VARIVIGGEN NEWS NO. 2

OCT 74

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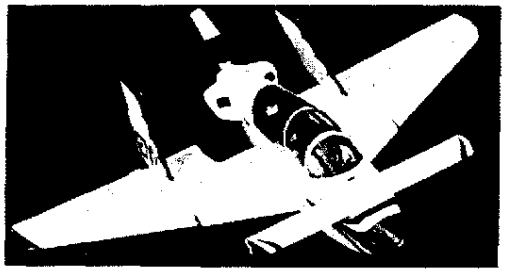


ACTIVITY at the RAF- This is the first opportunity we've had to inform everyone of our move. We have a new facility at the Mojave, California Airport where we are supporting VariViggen builders. We left Kansas in June and spent most of July in southern California looking for a home for the RAF. We then took N27VV on a 4500-mile trip which included the Oshkosh EAA convention (N27VV participated in the evening airshow and won the "OUTSTANDING NEW DESIGN" trophy this year), a visit with Ken and Margaret Ashdown (VariViggen builder S/N 069) on the beautiful island of Manitoulin in Ontario, Canada, Airshow appearances at Brantford, Ontario where we were the guests of the fine people of EAA chapter 115, stops in Kentucky, Indiana, Missouri, Kansas, and finally our big move to California, arriving in Mojave the first week in September. N27VV performed well despite the 110-lb baggage load on most of the trip and the 10,500-ft density altitude takeoff at Flagstaff, Arizona!

We made up "VariViggen Builder" badges for those who were at Oshkosh. We were pleased to see more than 40 builders during the week as well as six more at the Brantford show. Back-seat riders at Oshkosh included Fred Weick (Eurcoupe designer), Charlie Schuck (FAA), Harold Best-Devereux (EAA,Europe), Sheldon Gallager (Editor, Popular Mechanics), Peter Lert (Air Progress) and many of the builders. We flew two photo flights in which we posed for air-to-air shots in formation with Dick Curtis's Curtis Pusher Replica at 50 kt! Those photos should show up in magazines and the EAA film.

Even though the VariViggen had been to California twice before, we couldn't wait after arriving to Mojave for the first chance to really demonstrate her flying ability to the multitudes out West. The next weekend, September 7-8, was the EAA Western Fly-in at Porterville, Ca. The following excerpt from the Bakersfield, EAA chapter 71, newsletter written by Denny McGlothlen tells it all.

> "The star of the show was Burt Rutan with his "VariViggen", Boy this bird really turned me on. I was out on the runway when Burt flew in the airshow, and seeing the VariViggen make the low speed sharp turns right at lift off, well an airplane just isn't supposed to do such things but this one sure will. I can see that this is going to be a very much built airplane in the EAA ranks."

The VariViggen succeeded in awing the crowd there and also won the "Most Popular" trophy, the "2nd Monoplane" trophy, and the 1st place cash prize for the spot landing contest. The VariViggen has won every spot landing contest it has entered. Due to the fantastic low speed maneuverability and visibility you can use quick tight turns on short final to set up the correct height and speed for the accurate touchdown. The 2nd place-winner at the Beatrice, Nebraska contest just shook his head and said, "That's no fair; That's not an airplane!"

We have two more airshows and a magazine article committment within the next two weeks. After that we plan to remove the old cowling, give the aircraft a good inspection (she now has 400 flight hours) and install the new design cowling with prop extension. When testing is complete on the cowling we will begin cowling production.

RAF BUSINESS -Yes, we are now conducting a full-time business primarily to support VariViggen builders. Our facility on the Mojave Airport (100 yards S.E. of tower building) consists of an office and shop sufficient to allow us to provide VariViggen components, related engineering support for VariViggen builders, technical and educational material (the car-top wind tunnel project is aimed primarily at highschools and colleges), and engineering analysis/test consulting. Refer to the first edition of our CATALOG, included with this newsletter for detailed description of all products. The last page will be revised periodically and mailed to all builders.

We now see an important need for a periodic newsletter, complete enough to give <u>all</u> the information to builders that can assist them in their projects. Future newsletters will include essentially the same format information and photos as this one,with more builder-submitted information as it becomes available. All suggestions are considered - Remember this is <u>your</u> newsletter. Due to the fact that the plans have (and will be) marketed at a relatively low cost, builders are now being asked to share the continuing cost of research, writing, setup, printing, and mailing the future newsletters on a yearly subscription basis. Refer to the CATALOG for the cost and publish dates. Newsletter #2 is provided free to all plans and TR holders. Future ones can only be sent to paid up subscribers. We will continue to provide the updated list of VariViggen builders <u>only</u> to those who have returned their plans "page two" and have received an Aircraft Serial Number. We keep individual correspondence files of builders with S/N's , which now totals 128 builders.

