing has been accomplished in the areas of induction, exhaust, cooling, mounting, ignition system, and the engine-airframe compatibility.

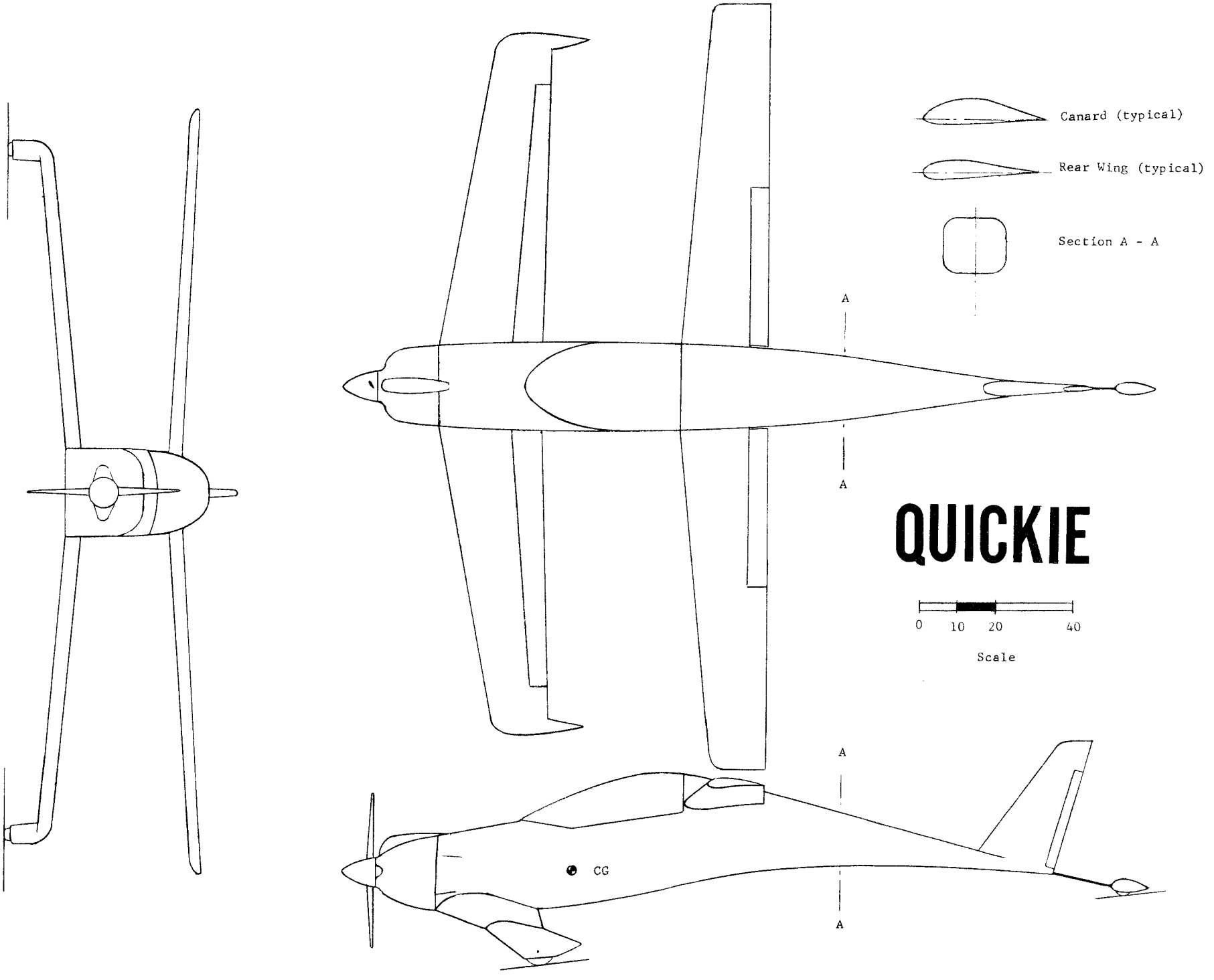
The result of all this testing is an engine specifically intended for installation in the Quickie. It is definitely not the same engine one can buy from the local Onan dealer.

