News from the President
George Applebay

Save these dates: August 31-September 2, 2013. We cordially invite you to Moriarty for a Vintage Sailplane Meet. Bring your vintage or classic glider to fly in some of the country’s best soaring conditions. You will also have an opportunity to see all that is new at the museum. Please register so that we will know how many to plan for. The registration form is on the next page or you can find it on the webpage www.swsoaringmuseum.org.

Many Thanks to Frank Whiteley. You may already know that Frank has been our volunteer webmaster for many years. Now he has provided the museum with free hosting for our webpage www.swsoaringmuseum.org.

Directions to the Museum
Approximately 35 miles east of Albuquerque on Interstate 40, take Exit 197 onto Old Highway 66 in Moriarty, NM. The museum is the big building on your left.

Member News
Are you receiving the newsletter by snail mail? Consider receiving by email. It saves museum resources and you can read the newsletter in full color. Contact us at the address to the left to change your preference.

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Registration for
Vintage Sailplane Meet
Moriarty Municipal Airport, NM
August 31 – September 2, 2013

Name ________________________________________________________________
Address ______________________________________________________________
Telephone ______________________________________________________________
Email ________________________________________________________________

Will you bring a vintage or classic glider? ______

If so, what glider? ________________________________________________

Please register as early as possible so that we can plan this event.
Contact Bob Hudson, 505-507-6332, bhudson964@aol.com, or George Applebay, 505-328-2019, for
information on operations, tiedowns, camping, etc.

Mail to:
U.S. Southwest Soaring Museum
P.O. Box 3626
Moriarty, NM 87035
FIBERA KK-1E UTU, N1070

In this issue we feature the Fibera KK-1e Utu. This sailplane, serial #18, is the only example of the Utu in the United States.

Glider History
The KK-1e Utu (English translation: Mist) is a mid-wing, T-tailed, single-seat, FAI Standard Class glider that was designed by Ahto Anttila and produced by Oy Fibera AB in Finland in the 1960s. The first flight of the prototype was on August 14, 1964, and it was first advertised in the US in the October 1966 issue of Soaring magazine. The Utu was one of the first manufactured fiberglass sailplanes [about the same time as the Hütter H-301 Libelle, Bolkow Phoebus, and Schleicher ASW15]. Twenty-two (22) Utus were ultimately manufactured but it is not known if any are still flying. Two Utu’s were flown by the Finnish team in the 1968 World Gliding Championships in Poland.

The museum’s glider was imported by Alcide Santilli and first flown from the West Mesa field in Albuquerque on October 21, 1967. The last flight was recorded on July 1, 1979, showing 1673 hours. Interestingly, Harland Ross flew this ship for 3 hours on May 20, 1973. The aircraft was not type certified and was registered with the FAA in the Experimental - Exhibition/Racing category.

Santilli completed diamond distance and diamond goal flights in this ship in 1970 and diamond altitude gain from 17,600 to 25,600 ft in 1971. He also flew the Utu to a NM record for altitude gain of 12,560 ft in 1974. He donated the glider to the museum in 2006.

Design, Development, and Construction
The following information is summarized from an article in the October 1966 issue of Soaring magazine. No author was listed for this article but it appears to have been written by the designer himself:

A design study of the Utu was the graduate work of Ahto Anttila while he was a student at the Finnish Institute of Technology.

The aim was to investigate the structural application of plastic laminates stabilized with polyurethane foam. As a result, the superiority of plastic materials, especially when compared to wood became evident.

The Utu has a 15 m wing span, with a single spar. The wing employs a NACA 63-618 airfoil at the wing root, changing to a NACA 63-612 section at the wing tip. The wing features a split terminal velocity trailing edge combination spoiler/dive brake. The landing gear is a fixed single wheel and tail skid.

The first of six prototypes was built by Mr. Anttila and three associates during 1961 and 1962. This ship, which never flew, was broken during proof loading. Prototype number two was built and flown by the builders during 1964 and 1965. It was sacrificed for destructive testing in 1966. Additional prototypes were built at the Helsinki factories of Oy Fibera Ab, the company established to produce the glider.

The difficulties in fiberglass structures [in the 1960’s] are the unknown factors which derive from the lack of tradition. There are few tried-and-true solutions to structural problems, few qualified workers (including designers) and only a handful of operational factories. Making a sailplane out of fiberglass today involves too many new processes to be done with the same confidence that we use in the manufacture of wooden or metal gliders. Yet, inherently the fiberglass sailplane has superior overall strength for a given weight, longer life, and lower cost per unit due to the radically decreased working hours.

The wing structure is fiberglass-reinforced-plastic (FRP) sandwich shell with a polyurethane foam core. There is a single I-spar and no ribs. The fuselage consists of a load-carrying outer skin, the rear part of which is also of sandwich construction.
Fittings for the controls, the seats, and the detachable instrument panel are bonded to the structure. A bulkhead just behind the pilot's seat has been retained to deal with the big loads transmitted by the wheel and the wing/fuselage carry-through structure.

The structure as a whole, therefore, is relatively simple, open and easy to inspect. The wings are attached with two conical bolts. Some control mechanism parts, traditionally made of metal, have been replaced with fittings of injection-molded nylon.

Several specimens of all main components were used in proof-loading experiments. Several different wings were proof loaded to clear up questions regarding buckling strengths.