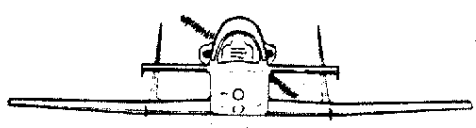
PLANS Changes - It has been four months since the last newsletter and many of the builders are well into their construction projects, so we have quite a few corrections/improvements to note. This section will provide changes, not only to the plans, but to the Tech Report and Owner's Manual as well. Changes will be classified as follows:

MEO - Minor error or Omission.
OPT - Optional Improvement.
DES - Desirous Change - Does not necessarily effect flight safety but should be incorporated to improve the aircraft or correct a fault.
MAN - Mandatory Change - Change must be incorporated as soon as possible as safety of flight is affected.

Remember, all mandatory changes are Air Mailed <u>immediately</u> to all newsletter subscribers.

Category	Location	Change
MEO	PL pg 59	Part No. of 8" Scott tail wheel assy omitted. NG35 is Scott # 3200. Channel shaped plate is furnished with V-NGSA assy purchased from RAF.
DES	PL pg 1&2	Change RAF address: Box 656, Mojave, Ca. 93501.
DES	PL pg 3	On weight & bal chart change 115 hp to 125 hp.
MEO	PL pg 5	Change number of AN3-14A bolts from 3 to 8. Change AN115-16 (16) To AN 115-3 (3)
MEO	PL pg 11	3rd column, 2/3 down F.S.137 should be F.S.37.
DES	PL pg 13	I'm told that solid rod gives better antennae performance than tubes. Use 1/8" alum welding rod or some alum clothes line available at any dept. store.
MEO	PL pg 14	Clarification - The C12 belcrank bearing rivets to <u>outboard</u> side of C9.
MEO	PL pg 20	F30 & F29 identification is <u>reversed</u> on flat layouts.
MEO	PL pg 21	Capstrip detail W.L.0.1 should be W.L.0.0.
MEO	PL pg 25	SPAR F change WS3 to W3. Two places.
MEO	PL pg 26	SECTION L-L change 57 deg to 54 deg.
MEO	PL pg 27	Right center. Change 83 deg to 173 deg.
MEO	PL pg 31	WA3 Omitted dimensions. Left two holes are centered. Other six holes evenly spaced & 0.31" from edges as shown.
MEO	PL pg 36	Tolerance on all control travel is ± 3 deg, except reflex travel which is 0 to 1 deg up (when down) and 7 to 8 deg up (when up).
MEO	PL pg 37	EC1 can be made easier & stronger with the legs overlapped or with doubler plates rather than butt welded.
DES	PL pg 42	RM5 change coarse thd to coarse double advance thd (for faster reflex travel).
MEO	PL pg 45	Pivot detail F14 should be F31.
MEO	PL pg 46	NG32 change .063 wall to .065 wall. NG1 1/16" hole for cable. Change to #50 drill hole.
MEO	PL CH 8,10	Clarification on wing atch assemblies. Be careful when cutting tapers in steel straps for WA5. There is a lefthand & righthand part to put the 5/16" holes in lower WA2 fittings on top.
DES	PL pg 50	MG2 5.1R should be 2.6R. MG5 1.63D should be 1.75D. MG11 1.7D should be 1.75D. MG4 "to fit MG12." The preferred method is to first drill MG4, clamp to MG12 then use MG4 as a drill guide to drill MG12.
MEO	PL pg 51	MG42 add the #50 drill cable hole as in NG1.
DES	PL pg 46	Strut assy. To allow improved strut lubrication, eliminate upper O-ring (2.8" from housing bottom) and move lower O-ring down .4" to within 0.1" of scraper. If you have already cut the two O-ring grooves, that's Ok; just cut the new lower one and leave the other grooves empty.
MEO	PL pg 53	Table at right. Switch No. 2. Change "overridden" to "not overridden."
MEO	PL pg 55	2nd column, 1st row. Add WR42 after WR32.
MEO	PL pg 58	NG21 Change F14 to F31.
MEO	PL pg 59	NG30 Add "any type steel."
MEC	PL pg 57	SAE Change AN115-16 To MS 20115-3 or To AN 115-3. (Same Thing)
OPT	PL pg 60	Static holes on both sides are optional. One side only is ok with a very minor error due to side slip (about 0.5 kt per deg).
MEO	PL pg 3	Lower left. Change 134.1 to 132.1.
DES	TR Cover	Change address & move nosegear back 6" on 3-view.
DES	TR pg 2	Change address. Change reference to "pk 2" to "Plans."
MEO	TR pg 5	Change empty weight to 950 lb. Change limit 'g' to 5 g. Ultimate is 7.5.
MEO	TR pg 5	Range with fuselage tank 375 mi. 555 mi. with added 12 gal long range tank.
MEO	TR pg 5&7	Change 300 ft to 400 ft.
MEO	TR pg 7	Change 85 kt to 80 kt.
MEO	TR pg 12	Add weight = 1500 lb to upper graph.
MEO	TR pg 23	Delete all reference to Bede. Change Newton to Mojave. (805) 284-2645. Delete answer about kit, refer to RAF CATALOG.

