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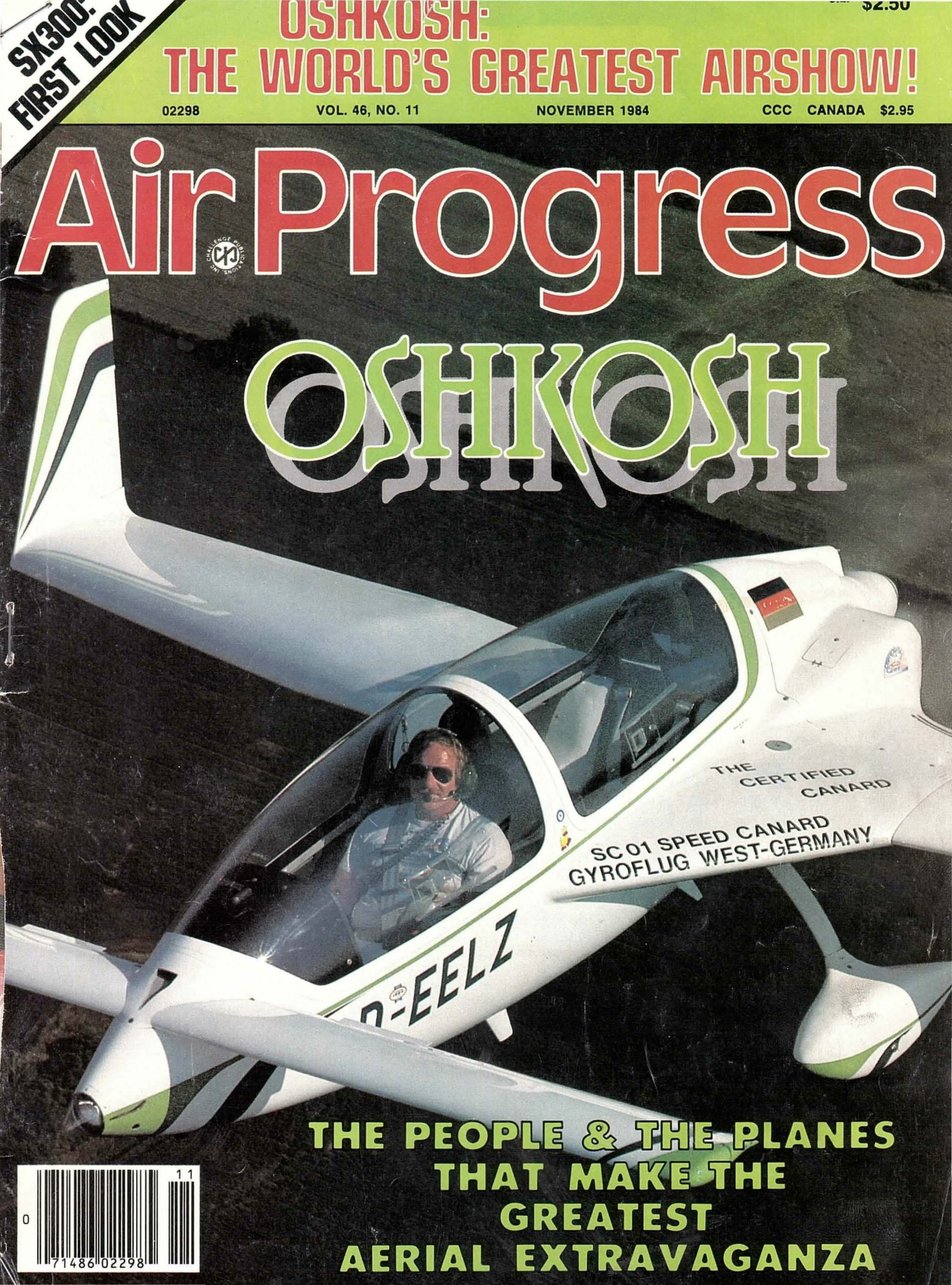

THE PEOPLE & THE PLANES THAT MAKE THE GREATEST AERIAL EXTRAVAGANZA

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IN THE AIR

teutonic and tail first

WE FLY GERMANY'S SPEED CANARD

By Budd Davisson

Standing by Gyroflug's exhibit tent in the Oshkosh commercial area you could hear all sorts of comments concerning their Speed Canard. "Look at that. Another canard clone!" or "How about that! A Rhineland Rutan!" And more commonly, "I wonder if Burt knows about this?"