These wings contained the same amount of fiber in the spars, but the material in the shells was distributed in a variety of ways. The results with these wings ranged from ultimate load factors of +5.7 to +14. The lowest values were obtained with wings in which the majority of the fiber was spread over a rather broad surface. This configuration provides a thick, dimensionally stable, and accurate wing contour.

The gathering of loads at the main-spar fittings requires a convergence of the fiber patterns in this area. This, however, leaves the wing shell unstable. Even very small buckling in the wing leading and trailing edges, which may occur in normal use, showed a tendency to widen into the middle of the wing under increased loads. The result was the buckling of the entire upper surface.

None of the calculation methods used in these tests turned out to be reliable. With the I-spar the full compressive properties of the laminate are attained. The best strength-to-weight ratio is obtained with attention to skin stabilizing. The permitted factor of + 8 gives a rough-air maximum speed of 130 mph according to O.S.T.I.V. requirements. Greater speeds are very unpleasant in really gusty conditions, and therefore questionable in practice.

During flutter studies complete flutter was - inadvertently - induced in the wings and rear of the fuselage of a prototype lacking mass-balanced controls. Flutter began at an estimated airspeed of 250 kph (155 mph). The only damage that was evident later was a small rend in the rear fuselage shell. To prevent this in the future 100-percent mass balancing of ailerons and rudder were subsequently incorporated. These tests seemed to prove the extreme resistance to flutter of FRP laminates. A wooden airplane would probably have disintegrated in a matter of seconds in similar circumstances.

Glassfiber-polyester laminates have been used throughout the Utu. These can in no way be regarded as new insomuch as they have been used for a quarter of a century, even in industry. Test results of the material already published are very comprehensive. Because of the high ultimate-load factors of sailplanes, and the small amount of yearly use, gliders differ significantly from other airplanes. They do not have the fatigue problems of conventional aircraft and rarely wear out in use.

Bearing this in mind it can be stated that FRP laminates are already used successfully for purposes far more demanding than the sailplane. Roof panelling is an instance. The FRP laminates have a strength-to-weight ratio two times better than wood (including plywood ) and are not affected by moisture as is wood.

**Flying the Utu**

Al Santilli travelled to Finland to fly the Utu and the following account is drawn from his article in the August 1967 *Soaring*.

“Being a shorty, I needed the backrest bar moved forward and the headrest cushion snugged up (a la Phoebus). A floor crank moved the pedals into position with a firm lock.

“With the center-of-gravity hook on the left side, and on slightly low tow to insure against possible over-running, I quickly discovered the sensitivity of the elevators. It was slippery, but in a way that
reminded me of a well-waxed pair of skis on slightly packed dry snow. I experimented with the stick-mounted trim setting. At 100 kph the elevator stick force was very comfortable. Aileron response on tow was snappy, and rudder response firm and light.

“I quickly ran through minimum sink, maximum L/D, stalls left, right, and dead ahead. There is ample warning before complete stall, and slow shallow turns were easy to keep on an even keel with no adverse yaw tendency. At 1.4 x min. sink (the figure used for comparison at this year's German nationals), I checked roll rate at under four seconds, from 45° left to 45° right.

“Spoilers are terminal dive limiting, and I looked for buffeting and elevator feedback with spoilers open, but was pleasantly surprised by smooth sink. Hand force on the spoilers is about 2 to 3 pounds, with no tendency for the spoilers to move by themselves.

“The noticeable rake angle of the rudder hinge had led me to look for a slowing down in a turn, or some other material evidence supporting the squawk against raking, but this wasn't so with the Utu.

“I tried nose-high and nose-low slips using full rudder, then with the low wing dropped to the point where it was impossible to maintain a straight track. Utu turned out to be very manageable and it was my belief that it could be landed on a dime without spoilers (but then how would I engage the wheel brake?)

“Sadly enough the time came for the landing approach. Those tall pines were a nice last hurdle. Both spoilers and a medium slip, quickly neutralized, put me where I wanted to be. The 4x4 wheel was so well positioned fore and aft that in the crosswind there was not even a hint of the ground looping which used to dog my surplus-sailplane flying days. When I finally left Utu it was like saying goodbye to an old friend.”

Memorable Flight: Theodore M. (Ted) Nagy flew the Utu about 30 hours during 1968, including a Region 9 contest at Roswell, NM. It was probably during a wave flight near Mountainair to 23,400 ft on March 9, 1968, that Ted heard a popping sound and, looking at his wings, was horrified to see that air trapped in the urethane foam had caused bubbles to form under the fiberglass and gel coat. The canopy had frosted over and his spoilers had frozen. He was able to land without spoilers. Al refinished the glider several times but lumpy patches continued to appear over time. You’ll notice these unlovely spots still apparent. In mid-1968 Fibera added a third glass ply to the wing skin to correct blistering on the early models.
General characteristics
Length: 21 ft 4 in
Height: 4 ft 0 in
Wingspan: 15.0 m (49 ft 3 in)
Wing area: 121 sq ft
Aspect ratio: 20:1
Airfoil: wing root: NACA 63-618,
wing tip: NACA 63-612
Empty weight: 412 lb
Gross weight: 684 lb

Performance
Never exceed speed: 155 mph
Maximum glide ratio: 35:1 at 50 mph
Rate of sink: 120 ft/min at 46 mph
Wing loading: 5.65 lb/sq ft

Above: Clear vision panels for high altitude flying.
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