

The Cirrus: A C



The Vintage Sailplane Association (a division of the SSA) recognized some years ago that as our fleet aged, there needed to be some way to recognize "tomorrow's vintage" sailplanes in time to start encouraging their preservation, restoration and flying. Thus the "Classic Division" was created for any sailplanes more than 25-years old. This is one result of that effort, a case study of a classic sailplane, the Schempp-Hirth Cirrus.

The Design, Construction and Distribution

Klaus Holighaus' Ph.D. paper at the Technical University of Darmstadt consisted of the design and calculations of this sailplane. Although Schempp-Hirth had made extensive use of fiberglass in the Standard Austria and SHK, the Cirrus was the first all-fiberglass machine they put into production. The only exceptions are the foam cores used to make the sandwich material for the wing skins and the fuselage bulkheads, and the internal steel frame in the fuselage. The unique internal tubular-steel frame ties the wings, pilot seat, and landing gear together. This frame is bolted to the fiberglass shell, and facilitates both the initial construction and any repair, since the highly stressed structure is steel.

The 17.8-meter wings illustrate an interesting compromise between goals of efficient thermaling and high speed inter thermal flights, intended to meet the requirements for soaring in central Europe. A rather thick Wortmann airfoil (FX 66-196/161) is used which yields low wing drag over a wide range of speeds, very gentle stall characteristics, and provides excellent thermaling performance without having to increase pilot workload with flaps. The slight disadvantage in high-speed cruise from the thicker airfoil is offset by using ballast. The result was a machine with an advertised best L/D of 44:1 and excellent thermaling characteristics.

With the clarity of hindsight, it appears the Cirrus is to a significant degree "over built." In the sixties, it wasn't clear just how strong these composites were and how long they would last. Accordingly, the design was rather conservative. The wing was static tested to 15 g's, and very extensive fatigue tests were conducted to simulate a life of 30 years (about 9,000 flying hours). Good thing, now that several of us are flying Cirruses more than 30-years old!! The testing included a total of 6.5 million stress cycles imposed on the wing, running through load factors of +5.75 to -3.45 g units. After the fatigue tests, a static test at temperatures up to 129° F under design load conditions corresponding to a gust speed of about 140 mph. Three decades of flying appear to vindicate the robustness of the machine. There have been only a few Airworthiness Directives, directed to the spoiler activation mechanism and the balancing of the tail levers.

The first prototype (see picture) is the only Cirrus with an all-flying V-tail, reflecting its design origins in the Austria. It is believed to be still flying in Italy. Actually, Schempp-Hirth built two prototype fuselages which flew with the

same set of wings. Both had the same German registration number (D-9406) but one had the V-tail (the V-1) and the other had the conventional tail (the Cirrus B) which went into production. Schempp-Hirth switched to the conventional tail for marketing reasons as a result of strongly voiced opinion from a well-known American pilot. While there were no handling problems in the V-tail prototype, the first conventionally tailed machine exhibited tail flutter that led to several changes in rudder and fin design - including a gas damper strut for the rudder - before the first production run began. (As an aside, the damper strut used in the Cirrus is that from the trunk lid of a Volkswagen!)

Between 1967 and 1971, Schempp-Hirth produced a total of 170 Cirruses, including the prototype. Of these, 63 were produced in Yugoslavia under license by the *Vazduhoplovno Tehnicki Centar* in Vrsac, Yugoslavia and are often referred to as the "VTC" or the "Yugoslavian variant." (None of the Cirruses imported into North America was a VTC.)

The first of the regular production run to be delivered to North America was No. 4, N1194, in 1967, to William Foley, AKA Motorless Flight Enterprises, the importer-dealer in the U.S. This sailplane was flown by Gleb Derujinsky in the 1968 U.S. Nationals and is prominently featured, along with George Moffatt's No. 23, in the film "The Sunship Game." A Burbank, California pilot who flies it with a new N-number, N49ME, now owns it. Charles Yeates imported one Cirrus, No. 18, into Canada and another 30 were sold in the United States. One of these, No. 84, was reported in Selinger's book (q.v.) as being sold to William Foley/Motorless Flight Enterprises in late 1969 or early 1970, but the U.S. FAA cannot confirm this, nor have they been able to produce any records.

Subsequently, one U.S. sailplane (No. 23) was exported to the United Kingdom, and five more (Nos. 15, 18, 42, 69, and 77) were exported to Canada. Four (Nos. 54, 58, 74, and 101) are known to have been destroyed, leaving 25 Cirruses known or suspected to be in the current North American fleet (6 in Canada and 19 in the United States) at this writing. One sailplane, No. 5, although "destroyed," was rebuilt and is currently in service. Of all these, the accurate flying/flyable status of five (Nos. 42, 69, and 82 in Canada, and Nos. 44 and 64 in the U.S.) is unclear, leaving 20 Cirruses known to be flying on this continent.

Competition

The debut of the conventionally tailed Cirrus in competition was in the World Soaring Championships in Leszno, Poland in 1968. (The V-tailed prototype had flown in the 1967 German Nationals.) Five Cirruses were entered, including No. 8 which won the contest under the control of Harro Wodl of Austria. Canada's Charles Yeates flew No. 18 to ninth place.

The first year of the Cirrus in North America saw only one flying in the 1968 U.S. Nationals, and that was No. 4, N1194, flown by Gleb Derujinsky. He placed 5th overall in the contest, flown at Elmira, New York, and won the second contest day, on July 4, in a 104-mile out-and-return flight.

