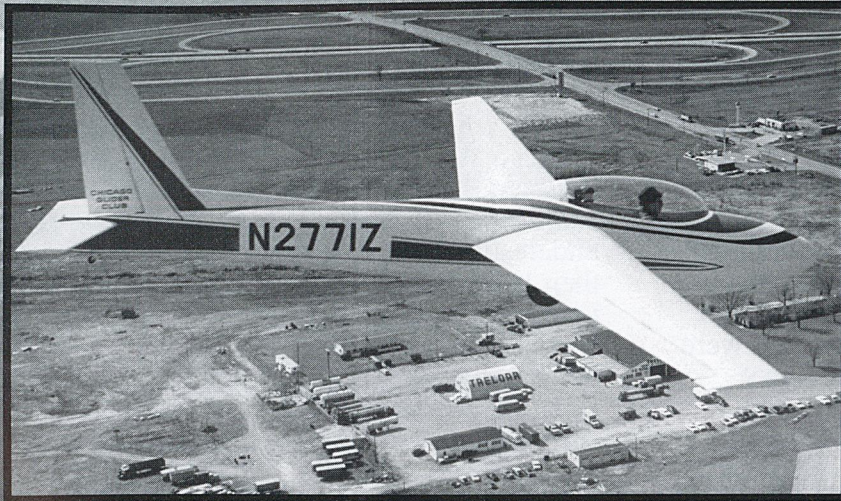
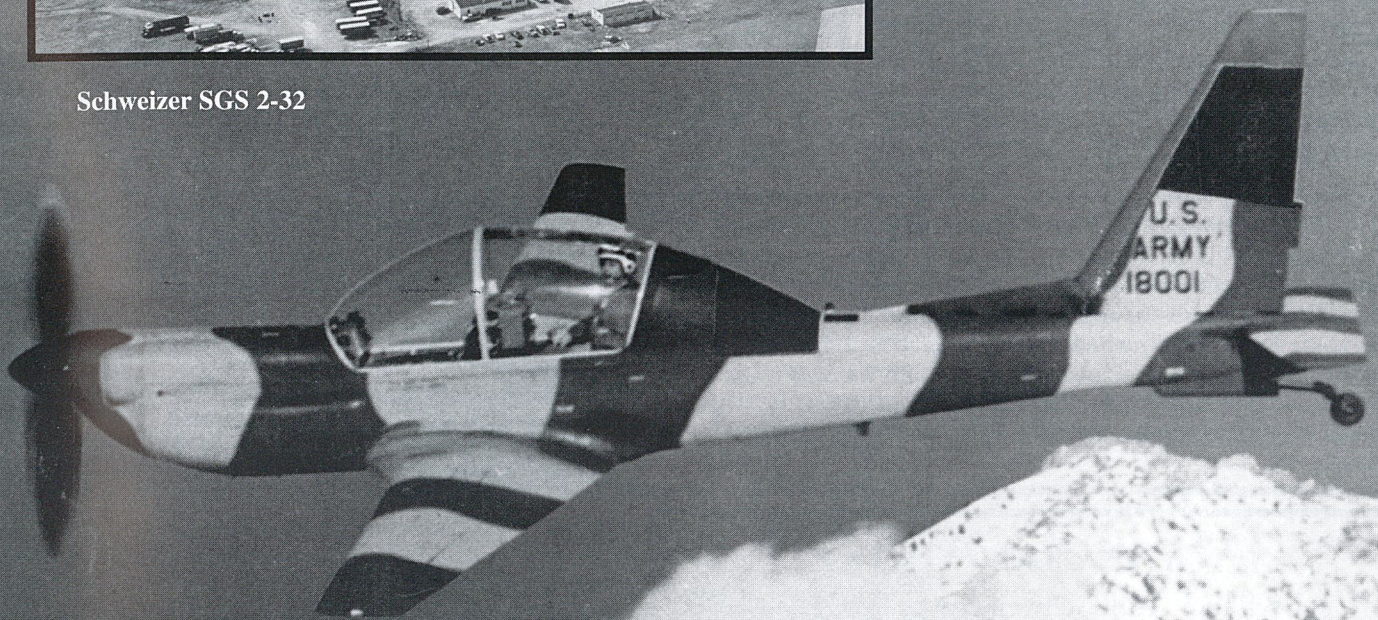


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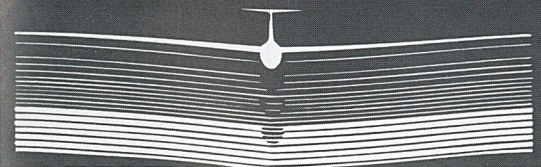


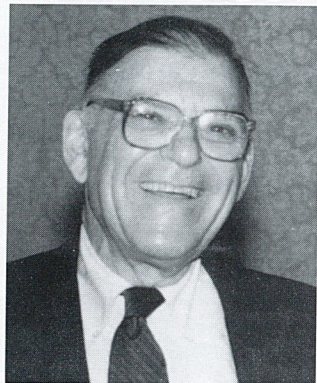
Schweizer SGS 2-32



Lockheed YO-3A

National Soaring Museum





Schweizer Sailplanes to Spy Planes

By William Schweizer

Two Schweizer 2-32 sailplanes were converted by Lockheed into quiet reconnaissance airplanes and were successful in keeping tabs on the communist military movements in Vietnam during the Tet offensive in January

1968. The aircraft were experimental vehicles taken to Vietnam for field testing in actual combat conditions. The Vietcong were continually moving troops and supplies through the dense jungle under the cover of darkness and conventional surveillance methods were useless. Whenever the guerrillas heard the noisy helicopters coming, they would hide under leaves, bushes, brush or in a foxhole. The reconnaissance airplanes, however, were extremely quiet when flown slowly, had a black and gray camouflage finish and carried night vision infrared sensing (see in the dark) equipment aboard. This made it possible for them to locate the enemy at night without being seen. The

aircraft were flown about 1000 feet above the ground and, at times, as low as 100 feet without being detected. Military observers were impressed and said the YO-3's made as much noise as a flock of birds flying overhead.

When the United States was drawn into the Vietnam War in 1964, our military advisors told President Lyndon B. Johnson that it would be a short war. However, it did not turn out that way. They underestimated the difficulty of finding their enemy and their troop movements in the rugged and underdeveloped country. Our military commanders in Vietnam were frustrated; and finally, in 1967, they told Washington that they needed quiet observation aircraft to fight the war successfully. Unfortunately, there were no such airplanes in our military inventory or otherwise available commercially. As a result of the Army's request, the Department of Defense talked to Lockheed Aircraft Corporation about their problem in Vietnam. Lockheed was approached because it had a reputation for building or modifying aircraft by hand on a

2-32 SCHWEIZER SAILPLANE AND ITS FAMILY
FAA approved 2-32, 2-3 place high-performance production sailplane presently holds three World Records and six National Records. It's one of the highest performance 2-place production sailplane in the world which ideally suits it for high performance power versions. Powered modifications have been built by Bede - Lockheed - and LTV Electrosystems Interest has also been shown by Martin - Ryan and other electronic companies.



About the Author

William "Bill" Schweizer was only 12 in 1930 when he and his brothers, Ernest and Paul A., built their first glider. Launched by elastic cords, the Schweizer 1-1 wafted Ernie a grand total of 40 feet. (A full scale, Schweizer 1-1 reproduction is on exhibit in the NSM's Schweizer Gallery)

Trained as an industrial engineer, Bill Schweizer took the lead in developing the Schweizer Aircraft Corporation's manufacturing organization and helped steer it through changes in products, technologies, and markets far beyond gliders. Still an enthusiastic pilot, he was elected to the United States Soaring Hall of Fame in 1985.

Now, the second Schweizer generation, W. Stuart and Paul Hardy Schweizer, Bill's sons, along with Ernie's son, Leslie, have taken over the operation. The Schweizer Aircraft Corporation is the longest continuously operating family aircraft manufacturer still in business, in the United States.

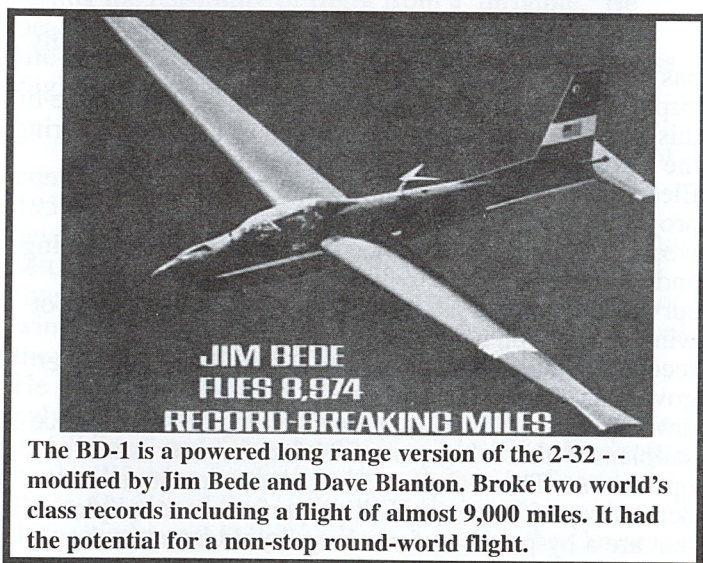
"rush-rush" basis to the specific requirements of the military. For example, in the mid 1950's, Lockheed built a fleet of U-2 spy planes in their California "Skunk Works" and had them flying over Russia for three years before they were detected. The Lockheed management responded immediately and turned the problem over to their Missile & Space Division at Sunnydale, California. Here, a group of engineers with a background in aircraft noise reduction were told to go right to work on the problem without contract coverage.

First, a study was made to determine if there were any military or commercial aircraft that could be converted quickly into effective quiet observation aircraft. Unfortunately, they did not find any good candidates. The engineering group concluded that, for an airplane to be quiet, it had to be able to maintain its altitude with a small amount of power and have an effective muffler system so engine noise would be minimized. In order to fly with limited power, the aircraft had to have an efficient wing like that on a sailplane. Therefore, the engineers started to look at various sailplane designs. They quickly concluded that the all metal, two-passenger Schweizer 2-32 with its 57

foot wing span was an ideal candidate for conversion to a quiet airplane.

Lockheed engineers made a preliminary design of a 2-32 with a 100 HP aircraft air cooled engine with a muffler and a speed reduction drive mounted behind the cockpit. The propeller shaft extended over the cockpit to the front of the aircraft. A large four-bladed wood propeller was mounted on the drive shaft in front of the aircraft's nose. The engine's speed reduction drive decreased the turning speed of the propeller which reduced noise without affecting its air thrust power. By the time the preliminary design was complete, the project was financed by the U.S. Army. The contract called for two 2-32 sailplanes to be converted as per Lockheed's drawing as soon as possible. The Army named the design Y0-3.

