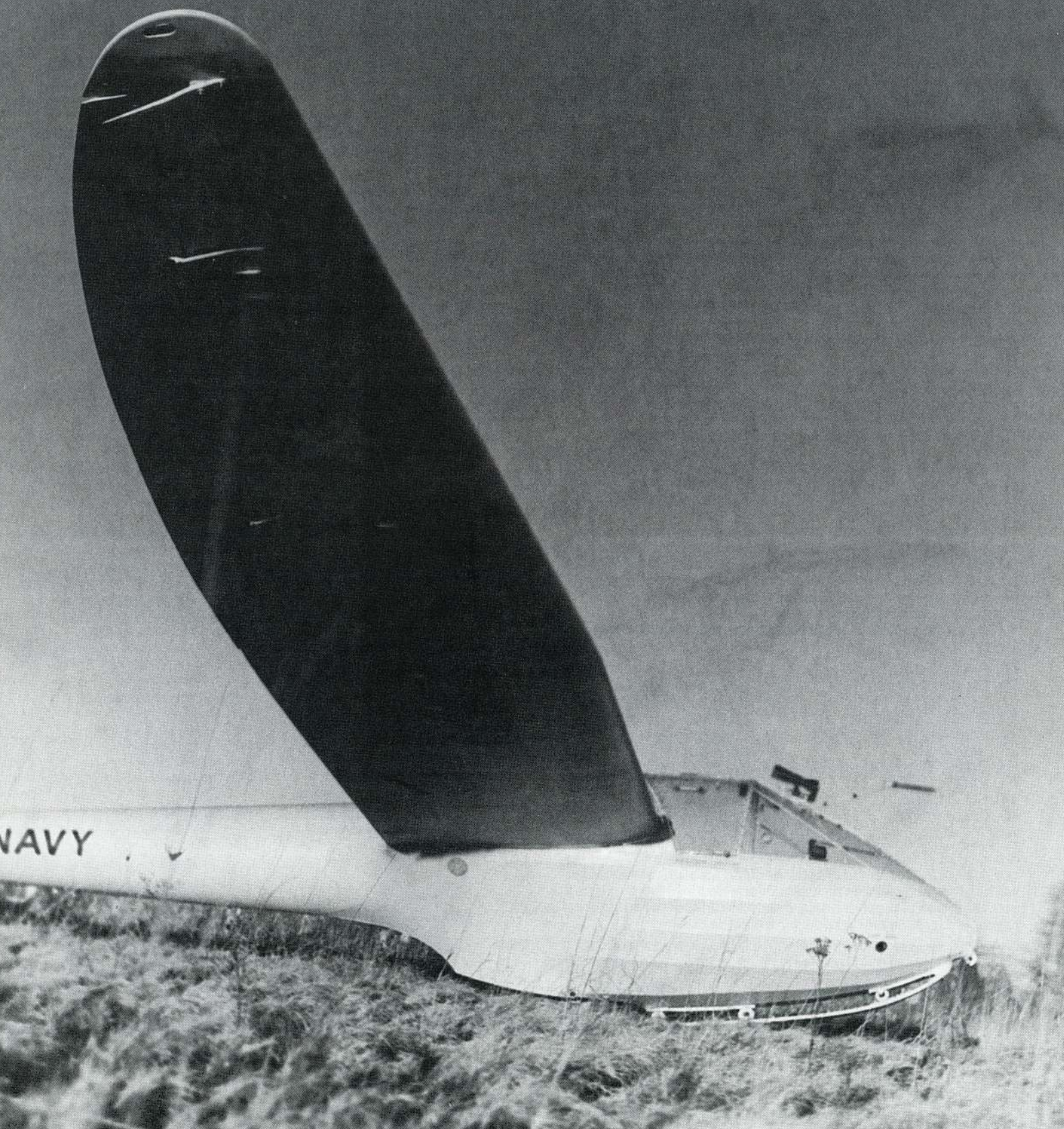
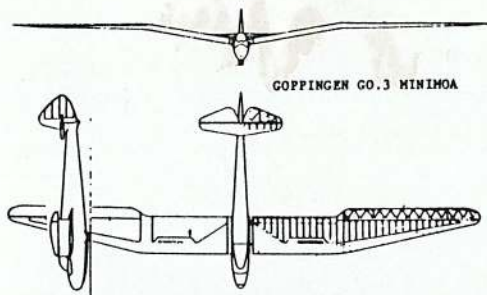


NSM

A Quarterly Journal
of the National Soaring Museum
Summer 1991
Volume 13 Number 4





EOGASE PHASE II

The Need For Scale Models

by Paul A. Schweizer

Phase I of EOGASE was completed when the 14 Evaluators of the most significant and popular foreign sailplanes that have flown in the U.S. completed their task and arrived at the list of 40 foreign sailplanes that will become part of EOGASE, The Evolution Of Gliders And Sailplane Exhibit. The evaluators were: Richard Benbough, Howard Burr, Corky Gill, Stan Hall, Roy McMaster, Rudy Mozer, Irv Prue, John Robinson, Vic Saudek, Paul A. Schweizer, Jan Scott, Charlie Spratt, Karl Striedieck, and Floyd Sweet. The list of these 40 sailplanes appears below.

