Southwest Soaring
Quarterly Newsletter of the U.S. Southwest Soaring Museum

April 2015

George Applebay, June 12, 1925 – April 6, 2015
U. S. Southwest Soaring Museum, Inc.  
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An affiliate of the Soaring Society of America

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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.

Sad News

In this issue we celebrate the life of George Applebay, soaring pioneer and a lover of all things aviation; a friend to many across the country and around the world.

The aviation world knew George as the designer and manufacturer of the Mescalero and Zuni sailplanes and the Zia motorglider. A master craftsman and mechanical genius, a master of fiberglass construction and repair, pilot and flight instructor.

We at the museum knew George as our friend, founder, leader, visionary, advisor, chief engineer, recruiter, cheer leader, tireless worker, benefactor, communicator, and fund raiser. George Applebay was all of that and more.

This museum was made possible by his boundless energy, initiative, and support for the idea that the southwest needed a glider museum. He contributed countless hours to find a site, entice an architect to develop the drawings, invite contributors to support this idea, and encourage the many helpers necessary to make it happen.

In the following pages we relate some of the magic that made George memorable to people around the globe.

The museum will celebrate its 10th anniversary on June 13 in Moriarty. Contact Bob Hudson for more information. 505-832-5072

George Applebay Memorial Fund

We have created a Memorial Fund in George’s honor at the Los Alamos National Bank in Los Alamos, NM. The family has asked that all proceeds go to the EAA Young Eagles.

If you would like to donate to that fund, please send a check made out to the George Applebay Memorial Fund to Kathy Taylor at 557 Todd Loop, Los Alamos, NM 87544. Alternatively, checks can be sent to the museum. Electronic deposits are possible. Contact Kathy at kathytaylor1000@msn.com or 505-672-0152 for the necessary information.
George Wiley Applebay was born on June 12, 1925, in Glenn, Oklahoma. The family later moved to Lowell, Ohio, where George fell in love with airplanes. At age 7 a barnstormer flew overhead and George ran to a nearby field to watch him land. Eager to help, he carried one of the pilot’s gas cans to a gas station half a mile away. That friendly, helpful attitude and generosity lasted a lifetime, and made him many friends along the way.

George built and flew model airplanes for more than a dozen years and built a Chanute-inspired hang glider at age 13. He doubtless learned a lot about flying and air currents from those experiences.

In 1938 he began helping out at the Pike Street Airport in Marietta, OH, fueling and washing airplanes. He decided there could be no better life than to hang out with people who liked airplanes.

This love of airplanes and airplane people took him to the Army Air Corps in 1943, where he became a mechanic and flight engineer on the B-17, then crew chief on the B-29.

After the war he obtained an A&P license and learned to fly on the GI bill. By 1950 he had a wife and baby girl, Georgann, and was operating a small airport and repairing airplanes in Ardmore, OK. On the advice of a friend, he moved to Wichita, KS, where he was hired by Boeing as a mechanic and inspector on the B-47. Boeing sent him to Seattle for a time to help prepare the new B-52 for its first flight.

Back in Wichita, he joined Cessna’s experimental department, working there through the flight testing of the T-37 jet. George said this was the best job he ever had. During his 5 years at Cessna, George spent his weekends building a home for his young family that now included a second daughter, Judy. As a founding member of the Wichita Soaring Association, George instructed in gliders from 1956 to 1959 when he moved to California. During this time he became friends with Harland Ross, designer of the Zanonia and R-6. George was building a Cherokee at the time. Harland advised him that it was OK to build somebody else’s design as a start but, from now on he should design his own gliders.

Joining his brother in Santa Barbara, California, he worked for a new company called Edgerton, Germeshausen, and Grier, that later grew into the giant EG&G. George helped them select a suitable aircraft and develop the instrumentation that was used to monitor natural radiation in soil and rocks on the ground, and to follow the radioactive cloud from atomic tests at the Nevada Test Site.

From that time on, his main interest was designing and building state of the art sailplanes. By this time he had already built two gliders (including the Chiricahua) and frequently made the long drive to the Mojave Desert to fly.

Now he moved to Albuquerque to work with the local EG&G group on projects at Sandia National Laboratories and Los Alamos National Laboratory. He now had two young sons, Brent and Darin.

From 1972 to 1983 he constructed gliders of his own designs for commercial sale. His first design in New Mexico was the Open Class Mescalero, conceived in response to the Soaring Society of America’s aborted 1970 Sailplane Design
Competition. The Mescalero was intended for production, but George discovered that there was no market for such a big glider. He sold the Mescalero in order to concentrate on his next design, the all-fiberglass Zuni for the 15m class. Only one Mescalero was completed.