NOTE: I strongly suggest that you write all changes into the plans from this list. Thus your plans will be updated even if you lose your newsletter and will contain no erroneous information.



MORE BUILDING TIPS

1. You don't need to strain your eyes on the grid on the vertical stabilizer ribs to get them cut out exactly the right size. Cut the top and bottom the correct size and make the others oversize. After they are mounted on the spars and the glue is dry make a 4-foot long sanding block out of a wood 2x2 with sandpaper glued along one edge. Run the block (held vertically) over the ribs to bring them down to the spars and into line with the end ribs. That tool can also be used to taper the top capstrips on the inboard wing and the fuselage formers to fit the skin.

2. Remember to get help on plotting the grid-drawn items up to full size. One person to read x & y dimensions from grid and one to plot (2 rulers help) directly on the wood. Several builders reported that they made all formers, canard ribs, inboard wing ribs and vertical stab ribs in less than 1½ days work; a reasonably small percentage of the total job. Carrol Holzworth (S/N 2) reports that he found a large sheet of thin plastic, drew 1" grid lines on it, then used it as a full size grid to punch through to mark the parts. Be sure you are using the <u>decimal</u> 12" rule and tape measure, fractions are for carpenters!

3. One builder wanted to know why there are more and larger bolts on WA2 than on WA3. The reason is they are sized for <u>bearing</u> on the wood spar vs. aluminum spar.

4. When drilling through the wood spar for the wing atch fittings use the following procedure: Clamp only the forward fitting in place. Be sure it's at the correct W.L. and B.L. Square the drill as well as possible (use a long drill bit and use a square) and drill only one hole. Then clamp the rear fitting on, installing a bolt in the first hole. Now drill all holes in the front <u>only</u> drilling ½ way through the spar. Then drill about 2/3 through from the rear to complete the holes. On final installation be sure to fill the holes with <u>epoxy</u> to take up any voids due to hole misalignment. The epoxy is stronger than the wood and will assure full strength even if there is a little slop in the holes.

5. Glue the building jig to the floor to prevent shifting during construction. Install a tight wire at W.L. = 0 and B.L. = 0 for use as a reference in measuring. The wire is stretched along the jig, attached forward of F.S.20 and aft of F.S.200. A tape rule and good carpenters level can thus locate any B.L. and W.L.

6. Be sure you are using a good <u>epoxy</u> glue (see plans and Newsletter #1) coat both parts and put on enough for a generous fillet. Capstrips are not required on the canard or vertical stab. It's probably a good idea to use 3/32" or 2½ mm hard birch ply on the canard top skin. This is not needed for any flight loads but the canard is used for handling the airplane on the ground. With the stick back you can reach over the canard and grab the canard trailing edge (not elevator) to pull the airplane. If you're already sheeted with 1/16" ply you may consider one <u>light</u> layer of fiberglass on top.

7. After trimming the canard skin adjacent to C8 spar, not too much overlap is left on the bottom. This can be reinforced with epoxy and cloth strips on the inside (Dynel, fiberglass, or even cotton). Don't do this everywhere, though, it can build up excess weight.

8. Charles Allen (S/N 047) substituted .063 4130 bent angles for C10. This is fine here, but the extra stiffness of extruded aluminum angles in most other places is required. 6061 T-6 can be used for C9 and E6.

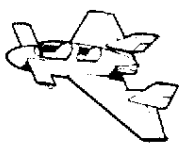
9. I notched the bottom of the canard and elevators to provide inter-bay drainage and only used 3 drain holes on each canard and each elevator.

10. Wayne Koch (S/N 009) built a Gilliom 18" bandsaw and 6" sander from a kit. They look like quality tools at a real low price. I was impressed with his, so I'm building my own. Write for their catalog, 1109 N. 2nd St., St. Charles, Mo. 63301. The bandsaw needs to be modified to provide a slower speed for steel cutting.

Stewardess to passengers: "Come on, now! Some clown doesn't have his seat belt fastened, and the captain can't start his engines."