List of top foreign sailplanes for EOGASE as of 5/22/91

No.	Type	No.	Type
1.	Glasfluegel Libelle H-301	20.	Schleicher ASW-15
2.	Jacobs D.F.S. Weihe	21.	Schleicher ASW-17
3.	Schleicher ASW-12	22.	Horten IV
4.	Schleicher ASW-20	23.	Darmstadt I
5.	Goppingen 3 Minimoa	24.	Diamant 19
6.	Kocjan Orlik II	25.	Schempp-Hirth Janus
7.	Goppingen 1-Wolf	26.	Schleicher ASK-13
8.	Schempp-Hirth Nimbus 1	27.	Slingsby Kirby Kite
9.	Schempp-Hirth Austria Standard	28.	SZD-24C Foka
10.	Schleicher KA-6B	29.	PIK-20
11.	LS-4	30.	Grob Twin
12.	Grunau Baby 11	31.	Glasfluegel 604
13.	Schempp-Hirth Std. Cirrus	32.	Lippisch Prufpling
14.	Schleicher ASW-25	33.	LO-150
15.	Schempp-Hirth Cirrus Open	34.	Zogling
16.	Blanik	35.	Skylark III
17.	Schempp-Hirth Ventus	36.	Glasfluegel Kestrel
18.	Schleicher KA-8	37.	Slingsby Kirby Gull
19.	Jacobs DFS Olympia Meise	38.	Pilatus
		39.	Caproni A-21
		40.	Schleicher ASK-21

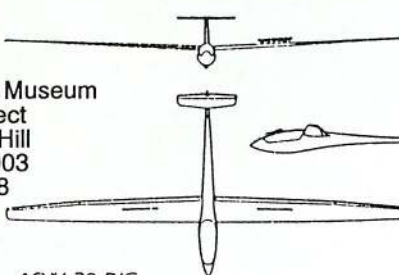
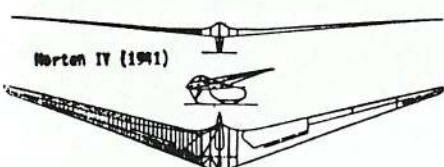
Phase II of the EOGASE project is to get scale models built of each of the 80 U.S. and 40 foreign sailplanes for EOGASE. We have commitments for 60 of the U.S. types and the list of 20 unassigned models appears below.

List of unassigned EOGASE sailplane models as of May 28, 1991

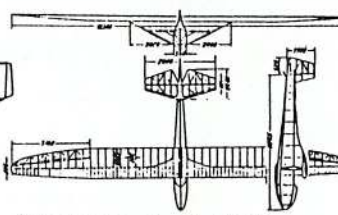
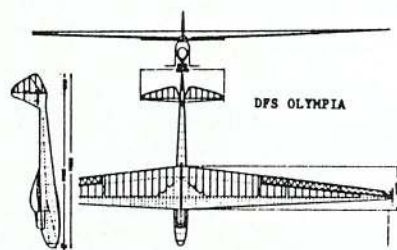
3.	Pratt-Read	53.	Ross R-6
10.	Stanley Nomad	57.	Mead Rhone Ranger
31.	Schreder HP-11	64.	Schreder HP-14
33.	Buxton Transporter	65.	Chanute Herring
34.	Schreder HP-8	66.	Schreder HP-18
36.	Detroit Gull	69.	Allen-Koppen MIT-KIWI
40.	Parker Tiny Mite	74.	Cocke Nighthawk
60.	Parker "T" Bird	77.	Schreder HP-16
44.	Schultz ABC	78.	Schreder HP-10
45.	Waco Primary	80.	Schreder HP-12

This is an update of the previous list dated April 23, 1991. We are in need of scale models of the above U.S. built sailplanes for our special Exhibit at the NSM scheduled for 1992. Recognition will be given on exhibit to model builders. So if you are interested in making one of these models, or know someone who might be interested, please let us know by writing or calling:

The National Soaring Museum
EOGASE Project
R.D. #3 Harris Hill
Elmira, NY 14903
607-734-3128



ASW-20 B/C



Goppingen Go.1 Wolf

Now that the 40 Foreign sailplanes have been determined, and there are still 20 unassigned U.S. models, here is your chance to contribute to this project by building or sponsoring a model for this major exhibit for the National Soaring Museum. Recognition of the model builder or sponsor will appear on the plaque that will describe each model. It is an opportunity for you to become part of this significant exhibit.

As mentioned in the previous article about EOGASE, the NSM wants to maintain an "official" list of all the U.S. and foreign sailplanes, and in this issue we list the foreign sailplanes. We suspect that they are not completely accurate and so we print them so you can send in to the NSM any additions or corrections. This will be an ongoing process so don't hesitate to write the NSM at any time.