George thought of Moriarty as the Soaring Capital of the Southwest, with its wonderful soaring conditions and large fleet of high performance sailplanes. In 1990 he decided that the Southwest needed a glider museum to showcase the sport to the general public. The museum moved into a hangar on the airport at Moriarty in 1990 and then grew into a second hangar. In 2005 the museum completed construction of a 38,000 sq ft building on Old Route 66 in Moriarty. And the rest is history!

Legacy

George’s most important accomplishment was to raise a wonderful family, including Judy, Georgann, Brent, and Darin. His wife Earlene died in 1983 and son Brent was killed in a hang gliding accident in 1975. The extended family includes two grandsons, Travis in Colorado and Tidus in Southern CA; as well as three great-grandchildren, all living in Southern CA.

George helped create a community of aviation enthusiasts by imparting his love of aviation to the many young people who worked with him on his diverse projects. Along the way he shared his knowledge of engineering and his skills in working with composites, metal, wood, and instrumentation, and infused his entrepreneurial spirit. The list of helpers is long and impressive. They include:

- Fidel Ramirez worked with George repairing and maintaining gliders for 34 years and has become the number one composite sailplane repair artist in the country.
- Steve Hill, through his company, Twisted Composites, designs propellers for some of the fastest airplanes at the Reno air races.
- Eddie Saurenman is a successful aerobatic pilot and aircraft designer who worked for Aviat Aircraft in Wyoming and lately is a consultant in aviation stress analysis.
- Doug Brady builds kit aircraft in Durango, Colorado.
- Dave Lawrie, President of Composite Tooling Corporation in Albuquerque does highly complex composite manufacturing for Sandia Labs, Los Alamos, and Phillips Labs. Dave does the really hard stuff that no one else can figure out.
Frank Hatten had a long career in auto racing and now has a machine shop in Indianapolis.

John Davis founded Sunlight Homes in Albuquerque, designing and building super-insulated solar homes.

Paul Mitchell had a long career at Lockheed and Gulfstream.

Craig Funston came down from Seattle to work one summer after high school. He is now a Professional Engineer with a successful business in Bellingham, WA.

Matt Sigala is a young Moriarty man who worked for George for a couple of summers in high school. He got the aviation bug and graduated from the aircraft mechanics school in Roswell, worked in aviation for a few years, and now travels all over North America repairing composite wind turbine blades.

Kevin Pfeiffer worked for George one summer. He is now a successful propeller designer at McCauley in Wichita, KS.

Jon Sharp of Nemesis Air Racing was our shop foreman in the early Zuni days. He worked for 25+ years as the composites go-to guy at Lockheed Martin Skunk Works. Jon designed and built two famous composite race planes, one of which is in the Smithsonian, and won 15 National Championships in 30 years. “George took me under his wing, and taught me a life time worth of composites and airplane building. … Thank you for your teachings, and sharing your never give up attitude, your drive, your desire, your ‘reach for the stars’ life. … for letting me and others be a part of and share in your dreams.”

George contributed significantly to the economy of Moriarty and the Estancia Valley. The Moriarty airport started as a dirt strip with a couple of hangars for the local crop duster when the Albuquerque Soaring Club, encouraged by George, relocated here. George had a vision for the airport and helped Mayor Howard Cavasos by founding the Airport Advisory Board and providing the City with good advice as to how the airport could grow.
In Steve Hill’s words, “Rest in Peace, George. We were all very lucky to have known you.”

Awards and Honors

George received many awards along the way.

In February 2000 he was named to the Soaring Society of America Hall of Fame.

The National Air and Space Museum displays one of his Zuni II sailplanes.

In December 2003, George was selected to represent Soaring at the 100th Anniversary of Flight celebration and the Grand Opening of the Udvar-Hazy wing of the Smithsonian Museum at Dulles Airport near Washington, D.C. He was introduced to the guests of the prestigious invitation-only event along with war heroes, designers, pilots, engineers, manufacturers, and other famous people in aviation, including astronauts Neil Armstrong and John Glenn.

In June 2005 the 180,000 member Experimental Aircraft Association (EAA) presented George with a Major Achievement Award at Oshkosh, Wisconsin, during their gigantic annual fly-in and airshow.

The EAA has a program called “Timeless Voices” and in 2009 they made a 37 minute video of George recalling some of his experiences. You can find it on the EAA website.

The NM State Legislature honored George on February 20, 2015, by naming the Zuni the State Glider. George received a standing ovation from everyone in the Round House in Santa Fe after the Proclamation was read.

