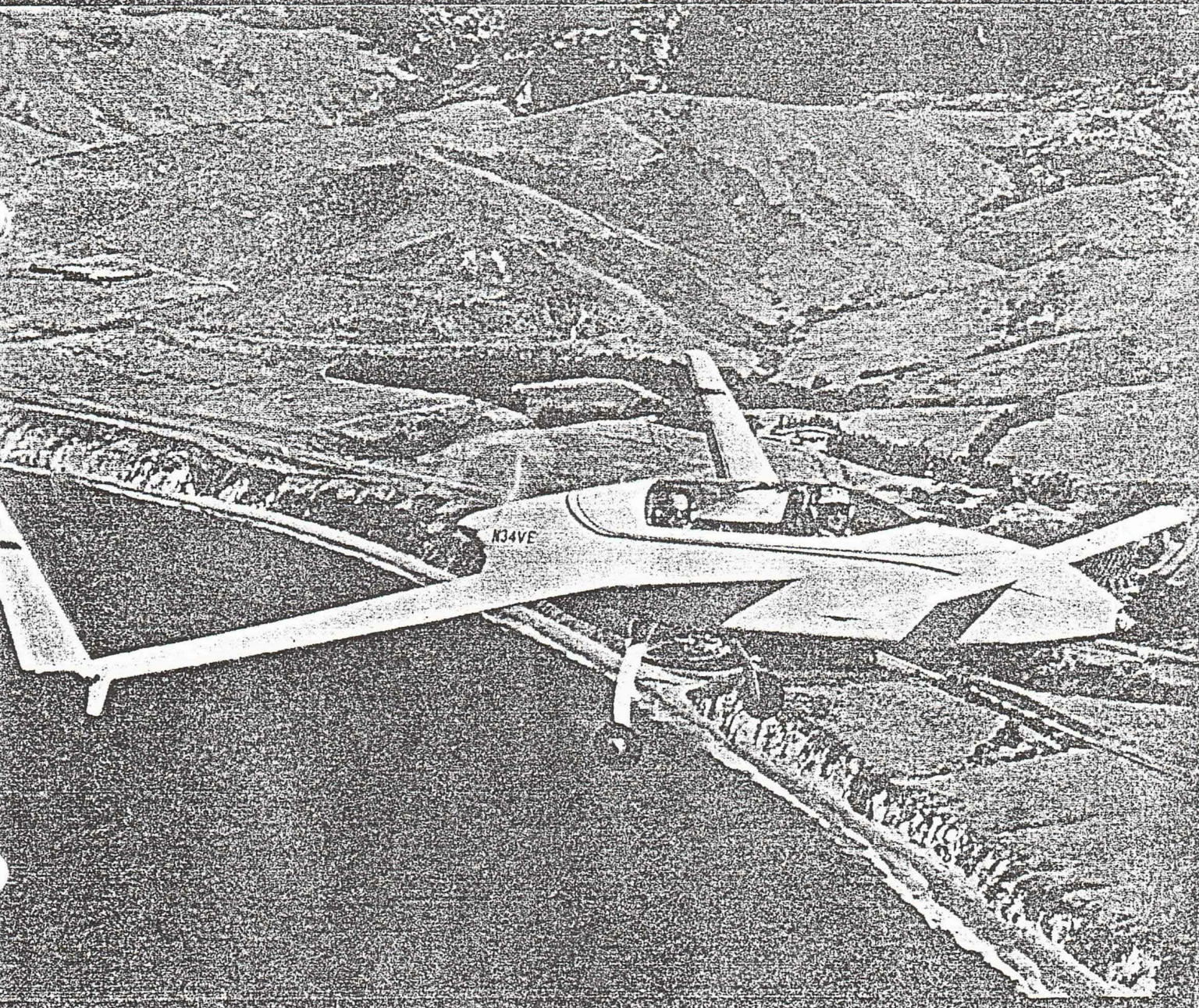
THE BUILDING OF A VARIEZE

by Dan E. Hogan



Normally, most of my spare time is spent at my favorite sport, tennis. However, while enjoying myself one warm sunny fall afternoon in 1976, something happened which changed all that for the next two years. From out of the northeast, I heard a very fast-revving engine in the sky that was not the usual standard aircraft sound. In a few seconds, a tiny craft appeared over the courts and our tennis game came to a complete halt as everyone couldn't help staring up at "Star Wars," scene one.