List of Foreign Sailplanes Flown in U.S.A. As of 8/90 1928-1970

YEAR	SAILPLANE	YEAR	SAILPLANE
1928	Darmstadt (later rebuilt & called "Chanute")	1939	Slingsby Kirby Kite
1929	Lippisch Prufpling	1939	Huetter 28
1928	Lippisch Professor	1940	Kocjan Orlik II
1929	Zogling	1943	Mueller Moswey III
1930	Hirth Musterle (Laubenthal)	1943	Horten IV
1930	Slingsby T-3 Dagling	1946	Slingsby Kirby Gull
1930	Kassel 25 "Haller Hawk"	1946	Fauvel AV 361
1931	Kassel 20 "Haller Jr. Hawk"	1947	Air 100 (French)
1931	Schloss Mainberg	1947	EON Olympia (Meise)
1932	Grunau Baby II (Schneider Hirth)	1947	Jacobs D.F.S. Weihe
1932	Jacobs Rhoenadler	1951	Scheibe Bergfalke II/55
1934	Scheibe Mu 13D	1952	Jacobs FW Kranich III
1935	Huetter-17 (Huetter)	1952	Schleicher DA-3
1935	Goepingen 3 "Minimoa"	—	Dittmar-Schmetz "Condor IV"
1936	Jacobs DFS Habicht	1953	Scheibe Bergfalke III
1937	Jacobs DFS Sperber-Senior	1955	Neukon Elfe PM-3
1937	Jacobs DFS Sperber	1955	Oberlerchner MG-23SL
1938	Jacobs D.F.S. Weihe	1955	Schleicher "Rhoenlerche"
1938	Komar "Bis"	1956	Slingsby Skylark II
1938	Kranich	1956	Blanik 1-13
1938	Grunau 8 ("36 Elmira/Sanborn & Brown)	1956	Scheibe L-Spatz
1938	Mueller Moswey II (Swiss)	1956	Slingsby T-21
		1956	Slingsby T-31 "Cadet III"
		1956	Slingsby T-38 "Grasshopper"
		1957	Slingsby T-45 "Swallow"

(continued on page 3)

(continued from page 2)

1957	Epler/Naegele/Lindner-Bolkow Phoebus	1964	KK-1e UTU
1957	Vogt LO-150	1964	Sagitta Super-17 (Dutch)
1958	Schleicher KA-6b (CR)	1964	Scheibe SF027A
1958	Breguet 905 Fauvette	1964	Schneider ES-60 "Boomerang"
1958	Mucha Standard (SZD)	1965	Schleicher KA-6E
1959	Slingsby Skylark 3	1965	E-391
1959	Schleicher KA-7	1965	Slingsby DART 15
1959	BKB-1	1965	Schempp-Hirth Austria Standard
1960	Schleicher KA-8	1966	Glasfluegel (Huetter) H-301 15m Libelle
1960	M-100 (3) Italy	1966	SZD-30 Pirat
1960	Fauvel AV-361	1966	M-200
1960	M-100S	1967	Glasfluegel Libelle (H-201 Std. Libelle)
1960	Sagitta (Dutch)	1967	Sleicher ASK-13
1960	Scheibe SF-26/26-A Std.	1967	Schleicher ASK-14
1960	SZD-24 C Foka "Seal"	1967	Eppler, Naegele, Lindner-Bolkow Phoebus B & C
1961	SZD Zefir 2	1967	Schempp-Hirth Austria SHK
1961	PIK-16 Vasama	1967	Gobe R-26S
1961	Slingsby "Capstan" T-49	1968	FK-3
1962	Foka	1968	Slingsby T-53B (2 place)
1962	Glasfluegel BS-1	1968	Neukon Elfe S-3
1963	Slingsby Skylark 4 (T-43)	1968	Slingsby DART 17
1963	Schleicher (KA-6 CR/PE)	1968	Diamant 19 (16 & 18)
1963	Schleicher ASW-12	1968	Schempp-Hirth Open Cirrus
1963	Scheibe Zugvogel IIIA	1969	Glasfluegel Kestrel H-401
1963	Cayla Edelweiss C-30S	1969	Schleicher ASK-17
1964	Schneider EA-59 Arrow	1970	Schempp-Hirth Nimbus I,II

1970	Schempp-Hirth Standard Cirrus, etc.	1977	DG-200 & 202
1970	Glasfluegel club Libelle	1977	Grob Astir CS & CS-77
1970	Glasfluegel 604	1977	Vickers-Slingsby Vega T-65A & D
1970	Caproni A-21S	1978	Centrair Pegase
1971	E-409	1978	Glasfluegel Hornet
1971	Salto H-101	1978	Lark I.S. 29D2
1972	Jantar 1	1979	Grob Astir Std. II
1972	LS-1	1979	Lark I.S.-28 M2
1972	PIK-20	1979	('77)Schleicher ASW-20
1973	Jantar Standard	1980	DG-202/17
1974	DG-100 & 101	1980	Glasfluegel 304
1974	Grob G-102 Standard III	1980	LS-4
1974	Lark I.S.-28 B2	1980	Schleicher ASK-21
1974	Pilatus B-4	1980	Schleicher ASK-22
1974	Schempp-Hirth Janus	1981	Grob G-102 Club IIIb
1974	Schleicher ASW-15B	1981	Lark I.S. -32
1975	Grob Speed Astir	1981	Schempp-Hirth Ventus
1976	Centrair AS-W 20F	1981	DG-400/17
1976	Glasfluegel Mosquito B	1982	DG-300
1976	Grob Twin Astir	1982	Schempp-Hirth Nimbus 3
1976	Grob G-103 Twin II	1982	Schleicher ASW-20 B & C
1976	LS-3	1983	Schleicher ASK-23
1976	PIK-20 D & E	1988	SchleicherASK-24
1976	Schempp-Hirth Mini-Nimbus	1988	('85)Schleicher ASH-25/2-place
1976	('70)Schleicher ASW-17		
1976	('78)Schleicher ASW-19		

We hope that you can assist us with phase II. Write the National Soaring Museum if there is any way that you can help. It will be appreciated.

1991 CALENDAR OF EVENTS

Date	Event	Location
Aug. 24 - 31	SSA Region III Sailplane Championships	Harris Hill/ NSM
Sept. 28	Fall Kite-Citement	Harris Hill Park
Oct. 12	NSM Board of Trustees Meeting	NSM
Oct. 12	18th Annual Ralph S. Barnaby Lecture and Banquet, Shirley Sliwa, lecturer	NSM
Dec. 6	Annual Community Soaring Luncheon	NSM

For further information contact Paul Prunier, Curator of Education

ON THE COVER: PRATT-READ PR-G1⁽¹⁾

Specifications	
Span	54.5 ft.
Area	230 sq. ft.
Aspect ratio	12.9
Airfoil	GS-4, GSM, GS-1
Empty weight	770 lbs.
Payload	380 lbs.