George’s designs speak for themselves.

The Sailplanes

Applebay GA-II Chiricahua

The Chiricahua is a high-wing, single-seat, FAI Standard Class glider that was designed and constructed by George Applebay, and first flew in 1970.

Design and development

George started the Chiricahua as a standard class sailplane in 1959, but the aircraft was not completed for 11 years, first flying in 1970. It was named for the Chiricahua people, a group of Apache Native Americans.

The aircraft is made from wood and covered in a combination of plywood and doped Ceconite. Its 15 m span wing employs a Göttingen 549 airfoil and features Schempp-Hirth style top surface airbrakes. As originally specified for the standard class, the landing gear was a fixed monowheel.

Only one example was built.

Operational history

On July 7, 1974, at New River, Arizona the prototype, N9413, was involved in an accident and substantially damaged. The aircraft was on a soaring flight, ran out of lift, made an attempted landing on a road in a 20 kt crosswind and struck a tree. The 24 year old pilot, who had 32 hours of flying time total, including 11 hours in type, was not injured. The aircraft has since been re-registered as N53MB.

Specifications (GA-II)

General characteristics

- Crew: one
- Length: 49 ft 3 in (15 m)
- Wing area: 148.2 sq ft
- Aspect ratio: 16.2:1
- Airfoil: Göttingen 549
- Empty weight: 590 lb
- Gross weight: 819 lb

Performance

- Wing loading: 5.47 lb/sq ft
Applebay GA-III Mescalero

The **Mescalero** is an American high-wing, T-tailed single-seat, FAI Open Class glider.

**Design and development**

The Mescalero was designed in response to the Soaring Society of America's 1970 *Sailplane Design Competition*. The competition was aborted and the glider was not completed until January 1975. The aircraft is named for the Mescalero Apache tribe.

The Mescalero is of predominantly composite construction, with a metal and fiberglass wing. The fuselage and tail have a fiberglass monocoque structure. The 72 ft wing is built in two pieces, has a very high aspect ratio of 36:1, and employs a Wortmann airfoil. The aircraft can be assembled from its trailer in just ten minutes using special ground handling stands that eliminate the need to lift the large wings by hand. All control surfaces are 100% mass balanced and feature automatic connections upon assembly.

Writing in the March 1975 *Soaring* magazine, Don Summers asked, “Why did a supership suddenly appear in the sagebrush and tumbleweed of New Mexico? In an interview I learned that his desire to build such a bird dated back nine years. Family responsibilities made the whole idea quite impractical until the day the SSA announced a Design Competition. That did it. George called a family conference and requested permission from his wife and four children to go for broke.”

The family enthusiastically supported his plan, and four years of hard work began. During the first year plus, the work was done in his garage and backyard. Needless to say, a 71-foot wing doesn't fit most garages – even half a wing. When he put up a shelter in the back yard to house the wing, a neighbor and a city building inspector stepped in to create one of those turning points in history one reads about. The scramble for shop space resulted in heavy financial commitments. George incorporated, sold stock, and founded Aero Tek, Inc.

George did not do all of this alone. His teenaged son, Brent gave up an active high school social life, a winning position in trail bike competitions, and most of his free time to help. Harland Ross, designer of the Zanonia, worked with George on the wing design. Charles Harper, retired machinist from Boeing, Wichita, helped with some of the trickiest parts of metal fabrication. And Jim Riva, former New Mexico SSA State Governor, lent enthusiastic moral support throughout.

Don spent an evening talking about the Mescalero with leading competition pilot A.J. Smith. Although AJ had not flown the ship himself, he had inspected it, reviewed the design, and gone over all of the information available. In his words, "This is the first Open Class ship built and flying in America that has the potential to be a world champion caliber ship. It's what we've been looking for ...

**Operational history**

The Mescalero was tested extensively, beginning on January 4, 1975, with ground tows on the 13,000 ft runway at Roswell, NM. Once controllability was established, aerotows were commenced. Two weeks later, the various modifications resulting from the Roswell flights had been completed and the ship was flown from the 7000-ft strip at Moriarty, NM. Test pilot Rick Apgar reported, "It's the sweetest machine I ever flew."

The sole Mescalero completed was intended as a prototype for mass production and was registered in the *Exhibition/Racing* category. George decided not to put the aircraft into production and sold the prototype to two local pilots. The new partners in the ship flew it frequently in the Moriarty area.

In November 2012 the aircraft was still on the Federal Aviation Administration registry, based in Fort Worth, Texas.