As you may have guessed by now, what we were seeing for the first time was Burt Rutan's prototype VariEze. The sound of the little engine flipping over and the weird shape of the aircraft really got inside me and it was love at first sight . . . make that first flight. (As most Eze enthusiasts know, N7EZ was originally flown with a VW engine, which accounts for the high rpm's.) Quickly the little plane flashed out of sight and our game continued. In a matter of minutes, it again appeared for a slightly lower pass right overhead. As before, it was gone almost before I had a chance to see what was to prove to be the ruination of my tennis game.

As luck would have it, my good friend and ex-P-47 fighter pilot, Stan Hill, was outside that same Saturday doing some chores around his home in Santa Barbara and was seeing the same sights and having the same thoughts as I. The following week, we were to bump into each other and comment on our experience of a few days ago. Our thoughts and remembrances of seeing our first Eze were predictably the same. Shortly, all the flying magazines began featuring Burt's new homebuilt with many pictures and fine articles that were to really light our fuses. The little canard seemed to be on my mind with each new feature to hit the newsstand.

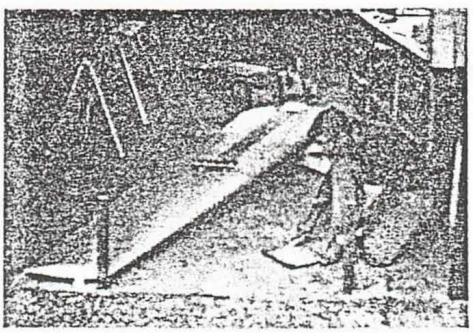
At this point in time, Jack Cowden, a new friend to me but an old friend of Stan's, came into the story, and before long a trip to Mojave was planned to see the amazing craft close up. Sixty-five to seventy people were expected to attend a builder's seminar, and Burt was totally unprepared for the upward of 250 builders and prospective builders that showed up. We were lucky and had folding chairs to sit on . . . many had to stand. All of the things that were demonstrated to us were very new, and I could listen and believe that this man knew what he was talking about. At least he was very convincing to the three of us that fall day in the desert at Mojave. As the afternoon shadows began to lengthen, Burt finally said the next few minutes would be "break time," after which we could all go over to the hangar and inspect N4EZ—the second generation VariEze, which was powered by the more conventional 0-200 engine.

The crowd around the little bird, which was kneeling in a strange nose-down attitude, snapped pictures and oohed and aaahed for a short time. Burt then selected a fellow who was about 6'3" and asked him if he wanted a ride in the back seat. With a shoehorn, he was tucked in and the 0-200 was hand propped to life on the second flip, which seemed to disturb Burt—but then it was cold.

With a gentle lift on the canard, the nose came off the ground, and down came a spindly-looking nose gear. Rutan is no midget but his practice showed as he hopped in with a great deal of ease and they taxied to the long cement runway.

The run-up was hard to hear, as the wind was beginning to get serious now and I wondered if this was really sunny California, or was I somewhere in my childhood in northern Illinois? The takeoff roll seemed normal enough but as the sleek craft flashed by, Burt lifted off at a steep angle of attack. OK I thought, he's showing off a bit and that's to be expected under the circumstances and this zoom will soon level off to a more realistic rate of climb. Instead, the Eze seemed to slow slightly but the pilot held it in a steady spiral climb that was truly amazing. After a few high speed passes down the runway—fast for 100 hp—our little group decided we had seen enough and retreated to the warmth of a local eatery to discuss the day's events. I think it was on the way back to Santa Barbara that the decision was made. We were going to build a VariEze.

Shortly thereafter, a complete set of plans was purchased and orders sent for parts and materials from Aircraft Spruce and Specialty and Ken Brock Manufacturing, both outlets being located in the Los Angeles area. Many exciting hours were spent studying the very detailed construction manuals in anticipation of the arrival of blocks of foam, gallons of resin, and rolls of fiberglass cloth. A short ride down highway 101 in a pickup truck was faster and cheaper than having all those strange sized items sent by freight. Besides, it gave Stan and me a reason to stop by our favorite airport in Santa Paula. (Never miss the chance if you're close by for a visit into the past . . . but that's another story).



Here's the right wing and the rudder. Note the attachment fitting.