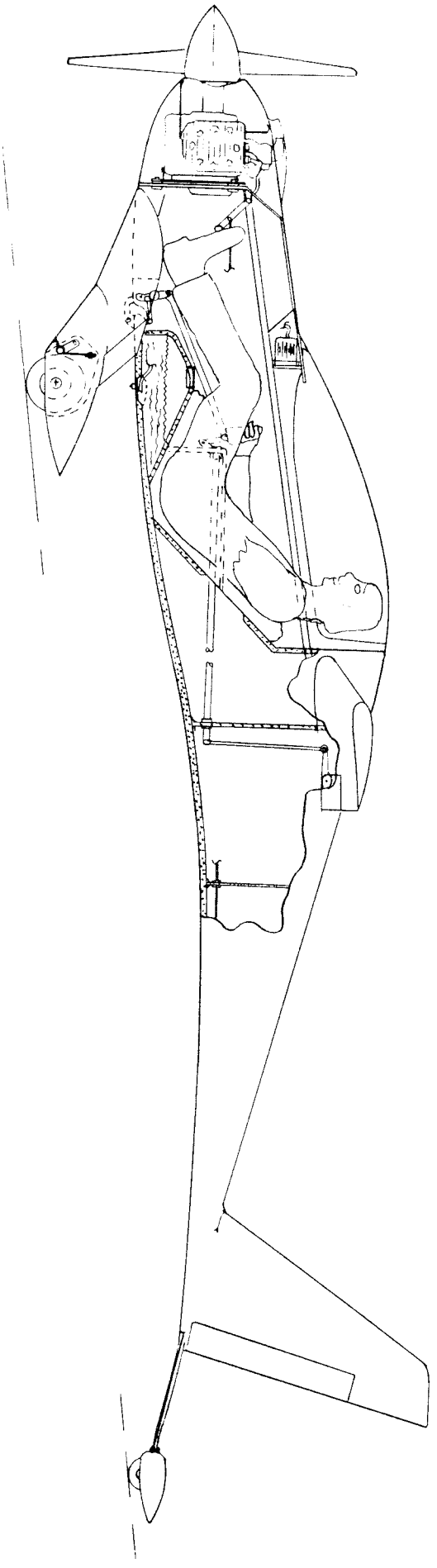









Canard (typical)
Rear Wing (typical)
Section A - A
A
A
QUICKIE
0
10
20
40
Scale
A
CG
A



## HOMEBUILT KIT PROGRAM

On the basis of the successful completion of the flight test program on the Quickie, we have decided to market the aircraft in kit form so that other individuals may enjoy building and flying the Quickie.

For the last three months, we have been carefully defining the kit program and bringing subcontractors on line. Our goal has been to minimize the large delays typical when a large influx of orders is combined with an inadequately defined production effort.

Quickie Aircraft Corporation will handle all sales and support from our Mojave, CA facility. The following firms will be subcontracting portions of the Quickie kit:

1. Aircraft Spruce and Specialty Co.
2. Ken Brock Manufacturing.
3. Cowley, Inc.
4. Fred Jiran Glider Repair

All of these firms are very experienced in working with the homebuilt aircraft business. You probably recognize their names from the VariEze program.

To repeat, when ordering a Quickie, you will not have to contact each of these firms, only Quickie Aircraft Corporation.

Orders for Quickie kits are now being accepted. Deliveries will begin on June 30, 1978. The initial delivery rate will be two kits per day. If the demand warrants it, the delivery rate can be increased to four to six kits per day. These numbers are based upon a five day work week. In excess of $100,000 has been spent for materials in order to minimize backlogs.

