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Le " VariEze " a vingt ans

Par Pierre Gaillard

La formule de l'avion " canard" , autrement dit de " l'avion qui vole à reculons " avec la voilure à l'arrière et les empennages à l'avant (regardez voler un col-vert, c'est tout à fait cela, empennages en moins), remonte au tout débuts de l'aviation : on la retrouve en effet sur des appareils conçus par Wright, Blériot, Voisin ou Fabre. Dans les décennies qui suivent, de temps à autres, quelques prototypes apparaissent çà et là, mais sans connaître le succès : Focke-Wulf FW 19 " Ente " en Allemagne, Miles " Libellula" en Grande-Bretagne, Curtiss XP-55 " Ascender " aux Etats-Unis. Finalement, c'est dans les années 70 qu'un génial concepteur américain nommé Elbert " Burt " L. Rutan gagne le pari de la formule canard… dans le domaine de la construction amateur.

GENESE

Ingénieur d'essais à la NASA, Burt Rutan rêvait depuis tout jeune de construire son propre avion. Après avoir testé en vol des modèles à l'échelle 1/5e, il fait voler le 27 février 1972 un delta à moustaches droites (Roland Payen aurait dit "Machutes") qu'il baptise " VariViggen ", du nom du chasseur suédois à voilure delta canard Saab 37 " Viggen " (coup de tonnerre) qui avait volé la première fois le 8 février 1967. Construit essentiellement en bois et propulsé par un Lycoming de 150 ch, son "VariViggen" fera la joie de près de 300 constructeurs amateurs.

Suit le " VariViggen 32 SP " (pour Special Performance) qui présente deux innovations importantes : l'usage généralisé des matériaux synthétiques et des " winglets ", ces petites surfaces verticales placées en bouts d'ailes, fruit des travaux de l'aérodynamicien de la NASA Richard Whitcomb. Cependant, les " VariViggen " souffrent du faible allongement de leur voilure, source d'une importante traînée aux basses vitesses.

ET LE " VARIEZE " FUT

Burt Rutan décide alors de revoir sa copie et, dans son usine de Mojave (Californie), développe le " VaryEze " (very easy, très facile), un biplace en tandem à voilure en flèche de grand allongement. Le premier prototype, immatriculé N7EZ, est construit en dix semaines. Doté d'un moteur Volkswagen de 63 ch, il effectue son premier vol le 21 mai 1975 aux mains de son frère Richard " Dick " Rutan, pilote d'essai professionnel. L'appareil se révèle aussitôt être une brillante réussite.

La voilure, qui présente une flèche de bord d'attaque de 20° et un dièdre négatif de 2°, entièrement réalisée en stratifié, ne possède aucune surface mobile. Un apex avant contient les réservoirs d'une capacité totale de 75 litres, tandis qu'un apex arrière masque les cylindres du moteur. Les dérives, pourvues de gouvernes, sont inclinées de 15° vers l'extérieur ; en outre, une petite ailette inférieure, calée à 30° vers l'extérieur, réduit les tourbillons marginaux, d'où une réduction de 7% de la consommation en croisière. Le fuselage, également en stratifié, porte à l'avant des moustaches d'une envergure de 4 m. Celles-ci portent les seules gouvernes horizontales de l'avion, sous la forme de volets courant sur tout le bord de fuite. Mus simultanément, ces volets servent de profondeur ; mus différentiellement, ils jouent le rôle d'ailerons. Grâce à cette disposition, la timonerie est courte et sans frottements parasites. Malgré leurs dimensions relativement réduites, les différentes gouvernes donnent des efforts corrects. Par ailleurs, la grande distance séparant les deux voilures permet une large plage de centrage et un fort amortissement aux rafales. Le train, escamotable sur les " VariViggen ", est constitué sur le " VariEze " d'un double arc fixe fixe en fibres de verre. Pour le train avant, il a fallu imaginer une solution originale car au sol, le " VariEze " a tendance à se cabrer à vide et l'accès au cockpit n'est pas commode. Solution : la jambe avant se replie vers l'arrière, ce qui permet d'enjamber le rebord du fuselage pour s'installer. Pilote et passager une fois en place, le moteur est mis en route, après quoi la jambe est sortie, ce qui permet à l'appareil de pouvoir rouler.