Lockheed immediately purchased two 2-32s and the modifications got underway in their experimental shop. Both motor gliders made their first flight in August 1967. They flew well and were quiet, but had one negative feature: they required a very long take-off run. This was the result of the 1000 lbs. additional



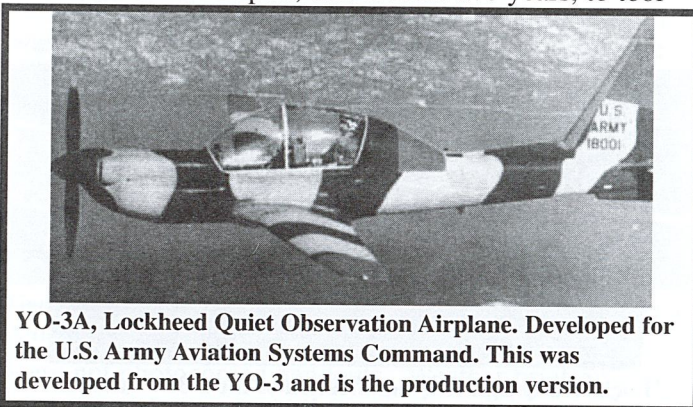
weight of the engine, gas tanks, propeller, drive shaft, avionics, instruments, etc. Once it was airborne, it could cruise around to maintain altitude with 50% of its 100 HP and it was a very quiet bird.

The Army was so impressed that, before Lockheed completed its flight test and evaluation program, it was ordered to send both Y0-3s to Vietnam for combat field test evaluation. The Army wanted to make sure that the quiet airplane concept was a practical weapon before investing in a production program. The aircraft were painted black and gray and the night vision infrared sensing equipment was installed. (This equipment picks up infrared radiation from objects that are warmer than the surroundings. For example, it will detect people, whose temperature is 98 degrees,

operating in an environment that is cooler.) Since the Y0-3 was a sailplane byproduct, the wings and tail surfaces were disassembled with ease and conveniently shipped by military cargo aircraft to Vietnam.

In the meantime, after Lockheed had the two Y0-3s snatched from under their noses, they purchased a 2-32 sailplane at their own expense so they could continue their quiet airplane research work. They had Schweizer beef up the structure of our sailplane so it would have an improved structural safety for a higher gross weight. In order to improve the take-off performance, Lockheed went on a search for an engine with more power that was comparable in weight and size to the 100 HP engine used in the Y0-3s. The only power plant they could find that met their requirements was an experimental rotary combustion automotive engine developed in Germany. It was called the Wankel and was owned by The American, Curtis-Wright Corporation. It produced 185 HP, had very few moving parts, and was liquid cooled, which made it easier to muffle engine noise.

The experimental Wankel engine was installed in Lockheed's 2-32 and they called the design the Q-Star. It looked the same as the Y0-3 except for the radiator in the nose. The take-off run was improved, it flew well, and it was very quiet. The Q-Star received considerable favorable publicity in the aviation press. The problem with the Wankel engine was not the design, but, rather, the development cost and timing. A Curtis-Wright spokesman said it would take a large investment on their part, and at least two years, to tool



and FAA certify the Wankel. Therefore, they would require a large commitment from a buyer. Neither the Army nor Lockheed were prepared to make such a commitment, so the Q-Star project was set aside.

The Y0-3s arrived in Vietnam in late 1967, just before the Tet Offensive began, and they were put to work immediately. The Army reported that they were able to fly over areas of troop development or other targets of military interest without alerting people on the ground. Before they left in early 1968, the Y0-3 had logged over 800 hours of combat flying without any bullet holes. The Army commanders in Vietnam

recommended to Washington that they proceed with the quiet airplane program.

Early in 1968, right after the Y0-3s returned, the Army gave Lockheed a go ahead to design and build twelve advanced quiet airplanes on a "rush-rush" basis. The design was officially named the Y0-3A. The combat field-testing gave the Army a clear picture of what these aircraft do and also revealed a number of design inadequacies. For example, the Army wanted the pilot in the rear seat and the observer in the front. Therefore, more room was requested in the cockpit area for instruments, avionics, and for the comfort of the crew. They also wanted a bulging, bubble-type canopy that would extend beyond the side of the fuselage to improve the crew's visibility. A retractable landing gear and many other details were also on the Army's "wish-list" for the Y0-3A. On the negative side, all these changes increased the weight of the aircraft. As a result, the aircraft now required a more powerful engine, and more gas which also added weight.

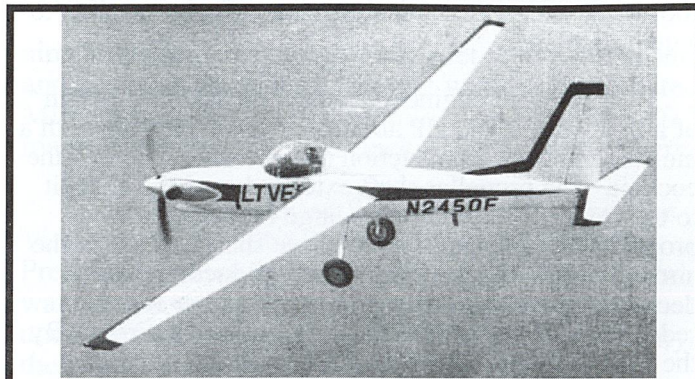
The designers decided to use a 210 HP aircraft engine mounted in the nose of the aircraft. The engine had a reduction drive to the propeller shaft so it turned three times faster than the prop. A large six-bladed wood propeller was used. It produced the same thrust for the power of the engine and was much quieter. The Y0-3A airframe utilized wings, tail surfaces, and the aft fuselage from the 2-32 sailplane design. These components were strengthened by Schweizer to carry the increased weight of the airplane. The forward fuselage,



Lockheed Q-Star is a modification of the 2-32 - - used in developing the quiet observation aircraft for the military. The latest model shown above has a Wankel type engine.

cockpit, engine installation, and the retractable gear were built by Lockheed and the Y0-3As were assembled at their plant in Sunnydale, California.

The first Y0-3A flew in the summer of 1969, and this time it was thoroughly tested before Lockheed would let it go. Six months later, a number of Y0-3As were operating in Vietnam. With their camouflage paint scheme, very low operating noise level, and sophisticated infrared equipment, they were very efficient. As a result, they were well received by the



LTV L450 modification of the 2-32 by LTV ElectroSystems - - designed to handle unmanned high altitude reconnaissance missions lasting up to 30 hours and operates at altitudes of more than 45,000 feet from remote control stations.

Army command. However, it took more than a few Y0-3As to win the unpopular "unwinable" war. Finally, in 1973, President Richard M. Nixon withdrew our troops from Vietnam. Our enemy, North Vietnam, went on to defeat South Vietnam and the war ended on April 30, 1975.

Since the Vietnam War, the Schweizer Company has been involved intermittently with reconnaissance airplane development, and in recent years, the volume of this work has increased. In addition to Lockheed, during the 1970's, the company worked jointly with L.T.V. ElectroSystems and Martin Marietta on a number of projects. Since the mid-1980's, Schweizer has been working directly for the U.S. Government in developing and manufacturing the 2-37A & B. These are quiet surveillance airplanes, respectively with 64 and 72-foot wing spans, which are used to perform covert reconnaissance missions for the Coast Guard and other government agencies. Currently, Schweizer is also developing the RU-38, a quiet twin-engine surveillance sailplane with a wingspan of 84 feet for over water operations. These airplanes have been developed as derivatives of Schweizer's high performance sailplanes that are a by-product of our long involvement in the glider business.

Since the Vietnam War, a great deal of progress has been made in developing equipment that increases the effectiveness of a quiet surveillance airplane. With sophisticated electronic sensors, plus a forward-looking infrared camera at night and high resolution television during the day, quiet surveillance airplanes can monitor activities on land or sea below without being detected. However, the real boost for covert aircraft operations came in the last decade with the development of the Global Positioning System (G.P.S.), which uses triangulation from satellites to provide precise location information. This equipment can tell the observer in the surveillance aircraft the precise location, within 15 feet, of the party or enemy he is observing anywhere in the world.



Changes in Competition Soaring: A Forty Year Overview

By George B. Moffat

George B. Moffat, Plainfield, NJ, delivered the 29th annual Ralph S. Barnaby Lecture Saturday, November 3, 2001 following an evening dinner at the Wichita, Kansas Marriott Hotel. He took the 48 attendees on a 40-year tour de force of competition sailplaning as he knew it: the ships, the pilots, and the rules.

These lectures honor the late Capt. Ralph S. Barnaby USN, one of the Founding Fathers, and former President of the Soaring Society of America. He was an honorary Vice President of the National Soaring Museum until his passing in 1986. Barnaby was a member of "The Early Birds," American pilots who flew before 1916. He broke Orville Wright's 1911 soaring record with a 15-minute, 6-second flight at Corn Hill, Cape Cod, MA, in 1929. The following year, he was glider-launched from the Navy airship "Los Angeles," testing the feasibility of flight from a dirigible. He headed the Navy's WW II glider program, and had a life-long commitment to the advancement of motorless flight in America.

George B. Moffat is one of America's foremost competition sailplane pilots and has been flying since 1953 and soaring since 1958. Aside from winning several National Championships dating from 1969, and setting three triangle speed records, he won the World title in 1970 and 1974. He is also an enthusiastic sailor, winning the Eastern High Point Trophy three times, and the Douglass Trophy for match racing against Canada. He wrote about 85 articles on soaring and sailing in publications such as "Yachting," "Soaring," "Sailplane & Gliding," and "Popular Science." In 1974, he wrote a book, "Winning on the Wind," published by Soaring Press. He placed first in the 1975 Smirnoff Transcontinental Sailplane Race, and won the Coupe d'Europe European Sailplane Championship in 1977 at Angers, France. He holds a PhD from Rutgers, taught at Rutgers Prep. School, Rutgers University, and was head of the English Dept. at Pingry School.

— Moffat's Barnaby Lecture Follows —

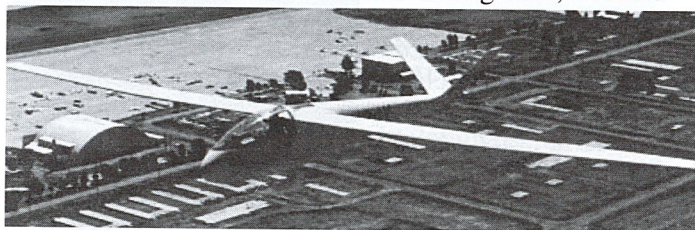
"Once upon a time...Isn't that how all good stories begin? Once upon a time I entered the Nationals, the 1962 Nationals, going on 40 years back, and it was a different world. What I'd like to do tonight is a sort of fast-forward from then until now with maybe a bit of a look into the future for a chaser. Using various Nationals across the years we'll have a look at changes and transitions in the three major classes.

Meanwhile, back in '62, entering the Nationals was easy. All I had to do was show up, waving my

newly minted Gold C distance, and I was in, with loud cries of joy on the part of the organizers, who were scouring the El Mirage landscape for any warm-blooded contestants. They ended up with 32 entries, flying a motley assortment of mostly 15 meter sailplanes—1-23s, 1-26s, several of Dick Schreder's HPs and a bunch of others, mostly wood and fabric one-third metal. No glass, since the first glass ship had yet to fly. Spans were generally right around 15 meters, with Dick Johnson's Adastra the only 17-meter ship. Only a handful of ships were over five-pound wing-loading, with my HP-8, at 7.5 lbs., the heaviest. Water ballast was a few years down the line, as were electric varicos, decent total energy, etc, etc. Radios were in short supply since they were expensive and unreliable. Most of us did without. Average age of the contestants was 46, not so different from Nationals today.

So what was a contest day like, way back when? Like today, it was evenly divided between speed and distance tasks. Distance missions were generally out and returns or triangles followed by a pilots' choice last leg, ensuring a landing at or well after sunset a long way from home plate. There was one free distance, with the leaders ending up in Utah, putting about 1000 miles on their crew cars. Air conditioning was a rarity; 100 degree plus temperatures were not.