Gross weight	1150 lbs.
Wing loading	5 lbs./sq. ft.
Structure: wood/fabric wings and tail, wood aft fuselage, steel-tube/fabric forward fuselage.	

Performance	
L/D max	26 @ 52 mph
Min. sink	3fps @ 49 mph
6-fps sink @	75 mph

Designers: M. Gluhareff, P. Leonard, J. Buxton, R. Stanley, H. Struck and R.W. Griswold, II.

No. built 75

The Pratt-Read had two distinctions for a WWII training glider — the side-by-side seating and the fact that it was the only training glider designed for the Navy. After the Navy released the PR's, they went to the Army Air Corps which used some for a thunderstorm research project prior to releasing them as surplus.

Later the PR was used in the Mt. Wave & Jet Stream Projects. The list of designers is a "Who's Who" of glider and model airplane greats. Pratt-Read was a piano manufacturer, which some say explains the weight of the ship. It has Schempp-Hirth dive brakes. Since 1952 it has held the multi-place world record for Absolute Altitude (44,255 ft.) and the multi-place national record for Altitude Gain (34,426 ft.), both flown by Larry Edgar. During the early and mid 1950's Betsy Woodward set a number of women's records in this ship.

(1) from SOARING, 1983 Sailplane Directory, Nov. 1983

DOUG JACOBS AND DON MITCHELL INDUCTED INTO THE SOARING HALL OF FAME



United States Soaring Hall of Fame members honor 1990 inductees Doug Jacobs and Don Mitchell. Top row, (L. to R.): William Schweizer, 1984; John Robinson, 1954; Joachim P. Kuettner, 1981; Victor M. Saudek, 1980; Paul A. Schweizer, 1955; Laurence E. Edgar, 1971; Bernard L. Wiggins, 1977; Hal M. Lattimore, 1989; Floyd J. Sweet, 1963; Bernald S. Smith, 1984. Seated (L. to R.): Virginia M. Schweizer, 1971; 1990 inductee Don Mitchell; Robert Fitch for 1990 inductee, Doug Jacobs; Elizabeth (Betsy) Woodward, 1967.

Douglas L. Jacobs of Larchmont, NY, and Donald S. Mitchell of Mariposa, CA, were inducted into the Soaring Society of America's U.S. Soaring Hall of Fame during the 37th annual ceremonies on May 11 at the National Soaring Museum. The pilots, named by the SSA's Board of Directors, were honored at an NSM reception and banquet.

The Hall of Fame was started in 1954 by the Helms Foundation of Los Angeles, CA, when the Foundation determined that soaring was a sport of such national and international stature that a Hall of Fame should be instituted.

With the induction of Jacobs and Mitchell, 86 Hall of Famers have been chosen for "achievements in a noteworthy manner in soaring, or who have made noteworthy contributions to the sport of soaring." In 1975 the SSA's board of directors transferred the Hall of Fame to the NSM. An illuminated walnut panel section adjacent to the NSM lobby lists the names of those selected for this honor.

SSA Region 2 Director, Robert Fitch of Montville, NJ, accepted the award for Jacobs, who was unable to attend. His plane was grounded with a magneto problem as he was about to leave for Elmira.

Fitch commented that since 1958, the Hall of Fame selection has been limited to just two members per year, one for soaring and the other for contributions to soaring. "Jacobs qualifies in both categories," he said.

Since 1930, 84 national soaring champions have been named and only 37 pilots have taken 84 titles. Only 7 have won the title 4 times or more; Jacobs is one of those. The leader is Dick Johnson with 11 (Hall of Fame, 1956) winning his first back in the 50's. Karl Striedieck has 9 (Hall of Fame, 1980) winning his first in the 70's.

Fitch continued: "Jacobs, by comparison is a new boy on the block, winning his first in 1982."

Fitch laughed as he said that Jacobs liked the even numbered years, winning in every even numbered year with the exception

of '86. In the 1985 world competition at Riete, Italy, his rookie year, Jacobs took five out of the first eight days there, winning the 15 meter class by the largest margin in many years. In 1986, he won the first Hitachi Masters of Soaring.

"Jacobs flew 34 days in world soaring competition and won 10 of them...He's a hell of a pilot," Fitch said.

Jacobs also has served as SSA Director-at-large, has arranged for corporate sponsorship of the 1987 and 1989 World Teams, and developed a funding proposal for the 1991 Team. He has written numerous articles for SOARING magazine and won the Joseph C. Lincoln Writing Award.

Excerpts from the SSA informational nomination ballot laud Jacobs as "a dedicated father and family man and a friend to pilots all over the world. He has demonstrated that gliding can be a family sport and that competitive soaring still can be fun." Jacobs, a successful investment banker, has given numerous hours as a guest speaker at club banquets and SSA conventions.

In closing, Fitch said that Jacobs qualifies not only for his soaring achievements alone, but also for his noteworthy contributions to the sport of soaring. "I'll be very happy to accept this award on Doug's behalf," Fitch said.

The second 1990 recipient, Don Mitchell, was introduced by Paul A. Schweizer, co-founder of the Schweizer Aircraft Corporation and SSA Region 3 Director.