**Specifications (Mescalero)**

**General characteristics**

- **Crew:** One
- **Wingspan:** 72 ft 0 in
- **Wing area:** 146 sq ft
- **Aspect ratio:** 36:1
- **Airfoil:** Wortmann
- **Empty weight:** 1,000 lb
- **Gross weight:** 1,500 lb

**Performance**
- **Maximum glide ratio:** 44:1

Until recently the Mescalero was the highest performance American built sailplane.

**Applebay Zuni**

The Zuni and Zuni II are single-seat, water-ballasted gliders designed to compete in the FAI 15m class.

**Design and development**

The Applebay Zuni, and the later refined Applebay Zuni II, were intended to compete with European fiberglass gliders that have dominated 15m class competitions since the class was established. The aircraft is named for the Zuni people.

The Zuni was designed in 1975 with advice from many leading pilots and designers. The aircraft was built using glass-fiber/epoxy resin composite materials, with particular attention to achieving laminar flow.

Using the classic pod and boom layout developed by the German glider manufacturers, the Zuni uses a modified Wortmann 67 series airfoil section in a relatively thin double taper wing, (19% at the root to relieve bending moments, rapidly thinning to 15% 0.9m outboard, 14% at the taper intersection and 13% at the tip) which is set high on the fuselage with 1° dihedral, (reducing drag from interference of the wing fuselage junction).

The integrally molded fin supports the slightly swept all-moving T-tail, with a small degree of reflex camber and a partially mass-balanced rudder. The single-wheel main undercarriage is manually retractable and a faired tailskid supports the rear fuselage on the ground.

Water ballast is carried in integral tanks housed inside the leading edges of the wings, holding 58 gal (484 lb). Conventional control surfaces were fitted, with pitch and roll controlled by a sidestick, and rudder by foot pedals. The entire trailing edge consists of flaps inboard, out to about ¾ span, with ailerons outboard which also droop when the flaps are deployed.

**Operational history**

Flight testing commenced in November 1976 with excellent results which generated much interest from the American gliding community and encouraged Aero Tek to start production.

Billy Hill flew his Zuni to wins in the 1977 and 1979 Region 9 contests and won the longest task (352 miles) at the 1977 Nationals. These competition successes quickly showed that the Zuni was at least the equal of European built contenders, and were reinforced by a favorable report in Soaring magazine by George Moffat.

But the early success was marred by a fatal accident in May 1977, caused by structural failure. Aero Tek was forced out of business in 1978 but George was determined to continue development of the Zuni. He formed a new company, Applebay Sailplanes, with daughter Georgann as its president, and they bought the tooling and assets from Aero Tek.

Dick Johnson performed a Flight Test Evaluation of the Zuni in 1979 and found weaknesses in the design. George took these to heart and embarked on a complete rework of nearly every aspect of the design.

**Zuni II**

The Zuni II was announced in 1980 and this represented a considerable advance. A center stick replaced the controversial side stick. The new unit was mounted on ball bearings throughout for smooth operation. Wing dihedral was increased to 2° for greater roll stability and better "grooving" in thermals.

A new seat pan improved ergonomics, with higher thigh supports and a flat floor in the rudder pedal area. The pedals were widened to provide a more comfortable angle for the feet. Quick detach mounts on the new pedestal-type instrument panel permit easy removal for access to the forward cockpit. A forward opening canopy opened on parallel linkages.

A new flap-actuation mechanism provided greater mechanical advantage for deploying the 90° flaps at high speeds.

The main gear was repositioned 5" farther aft. The resultant cg change produced a lighter tailwheel loading and easier directional control on rollout. Full-span carbon fiber spar caps became standard on the Zuni II. This allowed weight to be saved with improved strength and stiffness. All-carbon control
surfaces (stabilator, rudder, flaps, ailerons) were made available as an option.

The factory also directed much effort toward greater precision in wing profiling. New tooling plus improved finishing methods permitted the production of wings with far more accurate leading edges and airfoils than previously possible. Performance was significantly enhanced.

A serious attempt was made to minimize free play in the aileron linkage. The system now featured new hookups and closer tolerances throughout. The ailerons are actuated through a 2-to-1 differential system to avoid adverse yaw, and were interconnected to the flaps in the ±10° range.

The integral ballast tanks hold 58 gal of water, bringing the ship to a gross of 1200 lbs at a wing loading of 11 lbs/sq ft.

Quality control, production efficiency, and finish were markedly improved. George Applebay and the Zuni II team continued to pursue their dream of producing an American racing sailplane second to none in the world. The Zuni II represented a major step in this direction. The new ship not only outperformed the original Zuni, but it was lighter, stronger, more comfortable, and easier to fly.