Let's take the first day as typical. Pilots' meeting was nine o'clock and went on for a long time, as there



George Moffat and his HP-8 at McCook, NB., early 1960s. Alex Aldott photo

were not photocopied handouts. Weather briefing was by a genuine, government supplied weathermen who might or might not know anything about soaring. The task, set in concrete, was announced at the end of the meeting, in this case a 236-mile triangle to the East, followed by a pilot selected open final leg. Start time was pilot selected, no great problem with only thirty entries, but due to be a huge one as contests grew to sixty and eighty ships later in the decade.

I crossed the start line—still three thousand feet in those days—at about one o'clock, making pretty good time to Twenty-Nine Palms, what with bases at 12,000 AGL and a good tailwind. Of course, finding the turnpoint was anything but easy in those days of eyeball



Robert H. Ball, President of the NSM's Board of Trustees,(r) and Barnaby Lecturer George B. Moffat

navigation. Next it was northeast to Amboy, crosswind, and then a long upwind slug to El Mirage. Feeling sorry for the light wing loading ships, I rounded at five thirty, in weakening lift, very tempted to land, but set off northeast toward Las

Vegas. The sun was getting low—and so was I—as the Baker grade climbed up under me near the California border, and I just skinned across the five thousand foot pass thirty feet above the cars. Then it was a long, nervous final glide to the Jean Airport for a downwind landing on a narrow, rock-bounded strip close by the highway. Fingernails got mighty short on final glides in those pre-computer, pre-GPS days. Luckily there was a café at the end of the runway where I called in at dusk. It was at least a four-hour drive for my crew, so I had a leisurely dinner. It was pitch dark when I walked back to the ship. Suddenly I heard a scraping noise, looked up and saw a glimmer of white approaching. It turned out to be Graham Thompson in his Ka-6. He had made the same dicey downwind final leg as I, landing at the unlighted airport, which he had only seen once before. As I took his canopy and started to help him out, Graham, WWII Spitfire pilot, said, “Just let me sit her awhile.” We got back to El Mirage about five AM. Pilots’ meeting was at nine.

Nineteen Sixty-Nine

Let’s fast-forward to the end of the decade, 1969, the last of the single class Nationals before the SSA belatedly organized a Standard Class Nationals a year later. Marfa in ’69 was also the largest Nationals ever to be held, the 82 contestants swelled by 12 foreign entries, as this was a sort of informal pre-Worlds for the American-hosted World Championships the following year. Notable were three past World Champions from Poland and Austria, and our own A.J. Smith.

What else was new? Practically everything: 45 of the 82 entries were glass, including the top six finishers. There were ten HPs of various models, and the Schweizers, one quarter of the entries in the ’62 contest, were down to a single ship. The serious competitors were all 18 meter except for two Cirrus Bs on which I had extended the tips to 19 meters. Water ballast was common but in limited quantities. The Cirrus carried about 216 lbs and needed 500, minimum. Wing loadings were seldom over 7.5 lbs even with ballast. The superb ASW-12 was easily the best ship in the contest but hamstrung by its lack of water ballast and sole reliance on an unreliable tail chute for landing. The unflapped, under-ballasted Open Cirrus, lacked penetration.

Designers were feeling their way slowly with glass, especially leery of early tendencies to flutter. On the instrument front, electronic variors were ubiquitous and reliable total energy was possible due to PZL diaphragm compensators. Radios were universal.

Tasking had changed radically thanks to Paul Bikle and his Area Distance task, commonly called the Cats’ Cradle or the Bikle basket. This grandfather of our present PST task allowed distance flying within a fairly limited area with the possibility of landing back at the contest site. In practice, the smart money elected to land at the farthest down wind point in the task area. Paul and his Southern California Competition group had also come up with a new turnpoint recognition system of tetrahedrons displaying dots, which was not so successful and would soon be replaced by cameras. Free Distance was still with us and would cost the loss of two flying days when Wroblewski of Poland went 527 miles, dictating two rest days—naturally the best two of the contest. The foreign pilots who had come so far to fly were especially outraged, free distance having been long since abandoned in Europe.

Perhaps the most noteworthy change of the Sixties was the arrival of new blood. MacCready, Johnson, and Schreder had dominated the Fifties. The new decade saw the emergence of Alleman, Beltz, Byrd, Greene, Moffat, Scott, A.J. Smith, and Striedieck, all of whom would become at least U.S. Team members. Two would win a total of three World Championships. Most would be contributors to the invaluable Byars-Holbrook Seminars, which were so instrumental in raising the level of U.S. soaring.

Let’s take a look at the free distance day, that dinosaur of a task soon to become extinct. The weathermen noted an impassible east-west front hanging about 200 miles north of Marfa with a 15-20 knot southerly West offered no joy, but East looked possible for flights of up to 400 miles in weak, crosswind conditions. As it happened the day developed much earlier than the 1:30 predicted by the weathermen, and

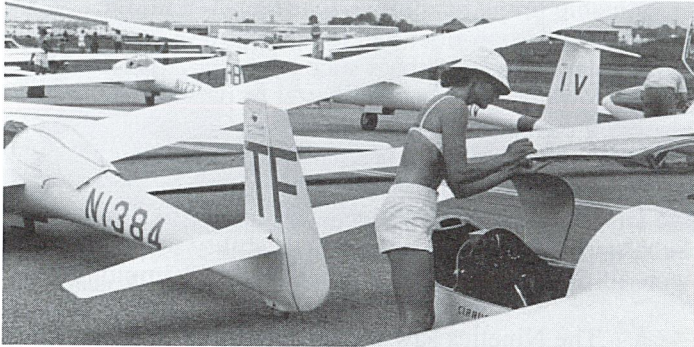


Moffat and his Nimbus at the 1970 Marfa,TX , World Soaring Championships

almost an hour behind, fatal on a distance day. The Europeans had been using designated starts and a start gate for years.

people with early start times made out. The weakness of the old pilot-selected takeoff time was clearly apparent, pilots stuck with late choices being

The day was difficult, with lots of cumulus-nimbus to dodge. During the last two hours I hardly averaged 30 mph and finally found myself down to 800 feet above a small airport. Landing was tempting, but I kept going for another seven miles, plopping into a plowed field for 374 miles. I felt it was



Gren Seibels photo of Mrs. Suzanne Moffat alongside George's Standard Cirrus

a good flight. And so it was, beating all the pilots like Scott, Johnson, and Greene with their years of local experience. What we didn't know was that the supposedly impassable front to the north had turned into a highway, allowing Jan Wroblewski to exceed 527 miles and the top ten for the day to exceed 480. All were strangers to Marfa and went where none of the smart money would have thought possible. For a soaring camp it would have been a fascinating day; for a national championship task it seemed heavy on long distance driving and luck, not to mention the loss of two excellent subsequent days of flying.

For those interested in knowing more about the 1969 Nationals, see Bob Drew's superb hour and a half documentary film *The Sunship Game*, available in video format from Direct Cinema, 310-636-8200. Price is \$30. For another view, try Joe Lincoln's 30-page account of the contest, which appeared in the September 1969 *Soaring*, and is, by far, the best Nationals write-up ever.

The Seventies

The major change in American soaring in the Seventies was the recognition of two new classes: the Standard in 1970 and the 15 Meter Racing in 1976, each with their own Nationals. This had the advantage of smaller nationals and more competitive racing but cut down on the sense of fellowship among racing pilots. By the end of the decade few Standard pilots knew many of the pilots in the other two classes and vice versa. Another major change, brought about by the mid-decade fuel shortage, and the subsequent banning of relights after off-field landings, was the role of the crew. Gone were the wild 100-mile an hour chases. More and more crews just sat at the field, fighting off boredom, waiting for the pilots to return. Tasking became shorter to ensure that return.

In the ships, design improvements came rapidly. At the end of the Sixties only a couple of the Open ships had spans above 18 meters, with max L/Ds usually in the low 40s. By the end of the decade nothing below 20 meters was a serious contender, and Dick Butler's beautifully improved 22 meter 604 dominated the class. Gross weight was up to 1450 lbs, 400 lbs heavier than the Cirrus I had flown in '69. Best L/Ds were around 50. The new 15-meter class was, at first, ruled by the Plk-20s, but by 1978, the new Schleicher ASW-20s dominated the class. In the Standard Class no less than 80 types of ship won the decade's Nationals, most with L/Ds right around 40.

New and notable pilots included Dick Butler, Eric Mozer, and Ray Gimmey, who would become the first US pilot to win Nationals in all the FAI classes. All would do well in World Championship competition.

The Eighties

The beginning of the Eighties showed another technological jump, largely made possible by the widespread use of carbon fiber in construction. This super strength material allowed much thinner wings and increased span. The new Nimbus 3 had a span of 24.5



1970 photo of George and Suzanne Moffat

meters, which I increased to 25.5m meters on Dick Brandt's ship. This, along with a gross weight that increased to 1930 lbs, produced a very carefully measured L/D of 62.5, up some four points from the 24-meter factory version. Schleicher, not to be outdone, came up with the ASW-22, which, tweaked by Dick Butler, reached similar gross and performance. Fortunately for the class, the 750 kg gross (1656 lbs) rule was invoked before the World Champs in '83. Dick Brandt and I had had plans to up the gross to 2150 lbs...

In the 15 Meter class, the new Ventus, with considerably better high-speed performance, superceded the ASW-20, although the handling left a lot to be desired. Late in the decade the LS-6b showed similar high-speed performance, better climb and far better handling to become the sailplane of choice. All of these ships had max L/Ds in the 43 range.

The coming of the Schempp-Hirth Discus in 1985 was a breakthrough in the Standard Class, using a swept wing design approach, which had been inaugurated by America's Wil Schuemann some years earlier. The result was outstanding performance coupled with equally fine handling. The ship dominated National and World competition for ten years.

An important development came toward the end of the decade with the advent of two-place performance sailplanes such as the ASH-25 and the Nimbus 3D. These ships offered the opportunity for two-place competition flying as well as advanced training. Woody Woods, with George Moffat as navigator-tactician, flew successfully in the '87 and '88 Nationals.

A highly notable new pilot was Doug Jacobs, who won the 15 meter Nationals in '82, '84, '88, and '90, together with the Worlds in Rieti in '85. Also looking promising were Westerners Bill Bartell and Gary Ittner and Texan Ron Tabery. Keep in mind that there were a lot of promising newcomers, but I am limiting mention to those who made the US Team and came in at least in the top half of their class.



1970 World Soaring Champion George Moffat (holding cup) U.S.A. with Pirat Gehrig, Switzerland, standing left and Lloyd Licher, U.S.A. standing right

The POST task was the successor to the old cats' cradle, offering a prescribed area distance task with a landing back at the contest site. This task has gone through many manifestations as its fans attempt to cure its many problems. In the '80s it was all too often called when weather was so iffy that the Contest Director had no idea where to send the fleet. This increased the already high luck factor, often making the POST days the ones that decided the contest. Its big fans tended to be in the east, led by Karl Striedieck, who abhors gaggle flying; its many opponents, Bill Bartell among the more vociferous, were Westerners. Up until 1999 these tasks were only used in World Championships if they were held in the States.

Gagging, virtually unknown in the Sixties since there was such a disparity in ship performance, became an ever-increasing plague in the Seventies and Eighties. A tendency to undercalled tasks during the Eighties to limit land outs, increased the problem, as did the traditional start line. Let a Doug Jacobs or Karl Striedieck announce a start and a cloud of glass would surely follow.