Schweizer recalled he and brothers Ernie and Bill met Don Mitchell in 1938 when he was at Harris Hill with Jack O'Meara and the first Baby Albatross. They learned that Mitchell got interested in flight about the same time as they did. "In 1929, he also built a primary glider when we did," Schweizer remarked.

Many years earlier, Schweizer watched the giant British dirigible R-34 arriving over Long Island after completing its transatlantic flight from E. Fortune, Scotland. There 108 hours and 12 minutes earlier, 6-year old Don Mitchell had watched the R-34's departure.

(continued on page 5)



(Left): Robert Fitch spoke at the Hall of Fame banquet on behalf of 1990 Hall of Fame inductee Doug Jacobs, who was unable to attend.



(Right): Hall of Fame banquet speaker and 1990 inductee Don Mitchell reflected on his soaring experiences and on some of the ships he's built through the years.

(continued from page 4)

"So, we have sort of the same roots," Schweizer speculated. Schweizer reviewed many of Mitchell's accomplishments and read a congratulatory telegram to the new inductee from Howard Burr, Glendale, CA, (Hall of Fame, 1987) which concluded, "...this prestigious Award is long overdue." Then, Schweizer turned to the mike over to Don Mitchell, who took banquets back to 1937, when he started with sailplane pioneer William Hawley Bowlus (First Hall of Fame inductee, 1954, d. 1967).

When Mitchell walked into the shop, Bowlus asked him if he was interested in gliding. "I had never seen a glider in my life except that primary that we built in high school, but I answered 'yes' anyhow," Mitchell said. He added that he wanted Bowlus to teach him how to design and build them. Shaking his head, Mitchell continued, "I was 22 and kind of stupid. I didn't think that he could turn me down or tell me to go away. He showed me the Baby (Albatross) and from then on we got along super."

Mitchell said that he was in "seventh heaven" living right in the shop with all those beautiful planes. When they went to license the Baby, a problem developed because Bowlus had a lawsuit against him involving the bankrupt Bowlus Teller Trailer Company. (The evolution of the contemporary Airstream Trailer can be traced back to a Bowlus designed trailer prototype.)

To circumvent the situation, Bowlus licensed the Baby Albatross in Mitchell's name. "So I went from never having seen a sailplane to owning one of the most beautiful and famous sailplanes ever built," he said. They began building sailplane kits for homebuilders.

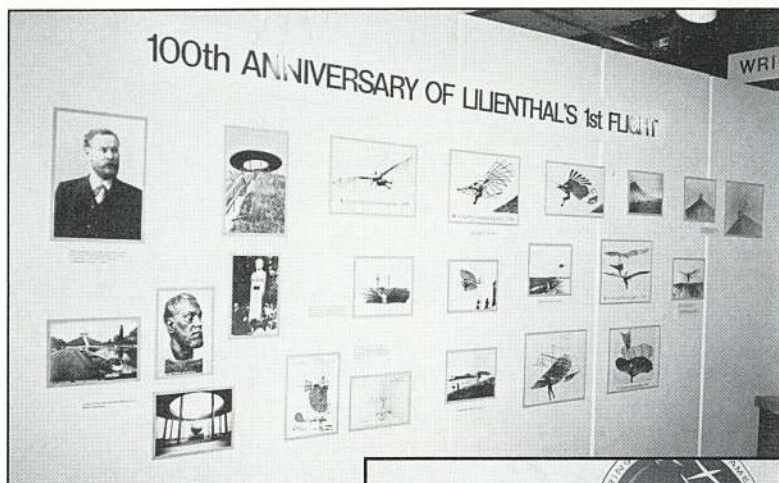
Then they built the Super Baby, which had the same pod, boom and tail as the Baby. The wings were made from the outboard panels of the earlier world record-holding big Albatross. (All three of these Bowlus ships, the Baby Albatross, the Super and the Bowlus-DuPont Albatross are in the NSM's collection).

Mitchell described how Bowlus was persuaded to incorporate by an LA advertising man who knew many of that era's aviation leaders. Donald Douglas (Douglas Aircraft Corp.) was on the board of directors of the new company and Mitchell was elected president. "I was only 23. So, in a year and a half I'd gone from not even knowing what a sailplane looked like, to owning this beautiful Baby Albatross and being president of a company that was building sailplanes," Mitchell said.

Subsequent projects included two-place versions of the Albatross and the powered Bumblebee which had to be renamed Dragonfly, "...because Republic Aviation held copyrights on every kind of bee you could name," Mitchell said.

During WWII, Mitchell worked on the Waco CG-4A and the innovative Bowlus XCG-16 military gliders. In 1948 he went to San Leandro, CA, and joined Ted Nelson (Hall of Fame, 1985) and Harry Perl in building the popular Nelson Hummingbird.

Mitchell said that a lot of people in soaring criticized them at that time for corrupting soaring by putting motors on sailplanes. "Now 43 years later everybody is beating their brains out trying to put motors on fiberglass ships," Mitchell said, "It was the way to go then and I always thought it was the only way to go."



(Above): Part of the 1991 NSM exhibit focus, display marking the 100th Anniversary of Otto Lillenthal's 1st Flight.

(Right): NSM president-elect George Edwards, left, outgoing president John C. Lincoln II, center, with NSM Executive Director Dr. Charles D. Smith at the Hall of Fame banquet and induction observance.



Mitchell began designing and building his own gliders in 1940. His first designs were flying wings, the Model 278 and the Osprey. He also drafted and built four conventional Nimbus sailplanes which competed in national and regional contests and won several design awards.