With its Ezeappearance (the registration number did not help much), the airplane can't help but be controversial. Although it differs in so many ways, the configuration will forever link the plane with Burt Rutan's marvelous Mojave motion machines. Yes, it will be controversial. Unfortunately, people are overlooking the real reason they should be talking about the Speed Canard.

Even if not one Speed Canard is sold in the United States, if it qualifies for our market, it will be a milestone airplane. No, more important than that, if the Speed Canard proves itself capable of being FAA certified and receives that Ivory Tower's blessing, then it will have done something exceptionally important. Already a completely certified airplane in West Germany—if Gyroflug can use that as a springboard to FAA certification—then the Speed Canard will be the first successful certification of a canard aircraft as well as the first utilizing state-of-the-art composites (yes, I know, but you can forget the Windecker). If Gyroflug is capable of clearing the FAA certification hurdle, it will have opened the door and set the precident for many new designs to come, the importance of which cannot be overestimated.

In speaking to representatives at Speed Canard USA's marketing offices in San Diego, they admit


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the gestation period of the Speed Canard includes a modification program that included a VariEze. They are quick to point out (very quick) that they rapidly moved away from much of the airplane's original aerodynamics as well as designing what is essentially an all-new structure for the machine.

Rutan is the first to admit that his method of "moldless composite construction" is designed strictly to ease the homebuilders' problems at tooling up to build a composite airplane. Most of that foam inside the structure is redundant once it is completely finished. The homebuilder uses the foam cores as molds over which he lays the required fiberglass skin, so he's building the airplane from the inside out and must spend many hours getting the glass-like finish you see on so many of them. In a production environment, a composite airplane, such as a Speed Canard, is constructed in female molds in which the first thing that goes on is the gel coat, followed by glass-foam-glass sandwich layups. The parts which then pop out of the mold require very little hand finishing to complete.

In almost all areas, the Speed Canard adheres to tried-and-true German composite sailplane technology to the extent that the fuselage doesn't utilize sandwich skins, but is a formed fiberglass shell with local reinforcing where needed. The results speak for themselves, since even the most critical examination of the airplane shows Mercedes-like fit and finish.

WE HAD TRIED TO FLY THE AIRPLANE AT OSHkosh, but the weather turned to garbage by the middle of the week and we decided to wait until the Speed Canard was en route to New York for shipping back to West Germany. Michael Schultz, a European journalist representing Gyroflug, wended his way through humid haze and occasional thunderstorms and then got to sit for another four or five days of garbage weather until we could finally get a chance to go flying. Right up front, we'd like to thank Michael and Gyroflug for having the patience and the time to let us have a go at their machine.

Having flown the VariEze and the Defiant, I was anxious to see how the Speed Canard compared. However, the more I thought about it, the more I realized I really shouldn't be judging the Speed Canard against Rutan's airplanes. If the Speed Canard is going to succeed as a certified airplane, it must bite deeply into a market that has probably never flown a Rutan-designed airplane and the Speed Canard must stand on its own. Although the comparisons are obvious, and the temptations great, the Speed Canard must be judged against itself, which, even as I approached the airplane, I knew wasn't going to be easy.

Probably the first thing you notice when you walk up to the Speed Canard is the plane stands on all three gear legs. We've become so used to seeing canards parked with their noses on the ground, because of the CG location, that the Speed Canard looks a little strange. In speaking with one of the German representatives, I was told the level stance is achieved by relocating the main landing gear a slight amount aft. Later, while flying the airplane, I was to find this relocation may have been a compromise in the wrong direction.

Since the airplane sits nearly chest high, you'd have to have a crotch as high as a giraffe to be able to step into the cockpit. Even Germans aren't that tall. The remedy to the situation is simple; you reach in and hit the master switch and throw the landing gear switch into the "up" position. A squat limit switch allows the electric worm gear actuator to pull the nose gear halfway in, which drops the canopy sides to waist level, making getting into the front seat similar to boarding a canoe. To get in the back, you slither backwards across the wing strake on your rump.