The Nineties

Surprisingly, ship performance in the Nineties increased only marginally, mostly by the addition of increasingly effective winglets. What did increase markedly was handling. Many of the older ships, especially in the Open Class, varied from poor to abominable in the handling department. With the stiffness of carbon fiber and the pressure of the marketplace, the new ships such as the Nimbus 4 and Ventus 2 were not only even better in performance but also very easy to fly. In the Standard Class, the new LS-8 offered near 15-meter class performance in all but the strongest weather and, toward the end of the decade, the Discus 2 was even better. All three of the new Schempp-Hirth ships showed their ability when they won all three classes at the 1999 World Championships.

The Nineties saw a proliferation of new classes such as the Sports Class, the Motorglider Class, the World Class and the 18-meter Class. These often thinly populated groups developed their own Nationals, frequently sporting ringers for the traditional classes hoping for a spot on the U.S. Team for the World Championships. In turn, the many World Championships would put great strain on the already limited Team funds contributed by SSA members.

Perhaps the most significant change in contest flying came with the legalization of GPS's in 1994. At a stroke, the navigational skills that many of us had built up for years were as dead as dinosaurs. So were many of the computer-varios we had used for ten years, such as my trusty Cambridge M-Nav, which couldn't accept loggers. Speaking for myself, I was dragged kicking and screaming into the new age. I used to like looking out the window at the landscape. Along with the new GPS's came new computer-varios, evermore complicated and expensive. Starting in the Eighties, these computers had begun to develop arrogant ways, demanding PULL and PUSH to the accompaniment of strident whistles and squeals.

It was only slowly that we began to realize that the GPS not only did away with navigation skills but also the very need for turn points, in the classical sense. Any anthill, anywhere, could now be a TP, no need for TP books with photos and sketches or observable features such as airports. Indeed, why not have a pilot create his own TP wherever he wanted. Unfortunately, the correct pronoun was still "he" 99% of the time as far as competition was concerned.

The Twenty-First Century

Technologically speaking, the first breakthrough — and only one so far — was the Eta, 101 feet of span worth of Eta, the prototype of a new German series for the Open class. A year later we still haven't seen any reliable performance figures, but it's safe to guess that the max L/D will be in the low to mid sixties. The max

gross of the new two-place powered sailplane is 2029 lbs., some 380 lbs above the allowable gross for World Championship flying. All records will doubtless fall,



April 1974 World Champions at Waikerie, Australia, Helmut Reichman, Germany, left, George Moffat, U.S.A. center, and Andreas Haemmerle, of Austria

especially in the hands of initial owner Hans Werner Grosse, but what about the high speed performance at the legal gross and eight pound wing loading? The Germans have fiddled the allowable gross for two-place motor gliders to 1880 lbs, but will the rest of the world buy this figure and thus outmode all existing Open class ships?

Otherwise, there seems little reason to expect any great performance or handling changes in normal span sailplanes unless some unforeseen new material allows the kind of improvement carbon fiber offered in the Eighties. In the late Eighties and Nineties manufacturers belatedly began doing the kind of sealing that once owners had to do for themselves, so now that avenue to improvement no longer exists. The enormous cost and high risk of little or no gain will tend to discourage manufacturers although not designers, those incorrigible optimists.

New pilots? It's too early to become much more innovative as we start to use more and more of the capabilities of GPS. Already the Turn Point Area Task with its variable radius TP's has been tried and seems promising (for a description of this, see Karl Striedieck's excellent article in the September 2001 issue of *Soaring*).

Instruments seem bound to get more and more complex and expensive as they take more and more of the decision-making away from the pilot, just as GPS took over all navigational skills. Are thermal finders all that far in the future? Couldn't the finder direct the stick and rudder, bypassing the so-often fallible mind of the pilot? Remember Ed Kilbourne's marvelous song about the LS-22—no stick, no rudder pedals, just a pair of fiber optic cables that plug into the brain? Or, come to think of it, why get into the sailplane at all when we could virtually direct it from the ground? It sure would cut down on accidents, and safety is always a major concern...

So how does four decades worth of development change the look of a contest day? Let's take a look at the last day of the Senior Nationals in Florida last March. Why the Seniors? This contest brings together pilots from all the major classes and usually sports winners of many Nationals as well as US Team pilots. The day started with a brief pilots' meeting at 9:30 for operational details and the weather. The task was to be announced from several possibilities at the 12 o'clock grid meeting, using the latest weather updates and selected by the CD together with two highly experienced contestant-advisors. The actual task could be modified in the air if necessary, one of the many changes brought about by Charley Spratt, all-time, best ever Contest Director.

At the tie-down area, something very different could be seen. Gone were the innovative and often imaginative homebuilt trailers, the only game in town in the early '60's. In their place were sleek, \$10,000 factory fiberglass jobs. You could have bought two new Ka-6s for that in '62. Gone also were a lot of the crews as at least a third of the 50 pilots were going crewless, a new development made possible in recent years by short tasks with few landouts and excellent, factory supplied tow-out equipment for the ships. Assembly was quick and easy, with most ships equipped with automatic control hook-ups. One non-improvement was weight. The new 15-meter ships averaged 100 lbs heavier than the Ka-6s and 1-23's of yore.

At the windy grid meeting, delayed by a slow developing day, an Assigned Area Task of 77 miles with a one and one half hour time limit was declared, a first for the use of this task in the US. Since each TP was assigned a radius of five miles and the actual turn was anywhere a pilot chose within the circle, the actual distance flown could vary from 50 to 100 miles. Launch was nominally 20 minutes after the end of the meeting, but on this day considerably delayed by weak conditions. Charley kept sending up sniffers, waiting until one could maintain 2500 feet. No more of those premature launches with half the fleet soon back on the ground.

Once aloft, I found the wind was 25 knots some 15 degrees off the first leg of the course; no guesswork here, thanks to GPS. Lift was about 2-3 knots to 3500 feet and rising, with cumulus and evidence of streeting. Charlie announced the last takeoff, giving 20 minutes to the opening of the GPS start. No more redline plus 20 knots, white knuckled starts to get the adrenaline pumping. At five minutes Charlie made one last check with his airborne advisors and the task was a go. No longer the situation of setting off on an impossible mission just because the CD had announced it four hours earlier.

Since bases were still climbing, I chose to wait 25 minutes before starting. Mistake. At 20 minutes the sky was looking mighty empty, and I was milling around at 2300 feet in a nothing type thermal. I finally struggled up to 3200. Where was that 4200 feet I'd had fifteen minutes earlier? I set off, cursing, but made fairly good time under tattered streets, with windblown clouds offering uncertain lift and the ground a bit too thrillingly close.

Since there seemed no percentage in bucking 25 knots winds longer than necessary, I turned as soon as we reached the edge of the area. Problem. How far would I have to go into the second area so as not to finish under the minimum time? Decisions, decisions. Some things haven't changed. All down the final leg, the computer was telling me the distance to the tenth of a mile and the required altitude to the foot, all optimized to the wind and MacCready setting dialed in; a far cry from the old fingernail chewing days. So was the finish, at a sedate, rule-required 100 feet. Gone were the dramatic 150-knot worm-burners a foot off the deck we used to scare ourselves with.

So what perspective have I gained from nearly four decades of contest flying? In the beginning most soaring pilots were in love with the romance of flying, the feel of being at one with the sky. Yes, there were technical types and they tended to win, but they hadn't reached anything close to critical mass. But somewhere along the years (as the ships grew better, the instruments fancier, and our knowledge greater) we truly lost

something. Perhaps the love of flying, the romance of finding our way around the invisible geography of the sky, began to be replaced with a love of technology. Of course each of the gadgets—radio, computer variors, GPS, just to name a few, made flying more efficient and usually safer. But they all cut down on the variables and mystery that made soaring so intriguing in the first place. Have we gone too far? Will we? I hope not.



George Oglesby designed cover of the April, 1974 *Soaring*

For me, soaring (and the kind of peak moments that competition brings, together with the wonderful assortment of soaring friends from many countries and backgrounds) has made up one of the richest parts of my life. They still do. I feel vastly fortunate to have competed in so many countries over the last four decades, which can be considered the formative years of modern soaring.

Cloyd Artman & Paul Loudon Jr. True Soaring Pioneers of the Northwest By: William Schweizer

I visited Oroville, Washington in July 2001, to get a feel for the area and learn more about the soaring activities that took place there in the early 1930's. I was ably assisted by Oroville native and local history buff James Lynch.

In the summer of 1933, Cloyd Artman made a 13 1/2 hour flight in an open cockpit primary glider. This flight was an unofficial world's record for that class of glider. It was then, and still is today, a remarkable flight. Just imagine the thrill, or fear, or probably both, of sitting out in the breeze on a small wooden seat, viewing the scenery around and directly down between your knees from an altitude as high as 5000 feet.

Artman built his own glider and then taught himself to fly before ever seeing another glider. This teenager was an intelligent doer, designer, innovator,

AUDREY ARTMAN TRIES OUT WINGS

Gains Proficiency Under
The Tutelage Of Her
Brother

Cloyd Artman, Oroville's glider expert, is now teaching his sister Audrey to pilot his machine. Sunday afternoon they made several flights at Scott's field east of town.

Mr. Artman has a new arrangement which he considers quite an improvement over towing in tea. Aing beginners to fly. He has bolted a large oil drum to the rear wheel of his car. To this he has attached about 2,000 feet of small cable. Blocking the car he jacks up the wheel with the drum on it and runs out the cable. When he wishes to start the glider all he has to do is start



Audrey & Cloyd Artman, The flying brother and sister team, with their home-made glider

salesman and daredevil. He developed a novel and effective, but scary, technique for launching gliders from the top of a mountain cliff. It was aptly called the greased board launching method.

Artman was a country boy, born in 1913, just prior to World War I. He lived and flew his first glider in Oroville, Washington, a small lumber and apple town with a population of 1000, located in the north-central section of the state near the Canadian border. After Lindbergh's Atlantic Ocean flight, like most boys of that era, he was bitten by the aviation craze and dreamed about flying himself. Artman built model airplanes that flew, but this was not enough to satisfy his appetite for flying. In the fall of 1930, when he had entered his senior year in high school, he came across a copy of the June 1929 issue of *National Geographic Magazine* which had an article about gliding and soaring in



Cloyd L. Artman in his home-made glider, "the Lone Eagle"

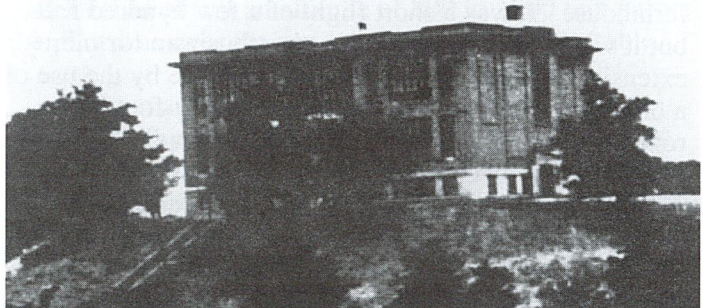
Germany. The story got Artman excited because he now saw a way he might be able to afford to learn to fly. It was in the early days of the great U.S. depression of the 1930's and there was only enough money for necessities in his family. He rationalized that by substituting hard work and ingenuity for money, he could find a way to build a glider.