By 1976 he had developed and produced the Mitchell Wing hang glider, the first rigid wing hang glider with roll, pitch and yaw controls. Following that, he built several powered versions of the Mitchell Wing.

"About 7 years later between kits, plans and finished ships, we had turned out about 2,000, and 90% of the kits were never built!" he said. The main reason was the difficulty in manufacturing a kit that goes together easily. The designer/builder said that people will buy kits, start to put them together, lose interest, throw them aside and the ships never get built.

Mitchell said that he's concerned about expense in soaring and the declining membership, "Maybe it's because of the ships we have. I think fiberglass is a tremendous engineering achievement...but I think that it has priced most people out of the market." He suggested lower performance, cheaper ships that fly slower and that self launch... "ships that people can go out and have fun flying," he emphasized.

The pioneering builder said that's what he's attempting to do with his new ship, the Stealth II, a 2-place flying wing. "A world beater," he declared.

Why the name Stealth II? He smiled conspiratorially as he mentioned an earlier model he call the U-2, hoping that Lockheed would sue him and he'd get lots of free publicity. "I never heard a word from them," he said.

Then, he built the P-38 (a knock-off of the famous Lockheed-built P-38 WWII fighter plane) with the same results. "See?" he baited his audience with a laugh.

Stealth II will be his 34th homebuilt aircraft.

The 76-year old airman thanked the SSA Board for being selected for Hall of Fame membership adding, "I've had a lot of fun. I love airplanes and I love gliders and I love to build things and I'll probably keep building them til the day I die."

(Right): Virginia (Ginny) Schweizer pre-flights the NSM's hands-on, moving sailplane cockpit, remodeled for flight simulation.



NSM WAVE SYMPOSIUM

40th Anniversary of the Mountain Wave Project

The 40th Anniversary of the Mountain Wave Project was marked by a symposium during Hall of Fame weekend May 11 at the National Soaring Museum.

Recalling their trail-blazing explorations into the then little known phenomenon of high altitude lee mountain waves were Moderator Victor M. Saudek, Los Angeles, CA; John Robinson, Rosemead, CA; Elizabeth (Betsy) Woodward, Lyme, CT; Dr. Joachim P. Kuettner, Longmont, CO and Laurence E. (Larry) Edgar, Northridge, CA.

Waves typical of those explored in the Sierra Wave and Jet Stream Projects (from the NSM Multi-Media Collection).

John Robinson, three-time National Soaring Champion, first absolute altitude record holder, one of the first Soaring Hall of Famers and chief pilot of the project, described some of the events that led to the formal wave investigations.

In the late 30's, vague stories about German pilots flying a Moazagoytl sailplane to extremely high altitudes reached the American glider community. On the West coast, recognition of the high, cigar-shaped lenticular cloud caused by windy conditions was virtually the extent of U.S. sailplane pilots' knowledge at that time, according to Robinson.

After the 1940 Nationals, Lewin Barringer and Jay Buxton were invited by the Union Pacific RR to test the soaring potential of Sun Valley, Idaho. Zanonias (RS-1) and a two-place Schweizer SGS 2-8 (later military TG-2) were used. Successful test flights were made in cloudless skies where pilots experienced smooth lift and did not drift downwind from a nearby 9,000-foot mountain. Flying figure-eight patterns, altitude went from 8,000 to 17,500 feet. "To our knowledge, this was the first flight in a recognized wave by sailplanes in the U.S.," Robinson said.

In 1949 Robinson released his Zanonias 6,000 feet above Bishop, CA. In turbulent air he went to cloud base at 12,000 feet, then up to the leading edge of the rotor cloud at 16,000 feet, and finally, in very smooth wave lift to 33,500 feet for a new absolute national and international altitude record.

Bishop and California's Owens Valley were the breeding grounds for records. In 1950 Bill Ivans went to 42,000 feet; Harland Ross set a two-place record at 38,000 feet; later Ray Parker and Robinson went to 42,250 feet. Still later Larry Edgar and Harold Klieforth went to over 44,000 feet, setting a two-place record that still stands. Paul Bikle went to 46,000 feet and recently, Bob Harris streaked to 49,000 feet.

Bob Symons at that time soared a surplus WWII Lockheed P-38 fighter to 35,000 feet over the Owens Valley, climbing 500 to 1,000 feet per minute with both engines idling just to keep them warm! (A P-38H weighs approximately 6.69 tons empty and has

a wing loading of 61.98 lbs. per sq. ft.)

Pilots at 40,000 feet reported seeing lenticulars and ice crystals at an estimated 80,000 feet. "Meteorologists from all over the world became interested in the phenomenon that could lift a plane without an engine to such fantastic heights," Robinson said, adding, "We knew that altimeters can read from 1,000 to 2,000 ft. higher than a plane actually is, when flying on the lee side of a mountain range while a strong wind is blowing over the tops."

He said one of the reasons for conducting the Mountain Wave Project was that several air liners had been lost during storm conditions while flying over high mountains. Strong downdrafts of 4,000-5,000 feet were underestimated by a large margin; add the altimeter error and no amount of throttle will save the ship. "Still," Robinson commented, "the aviation industry and military needed proof."

In 1950 the Mountain Wave Project, Phase I was started, with the USAF Cambridge Research Center as the prime mover, along with UCLA's Meteorology Dept. and the Southern California Soaring Association (SCSA). The first phase of the project was to devise patterns for wave exploration and when possible, to attempt setting new soaring records. The SCSA conducted all flight operations, provided pilots and equipment, including the two specially modified WWII surplus Pratt-Read sailplanes that were used for all the actual wave flying. The late Dr. Wolfgang Klemperer and Victor Saudek handled the SCSA organizational planning.