Yes sir, there's no doubt the Europeans know how to lay out cockpits. The formed fiberglass seat somehow molds around your back and legs in such a way that you just know they had you in mind when they made up the molds. The consoles running down both sides of the cockpit place everything exactly where you want. The side-mounted control stick is on the right console and the throttle quadrant on the left, with most of the systems controlled by rocker switches on the left console behind the throttle quadrant.

I only had two very minor complaints regarding the instrument layout (if you don't include not being able to read German). The first was that the four lever throttle quadrant placed the mixture and carb heat right in line with the rest of the levers, making it possible for a new pilot to mistakenly grab the mixture, thinking he had the carb heat. The other anomaly was that the manifold pressure gauge was on the extreme right of the instrument panel and was an easy-to-read standard instrument with one inch gradients. However, the tachometer was mounted low in the middle of the panel, between my legs, and was marked in 250 rpm increments, making the two gauges not only different and spread far apart, but the tachometer used a non-standard type of marking. Also, with the tach down between my legs, I couldn't quite see the top end of the needle. I would have preferred to see the tach mounted over next to the manifold pressure gauge. Minor complaints and easily fixed.

As I was strapping in and trying to locate the various switches and gauges, I knew I was going to be seeing the Speed Canard in the worst of all possible situations. As a two-place airplane, I felt it should be evaluated with two people on board, but compounding that performance restriction was the 95 degree temperature and seventy-five percent humidity, the Speed Canard wasn't going to fool me with glittering non-standard performance numbers. No matter what I saw today, I knew that this was the very bottom and everything would work up from this level.

AFTER PICKING MY WAY THROUGH THE TEU tonic word-maze, I figured out what most of th gauges did even though I didn't know what t words said. The master switch and the key were or a pedestal between my legs and a quick punch at ne master switch and a twist of the key lit the fire o the 0-235 115 horse Lycoming behind me. The enti starting procedure felt like it was taking place b remote control, since the engine noises were so f removed. Turning the avionics master on, the Sigtroni intercom came to life and I heard Michael grumb something about leaving the front canopy open un ready to takeoff, so we wouldn't both cook. Even thou the canopy has excellent little ventilation windo on the side, I considered the sweat rolling down r forehead and took his advice.

The rudder pedals are totally independent of ea other. You can put them both down at the stme ti and deploy both rudders at once. After looking arou in vain for the brake pedals, I was advised that depre

ing a rudder pedal all the way down gave you the brakes, which are also your only mode of steering while on the ground. I started taxiing and found the braking differential perfect. I had absolutely no trouble in wending our way down the narrow taxiway to the end of the runway. After a quick runup, I rolled out on the centerline and prepared to have at it.

Standard takeoff procedure is fuel pump on and electric trim full aft. The trim is a small microswitch on the left console below and behind the throttle. I found that location a little inconvenient, if only because I had to bring my head inside to locate it. I would have preferred to have had it on the top of the control stick and move the microphone switch over to the throttle. However, once the trim indicator was full aft, as indicated by the mark on the cable running by my left elbow, I brought the power forward. The little Lycoming wound up and I was rewarded with a sewing-machine like sound that was the little Hoffman three-bladed constant speed prop spinning up. As far as noise goes, this has to be one of the quietest little airplanes.

The acceleration is just exactly the way you would want it to be, neither blindingly fast nor lethargic. But as the nose wandered one way or another, I had to remember to punch the brake and then pull my foot fully off the pedal, otherwise I would only have one rudder deployed when the airplane decided to fly off. With the trim full back, I just rested my fingers around the control stick, waiting for the nose to come into the air. My intention was to catch the nose coming off and hold a nose high attitude and run on the main gear. But somewhere in the neighborhood of 110 km (65 mph, I think) the nose leapt into the air, taking the main gear with it.