Because of the standard 18 h.p. engine(which will cost us about double our original 16 h.p. estimate), the standard electrical system, inflation, and the use of only the highest quality subcontractors, the price of a complete Quickie Kit has risen some. We still feel, however, that it is the outstanding bargain on the sport aircraft market, particularly with respect to operating costs. We are very proud to be able to offer it to you.

Since you will now be able to buy the Quickie kit less engine, if you desire, substantially more people can afford to get started building right away. By placing a deposit for the engine initially, but not actually buying it for several months, you will be able to budget your expenses better, while still having the engine when you are ready to install it. We should also add that for those of you who desire to try to finance your aircraft, many banks will loan customers with good credit ratings up to $2,500 without a lot of red tape.

Our production engines are going to have a number of special features including:

1. One hour dynamometer break-in and testing.
2. Magnafluxing and X-raying of all reciprocating parts.
3. Special side load testing
4. Special assembly quality control

These features do, of course, raise the cost of the engine. However, since they are available to us, we feel that they should be offered. The cost of the Quickie Engine package is still far less than any other aircraft engine.

The Quickie engine package includes:

1. 18 h.p. engine specially modified for aircraft use by Quickie Aircraft Corporation. After break-in, these engines will produce a minimum of 18.6 h.p. We will sell only modified engines.
2. Propeller - Precision machine cut
3. Exhaust System
4. Propeller extension with special vibration control counterbalance.

To obtain these features, we must order in lots of at least 50 engines, and place a deposit for each one. Therefore, we will require a deposit of $250 at the time that you order the Quickie engine package. The balance is due 30 days prior to shipment to our facility for modification. Upon receipt of your order, you will be notified as to the expected delivery date.

Portions of the Quickie kit will be drop shipped from several locations in Southern California. Therefore, if you desire to pick up your kit personally, prior arrangements will have to be made.

## WHAT THE BUILDER MUST SUPPLY

In order to save the homebuilder some money, we are not going to ship the finishing materials(e.g. paint), the small 12V motorcycle battery(can't ship the acid), and a few hardware store items like a small piece of screen door screen and a 10" length of 1/4" wood dowell. Since these items are available anywhere, it is uneconomical for us to ship them all over the country.

In addition, the homebuilder will need to purchase some plywood for the hot-wire templates, and some lumber for jigging the wings.

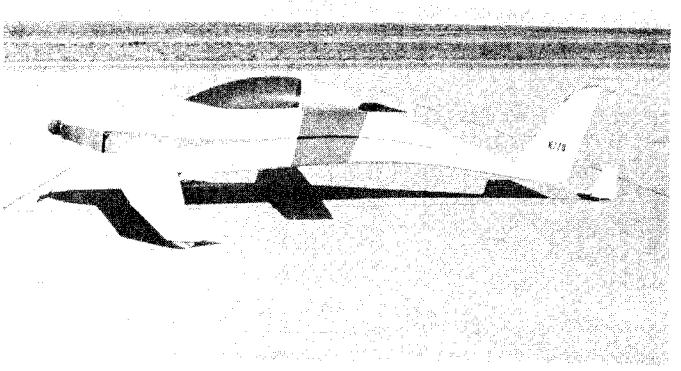
Most homebuilders will already have all of the tools necessary to build a Quickie. In addition to the ordinary tools found in toolboxes, you will need a 1/4" drill and some type of power saw(e.g. bandsaw, sabre saw, etc.). In many cases, these tools could be rented or borrowed for the short times that they are needed.