Sailplane/towplane pilots were John Robinson, Ramon (Ray) H. Parker, and Laurence E. Edgar. Alternates were Robert E. Symons and Allan Langenheim. Pilots, flying observers and photographers were Betsy Woodward and Richard Eldredge. UCLA's meteorologists were Harold Klieforth and Jim Eidinger. Dr. Joachim P. Kuettner was USAF project scientist. Air Force personnel manned the three theodolites triangulated on the

(continued on page 7)



THEN: Dr. Joachim P. Kuettner, (left), Laurence Edgar, (right), in wave flying gear, (U.S. Navy photo).

AND NOW (left to right): Larry Edgar, Betsy Woodward, John Robinson, Victor Saudek and Dr. Joachim Kuettner in front of a section of the NSM's 40th Anniversary - Sierra Wave display.



(continued from page 6)

ground. Because of the sailplanes' mostly wooden construction and minimal steel tubing, radar targeting was very poor.

Robinson described an experience he and Ray Parker had in the clear air turbulence below the wave or the rotor clouds. They were on tow, climbing between 3,000-5,000 feet above the ground. "Suddenly we were slammed up and down very violently and rapidly, registering plus 5 and minus 4 G's acceleration (G-the force of gravity). Although we were strapped down very tightly, our shins hit the instrument panel...and I still have the dents in my shinbone to remind me."

"Clear Air Turbulence was a real shocker, far in excess of anything that I had found in thunderstorms into which I had deliberately been soaring for years," Robinson commented.

Betsy Woodward described her meeting with Karl-Erik Ovgard, a Swedish sailplane pilot visiting the U.S. Ovgard, although not a part of the project, lost his life attempting to set a Swedish altitude record in the wave at Bishop. "I found that I was doing the interpreting for Karl-Erik," Woodward explained, "Americans, if they want to be understood by foreigners, sometimes feel that all they have to do is speak louder...I found that it worked better if you just spoke slowly. So I interpreted loud English into slow English for Karl."

Ovgard, flying solo in one of the Pratt-Reads, had been taking pictures at about 30,000 feet. The last photos taken showed the oxygen gauge at empty. He lost consciousness and came down with the glider, the only fatality associated with the Project.

By 1952, Phase II of the Mountain Wave Project was underway. Flight and support personnel had become a team. The group had begun to appreciate the magnitude of the task they had undertaken in wrenching the secrets from these exquisitely violent and beautiful atmospheric spectacles.

Woodward remembered her woman's international record altitude flight as being a regular project flight. She said that she was instructed "very strongly" not to go above 40,000 feet. But since there was another glider up that went to 42,000 feet, she felt as if a mother hen were there. "I went to 40,200," she said, "which, when calibrated out, came to be something like 6 feet under 40,000."

Project director Dr. Joachim P. Kuettner reminisced on meeting Wolfgang Klemperer, who was with American Intelligence

after WWII. Kuettner was then working in an observatory on the Zugspitze, Germany's highest mountain. Klemperer was investigating German wartime flight testing, especially a completely boundary-layer controlled Dornier aircraft that got fantastic lift coefficients. Kuettner said, "I knew who he was and he apparently knew me. It didn't take long before Klemperer and I forgot about WWII and talked about soaring. He collected some information on our research on wave soaring."

Later Kuettner moved to the U.S., doing research for the Air Force. He and Joe Fletcher, who was director of the AF Cambridge Research Center, met with the Sierra Wave team at Bishop. (Fletcher, a well-known explorer, is presently head of the 'Search for Noah Project'.) "At this meeting were people from UCLA and the chairman, Victor Saudek, whom I had never met before," Kuettner said. "But, it didn't take Fletcher and myself long to see that we were dealing with a superb organizer and engineer, a very solid person. And, although the SCSA is a sport organization, we were in good hands."

The white-maned Kuettner, a born story-teller as well as an eminent scientist, told of a 300-kilometer flight he made 40 years ago in George Deibert's Schweizer TG-3A. He was incoming from Bishop at 20,000 feet over Las Vegas, NV, and identified himself as a glider to the tower, requesting landing instructions. He was told to stand by. After 10 minutes Kuettner told them that he was still awaiting landing instructions and Las Vegas tower asked, "How much fuel have you left?" Kuettner replied, "None." A panicked operator said, "Repeat!" Kuettner said, "I have no fuel left. Then, I heard the voice of an airline captain say, 'He's a glider, dummy'."

Kuettner concentrated on the last phase of the Wave project, three years later in 1955, using a folio of transparencies to illustrate his remarks. This phase was renamed, "The Jet Stream Project", and was done on a much wider scale, using an AF, B-29 and B-47 jet. A highly technical discussion followed, much of which appeared in six successive issues of SOARING. (1)

The Jet Stream Project was to investigate these torrents of upper air, their effect on mountain waves and the further possibility of their impact on disruptive weather downstream.

The speaker reviewed some of the problems faced by the sailplane pilots: frozen spoilers and facemasks at altitudes over 40,000 feet, and violent turbulence where sailplane and crew were subjected to 4,500 feet up per minute and 2,500 feet down the next minute.

Kuettner spoke of enormous horizontal gusts where "the airspeed increased incredibly, while you were trying to hold it down...over 100 miles per hour...And you know, if you get a severe vertical load, your stalling speed goes up as the square root of this load. For example, if you sustain a 10G load, your stall speed goes up three times what it normally is." Twice Kuettner went into a high speed stall, which he said actually saved him, because, "You lose control of the airplane, but you don't fly anymore with this heavy load."