SHOPPING - Here are a few helpful sources we've found or have been notified of.

1. Western Ply & Door still has good prices on the birch ply (See Chap 2). 50"x50" sizes
2. UNIVAIR, Rt 3 Box 59, Aurora, Co. 80010 has rebuilt Scott tailwheel assy #3200 for $70.00.
3. Harbor Sales, 1401 Russell St., Baltimore, M.D. 21230 has an excellent lightweight plywood (A/B OKOUME) in the thicker sizes (5/32" & up). Their 5/32" is light enough to be a substitute for birch 3/32". It is too soft to substitute where <u>hard</u> birch is called out. Send for their price list.
4. Spencer Aircraft, 8725 Oland Ave., Sun Valley, Ca. 91352 has good prices on hardware, I'm told.
5. Ask questions at your local EAA chapter meeting.
6. These outfits have catalogs with a very wide variety of needed parts, the first one is an absolute must: Aircraft Spruce & Specialty, Box 424, Fullerton, Ca. 92632; WAG Aero, Box 181, Lyons, Wi. 53148; Aircraft Components, Northshore Dr., Benton Harbor, Mi. 49022.



FLASH - "FLYING" MAGAZINE FLIES THE VARIVIGGEN - Peter Garrison of "Flying" magazine conducted a flight evaluation of the VariViggen for an upcoming article in "Flying," the largest general aviation magazine.

PARKING - Without pilot or copilot the cg is very near (slightly aft) of the main wheel location (with weight on the main gear its reaction moves aft of the no-load position shown in Chapter 19). Thus when the pilot gets out, he lets the aircraft down on the aft skids. At first we were ashamed of this tail-sitting attitude and would immediately tie the nose gear to a tiedown or install an aluminum tube tripod under one skid whenever we parked. I don't do this anymore for the following reasons: 1) sitting on the skids, the center of pressure is well centered and the aircraft will take winds from any direction with little weathervaning or upsetting tendency common to the conventional parked aircraft, 2) when parked in a hangar even a low wing aircraft will overlap all the way to the fuselage and thus a VariViggen will take up considerably less room than even smaller homebuilts (I've put it in many hangars after the owner said "sorry we're full," without even moving other airplanes!), 3) this attitude allows more convenient preflight inspection of fuel, oil, landing gear and pulling the prop through, 4) baggage loading, fuel and oil loading is convenient while on the tail, 5) it is very easy to pull the nose down by the canard tip, step to the ladder and get in when ready for ingress, 6) we consider it a "status symbol" - just one other thing no other plane on the field can do! However, for an airshow, in order for people to more easily inspect the cockpit, we either tie the nose gear to a tail tiedown rope (VariViggens park backwards, too!) or retract the nosewheel only (pull the main gear breaker) and set it clear down on its nose. Thus, the canard is an excellent seat for four to watch the show!

ENGINE Selection - Since I mentioned I would like to have 180 hp in Newsletter #1, alot of you have thought it was for more speed. Not true, considering 75% power cruise, speed would only increase 10 mph with 180 hp. The main reason would be for better rate-of-climb, particularily at high altitude. Remember, low aspect ratio means lower climb performance. A VariViggen will not climb as well as a conventional aircraft with equal cruise speed and hp/weight ratio. Those that want better high altitude climb performance and want to use a heavier engine or constant-speed prop will find the airplane tailheavy and for that reason I have not recommended them,due to the terrible requirement for lead in the nose. There is a better solution, however, that can eliminate this problem. I used this solution when I found my partially completed airplane to be tail heavy. The original design had a shorter wingspan. I increased the span of the outboard wing panels. This moved the allowable cg range aft, thus solving the problem without lead. A disadvantage is a slightly reduced g-capability. If you are interested in using a constant-speed prop or heavier engine, send me the weight, length of engine, and weight of the prop. I will then calculate for you the amount of extension to the wintip, show how to make the extension and calculate the amount of reduction in allowable 'g'. Please also include $6.00 as consulting fee for this design change. This can only be done up to a point at which the control power of the canard is reduced and the overall cg range is too small. While this solution is better than lead nose weight, I still recommend 150 hp (180 hp for short airstrips or high density altitude flying) and a modern light weight wood prop.

MODIFICATIONS - As you know, it has been our policy to not be adverse towards those who want to modify the aircraft. We have had this policy mainly in the interest of promoting education and design progress. However, we have seen some examples of modifications, even some under construction that will result in disappointing performance and in some cases unsafe flight characteristics. In all cases those individuals designed their modifications by aesthetics and by eyeball rather than by valid engineering calculation supported with appropriate tests. In most cases, when I was able to point out the disadvantages and calculate the effect on performance and stability, the author of the change decided to stick with the plans. One builder doubled the rudder area and didn't even know that that would reduce overall directional stability due to rudder float.