The airplane has a noticeably long takeoff roll, the penalty, I believe, of relocating the main gear to keep the nose gear down while parked. It takes so much speed to get the canard surface flying, that a lot of runway is left behind. I watched Michael take off solo on my home runway and he used up an easy 1300 to 1500 ft. With two of us on board, takeoff distance felt like at least 1600 feet. None of those distances were verified with a yard stick, but were measured by heartbeats getting a little louder when we passed the point where most airplanes would have left the ground. Having the airplane sit level while parked is nice, but personally I would rather see the Speed Canard get off a little quicker (assuming, of course, I am correct in saying the main gear location is what delays the rotation).

With the trim full back, the nose jumped into the air and I found myself subconsciously feeding in a little forward stick to hold a given attitude. However, what I thought was a "little" stick, the airplane thought was a lot, and I found myself overcontrolling in pitch, causing us to bobble up and down just the slightest amount. I wanted 150 km (83 knots), so I picked what looked like a good attitude and let it accelerate. I have to admit that I was a little spooked right at that instant because it's very seldom that I find myself having to pay that much attention to pitch input. The aileron input felt a little strange as well.

Clinging desperately to 150 km/h and full power, I let it climb out straight ahead until I had a comfortable altitude to begin playing. The climb angle was very flat, probably indicative of the amount of weight we were carrying and the outside air temperature. We were showing something in the neighborhood of 700-800 fpm.

While climbing out, I made several turns and found I wasn't totally sure of what was going on. Somehow the airplane felt a little different. In fact, it wasn't until Michael pointed out the yaw string on the canopy that I discovered what the problem was. The airplane needs a huge amount of rudder to counteract what is a substantial amount of adverse yaw. It's quite easy to input too much aileron and not enough rudder, causing the nose to go the opposite direction. If I paid attention to the yaw string, I felt much more comfortable in making the machine go where I wanted it to. Also, as I was to later find out, I should have adjusted the rudder pedals further back since I really didn't have enough travel to easily get as much rudder as needed.

The rudder-aileron harmony was such that it took me a while to get used to it (I'm not sure I ever did). But, what the yaw string and slip-ball really pointed out was the airplane's tendency to let it's nose slip to the outside while in a turn. Once established in a turn, to keep the ball in the middle and the yaw string centered required gentle pokes of inside rudder. On a normal airplane you would say it didn't have enough vertical stabilizer surface. But in the case of a canard, I'm not certain what it is. It's nothing particularly troublesome, but it is a flight characteristic that you don't find in many airplanes.

AS I GOT UP TO ALTITUDE AND PUT THE NOSE down, I brought the power back to 25 inches and 2500 rpm. Michael says they continually cruise the airplane at 2600 or 2700 rpm, but that seems excessively high. At any rate, as I held level flight, the airplane appeared as if it wasn't going to accelerate to advertised cruise speed. Ducking the nose slightly and shedding 150 feet brought the air speed up close to 140 knots true and it stabilized when I leveled out. At first impression, this is an airplane that has one of the mythical "steps" and you have to dive to get on that step. In reality, I think the Speed Canard would eventually accelerate to cruise speed, but it requires a little bit more attention to pitch control than I was giving.

One of the true sales points of canard designs is that they are supposed to be airplanes with extremely docile and safe stall characteristics. So, bringing the carb heat and power back, I pulled the nose above the horizon and started to burn off speed. Eventually somewhere down around 60 knots the stick was against the stop and holding it there produced nothing more than a general bobbing of the nose while the vertical rate of descent went to 1000 ft per minute. The relaxation of back pressure and any amount of power immediately put the airplane back into flying mode.

Michael suggested I try a power on stall so I left the power at 25 square and gingerly started the nose moving up. Impatient at the way I was pussyfooting around with his airplane, Schultz took over and pulled the nose up to what must have been a 30 degree angle and said "Here, hold this." The airspeed dropped off the gauge and the nose bobbed but the airplane never showed any indication of doing anything stupid.

While we were doing the stall series, I seriously considered stomping on the rudder, while stalled, to see if I could get it to depart into a spin. However, I figured that like most canards it would resist the

spin and therefore I made no effort. Later on, while reading the handbook, I noticed a rather cryptic comment about spin recovery, in which it gives a very definite spin recovery procedure including not only rudder against the spin, but putting aileron INTO the spin as well. According to the manual, when you recovery from a spin, and this is the text language, ". . . pitch becomes steeper, spin speed increases, maintain controls in the set position until full elevator efficiency as indicated by distinct pitching down. Then pull out smoothly. An immense loss of altitude occurs." So, not only is the Speed Canard capable of being spun, but apparently it's not one of your more benign spinners. It's a good thing I fought the urge to stomp on a rudder.