Artman designed his own glider from pictures he had seen and from articles he had read on the subject in *Popular Mechanics Magazine*. Construction got underway during the winter of 1931, with the help of his 16 year old sister Audrey. Since they lacked wood and metal working tools to make some of the parts, Artman, the salesman, contacted his school principal and convinced him that the glider construction was an educational project. Reluctantly, he was given permission to use the manual training shop after school hours. Artman and his sister came up with some ingenious substitutes for expensive aviation materials. The structure of the glider was made from white pine

and the wood parts were joined by gusset plates made from plywood scraps. The wood joints were secured by an assortment of common nails, stove bolts, screws, cigar box brads and Le Pages Glue. Landing and flying wires, which supported the wings, were made from fence wire. An old pickaxe handle became the control stick. The pilot sat on a board and rested his feet on the wood rudder bar that pivoted to control the rudder. Old electrical wires were used for the control cables. The wings and tail surfaces were covered with muslin from the local dry-goods store. To make the covering tight, water was applied to shrink it and then it was coated with varnish to make it airtight. Apparently, the Artman glider was not a pretty bird, but the flight controls were effective and the structure was strong enough to withstand flight loads. Artman was adventurous, but not a fool. He carried out practical strength tests on wires, cables and joints as he built the glider.

Artman first flew the glider on mild slopes to prove out the design and so he could gradually learn to control the bird. To achieve flying speed and become air-borne, he used a bungee-cord slingshot launching method and the slope of the hill. On steeper hills and on snow, he dispensed with the bungee-cord and just sledged down the hill to get airborne. Artman made the bungee cord from hundreds of strips of rubber from auto tire inner tubes. Without an instructor, Artman taught himself to fly and had acquired several hours of flying time without a serious mishap.

Then, in 1933, he took his glider to the top of a ridge on the east side of Oroville, which was over 1000 feet above the valley. At first, he made a straight glide to the valley. The ridge faced the northwest and the prevailing wind came from that direction, so there were up-currents along the face of the ridge when the wind was blowing. On a later flight, Artman turned very gingerly into the up current after take-off. It was not long before he was soaring on the ridge and his first real soaring flight was over an hour long. He eventually worked up to his record flight of 13 1/2 hours. His best altitude was over 5000 feet and his longest cross-country



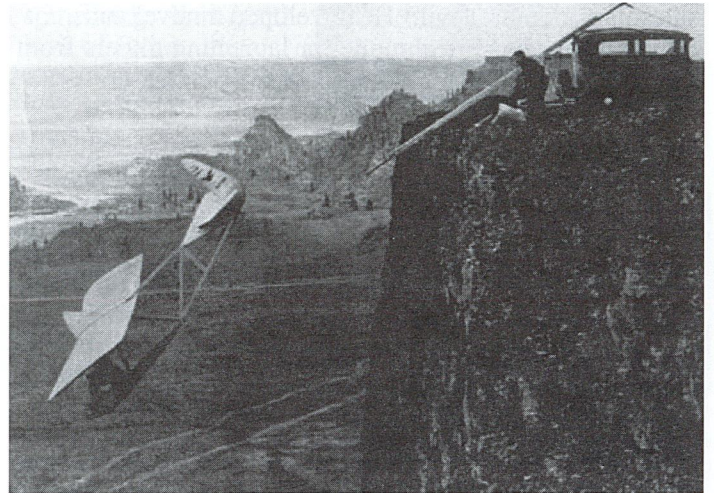
Artman constructed his glider on the third floor in this school, built in 1913. (Picture taken in 1922.)

flight was twelve miles out with a return to the starting point.

Soaring is really gliding down in upward moving air. If the air is going up faster than the glider is sinking, the craft will gain altitude. Artman's soaring flights were limited to the geography of the ridges and required the wind to be blowing directly at it. Thermal soaring, which does not require hills, was, at that time, in the early stage of development and Artman did not have a rate of climb indicator, which is an essential instrument.

It was an unbelievable coincidence that Artman was not the only glider builder and self-trained pilot in the area close to Oroville in the early 1930's. Without knowing each other Paul Loudon Jr. from the town of Nighthawk, 12 miles to the west, was doing the same thing at the same time as Cloyd Artman. He was also a model airplane builder who read and studied magazine articles about gliders and decided to give it a try. Since Paul's family were successful farmers and interested in their son's activities, they helped him build and finance the glider project. Apparently, his parents never thought the glider would fly more than a few feet off the ground. With the financial backing of his parents, Paul was able to buy standard aircraft materials by mail from aircraft supply companies such as control cables, flying wires, pulleys, and various types of aircraft hardware. This simplified the construction and made the glider look more professional than Artman's. Loudon's mother even cut to size and sewed the muslin fabric used to cover the wings and tail surfaces. When the glider was finished, Loudon spent hours on the ground testing and learning to use the flight controls when there was a steady wind from one direction. His father also towed him along the ground with a farm vehicle so he could get a better feel of the aircraft in motion before he tried to fly. The glider was named "Nighthawk" after the town. The name was painted on the tail.

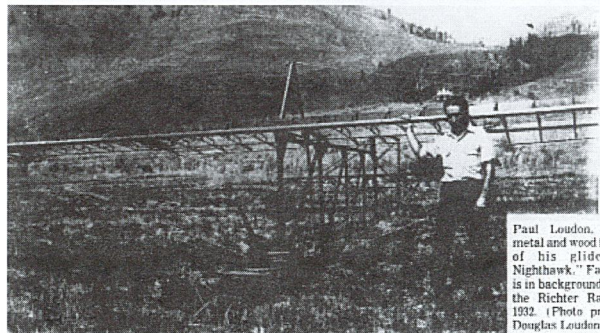
The maiden flight of the "Nighthawk" was made in the fall of 1932 on a small hill near the Loudon family farmhouse. It was a short flight of a few hundred feet, but it was successful and created enthusiasm for more extensive flights. The launches were made by the use of a bungee, or shock cord. This was a thirty-foot long rope, one inch in diameter, made up of bundles of elastic rubber bands covered with loosely knit cotton binding. The shock cord was the project's most expensive item, costing over a dollar a foot. (Today it would cost over twenty dollars a foot). Loudon used the shock cord in the shape of a V, with a short hemp lead rope hooked to the nose of the glider. The rope arrangement would look like a Y. When the glider and pilot were ready to be



Launch and release! Artman swoops down over the valley launched, the ground crew would walk out – then run – until the shock cord length was doubled. Then, at the pilot's command, the tail holders would release the rope like a slingshot and the glider would be snapped into the air like a slingshot's arrow.

Loudon's method required two steel posts to be driven deep into the ground, about 25 feet apart. Then, the ends of the shock cord were attached to the post. The shock cord was drawn back like a slingshot and then hooked to the glider. The tail of the glider was tied securely to a large sagebrush to hold it in place. Then, at the pilot's command, the tail anchor rope was cut and the "Nighthawk" catapulted into the air. Loudon's shock cord launching technique seemed a little "hairly", but there were no reported accidents.

Loudon gradually made longer and longer flights by taking-off further up the hill. When he became confident in his flying ability, he went to the top of the ridge. His take-off site was one mile past the end of the road. His crew carried the 150-pound glider the last mile. Glider launches were hard work then but as Loudon remarked in his later years, "We had a lot of



Paul Loudon, Jr. with metal and wood framework of his glider, "The Nighthawk." Family home is in background, known as the Richter Ranch. Date 1932. (Photo provided by Douglas Loudon)

help back in the 1930's. With the depression nobody had anything else to do." When Artman and Loudon

began to fly, word got around fast and they met each other and became good friends. They exchanged information and flew together. Loudon joined the U.S. Army Air Corps after graduating from high school and that ended his glider activities. He was an excellent glider builder and pilot, but was not the gregarious promoter that his friend from Oroville was.

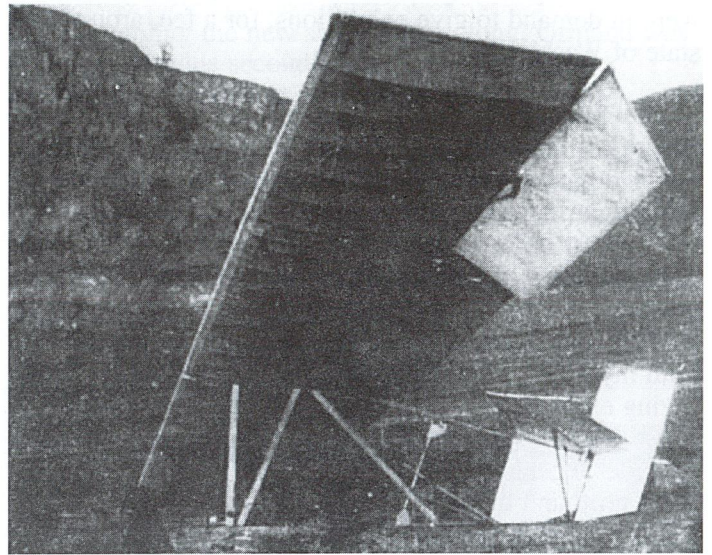
Artman was an uninhibited natural showman and quickly became a local celebrity. The natives were dumfounded with his motorless flight activities and he received good coverage in the *Oroville Weekly Gazette*. When Cloyd flew, he would usually take along his lunch in a knapsack. A surveyor's altimeter was hung around his neck and, believe it or not, he also took his coronet. At times, he would stay up until it was dark and, if he did, he would blow a certain bugle call to signal his mother and sister to come out of the house and prepare for the landing. They would light four kerosene lanterns to mark the back pasture and drive their Model T Ford out to the field with the headlights on.

A Seattle engineer who was a glider designer, builder and pilot, heard indirectly about Artman's gliding activities. He and his friend, an experienced glider pilot, decided to investigate and took their more advanced glider to Oroville for a weekend. They were aghast when they looked at Artman's crude homemade glider



"Artman Sets World Record," headlined the August 18, 1935 *Oroville Weekly Gazette*

but were amazed by how well it flew. Pete Bowers, an aviation historian, wrote the following about their visit: "He made a monkey out of the hotshot experienced glider pilots from Seattle who went to Oroville to show up this country bumpkin. Artman not only out-flew their secondary type glider; he literally knocked them out of the air by flying above them and tossing apple cores on them. They just did not know how to slope soar that cliff."



Doug Loudon photo of "The Damaged Nighthawk." Muslin sheeting, sewn by Mrs. Paul L. Loudon Sr., covers the framework of metal and wood

Artman's unique greased board glider launching device also drew spectators. It consisted of a 20-foot wooden chute or plank mounted on the rear roof of his Model T Ford sedan. When the glider was ready to be launched, it was placed near the top of the chute with a retaining line to the front of the car to hold it in place. The Ford would then back up carefully so that the chute extended just past the brink of the cliff. When Artman was ready with his safety belt on, he would pull the release on the retaining line and away he would go.

Word spread about Artman's gliding activities around the state and he had numerous requests to give flight exhibitions in other areas. To launch his glider at an airport or a large flat field, he developed a winch tow arrangement. A large oil drum was bolted to one of the rear wheels of his car that was jacked up off the ground. A small cable was hooked to the drum and to the back of the glider. The pilot had a release mechanism so he could release the cable from the nose lock on the glider. The car driver would start the motor and roll the cable on the drum. He would get the glider moving faster and faster until it was airborne. With the winch tow the glider could obtain an altitude of 800 to 1000 feet before the pilot was over the car and had to release the cable.