I must modify my policy to point out that I am not adverse to anyone modifying the airplane that is qualified (or finds qualified help) and is willing to conduct the analysis and tests required to verify the modification before flying his aircraft. I am very adverse to those who may give all the rest of us a bad image by building a "VariViggen" that either has poor performance or contributes to an accident statistic under the name VariViggen.

A plans-built aircraft has good utility and excellent flying qualities. Modifications that add weight, be they as subtle as extra heavy gussets everywhere or fiberglass over the wood skin, or more substantial like 70 gallons fuel or four place, etc., etc., can result in very disappointing climb performance at high altitudes. Our experience in flying N27VV over 400 hours in all kinds of flight conditions, runways, weather, density altitudes, etc., is very valuable and we have found that due to the low aspect ratio (necessary for optimum low speed flying qualities) the airplane should have a lower weight-to-power ratio than conventional designs. You cannot expect to carry four people and more fuel adequately from Albuquerque in the summer unless you use at least 200 hp.

You cannot expect the same safe flying qualities if you stretch the nose several feet for "looks." This would decrease stability and actually slow down the aircraft! You cannot just assume that a beautiful flush inlet three inches from the top of the wing will provide adequate cooling. My measurements during development of an oil cooler system showed terrible pressure recovery during low speed.

I should point out that because with a canard aircraft both surfaces are lifting wings (the canard actually has a much greater wing loading than the main wing) their size, position,interference with each other, high lift devices, etc., have a very important effect on the cg range, the flying qualities, and low speed performance. Their design is far more critical than with a conventional aircraft with one main lifting wing (sized for performance, etc.) and a tail sized

merely to provide adequate static margin and sufficient cg range. For example a formula-one racer has an extremely small tail - but it can be designed for one cg only and still provide adequate stability and sufficient control. But if it were a canard, the designer would have much less room for change, to provide a large flight envelope (speed range and maneuverability) even for one cg.

Therefore I am unable, without conducting the appropriate test to answer a question like "is it ok to move the canard down eight inches to clear my extra radios in the instrument panel." I am not adverse to you making the change however, if you are willing to conduct the test and verify its satisfactory result. The car-top wind tunnel system which will be available this December is an excellent method, others are also valid.

Remember, this aircraft was not developed by "guess work" but by a very careful design-test program. Small changes can be full of 'surprises.' If you modify an aircraft, when it is ready to fly, you are an experimental test pilot, not a production test pilot - be prepared to accept the full responsibility to safely plan and conduct exploratory testing and critical flight envelope expansion - for there are no proven limits on your airplane.

I don't mean to inhibit progress, only to promote valid development. In this way we are also promoting education, which is what EAA is all about!

NASAD - The VariViggen plans have been submitted for approval by the National Association of Sport Aircraft Designers. Several areas of information are required that were being reserved for the VariViggen Owner's Manual. This information is being distributed to all plans holders now in order to qualify for NASAD approval before the complete Owner's Manual is published. The information in the Owner's Manual will be more detailed and will include information in several other areas (see Catalog).

VARIVIGGEN AIRCRAFT MAINTENANCE/INSPECTION/OVERHAUL/CHECKLIST/ MAIDEN FLIGHT PROCEDURE

MAINTENANCE/INSPECTION

Wood Structure - Wood structure, properly sealed with the epoxy specified or with a good grade of varnish, will provide years of service with no maintenance, especially when hangared. Periodically check all visible surfaces for cracks or chips in the finish that indicate either degrading protection or internal damage. Check that all moisture drains are open. Remove the outer wing panels once per year to inspect inboard wing internal structure through WR46 rib.

Metal Structure - Periodically inspect rudder and outer wing panels for skin buckles or loose rivets that may indicate internal damage. Check that all moisture drains are open (none required on foam filled ailerons). Inspect outboard wings for internal damage and corrosion through ribs with panels removed once per year.

Plexiglass - Cracks up to three inches long should be stop-drilled ¼" outside of the visible end with a 1/8" dia drill. Larger cracks require replacement (N27VV has had no cracks).