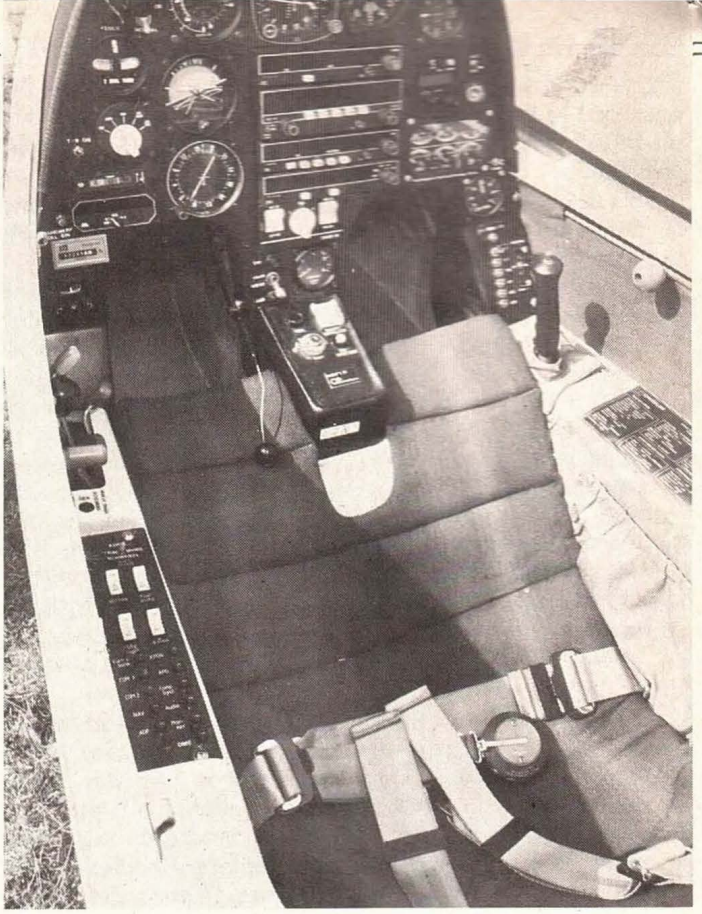
Leveled out in cruise and honking along at 140 knots, I played with the trim and found I could put my hands in my lap for an extended period of time. The airplane would just continue flying straight ahead, making it an excellent cross-country machine. In fact, the overall comfort of the cockpit, the control placement and visibility which is aided by the plexiglass wrapping down past your shoulders really does make for a fine cross-country feeling. That, combined with its 43.3 gallons of fuel, makes going someplace easy.

I tried slow flight at the recommended approach speed of 150 km (83 knots) and still had to stop fighting the airplane in pitch and rudder control. Michael finally said to stop trying to fly it and to control the speed with the trim. I thumbed the little microswitch a few times in the right direction and found I could target a speed with no problem whatsoever. But as soon as I started to hand fly I'd mess up. The airplane was perfectly speed stable and the only problem was the ham-fisted pilot. Also, when slow flying the airplane the rudders that were so necessary at normal speeds would become absolutely mandatory at slow speeds. Afterwards, Michael said when he comes in to land he adjusts the rudders to a full back position via the adjustment cable between the legs. Had I known, I wouldn't have worked quite so hard trying to keep the yaw string straight.

On my first landing, I approached a little high but, bringing the power all the way back and letting the prop flatten out, brought the airplane down very nicely. It comes down much easier than either a VariEze or a LongEze (even with a speed brake), probably because of that constant speed Hoffman in back. That first approach was high enough that if in a LongEze I would not have come close to hitting the airport, much less the runway. Speed Canard has much more drag than Ezes.