Lors du rassemblement d'Oshkosh '75, la présentation du " VariEze " fait l'effet d'une bombe, d'autant plus que le prototype établit pendant la Convention un nouveau record de distance en circuit fermé pour la classe C1a (avions de moins de 500 kg de masse totale) avec 2620,3 km. Le siège arrière a bien sûr pour cela fait place à un réservoir supplémentaire. Burt Rutan vient tout simplement de révolutionner la construction amateur.

LE TEMPS DES CANARDS

Au début de 1979, 2 000 liasses de plans du petit canard ont déjà été vendues, une centaine d'appareils a déjà volé et le " phénomène Rutan " a franchi les océans. Au fils des années qui suivent, des modèles dérivés voient le jour, toujours à destination des amateurs, tels le push-pull " Defiant " ou les monomoteurs " Quickie ", "Cozy" ou " Long-Ez ". En 1985, près de 600 " VariEze " ont été construits aux Etats-Unis, mais le 13 juillet de cette année-là, la Rutan Aircraft Factory Inc. cesse la commercialisation de ses plans. Seul subsiste un service d'assistance aux clients ayant acquis un dossier avant cette date. Burt Rutan a décidé de jouer dans la cour des grands et a créé, toujours à Mojave, Scaled Composite Inc., pour se consacrer à l'étude de machines de plus en plus évoluées et de plus en plus étonnantes. Il en résulte l'année suivante le stupéfiant " Voyager " qui effectue entre le 14 et le 23 décembre 1986 un tour du monde de 43 927 km sans escale.

La Rutan Aircraft Factory Inc. disparue et Burt Rutan ayant cessé d'apporter son assistance à différents petits constructeurs, on peut aujourd'hui craindre que " le temps des canards" soit, à terme, révolu dans le milieu amateur. A moins que…

PROFESSIONAL BUILDERS

The use of a professional builder for the construction of an experimental/amateur built airplane is, strictly speaking, not allowed. However, there are some gray areas. For example it is perfectly legal to hire someone to help you build your airplane, and to rent space in his shop to do so in. As long as you fully participate in the building process you will be in accordance with the section of the FAR's that allow the construction of experimental airplanes for the recreation and education that the building process provides.

Experimental Aviation, Inc. is not in the business of building airplanes, and we do not recommend that you hire someone to build in your place. We do recognize that such arrangements exist. We will, for that reason, pass on the following information from a professional builder we happened to talk to in regards to this issue.

There are several scenarios by which a professional builder may be used:

1. The owner is the legal builder and manufacturer.

    a. Be sure that your name is on all certificate
    b. Understand the builder is only your hands, and works at your direction.
    c. The builder's name will not appear on anything
    d. This is the *most* illegal of the options
    e. If discovered, the FAA may deny certification in the Amateur built category.

2. Form a partnership in which the two of you are builders and owners. At the end of the project, buy out the other half of the airplane.

    This may be the best scenario for liability purposes

3. The professional builder builds the plane, registers it, then sells it to a subsequent owner

    a. The builder takes all the liability risk
    b. The subsequent owner cannot get a certificate to let him do the annual inspection on the airplane himself. However, since he didn't build it, he won't know the machine intimately, and it would be better to have an A&P do the inspection.
    c. Generally, this only occurs where the builder and owner know each other well

4. Form a new corporation, which builds the plane and is at risk

    a. Very expensive
    b. Time consuming
    c. High overhead
    c. Depending on the local FSDO or inspector, may not be allowed under the regs.
    c. The very best for liability

5. Form a limited liability partnership or company

    a. A new kind of firm, one that an inspector may allow
    b. Uncertain future status

6. Check with a practical attorney.

    You should consult with one regardless of which scenario you choose

Professional Builders will generally cost between $40,000 - $50,000 for a completed airplane, depending on the extent of the custom work done. The price can be much higher if extensive customization is desired.