Even though this was to be our first airplane we were confident of our skills as we have been involved with model planes all our lives, and after all, the VariEze is just a full size model. Even though it's a bit more complicated, anyone with a reasonable amount of desire and craftsmanship should be able to construct one.

Within a few days we were all set up to begin work in earnest on our new project. On most aircraft, it would be up to the builder as to where to begin. Not so with an Eze. The first item to be built is a bookend. That's right, a bookend. If properly done it will teach the skills necessary to build a "glass" airplane. Can you imagine how many strange shaped fiberglass bookends there must be in the world today?

With our newly acquired skills in the fine art of fiberglass construction, we made our first "hot wire" cuts on the foam block to form the inner core for the canard on March 18, 1977. We had decided to take pictures of the building process at each step of the way, and that first night we had something to show for our efforts that was truly amazing to us. The assembly of the foam cores was not difficult, and before long we were ready to do our first major exterior glass lay up. After re-reading the manual before each night's work, we started glassing the outer surface of the almost 12 foot long canard. I remember the exhaustion I felt that night when I went to bed and had to admit to myself, that was not fun . . . it was hard work mentally. I'm sure it was the pressure of having to start and go right through at a reasonable pace without stopping, and the fact that it was all so new to us. However, by the next few sessions I felt very comfortable with the new materials we were using to build our Eze.

Very early in our project we de-

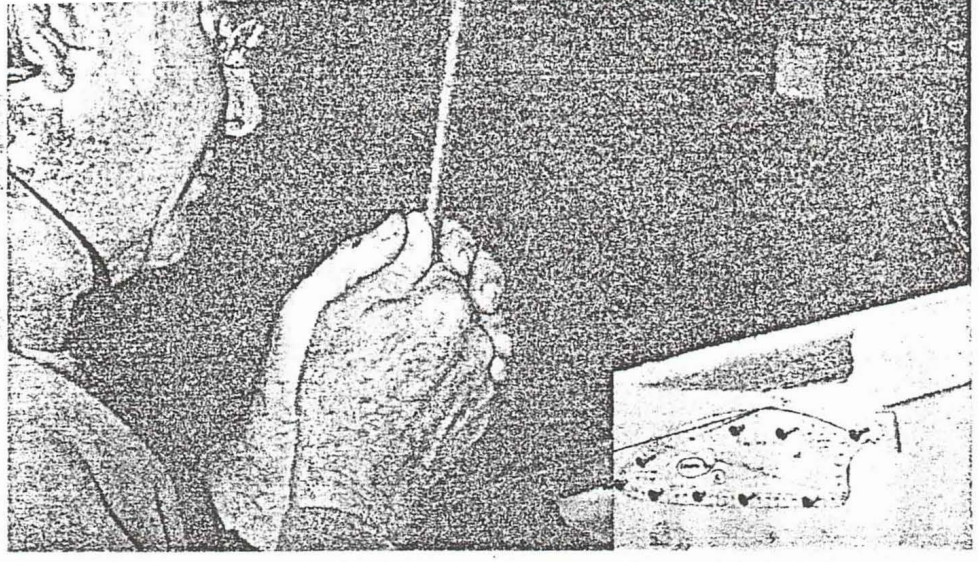
cided to locate an engine, which proved to be a good move, as Continental 0-200s were becoming very difficult to find at a reasonable price. Because we did not want to buy an engine of unknown quality, we settled on a rebuilt from Western Cylinder in L.A., which was done to factory new specs and has proven to be a fine powerplant so far.

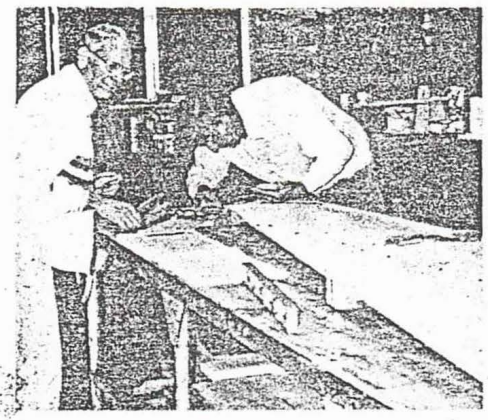
By maintaining a very regular work pattern of Tuesday and Thursday evenings plus the afternoon of Saturdays, we were able to complete many operations and show some finished components before long. I believe this is one of the reasons that the completion ratio to starts is high with the VariEze: progress is easier to see, and perhaps this generates a higher level of interest throughout the project.