Mechanical Components - All controls and reflex/gear pivots that are sealed bearings or oilite bushings require no lubrication. Check periodically for any excessive slop or binding. Check all cables annually for any signs of fraying or wear. Replace any frayed cable. Grease main gear, external gears, reflex screwjack, NG23, MG16 bushing, and MG31 zerks with automotive grease every six months. Periodically check main gear shock doughnuts and all tires for excessive cracks. Inflate main gear tires to 36 psi and nose gear tire to 40 psi. Periodically clean nose gear shock strut and service as shown on plans, page 45, once per year. Check brake fluid level and brake puck wear twice per year or every 50 hours flight time. Check all landing gear, engine mount, and control system structural parts for damage or cracks each 50 hours flight time. N27VV required only routine maintenance and one brake shoe and tire change in its first 300 hr/2 years.

Electrical - Check for loose or chafing wiring every 50 hours flight time. Follow manufacturer's recommended maintenance for battery.

Engine, Propeller, & Instruments - Follow manufacturer's recommendations.

OVERHAUL

Engine, Propeller, & Accessories - Follow manufacturer's recommendations.

Gear & Reflex Motors (MG39, NG4, & RM9) - Replace every six years if aircraft is hangared and every three years if not hangared.

Wheels & Brakes - Follow manufacturer's recommendations.

CHECK LIST

Preflight

1. Ignition - off
2. Remove gust locks
3. Remove tiedowns
4. Check control surfaces (freedom & security)
5. Check landing gear & tire
6. Check fuel & oil quantity
7. Under cowling - nothing hanging or dripping
8. Drain strainer
9. Prop (nicks & security)
10. Pitot static - clear
11. Gear handle down
12. Master on - check reflex operation & instruments

Engine Start

Follow manufacturer's recommendations

Before Takeoff

1. Fuel - on
2. Mixture - rich
3. Mags & carb ht
4. Trim - T/O
5. Reflex - 8 deg
6. Ammeter - chg
7. Gear - handle dn, 3 green lights
8. Controls - free
9. Engine inst. - green
10. Circuit breakers
11. Harness - both seats
12. Canopys - locked

Before Landing

1. Mixture - rich
2. Carb ht - A/R
3. Reflex - 4 to 8 deg
4. Gear - dn, 3 green lights, visually check mains
5. Airspeed 65 to 75 kt on final

Securing

1. Avionics - off
2. Master - off
3. Mixture - cutoff
4. Ignition - off
5. Gust locks - on
6. Tiedowns

MAIDEN FLIGHT PROCEDURE

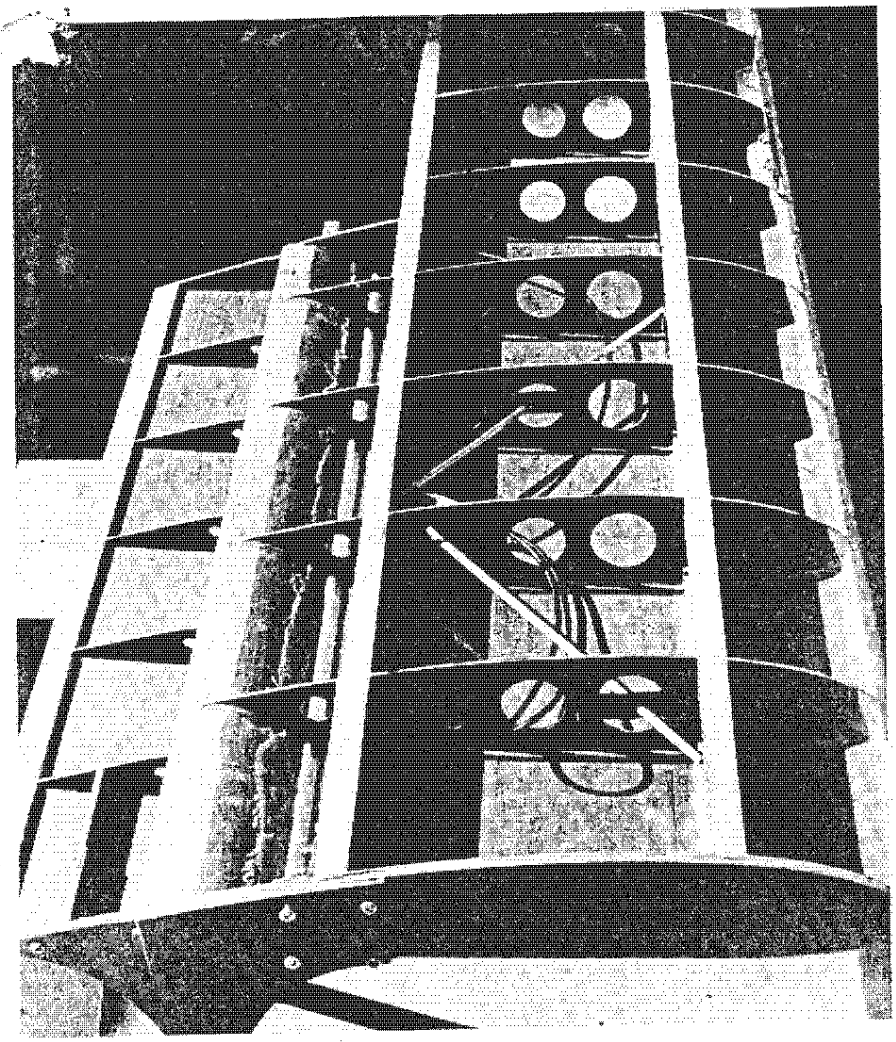
Ground Tests - Run engine on ground at least one hour. Check for sufficient fuel flow at full throttle and minimum fuel quantity. Taxi enough to thoroughly check engine, brakes, controls, landing gear, and to become thoroughly familiar and comfortable in the cockpit. Recheck weight and balance (see operating limitations).