Artman taught his sister to fly and Audrey became a very good pilot. When she was just 19 years old, she established unofficial world's women duration and altitude records. For the duration record, she made a flight of two hours and five minutes. For the altitude record, she soared 1200 feet above the take-off site and 3000 feet over the floor of the valley at Oroville. They became a well-known brother and sister flying team and

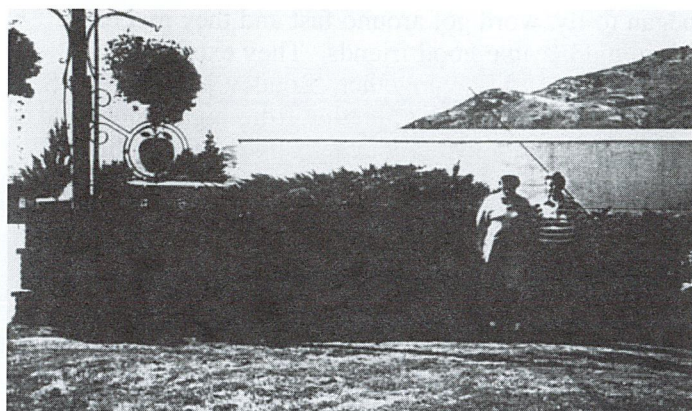
were in demand to give exhibitions, for a fee, around the state of Washington.

In the fall of 1934, Artman entered Washington State College at Pullman and majored in aeronautical engineering. He wrote Ralph S. Barnaby, the president of the Soaring Society of America, the following message in 1935, "Gliding and particularly soaring have been my hobby for the last four years and I have reached the point where it has almost become a business with me. At least, I am working my way through college with my little primary glider by staging programs and giving exhibitions and talks on gliding and soaring." Since Artman's father had died, he was now the main provider for the family. The college was anxious to have him enroll and they promised him a job as a janitor to help make ends meet.

In 1937, Artman's aircraft construction class at Washington State designed and built a two-passenger glider, which had an enclosed cockpit and a retractable landing gear. It was reported in the college newspaper that Artman had tested the new glider solo at Steptoe Butte from Monday to Wednesday, April 17, 1937. The glider flew well and they were pleased with the flight characteristics. Artman made a number of flights. However, on the last flight, he landed with the retractable landing gear extended and the glider ran into a woodchuck hole. The ship made a violent ground loop (spun around with the wings level) but there was no apparent damage.

The following Sunday, it was announced there would be a public flight demonstration of the new two-passenger glider at the Wawawai site on Snake River. Frank See, a glider pilot and Artman's fellow student, was his first passenger. Audrey was slated to go on the first dual flight with her brother but she suggested that Frank See, who had worked so hard on the project, should take her place. It was a very windy day but the demonstration had been announced so they decided to fly anyway. The slope winds coming up the 1200-foot rocky cliff of the Snake River created very turbulent air. They took off and started to soar and all eyes including Audrey's were on the new glider. All of a sudden the observers saw the left wing fold back and the glider fell straight down into the rocky river bank below. Sadly, Cloyd L. Artman and Frank See were killed instantly in the crash.

Examination of the wreckage indicated that a shear failure had occurred in the wing attach fitting to the fuselage. It was theorized that the ground loop might have resulted in some damage to the wing fitting or that the fitting might have lacked the proper design



The author and Oroville's Association of Commerce representative- July, 2001

structural safety factor. The answers to the above questions were never clearly determined.

Ralph Barnaby made the following comment when he learned of the accident: "And so, at the young age of twenty-four, Cloyd L. Artman passes into history- a brief but brilliant meteor flashing across the aviation sky. Remember the name, for he is one of the true pioneers of our sport of soaring."

1. *Soaring*, July 1967-Cloyd Artman Pioneer of the Northwest
2. *Soaring*, Nov. 1970-The Rough-Hewn Genius
3. *Soaring*, June 1985-The Greased Board Launching Method
4. *NSM Historical Journal*, Nov. 2000 - Cloyd Artman- The Northwest Soaring Trailblazer of the 1930's
5. James Lynch, July 2001-Research in Oroville, W.A.

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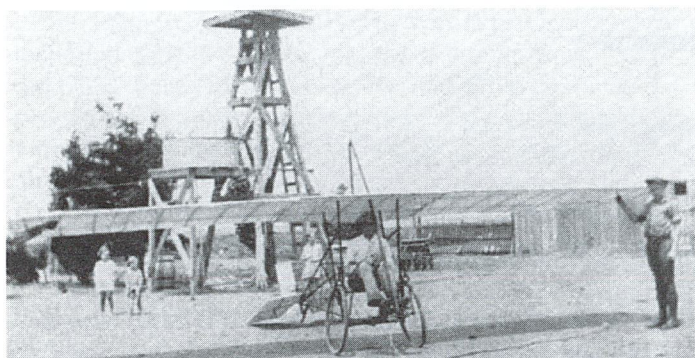
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Anyone is invited to contribute material and pictures with identification, about historical soaring activities, renovation of old sailplanes, soaring pioneers, unusual uses of sailplanes, etc. Manuscripts are subject to whatever revisions, additions or deletions are necessary to make the material conform to the space limitations and standards of the NSM. Material that is to be returned must be accomplished by a stamped self-addressed envelope. No compensation other than credit will be given.

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Early Gliding and an Auto-Tow, Texas Style



R.D. Ormond, about to take to the air on his home-made Dieeder glider

The Tortilla-flat, West Texas cow-country is a locale where you would not normally expect to find much glider activity, post World War I. But to Lt. Col. R. D. Ormond (Ret.) of Grand Prairie TX, it was the axis of an aviation career that led him through World War II, and by 1955 to the Engineering Division of Chance Vought. In 1928, he may have been the first to build and fly a glider in west Texas.

The following story was edited from a July/August 1955 *Soaring* article, "Early Gliding in Texas." While no author's name is given, Robert C. Forbes was the magazine's editor at that time.

In the early 1920s, Ormond was a ranch lad thinking of smoother rides than those atop mustang cow ponies, something that did not require saddle-breaking every time it was brought out of the corral.

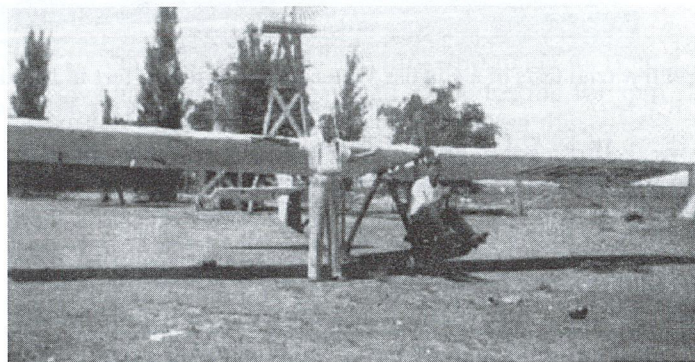
By 1928, like most kids, Ormond was devouring *Mechanics Illustrated* and similar publications. It was from the such pages that he stumbled across a picture of a glider, the first he had ever seen. To glide on the wind with no engine; what a challenge! With the limitless confidence of youth, and with only a photo to work from, he started construction of his first machine, the Dieeder Glider.

He sawed, hammered, stitched, and glued his way through to a rudimentary knowledge of aircraft construction. At last, he had something that looked pretty much like the magazine picture. Next, through numerous bumps, bruises, and repairs, he taught himself to fly on the rickety primary. He allowed that the G-forces of some of his landings were not too dissimilar from those of bronco busting.

By this time, young Ormond realized that the Dieeder had structural limitations. It also had possibly serious stability problems. Burrowing through a stack of popular science/mechanics/craftsman magazines in 1930, he found a picture of a better engineered mount, a variant of the German Pruefling primary glider. The future Air Force colonel started laying out, then crafting,

and assembling the new ship. Before long, Ormond was in the air with his second glider.

Ormond lived in Sudan, TX, a vast area of perfectly flat country, with nothing resembling a ridge for miles. Slope soaring was out of the question. However, he was in the midst of long arrow-straight roads, which had very few telephone poles or electric



Ormond's second home-built glider, which closely resembled the German Pruefling

wires. (It would be years before the results of Roosevelt's Rural Electrification Program would reach Sudan).

The main road ran by the Ormond place. It stretched uninterrupted and unobstructed for 15 miles to the first turn. A dozen or so lariats were knotted together and secured to the family car. With Ormond in the Pruefling hooked at the other end, the combination sped away. He lifted off on a 15-mile, auto-towed glider flight to his goal, the first turn in the road. It was probably a world record for continuous auto-towing. (Maybe it still is; any of our readers know?) The ingenious birdman rigged an inexpensive camera on his glider, with a shutter pull-string to record the flight. He kept a photo album with his many glider aerial shots of the West Texas countryside.

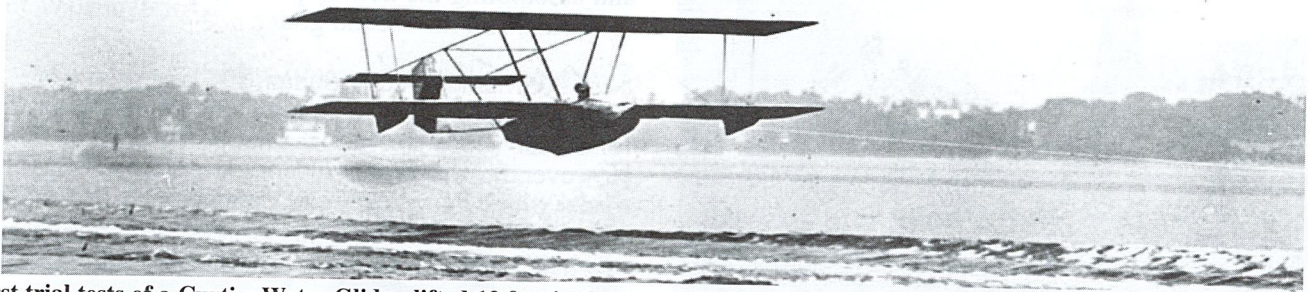
Ormond's third glider project was rebuilding a Cessna Primary that he successfully flew in 1932.

The *Soaring* article concluded by saying that, "by the time of World War II, Ormond was an accomplished airman, including skills in aircraft design and construction." He joined the Royal Canadian Air Force and then transferred to the United States Army Air Force with America's entry into the war.

The family car, in the foreground, is photographed by Ormond during one of his marathon auto-tows



The Curtiss Water Glider



"First trial tests of a Curtiss Water Glider, lifted 12 feet in the air, pulled by a motorboat at 35 miles per hour. It released from the boat and stayed airborne for 30 seconds." (Kadel and Herbert News Photos)

In 1922 Glenn H. Curtiss started to build a flying boat-glider at his Long Island facility. It was one of the first attempts to produce such a sporting glider in America. In his book, "Glenn Curtiss, Pioneer of Flight," author C.R. Roseberry wrote that Curtiss had studied the air currents over water and noted that they did not rise vertically as they do over land; yet an albatross could ascend from a wave and soar great distances.

This was at a time when interest in motorless flight was just beginning in an organized fashion. Productive glider experimentation and meteorological investigations were being held during glider meets at the famous Wasserkuppe in Germany's Rhoen mountains.

Though he made this ship for his personal use at his recently built home in Florida, Curtiss envisioned an engineless aircraft that could be marketed as a new method of sport flying. Curtiss realized from his observations that soaring over water may not be practical. But a hydro-glider, part boat and part glider, trailed and then airborne behind a fast motorboat, might open a new quasi-aviation market. The technique involved the glider gaining altitude towed behind a speedboat, releasing, gliding for as long as possible, landing, and then being towed off again.