If you wish to get in touch with a professional builder please contact EAI for a referral.

We hope this information is helpful.

John Denver Crash Report Called Flawed

By Peggy Lowe-Denver Post Staff Writer

Jan. 27 - An attorney for John Denver's family on Tuesday criticized the final federal report on the plane crash that killed the pop singer and said he will ask the government to reconsider its conclusion.In a report issued Tuesday, the National Transportation Safety Board said the crash can be blamed on the plane's design as well as pilot error. Denver, the report said, took off with too little fuel in one tank, had trouble switching to a backup fuel tank and then inadvertently put the plane into a roll.But Bill Wimsatt, a Los Angeles lawyer who represents Denver's mother and the singer's three children, said the NTSB report is flawed. The report missed two vital issues, Wimsatt said.First, Denver could not have added fuel to the airplane because of federal weight limitations, and to fly with any more fuel would have been illegal, Wimsatt said."Frankly it's such a basic mistake (by the NTSB), I don't see

how they could have missed it, but they did. Big time.'' Second, Wimsatt said the NTSB's report incorrectly theorized that

Denver caused the plane to roll while trying to reach the fuel

selector valve. Instead, he said, Denver probably lost control of the

plane because it became unbalanced after losing power.

'Their idea that he (rolled the plane by mistake) is not bad, but

it's not a necessary ingredient to explain the accident,'' Wimsatt

said.

'The more likely explanation is that the loss of thrust from the

propeller created a change in balance that contributed to the loss of

control of the airplane.'' Denver, the 53-year-old parttime Aspen

resident, was killed when his small, experimental plane plunged into

he ocean off Pacific Grove, Calif., on Oct. 12, 1997.

Witnesses said they heard a sputter, and federal investigators

theorize that Denver ran out of fuel in the left tank and had trouble

switching to his right tank.

The plans for Denver's homemade Long E-Z say the fuel selector

handle, which switches the fuel flow between the left and right

tanks, should be located between the pilot's legs. But the plane's

builder, Texas aircraft maker Adrian Davis Jr., told investigators he

put it behind the pilot's left shoulder because he did not want fuel

in the cockpit.

The day of the crash, Denver and a maintenance technician talked

about the handle's inaccessibility.

"They tried a pair of Vise Grip pliers on the handle to extend the

reach of the handle, but this did not work,'' said one investigative

report.

Under those circumstances, the pilot would have had to remove his

shoulder harness, turn around and switch the handle. While doing so,

Denver's right foot pressed against the right rudder, the report

said, causing the aircraft to roll.

The plane had no flight data or voice recorder, so investigators had

to piece together their account of the plane's final minutes. "That's

just a theory,'' Wimsatt said. "You don't need to theorize in that

way to explain the accident.''

But Wimsatt said he was glad the NTSB report highlighted the fuel

valve. The NTSB said contributing factors included the builder's

decision to relocate the fuel tank selector handle and an absence of

markings on the handle and fuel gauges, as well as Denver's lack of

training in his new plane. Denver's survivors have filed a lawsuit in

a California court against the valve manufacturer, Imperial Valve

Co., and its supplier, Aircraft Spruce and Specialty Co.The suit seeks undetermined monetary damages, he said. Wimsattrepresents Denver's mother, Erma Deutschendorf of Aurora, two adultchildren from his first marriage, Zachary and AnnaKate, and his daughter by his second wife, Jesse Belle.Experimental and amateur-built aircraft like the Long E-Z are not subject to all Federal Aviation Administration rules. The safety board recommended that the FAA, the Experimental Aircraft Association and insurers cooperate to "strongly encourage" pilots of new experimental planes to undergo formal training, not now required.