WITH MICHAEL'S VOICE SOUNDING SO PATIENT in my headset, I found the way down to the end of the runway and gently started to break the glide. Leveling out, I found the nose intruding into my field of vision more than expected. True to my characteristic habit of screwing up first landings, I held off just a little too high. As the plane started to settle and I felt for the ground, the canard came up and blocked a good portion of what I wanted to see . . . like the edges of the runway. I plopped on to the main gear a little on the hard side, but the airplane showed no indication of bouncing back up.

As I released some of the back pressure and let the nose fall through, it fell what seemed like a huge



The comfortable cockpit of the Speed Canard.

distance before the gear contacted the runway and we were rolling straight ahead All the way down final I had been reminding myself to keep feet off the rudders so I didn't unconsciously have both of them deployed, although I did use them as speedbrakes on the approach to help get us down. As we were rolling out, I deployed both rudders and went for the brakes, finding the braking to be exactly what was needed to both slow down and keep the airplane on the centerline. From that point of view, the landing was dead simple.

As we took it around for the next landing I was noticeably more comfortable with the way the airplane flew. I backed out farther on final to give a flatter approach angle, determined to bring it a little lower before starting to flare. This time the landing was much better but a lot of the runway still disappeared behind the canard. Later on, experimenting with seating height, I found that by having the rudders so far forward I was unconsciously scooting down in the seat. Had the rudders been back where they were supposed to be, I would have probably been able to see over the nose and the canard In that seating position there was a good five to six inches between the top of my head and the canopy.

In most ways the Speed Canard feels like an early VariEze. It is light in pitch in all modes, but is especially light when slow. One is much better off leaving the elevators alone after getting it trimmed to a given speed. As with the early VariEzes the rudders are absolutely essential to good control and actually contribute as much to the roll as the ailerons and any lack of coordination, of which I had plenty, result in slewing in all directions, which I did. Also, as with the early Ezes, you are better off picking an attitude

and flying it on to the ground Navy-style, then trying to flare and hold off in a full stall because the pitch attitude gets high enough so visibility becomes a problem. However, the Speed Canard doesn't show any of the slow speed Dutch roll tendencies of the VariEze. All of these shortcomings were in the VariEzes and the corrections of these characteristics were part of the development of the LongEze which demonstrates absolutely none of these traits.

As with all things German, the airplane is very well finished and comfortable to the extreme. You'd have to look long and hard to find a production machine that is screwed (or glued) together like this one. The attention given to pilot and passenger comfort is really nice. However, I do think the design was frozen a few millimeters short of being what the American market is likely to buy. This doesn't mean the airplane is designed poorly, it just means we have a classic case of European design concepts versus American tradition. It's the old Chevy-versus-Porsche syndrome.

Very few American pilots fly motorgliders or standard class sailplanes, so very few of us are used to either the seating position or the control inputs. Most Americans are ham-fisted compared to their European counterparts and the average C-152 driver would be in trouble his first time around in the Speed Canard. A standard class sailplane pilot, on the other hand, would eat it up. I'd like to see the airplane make the step forward in handling that we saw between the VariEze and the LongEze, which would make an airplane much more suited to the American market.

Marketing for the Speed Canard is being handled by Speed Canard USA, Inc., in San Diego, California. In speaking to them about their plans for taking orders, they openly admitted that any orders taken would be contingent upon getting FAA certification. Because of that, they will only take deposits on German contracts which would give the individual a guaranteed price of $42,000, depending on the rate of exchange at the time. When the airplane is certified and eventually brought into the United States, they expect the price to climb to between $50,000-$54,000. I suppose whether the airplane gets certified or not, an enthusiast could buy one in Germany and license it in the US under the airshow and exhibition provisions of the Experimental category. If you were going to do that, you'd lose many of the advantages some attach to owning certified airplanes.

As we said early, the airplane is bound to be controversial for a number of reasons. If Gyroflug can successfully scale the certification ladder, we may well find a new generation of airplanes being promulgated on foreign shores and brought in through the certification reciprocity pipeline. It actually makes little or no difference how certification is tamed, so long as it is tamed. We can't continue to ignore state of the art structures and airframe design simply because of bureaucratic B.S.

With a few very minor improvements, the Speed Canard could be a fine airplane. More important, it's one hell of a step towards breaking yet another traditional barrier to progress. □