Curtiss designed a glider that was, in many ways, a micro version of his famous Navy and sport flying boats. Pete Bowers, "Interesting Gliders" feature in the 1954, September/October Soaring, wrote that the SX4-1 Model 29 was an early version of the pod and boom layout that was later utilized by some American sailplane designers and builders. Curtiss' marine skimmer was an aerial equivalent of an aquaplane or water skis.

Records at the Hammondsport NY, Glenn H. Curtiss Museum indicate that the SX4-1 Model 29 Water Glider was a single seat biplane. It had a 28-foot wingspan; a 280-square foot wing area, a 22-foot 11-inch length, and weighed 150 pounds empty. It could be towed at 30 miles per hour.

Curtiss conducted some personal experiments on Long Island's Manhasset Bay with his new aquatic

glider, which he described as "a first step in sea-going soaring." Acting as his own test pilot, he was towed by a speedboat until his Water Glider lifted off, then he dropped the towline.

Bowers commented that figures were not available regarding the glide angle (l/d), "but considering the drag of the biplane wings, plus the wood veneer hull, wingtip floats, booms and wires, the glide ratio must have been in the neighborhood of six or seven to one." He continued, "Actually, for the type of flying that was to be done with the machine, glide wasn't too important." Further he wrote, "It would be interesting, after taking a look at the knife-edge airfoil section shown in the photo, to guess what the stall characteristics must have been like, especially with no washout."

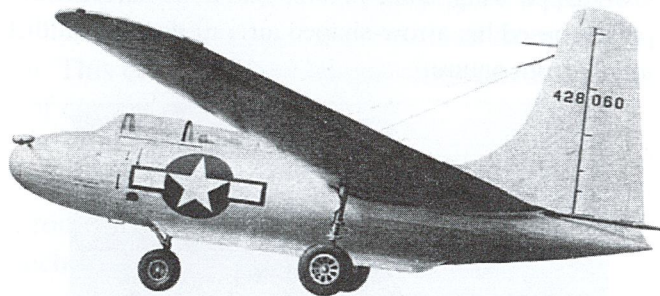
Roseberry, in his book said that so far as soaring was concerned, these experiments were not very successful. The aviation pioneer managed to keep the glider in free flight for only 17 seconds. Not discouraged easily, Curtiss came up with the idea of towing the Water Glider behind a flying boat. He invited Army and Navy officers to witness a demonstration, suggesting that it could be utilized as a flying boat air train. "The officers were more interested in it as a towed target for aerial gunnery," Roseberry wrote.

Even though the Water Glider was made by a major aircraft manufacturer, the diminutive craft did not catch on. Only one was built. Bowers pointed out that while seagoing gliders could doubtless open up many new soaring sites, one major disadvantage must be recognized. "It would be helpless and at the mercy of the wind when adrift...Landings would have to be chosen with great care."

Of course, now aqua-gliding or more accurately aqua-kiting, has become a popular seaside, lakeside and riverside water sport. These aerodynes are not constructed like the Glenn Curtiss' finely crafted ship, but are wing or parachute structures durable enough to hang or sit under, and experience the exhilaration of flight while being towed behind a power boat.

The Cornelius XFG-1 Experimental Fuel Glider

The exigencies of World War II produced many technical oddities that in peacetime would draw quizzical stares from passers-by, and drive cost accountants to their bicarbonate of soda (or maybe, whiskey and soda.) That was the kind of unusual aircraft the Cornelius Aircraft Corporation's XFG-1 Experimental Fuel Glider was. It was designed in 1943. Airborne, it looked like a lumpy, reversed boomerang, with a outsized rudder. Actually, this flying troll was a glider gas tank. Its wings were swept forward 15 degrees at 25 percent of the chord position. In addition, the wings were fitted with a variable incidence device that allowed for changes in the angle of incidence (or angle of the wing to the fuselage) to trim the ship in flight. (1). Its layout was originally conceived as a possible test configuration for a radical new type of fighter.(2)



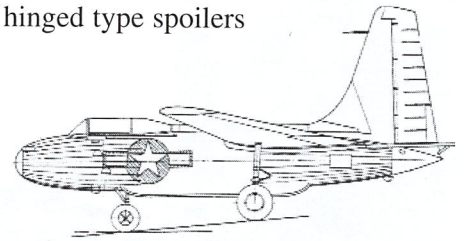
Prototype XFG-1

The weight of fuel, defensive armament, ammunition and payload severely limited the range of Allied bombers at that time. One of the suggested solutions that made it off the drawing boards was the XFG-1. This flying fuel cell, on automatic pilot, and with 677 gallons of fuel onboard, was to be towed behind the bomber by a combination tow/fuel line. When all the fuel was transferred to the bomber, the empty glider would be released and allowed to crash into the sea, or enemy territory.(3)

The XFG-1 Experimental Fuel Gliders (only two were completed) were built under sub-contract by the Spartan Aircraft Company of Waco TX. According to an October 1943, USAAF declassified document, the specifications were:(4)

Towing speed- 250 mph
Airfoil section-root NACA 23018, tip NACA 23012
Chords- root 116 inches, tip 44 inches
Wing loading-12.3 lbs. per sq. ft
Stall speed-57.5 mph.
Fuselage-28.8 ft., wood and steel tube construction
Gross weight- 8,000 lbs
Wings-two spar, plywood covering to rear spar, full cantilever
Weight empty-3235 lbs.
Useful load-4,765 lbs.

Two upper surface, hinged type spoilers
Wingspan- 53 ft.
Flaps
Area-350 sq. ft.
Jettisonable
tricycle landing
gear
Aspect ratio-8



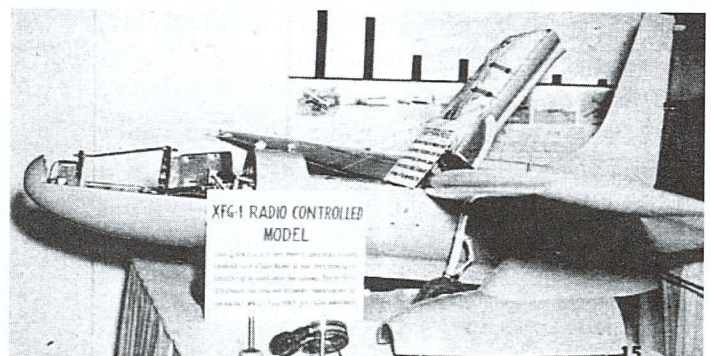
On October 1944, the tiny ship made its first flight. Later that year, a Spartan pilot, testing for spin characteristics, was unable to recover from this maneuver, and was killed in the crash that followed. A quarter scale radio-controlled version of the XFG-1 was built a Wright Field, then taken to the Lakehurst, NJ, Naval Air Station. There a blimp towed the model to release altitude. It then was maneuvered into a spin, and recovered with the use of a parachute.

Another XFG was built and was again tested for spin recovery. According to military glider historian James Mrazek, the pilot stabilized the glider "by a critical sequence and trimming of controls." On the second test, a spin recovery chute was used. By that time, official interest waned, and no more were produced. The Air Force used the second one for static display after the war. The surviving high-tailed XFG-1 Experimental Fuel Glider met its demise while being trailered under a low bridge.

Interested scale and RC modelers can find a general arrangement, three-view drawing of the XFG-1 by L. N. Wiczorek in the April 1946, *Model Airplane News*.

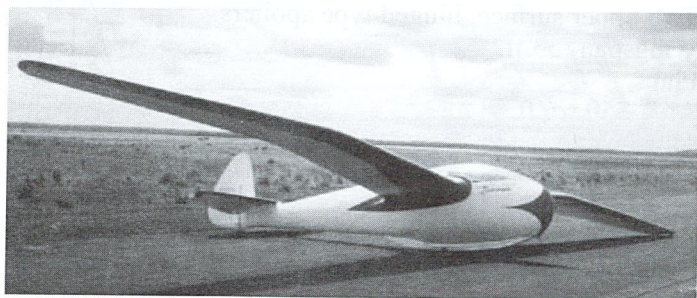
Footnotes:

- (1) Unusual Gliders by Peter Bowers, September-October 1955, *Soaring*
- (2) *Fighting Gliders of WWII*, by James E. Mrazek
- (3) Ibid. 1
- (4) Contract #33-038-107, The Cornelius Aircraft Corp. Declassified January, 1953



Radio-controlled 1/4 scale XFG-1 flying test model

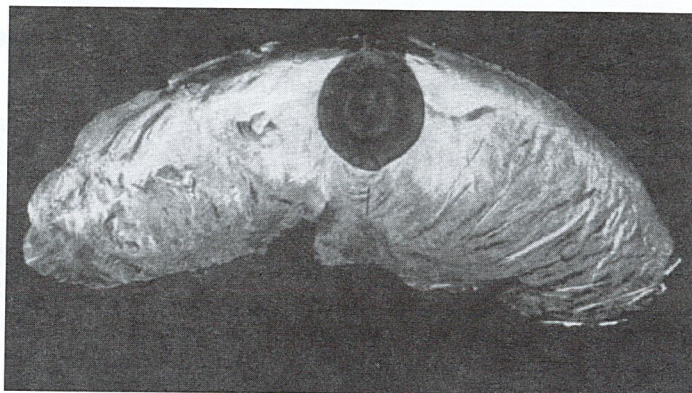
Zanonia - The Sailplane Named After a Seed



RS-1 "Zanonia" at Ephrata, WA Airport May 1976

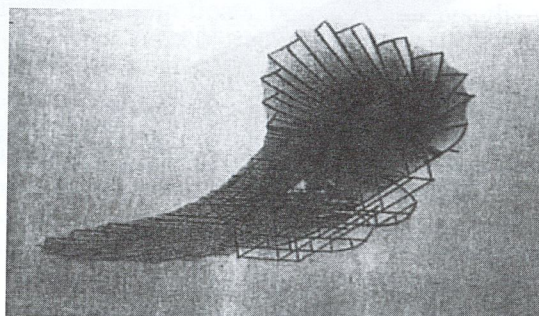
Several readers of the last NSM Historical Journal inquired about the source of the unique name of John Robinson's record-breaking Zanonia sailplane. In the March/April 1953, issue of *Soaring*, the late pioneering German aerodynamicist and flying wing designer, Dr. Alexander M. Lippisch, wrote an article, "The Seed That Became a Tree." It describes the relationship between the zanonia glider-like seed and its application to motorless flight. Lippisch, the designer of the world's first Delta Wing aircraft, tells of an idea inspired by the scimitar-shaped zanonia seed, (*zanonia macrocarpa*), and the relevance of this concept in building a wing planform for sailplanes, for power planes, jets, and finally for rockets. Though Robinson's Zanonia was not a delta-winged sailplane, its outstanding soaring characteristics were reminiscent of the gliding seed.

Lippisch's Soaring story originally appeared in the Collins Radio Company's *Collins Signal*. He wrote, "Several thousands of years before men invented their flying machines, nature was faced with the problem of the design of a flying seed, and she solved it in the most elegant manner we could imagine." The plant was a large vine of the cucumber family, *zanonia macrocarpa*, and grew in the jungles of Indonesia. Since there was little or no wind to propagate these seeds, the only method to disperse them over a wide area was for them to form into little gliders. From the height of the 150-foot trees on which these vines climbed, a large area could be covered by gliding seeds. Instead of a bird-like configuration, nature formed this seed into a kidney-shaped flying wing. The actual seed in front of the center is surrounded by a very tiny thin tissue that forms the wing. These seeds are captive in the fruit, and when the fruit opens, the seeds tumble out, drifting down, and into thermals that are sometimes generated in that moist jungle environment. This thermal boost often carries over surprisingly long distances.