High-Speed Taxi - Weather - smooth air, no crosswind. Runway requirements - smooth, at least 4000 ft for initial tests. Reflex - 8 degrees. Make several runs as follows to speeds of 40 kt, 45 kt, 50 kt, 55 kt: Accelerate to aim speed; reduce power to maintain speed. Lift nose wheel off about one ft above the ground, check directional and pitch control, rock wings (with mains still on the ground) to get the feel of roll control (nose may not rotate at 40 kt). When you feel you can comfortably control pitch attitude up to one to two ft nosewheel height, you are ready for a lift-off. Accelerate to 60 kt, reduce power to about ½ throttle, rotate nose and fly down the runway at an altitude of several feet. Reduce power very slowly to idle once airborne (slowly, so you don't have to adjust for abrupt pitch trim changes, if any). The airplane exhibits a pronounced ground effect and may float a long way down the runway. It's best not to make a "full stall" landing (aft skid clearance), just lower it to the runway. Ask yourself - is the airplane out of trim directionally or in roll? If not, you're ready for the first flight.

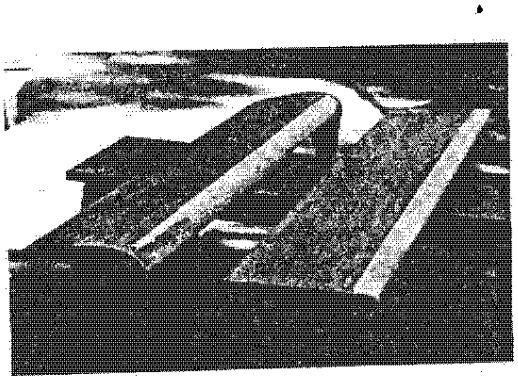
First Flight - Once the lift-off and flight down the runway is accomplished, the hard part is over. The actual takeoff, full flight, and landing are much easier. I still recommend smooth air and a large smooth runway. The following is a description of the prototype's (N27VV) first flight: "As the Cessna 172 chase plane maneuvered into position, I started my take-off roll. Take-off (at 50 kt) and climb (at 80 kt) were normal and a very strange feeling came over me as I cleared the end of the runway. The air was absolutely still and there I was climbing straight ahead. I had waited a long time for this moment, but somehow it felt like I was on my first solo. I had to rock the wings to convince myself I was really flying. I leveled off at 1500 ft AGL and performed some stability checks - static and dynamic and pleased with the results proceeded to do sideslips and maneuvering turns. I set the reflex at several positions and slowed up to near full aft stick to check low speed handling. Again the aircraft felt solid, while still responsive - particularly in roll. So much for the "work", I moved in close to the Cessna for some pictures, then made a low pass down the runway and landed just at sunset after 50 enjoyable minutes of flying." Best final approach speed for first flights is 75 kt.

DO NOT forget to send us your change of address if you move. If you have a question that requires our answer, send a self-addressed, stamped envelope. Be sure to send any comments or suggestions for the newsletter. Also send us your builder tips and photos. Items to be covered in future newsletters: details on new cowling, long range fuel tanks, alternative aileron construction eliminating foam, cabin heater, ingress ladder, improved carb heat muff, external wood finishing procedure, and anything you suggest!