A total production of 20 Zuni and Zuni II aircraft had been built when production terminated in 1983.

Operational history
Three Zuni II aircraft were leased by the Polish gliding team to represent Poland in the 1983 World Gliding Championship. Modest success in National competitions was repeated in world class competition, but legal issues over an early structural failure and the low level of investment prevented the Zuni from achieving its full potential. The poor currency exchange rates of the early 1980s allowed European gliders to be imported at lower prices than equivalent American goods.

Jerry G. Mercer donated his Zuni II to the Smithsonian Air and Space Museum in 1982, after acquiring all of his Silver C, Gold, and two Diamond FAI gliding badges during one flight over Taos, New Mexico, an accomplishment that had never been done before.

FAI soaring badges were earned in the Zuni. Billy Hill and Doug Barritt flew a number of New Mexico and Nevada State and National records in the Zuni in the 1980s.

The Zunis are still out there, flying. Steve Leonard has set Kansas and New Mexico state records and won a number of contests in his Zuni II, including a first place in the 2009 Region 10 South Sports Class contest at Brenham, TX.

As of March 2015, 14 Zunis continue to be listed on the US Federal Aviation Administration aircraft registry.

Specifications (Zuni II)

<table>
<thead>
<tr>
<th>General characteristics</th>
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<tbody>
<tr>
<td>Crew: 1</td>
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<tr>
<td>Length: 21 ft 8 in</td>
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<tr>
<td>Wingspan: 49 ft 3 in</td>
</tr>
<tr>
<td>Height: 5 ft</td>
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<tr>
<td>Wing area: 109 sq ft</td>
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<tr>
<td>Aspect ratio: 22</td>
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<tr>
<td>Airfoil: Wortmann FX 67-K-170 inboard, modified FX 67-K-150 outboard</td>
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<tr>
<td>Empty weight: 535 lb</td>
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<tr>
<td>Gross weight: 1,200 lb, including 483 lb water ballast</td>
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Performance

- Maximum speed: 133 kn (153 mph)
- Maximum glide ratio: 38@ 61 mph
- Rate of sink: 108 ft/min
- Wing loading: 11.01 lb/sq ft

Applebay Zia

The Applebay Zia is a single-seat, high-wing, twin-boom, pusher configuration motor glider that was designed by George Applebay. The aircraft was intended to be offered as a factory completed aircraft or as a kit.

Design and development

Even though the Zia was designed for the 1982 Sailplane Homebuilders Association Homebuilt Sailplane Design Contest, it was withdrawn from the competition as it required changes during the contest period, which the rules prohibited. In fact the design that was to become the Zia went through six different configurations, starting as a canard. The aircraft is named for the Zia Native American people.
The Zia is constructed from fiberglass with a carbon fiber wing spar. The aircraft has fixed tricycle gear featuring wheel pants. The specified engine is the 28 hp Rotax 277 two-stroke, which is started with a manual recoil starter. The aircraft has flaps which deploy to 45° and retract anytime the flap handle is released, intentionally preventing the use of flaps and throttle at the same time. Fuel is 4 U.S. gallons carried in the left wing root tank.

The Zia was placed in series production in the fall of 1983 but only four were completed, including the prototype. The design was not type certified and all examples produced were registered in the Experimental category.

**Operational history**

In March 2011 there were still two Zias registered in the USA, including one owned by the designer. This aircraft now resides in the Southwest Soaring Museum.

**Specifications (Zia)**

**General characteristics**

- **Crew:** one
- **Wingspan:** 46 ft 0 in
- **Wing area:** 118 sq ft
- **Aspect ratio:** 18:1
- **Airfoil:** Wortmann FX 66-197
- **Empty weight:** 400 lb
- **Gross weight:** 650 lb
- **Fuel capacity:** 4 U.S. gallons
- **Powerplant:** 1 × Rotax 277, 28 hp

**Performance**

- **Maximum glide ratio:** 25:1
- **Rate of sink:** 120 ft/min
- **Wing loading:** 5.5 lb/sq ft

**Acknowledgements:** The preceding account synthesizes information from the Soaring Society of America’s *Sailplane Directory 1974*, *Sailplane Directory 1997*, various issues of *Soaring* magazine, Martin Simon’s *Sailplanes 1965-2000*, the online Wikipedia, and from accounts by Steve Hill and others. Photos are by Kathy Taylor, Jim Foreman, and from many of those sources.
Zuni serial #7 over Black Forest Gliderport, Colorado, in 1980
(photo by Jim Foreman)
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Benefits of memberships include:
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