The flying seed, *Zanonia Macrocarpa*

In the mid-1920's, a friend sent Lippisch a flying zanonia seed. He recognized it as essentially an arrow-shaped wing, and as others had done before him, Lippisch based his arrow-shaped aircraft designs on this example from nature.



The 1906 Etrich glider, from Alexander Lippisch' book, "Ein Dreieck Fliegt"

Lippisch continued: "When aviation was in its very beginnings, the flying ability of the Zanonia seed was discovered, and the method of stabilization of flight of an all-wing model was analyzed. It was found that the wing of the zanonia seed was so constructed that the sweptback wing twisted its tips upward, giving them "washout" (Washout is the decrease of the angle of incidence toward the wing tip; in this case, a means of obtaining longitudinal stability of sweptback wings.) Since the tissue of the wing is very flexible, the inherent stability of this seed was produced by the load in flight. Today we would say that this stability is created by the aeroelasticity, or elastic variations due to air loads, of the wing structure.

About Dr. Alexander M. Lippisch (1894-1976)

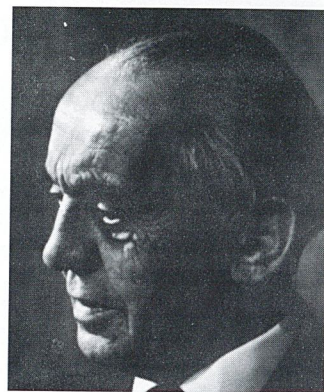
Alexander Martin Lippisch was born on November 2, 1894 in Munich. He witnessed Orville Wright make the first flight in Germany at Templehof, in

1909. He was immediately attracted to the field of aviation, and was destined to be part of its history. In 1915 he enlisted in the German armed forces and served until 1918 as an aerial photographer and mapper. After the war, he began his career as an assistant aerodynamicist with Zeppelin-Werk (later Dornier). His interest in the glider movement that began in the Rhoe Mountains in 1920, soon took him to designing gliders for Weltensegler, Inc. in 1922, and later to A. G. Steinmann. In 1925, he joined the Forschungs Institute der Rhoen-Rossitten Gesellschaft, a German sailplane institute. There he was made head of the aerodynamic design section. He drafted many well-known sailplanes, and created the high-performance "Fafnir," a standard for modern sailplane design. However, his main interest centered on proving his assumption that an airplane could be shaped like a flying tail and still be a practical aircraft. The all-wing delta design evolved from this research. This configuration became fundamental to the design of current supersonic aircraft.

The first Lippisch motorized delta wing flew in 1931. From 1933 to 1939 he was in Darmstadt as chief of the technical department of the Deutsche Forschungsanstalt fur Segelflug (DFS). He was sent to the Messerschmitt Company in 1939 to develop a rocket fighter for the Air Ministry that later became the Me163. As director of the Aviation Institute in Vienna, his team worked on delta wing airplanes that were designed to accommodate a variety of new power sources, such as

turbojet and ramjet engines.

He came to the America in 1946 as part of the U.S. Department of Defense, Operation Paper Clip program. Lippisch and his family became citizens in 1956.

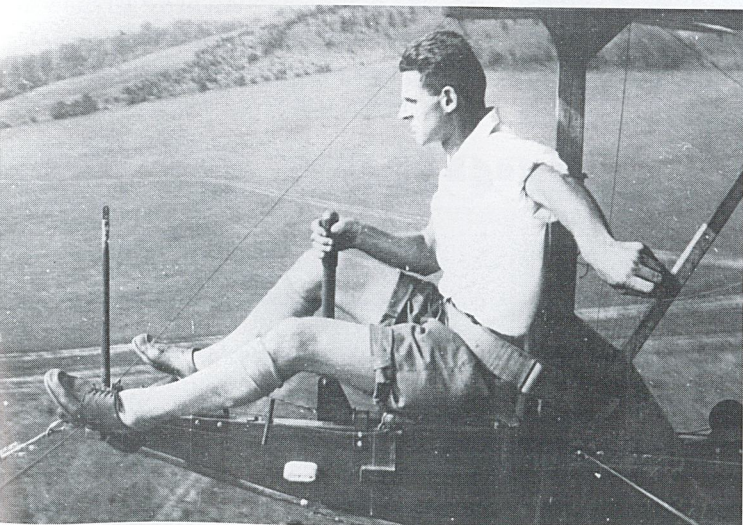


In 1950 he was appointed director of the Collins Dr. Alexander M. Lippisch Radio Company (Cedar Rapids, Iowa) aeronautical division, where he designed a high-speed smoke tunnel. He later directed the hydrodynamic laboratory. In that capacity, Lippisch proposed a boat whose hull would lift out of the water by means of short airplane-type wings, an aerofoil. A full-scale model of the Collins X-112 aerofoil flew in 1965. Retiring from that company in 1964, Lippisch consulted for several American and German companies on the designs of aerodynes, aeroskimmers, and aerofoil boats.

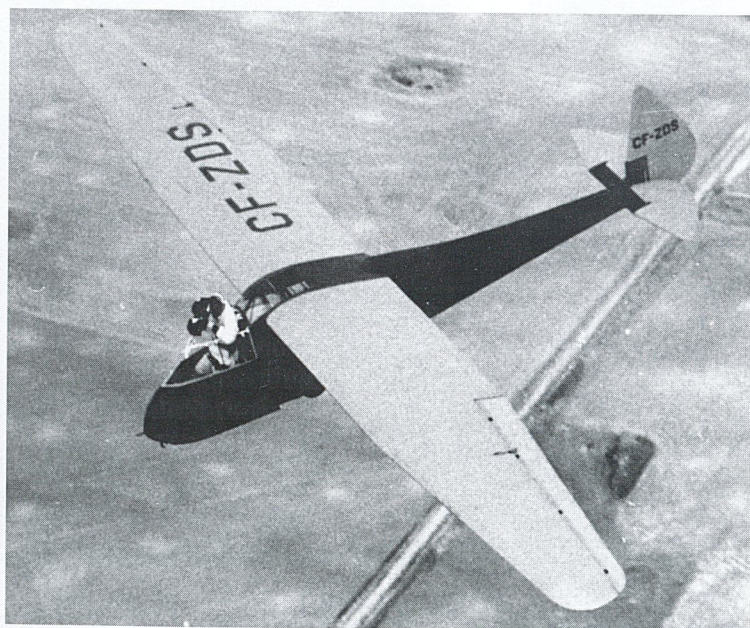
A believer in the importance of a broad education, Lippisch gave many lectures on the significance and history of flight.

He died in 1976 of a heart and lung ailment in Cedar Rapids Iowa.

From the Archives - Continued from back page

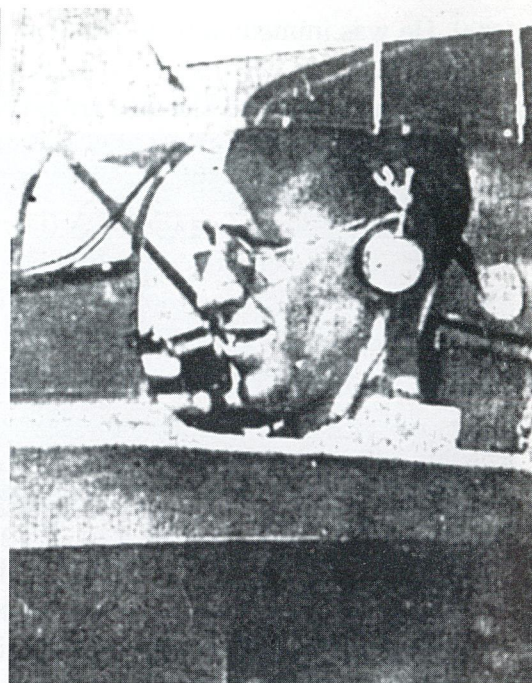


"Up an Away," Gustave "Gus" Scheurer taking his picture while on tow, at Lyons, near Millington, NJ



Unidentified photographer, standing in the front seat of the Saskatchewan Soaring Club's two-place Cinema, 1962

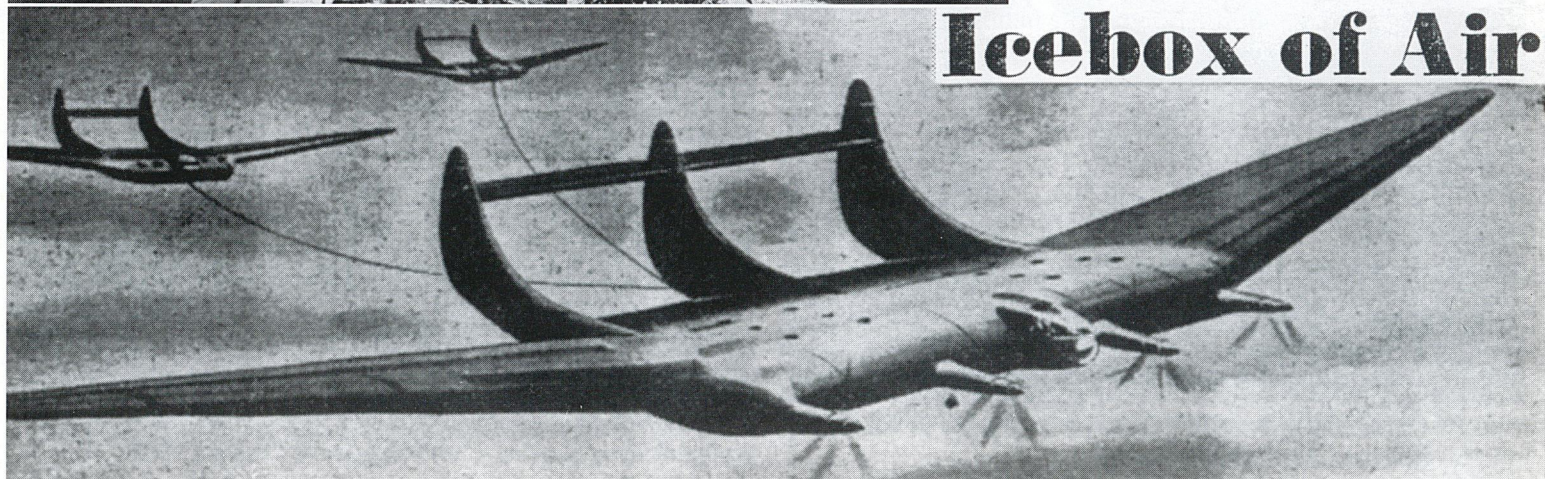
From the Archives...



Above- A 1933 newspaper clipping of Professor Roswell E. Franklin at the 1933 Nationals in Elmira

Left- The Sacramento Soaring Club's Baby Bowlus being positioned atop a mounting post for display at the 1954 California State Fair. Standing on the rig- Alan Rogers, in white T-shirt- John Flynn, behind bush- F.A. Smith, in coveralls- Vic Swierkowski

Below- "Transporting perishables from Florida to Canada." An artist's rendering of a 1943 wartime idea for the post-war design and utilization of commercial flying wing, glider trains



Icebox of Air