But an EAA official said training is already required twice a year and that pilots of experimental planes should not be singled out.

"I don't see how they can isolate that need to EAA pilots," said Gayle Hess, president of a San Diego EAA chapter in San Diego.

The Associated Press and The Washington Post contributed to this report.

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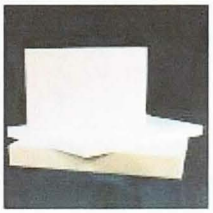

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AirVenture pays tribute to Burt Rutan

Written by

Mary Bergin
Special to the Press-Gazette

12:29 AM, Jul. 16, 2011|

Two wings. One fuselage. Propeller in front. Tail at back. I was content with my presumptions about airplanes in the 1970s, until Burt Rutan began messing with my head in Oshkosh.

The newly retired California designer of eye-widening and award-winning aircraft earns a day of tribute July 28 at the annual Experimental Aircraft Association's AirVenture.

Some of the 500,000 who attend AirVenture — the world's biggest gathering of aviation enthusiasts — arrive in the 10,000 planes that temporarily turn Wittman Regional Airport into the world's busiest, based on the number of takeoffs and landings. Many are homebuilt planes, constructed by average people.

Rutan made some of this possible while challenging conventional thinking, although another dimension of his work is beyond the average pilot's reach. Consider the two-passenger SpaceShipOne, a 2004 design that earned Rutan the $10 million "X Prize" and someday may launch private-pay passengers into outer space. The technology is licensed to Virgin Atlantic's Richard Branson, the British entrepreneur who is selling $200,000 tickets to ride another Rutan version of the spacecraft, now undergoing test flights.

So the world of flight remains ever changing, even as federal dollars for space exploration dwindle. One reason people attend the EAA AirVenture is to marvel at the miraculous possibilities.

For five years, I'd cover the annual EAA fly-in and see Rutan show up with something new and strange that seemed to break the rules.

The aerospace engineer's single-seat Quickie, galactic in tone but sporty in size, flies with a rear-end propeller and was born shortly after the 1977 "Star Wars" movie release. The sassy little plane, big enough for just a pilot (who is no larger than 6-foot-6 or 215 pounds), earned the EAA's Outstanding New Design Award one year later.

Rutan would win the award three times before the decade ended.

His Quickie was a condensed version of the two-person VariEze ("very easy"), which was missing the traditional tail but had four wings — one set long and v-shaped, the other short, straight and piercing the airplane's nose.

Both planes were sleeker relatives of the VariViggen, whose stocky body and thick, flipped up rear wings seemed itchin' for a fight. None provided as much room, fuel or payload as the subsequent Long-EZ.

"EAA has been a critical component of my career since 1972," Rutan says, in press materials. "Our annual trips to Oshkosh were the highlight of our business year," and opportunities to meet and guide aircraft homebuilders "were critical to the success of the builders and me personally."

The annual fly-in began in 1953 as a way for pilots to network, socialize and learn from each other. Volunteers (about 5,000 this year) are crucial to the event's success.

No alcohol is sold on the convention grounds.

Some components don't change. That includes the diversity of what flies: screeching military fighters and hefty bombers to delicate ultralights and nimble aerobatic designs.

Almost 1,000 AirVenture events — workshops, concerts, book signings — engage pilots and the public. Most popular are the afternoon and at-dark air shows, where pilots deliberately stall engines, spin and roll. Teams of planes perform an aerial ballet of dips, swoops and twirls. Others re-enact historical military battles with a fierceness of precision and power.

Speed matters, sometimes. Other times it's all about grace and synchronicity. Few know this better than Bob Hoover, an air racer, World War II pilot and a pioneer in aerobatic performance. The Nashville native gets his day of honor July 26 at the AirVenture.