I think it is worthwhile at this time to mention sensitivity to the materials used in the construction. Many builders developed a very irritating rash on various parts of their bodies, and once present, it is difficult to continue working with the resins and hardeners. This sensitivity seems to vary from person to person for no apparent reason. Perhaps our work schedule of three or four half days per week helped avoid the problem, and I feel fortunate that none of us had the slightest sign of skin irritation. Others I have talked with who worked at a more serious pace seemed prone to develop a sensitivity problem. Occasionally I would hear of a builder able to practically swim in the stuff and to be totally unaffected by it. I understand that there is now a new formula out that eliminates the problem completely.

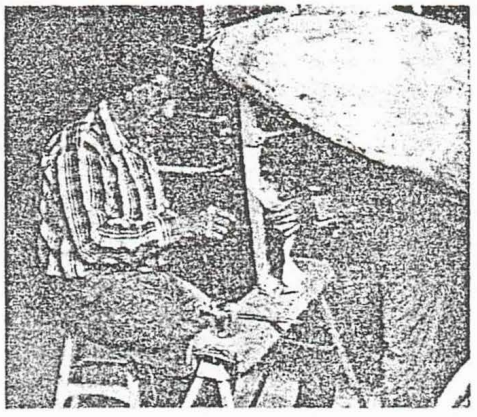
As the weeks became months, we pressed on, never missing a work session, and I must admit I was having a ball. I even recall a comment on what we would do with Tuesday and Thursday evenings once the plane was finished. I guess I would say that we were building an airplane for the fun and satisfaction of building it . . . not to hurry through the process just to have a plane to fly.

The timing throughout the project was very lucky with regard to modifications that Burt incorporated in the VariEze from time to time. The addition of ailerons, landing brake, and gear attachment mods did not cause us any major re-work. I would have been sick had it been necessary to cut into a completed wing to install an aileron. This did happen to many people who were farther along with their planes than we were when most of the major changes came out in the quarterly





Jack and Stan are shown working on a wing section in the jig.



The nose gear gets glass wrapping for additional strength.

Rutan newsletters.

I wonder how many designers would bite the bullet and do what Burt Rutan did to make the Varieze a safer plane to fly. Many will ask why all these changes were not engineered into the design before one set of plans were sold. I personally doubt that a man like Rutan will EVER be done with the design and refinement of the VariEze.

Soon we began to notice that the shop was getting crowded as we worked our way through the builder's manual, chapter by chapter. Parts were hung from the ceiling and stored elsewhere to make more room. Eventually, we reached a point where we could divide our abilities somewhat, which speeded up the building process. Hangar flying took place on a regular basis now and our photo album was getting filled up as our efforts began to produce assemblies that could be pushed outside for trial fitting and alignments. As word of our progress filtered around town, we began to find some of the work sessions turning into bull sessions. I'll admit I enjoyed them very much, and view them as part of building an aircraft.

The summer of 1978 saw a 75% completed Eze and a surprise last minute trip to Oshkosh with my boss in his Piper Archer. Twenty-four VariEzes showed up before the week was over, and I spent much of my time talking and listening to other builders and pilots. The daily "bull sessions" in front of the Eze display area were very enlightening, and I almost felt like one of the gang, but not quite; no plane yet.

I saw some rather average looking Ezes, some that were not, and a couple that were just gorgeous. Upon returning home with several rolls of color slides and the latest words of wisdom from Burt Rutan and several owners, we sanded, filled, and sanded some more to achieve the best finish we could without getting out of control on weight. Weight seems to be one thing that only a handful of builders have been able to control properly. With very few exceptions, most Ezes finish up on the heavy side. I secretly think even Burt's airplane is heavier than advertised.

Once the paint was done to our satisfaction, we began bringing all the assemblies together: final engine installation and wiring connections, brakes, upholstery, etc. Realizing we were beginning to run out of things to complete, I was getting more ex-

cited each day. At this point my boss, who is a complete flying nut and owner of the VW agency in Santa Barbara, made the usual comment, "You're going to let us display your Eze on the showroom floor aren't you?" This sounded like a great idea to the three of us, and besides, what a neat place to do the final trim and detail work. As it turned out, it was a super place to also do the final weight and balance operations.