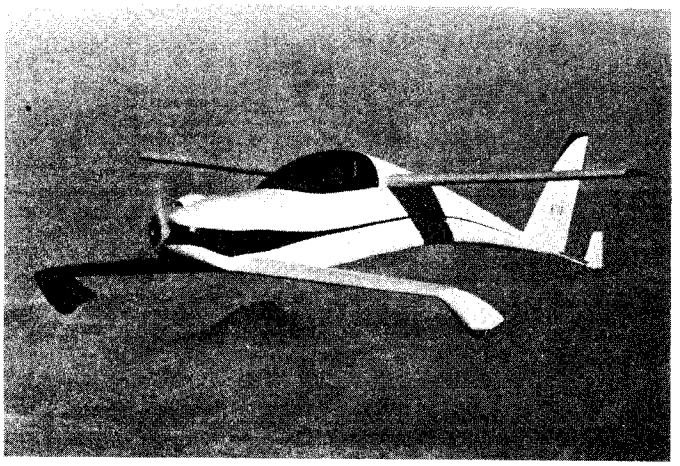
Last, but certainly not least, the builder will have to supply about 400 manhours of labor to assemble and build a Quickie. We think this is a reasonable figure for someone who is used to working with his hands and who can quickly acquire the confidence in working with the materials. We are also sure that some individuals will take 1,000 hours, since what one man can do in 4 hours, another will

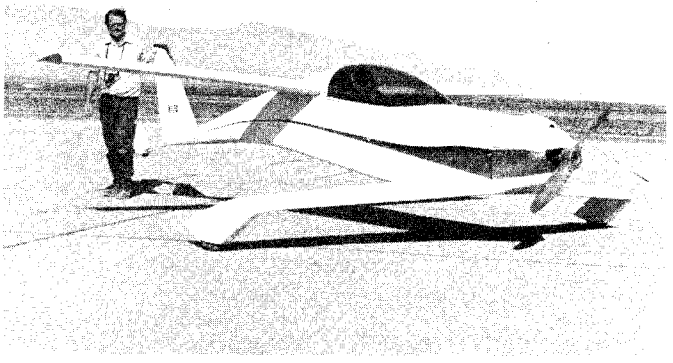
look at for two weeks. For those of you familiar with the VariEze, we are confident that a person can build a Quickie in 1/2 the time that he could build a VariEze.

## WHAT YOU GET FOR YOUR MONEY

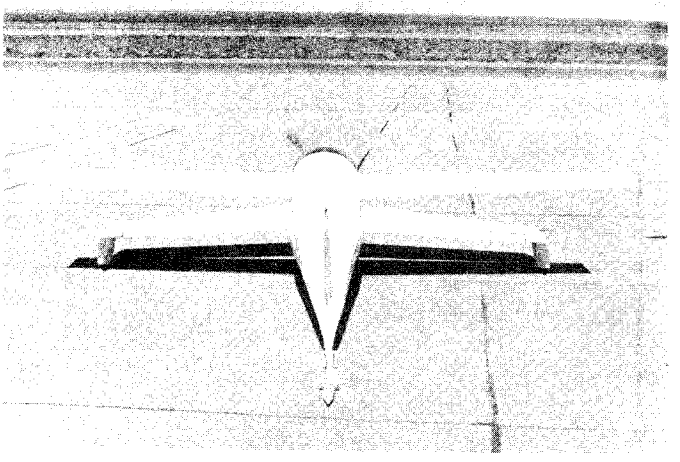
1. Construction plans, owners manual, and a 1 year subscription to the Quickie Newsletter.
2. Raw materials to construct the basic aircraft including fiberglass cloth, resins, foams, sheetmetal, tubing, hardware, etc.
3. Premolded components include the canopy(clear), cowling, S-glass fiberglass tailspring.
4. Welded Parts - All welding will be done.
5. Instruments will include all necessary day-VFR instruments (compass, airspeed, altimeter, tachometer, oil pressure, and oil temperature) plus a cylinder head temperature gauge.
6. Machined parts - All close tolerance machining will be done.
7. Tools include mixing cups, brushes, stirring sticks, filter mask, gloves, and a $22.00 pair of special scissors for cutting the cloth.
8. Electrical system - A 15 amp alternator is standard equipment. Also, wiring, switches, and fuses are included.
9. The engine - The 18 h.p. engine will be standard and will include a full-flow oil filter. The fuel consumption of the 18 h.p. engine is actually lower than the 16 h.p. version.
10. Propeller - Because of the lead times on finishing propellers, and also in order to save the builder some money, you will sand, varnish, and balance the prop. We will offer a finished prop on an exchange basis.
11. Support - We want you to finish your Quickie. In addition to the items in 1, we will be conducting builder seminars, and are available to answer questions and assist the builder on an individual basis.