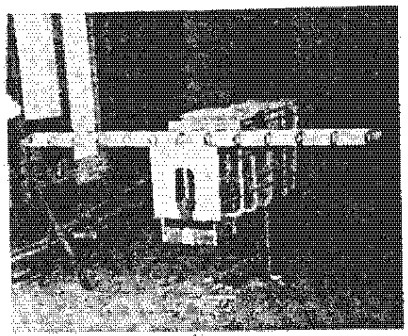
Burt & Carolyn Rutan



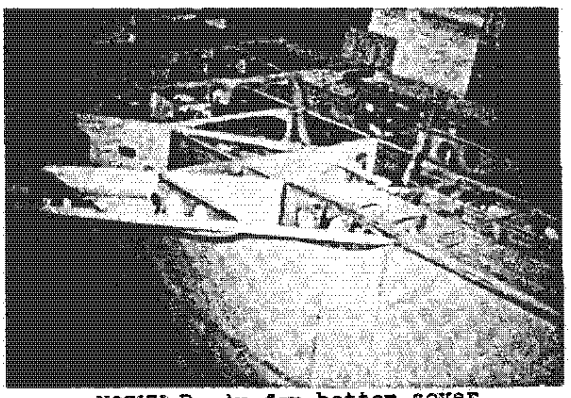
Charles Allen S/N 47
Canard ready for cover.



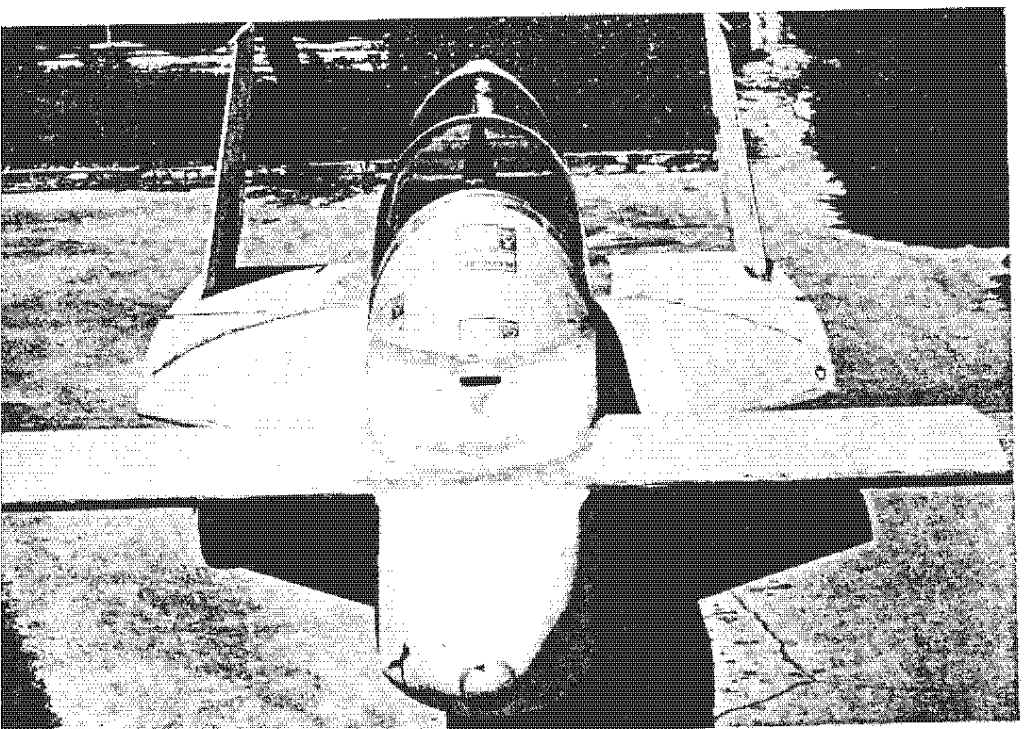
Charles Allen , Elevators



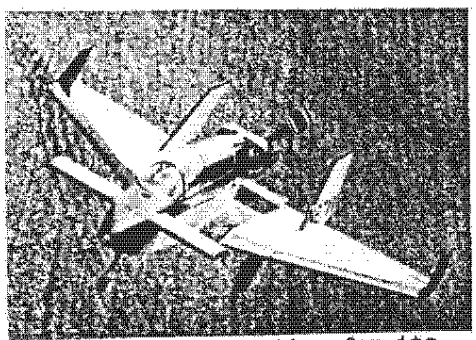
Jim Cavis S/N 31, June 74



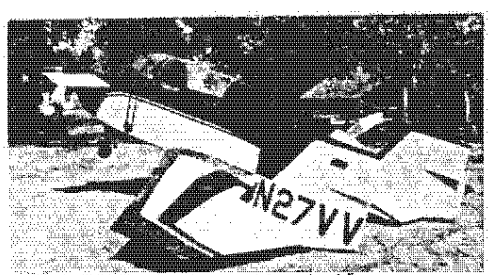
N27VV Ready for bottom cover



N27VV Ready for outboard wings



N27VV in configuration for its first flight. Note tip plates and no cowling.



N27VV Parked on its tail at a dirt strip in Kansas.