Strange looks on customers' faces and double takes were the order of the day for about two weeks. At night, the showroom was completely dark except for three spotlights on the Eze, which was quite striking. It wasn't long before the local newspaper came by to do an interview with us. After show time was over, the only place left to go was the airport, where we fortunately had access to hangar space.

Our expense to this point totalled $11,000, which included $4,000 for the engine. I'm sure we could have done it for less and many have, but we decided to go "new" with very few exceptions.

The following Saturday, we started the 0-200 for the first time. I had never hand propped an aircraft engine before, and while being cautious, I was not at all concerned about it. I was a bit startled when the engine fired on the first flip after two pulls to prime it. With our final inspection from the FAA in hand, we began the ground testing that is spelled out in the owner's manual by Burt Rutan.

At this point, we suffered some problems with our radio gear. We were able to receive loud and clear, but could not transmit properly. After much help and effort on the part of some friends, the problem was traced to a faulty new headset microphone. In preparation for the first flight, Stan had been flying many types of aircraft for several months and felt qualified to make the maiden flight. To make as much headroom available as possible, we took out the upholstery, as a parachute caused Stan's head to touch the top of the canopy.

Even though we had countless requests to notify many friends the day of the first flight, we had decided to have as few people around as possible. The following Wednesday morning, very early, we were all there . . . the four of us. My boss offered his Piper Archer to fly chase for us. Armed with a 35mm camera, we followed Stan out to the active runway. Final clearance was radioed from tower and away we went. As the little plane sped down the runway it seemed an eternity till Stan lifted off. In reality, the takeoff roll was about like the Piper we were in. The feeling that swelled through me at that moment I could never put into words. I can only guess how Stan felt. After all, he was doing the flying. I'm sure Jack, who was at the other end of the field with a long lens camera, felt much the same. The effort of all those months of loving work did indeed fly.

After clearing the airport and gaining sufficient altitude, Stan began feeling out N34VE. Wherever he went, we went, all the while in touch with him on 122.9. Gentle turns and slow flight were the order of the day, with a few landings at 4000 feet tossed in just because. The first flight was about one hour, and in that time I recorded mentally many pictures that will be with me all my life. The pristine white of the Eze's outline against the blue of the sky and the Pacific ocean created images that made the 23 months of building time seem short. Soon we were asking landing instructions

and re-entered the pattern. A slight cross wind had come up and Stan didn't like his first approach so he went around again. This allowed us time to land and be on the ground to watch the first landing. Out popped the landing brake followed by a smooth landing. With the canopy open and a smile of satisfaction on his face, Stan rolled up to the hangar area. With a little throttle and left brake, he killed the engine and came to a halt parked just perfectly, as he must have done many times years ago. The little VariEze was far removed from the image of the P-47 fighter he was remembering with fondness from his past.

Another complete inspection was followed by many uneventful hours of flying to build the necessary time to allow the FAA to sign off the Eze. I'm sure Stan grew very tired of looking at the same scenery for 40 hours. He used the time to slowly expand the flight envelope and gain proficiency with our new toy. I was especially proud of the fact that the plane required no trim adjustments at all.

At this point, we began to seriously consider the possibility of making the trip back to Oshkosh for the '79 Convention. I'll admit I had mixed emotions about going that far with a new airplane that didn't really have much cross-country time on it. I sure wanted to go, and my boss entered the story again. He was going in the Piper and taking three of his youngsters along. It didn't take too much to convince us that we could fly along with him and not have to worry about any radio or nav work, as his ship had dual this and dual that. His cruise was a little slower than we normally fly, but we didn't mind, as we were still being considerate of our new engine. The trip across and back together gave us many opportunities to get some super pictures of the Eze.

A flight to Oshkosh is a story by itself, and I'll not try to tell it here. I would, however, encourage anyone who has never been there to put it on the top of his list as a definite must. N34VE flew there and back and never gave a minute's trouble the entire trip. A few takeoffs under less than ideal conditions really made believers out of Stan and me. Our VariEze performed as advertised, and in some areas, better.

As for Tuesday and Thursday evenings . . . well, there is now a Hiper-Bipe under construction, which may force the sale of N34VE. We'll see! In the meantime, Charlie Brown, these danged flyin' machines are sure the ruination of my tennis game. □