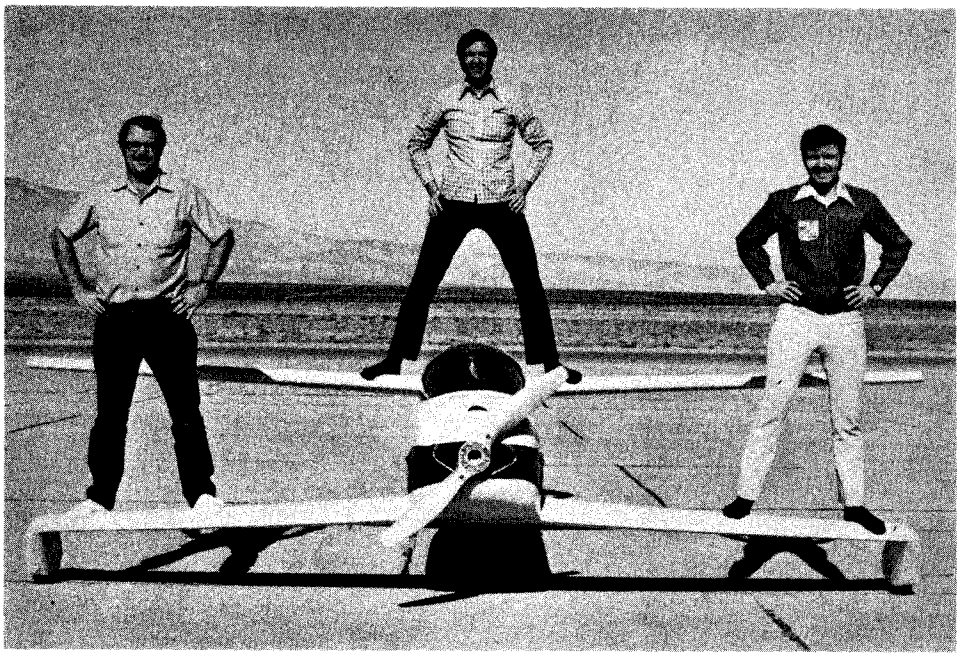




Quickies are easy to lift, as demonstrated by this 98 pound weakling who just happened by.