The 1969 U.S. National Soaring Championships might be considered the high point for the Cirrus in competition on

Classic Case

By Jim Kellett

this continent. No fewer than eleven were entered, and they placed first and third! Two of the sailplanes – Moffatt's No. 23 and Derujinsky's No. 4 – were modified by having their wings extended by about one meter. One of the eleven, No. 24 N3441, crashed during the contest and the crash was caught on the film, "The Sunship Game." In 1970, Open Cirrus were down to seven in the U.S. Nationals, and the highest-placed machine was only third, when "Big John" Brittingham flew No. 15 to third place for the second year in a row! The Cirrus is still, nearly 30 years later, a popular and effective contender in local and Sports Class contests.

Accidents

It's surprising that five Cirrus out of the original 31 in the North American fleet have been destroyed. Even more surprising is that eleven more sailplanes were involved in accidents resulting in serious or moderate damage, and three pilots died in these crashes. Like any current owner/pilots, I find these data for the frequency and severity of damage in so small a fleet hard to explain. Derek Piggott is correct in that the Cirrus is quite easy to fly, and has no surprising characteristics – certainly not when compared to some other early glass machines of the same era, which now appear to be much more challenging to the inexperienced pilot than the Cirrus.

Detailed accident data are inadequate to identify any clear pattern. For example, there is not a "cluster" early in the sailplane's history, which might have suggested that the relatively sharp improvement in sailplane performance in the late sixties caught pilots unaware. Nor is there any convincing evidence of any significant structural design deficiency, even though one sailplane (No. 58) was destroyed in what was believed to be a tail flutter incident.

A Rich Family History

The individual records of the sailplanes in this small fleet are, like the life histories of individuals in a genealogy, rich with experiences and adventures. For example, after George Moffatt modified the wings of No. 23, N1216, the plane moved through several owners including one who took it with him to England for a tour of duty, where he acquired partners. One of these partners was a paraplegic, so the sailplane was modified again in 1993 to accommodate hand rudder controls. Today, No. 23 remains in a partnership of British pilots who continue to enjoy it, having made more than a few badge flights in it, including a Gold C and Diamond altitude as recently as 1995.

The status of one sailplane, No. 64, N11NC, remains a mystery and may have, to use Jeff Byard's term, "returned to nature." In the late eighties, the owner apparently tired of it and left it tied down in the open for several years. During this time it deteriorated badly. In 1992 or 1993, the sailplane disappeared from the Montague-Yreka airport, its fate unknown.

The circumstances of another, No. 33, N4137C, are unusual in that it is still owned and flown by the original purchaser! Flown by the father-son team of Fritz and Burt Compton, the sailplane has the enviable record of an average of three hours per flight for its entire lifetime! This may well be a record for sailplanes!

In another case, No. 5, N99VJ now flies in Texas. It's had a hard life: after a series of accidents and incidents, it was destroyed by a crash into trees in 1982. Like the Phoenix, however, it rose from the ashes to be rebuilt and recertified in 1993. It graced the cover of *Soaring* magazine in September 1994 while its current owner, Cliff Oliver, was flying it over Medina Lake in Texas.

Maybe we should have "parts donor cards" for sailplanes like No. 55, N441U, that was the victim of a serious crash in Maryland in 1983. Its remains floundered around in limbo until 1991 when it was bought sight unseen at an auction. About the same time, No. 54, N8514 was destroyed in a crash in Texas. George Applebay took on the task of rebuilding it, using the right wing from No. 54 to complete the task in 1994! It's interesting to note that some parts from No. 54 were also used in repairs to No. 5! Finally, the current owner of No. 55, Craig Freeman, still uses the trailer from No. 58, the sailplane that was destroyed by a suspected tail flutter incident in 1989. (Moral: Don't throw ANYTHING away!!)

Where Do We Go From Here?

The Schempp-Hirth Cirrus is only one example of a Classic sailplane. These sailplanes are a major resource to the soaring community. New pilots can find in this fleet reasonably priced, well-performing machines that can meet many pilots' needs. The Classic sailplane also serves as a bit of living and flying history that bridges the wood and fabric machines of the vintage era with the state-of-the-art racers of today. Not only do these planes deserve our attention because of their historical significance; they are valuable resources to the vast majority of soaring pilots who are engaged in recreational, badge, and regional or sports class contest flying. VSAs Classic Division encourages the sharing of information and experiences between Classic and Vintage sailplane owners, and publishes the *Bungee Cord*, a journal devoted to the preservation of older sailplanes. For more information write: VSA, 4310 River Bottom Dr., Norcross, GA 30092.

References:

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- "The Schempp-Hirth Cirrus," William M. Foley, *Soaring*, July 1967.
- Selinger, Peter F., "Segelflugzeuge vom Wolf zum Discus," Motorbuch Verlag Stuttgart, 1989. (The author is indebted to Mr. Ernest Klimonda for his translation of the relevant passages from German to English.)
- Federal Aviation Administration Ownership Files.
- National Transportation Safety Board Accident Reports.
- Personal Correspondence with current and past Cirrus owners.

About the author: Jim Kellett flies his Cirrus with the Skyline Soaring Club (<http://www.ssl.usmd.edu/skyline/>) in New Market, VA. An SSA member since 1966, and the Chair of the VSA's Classic Division since 1996, he has been associated with four Clubs and one commercial operation over the years, and has been a CFI since the mid-seventies. He retired from the Federal service in 1996 and now lives in Winchester, VA.