# THE TEST TEAM

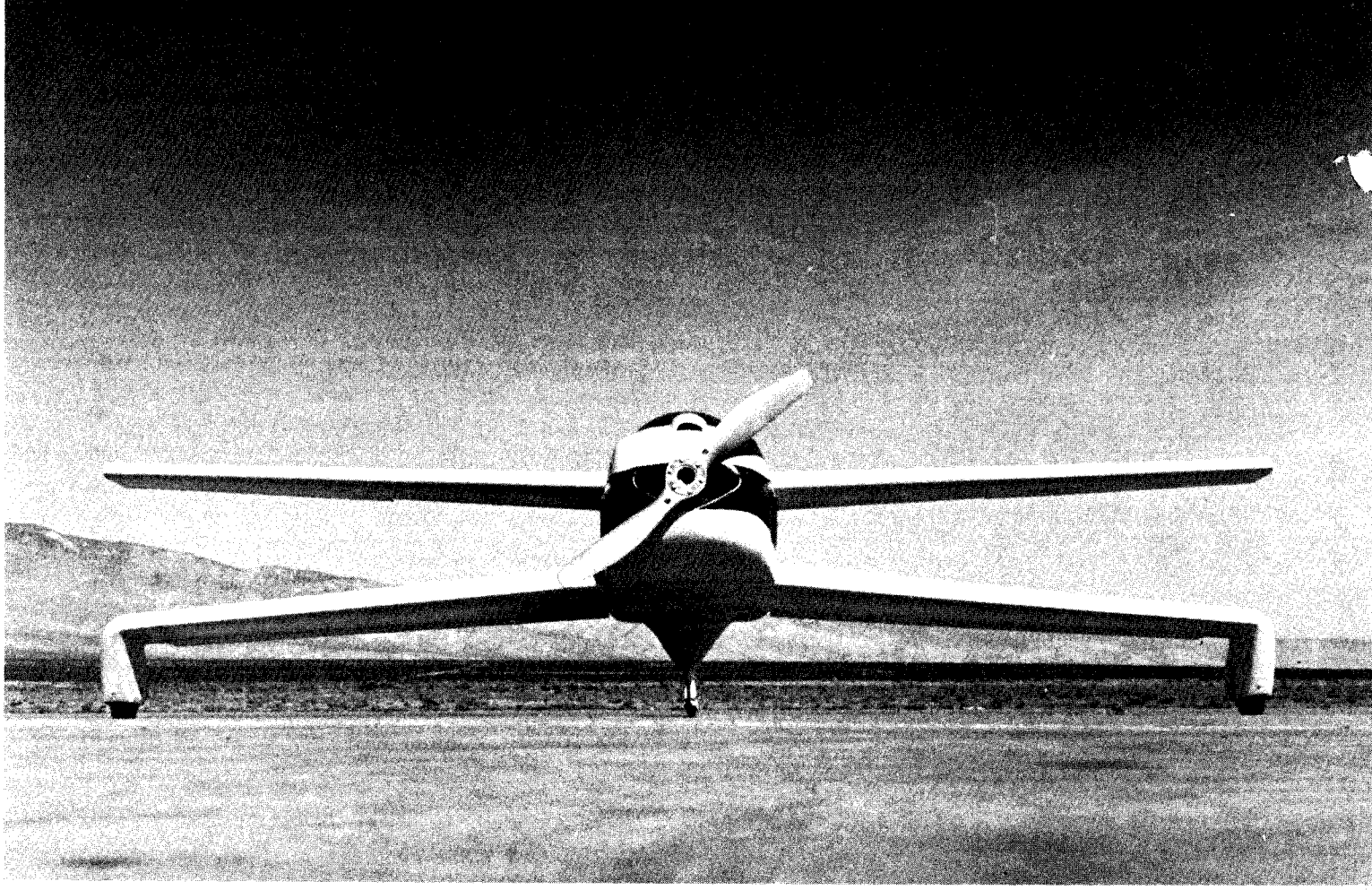


GENE SHEEHAN BURT RUTAN TOM JEWETT

Gene Sheehan - Working in aerospace since 1964; homebuilt aircraft since 1973 providing support for homebuilders; diversified background in aircraft production, including experience at General Dynamics and Rohr. Gene has been involved in several protoype homebuilt projects including a BD-4, a helicopter, a gyrocopter, and a BD-5. He attended the University of Texas at Arlington and is also a Private Pilot.

Tom Jewett - Former Flight Test Engineer on board the Rockwell B-1 Bomber. Graduate Aeronautical Engineer from Ohio State University in Columbus, Ohio. Tom has spent his entire career in the flight testing of new aircraft including homebuilts, jets, and the B-1. He is also an active flight instructor, and holds Commercial, Instrument, and Flight Instructor Instrument ratings.

Burt Rutan - 13 years experience in aircraft developement and flight test. Burt designed and developed both the VariViggen and the VariEze homebuilt aircraft, both of which feature a canard design and inherent stall/spin protection. Since the Quickie design is frozen, Burt is no longer actively associated with the program so that he may devote his time and energy to several new projects.



★ Distinctive, rugged, all composite design

★ Outperforms airplanes with several times the horsepower

★ A "Quickie" to build, a joy to fly

★ Unequalled fuel economy

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