"The Sailplane For Research" was the subject of the next speaker, Vic Saudek, supervisor on both the Wave and Jet Stream Projects. He opened with a discussion of the sailplane and seatbelt restraining devices. Orville Wright's 1911 #5 glider had none. Lt. Benjamin Fulois used a rope to tie himself to a wing strut in the first Wright plane sold to the Army in 1909 and thus invented the seat belt.

The Projects' Pratt-Read WWII surplus Navy training gliders were available, low cost, and flown successfully in the 1946 Sanford, FL, thunderstorm project, Saudek said.

He and Ray Parker were familiar with them and knew their weak spots. Flying in the troposphere's extreme cold was a major consideration. (Troposphere: the atmosphere from the earth's surface to the tropopause, where the stratosphere begins.) Grease in all the bearings had to be replaced and canopies were modified to prevent shattering at low temperatures.

The differential of wood and steel cables called for loosening the cables, "...praying that the control surfaces wouldn't flutter at low altitudes," Saudek worried. He added, "They didn't, mostly because the ailerons and elevators were mass balanced and the air speeds were kept reasonable." Doors were cut down for accessibility and strips of aluminum foil were added for radar return. The Pratt-Reads were flown at about 240 pounds overweight.

A two-place, all-metal Schweizer 2-25 was added for the Jet Stream Project. It was flown single-place with instrumentation in the rear pit.

(continued on page 8)

(continued from page 7)

Saudek pointed out that the idea of a specially designed research sailplane originated in pre-war Germany. There, a four-place glider was developed for that purpose. The Russians modified the idea and built it into a troop carrying glider.

The August 1948 SOARING carried an article by Saudek on what a high altitude, pressure cabin sailplane might look like. "It had a number of features that were finally used in the proposed design that we worked on four or five years later," he said.

In 1951-52, the SCSA, using world-famous aerodynamists and stress analysts came up with such a proposal. The specialized sailplane design featured a 36-to-1 glide ratio and a 120-foot wingspan. The story and specifications appeared in the June 1973 SOARING.

Despite today's hyper-sensitive weather satellites and super-smart computers, Saudek still feels there is a need for pressure cabin stratosailplanes for future meteorological investigations. He said that with electronic sensing the sailplane could radio data directly to a computer which would simultaneously accept information from the tracking network. Software would permit the drawing of wind-flow trajectories and patterns, printing and binding the information quickly enough so that total results could be provided to the research pilot at landing time.

Saudek pointed out that meteorology had been a very minor activity in the soaring movement and probably never more than a footnote in aviation. "Soaring research has accomplished much. It does not have the glamour of the bigger sciences. But if we find some key facts of nature, there will be some payoff..."

The next speaker, Larry Edgar, brought along pictures and artifacts of the Wave Projects. He also explained the intricacies of the pressure and demand oxygen system that was used at 43,000-foot levels and the difficulty communicating because of mouth dryness.

He summarized his world two-place altitude record flight with UCLA meteorologist Harold Klieforth. As they passed 38,000 feet, the temperature went off the Centigrade scale at minus 78 degrees. As they went higher it began to warm to about minus 68 degrees. "We got up to 40,000 feet and were still climbing at about 1,000 feet a minute and I was ready to knock it off," Edgar said. "But Klieforth wanted to ride it out. So, up we went."

About this time Edgar began to suffer bends in his knee. At that altitude the body gases expand almost 7 1/2 times resulting in pain in the joints. Edgar said, "Ok, 44,000, and when we get there, that's it!" Edgar laughed, "So that's how we happened to get the altitude record; no intention at the time. We really didn't think too much about it."

He gave a slide presentation, commenting, "We were antiques by today's standards, when you consider the glass ships and communication methods in current use."

He showed slides of typical waves, pointing out the cap, the roll and the lenticular at the top.

Later he moved to a discussion of the disintegration of his Pratt-Read after hitting severe roll cloud turbulence. Descending from 39,400 feet, he was at 17,000 feet, six miles south of Bishop, CA, and had planned to drop down through tiny tufts ahead of a roller cloud. Then it happened: a shearing wind shock so violent that he started to black out. Next, an explosion as the ship began to break up; and suddenly, quiet, except for the sound of the wind whistling by.

"Something was holding both my feet: the rudder straps!...I couldn't see; everything was black," Edgar said. He fumbled across his chest for the rip cord and the chute pulled him free minus helmet, goggles, gloves, boots and oxygen mask.



(Left): SCR-584 radar, (U.S. Navy photo).

(Right): Mitchell cine-theodolite mounted on camera post, (U.S. Navy photo).



Sierra Wave Pratt-Read sailplane parked on Manzanar, CA airstrip, (U.S. Navy photo).

Vision in his right eye returned. Turning and swinging under the chute, he was suddenly jerked upward by a vicious gust. Tugging the shrouds furiously, he came out just below the roll cloud.

"It was a massive, dark, boiling thing. For the first time free of the cloud, I realized my left hand, arm and shoulder were useless. I could see parts of the Pratt-Read being carried upwards past me; pieces of fabric and plywood were disappearing in the roll cloud," he said.

Slowly sight returned to his left eye as he drifted over the valley. Approaching the ground, Edgar drifted backwards at about 25 miles per hour. His descent under the roll cloud was tracked by the Project's BT towplane. "I was stunned by the landing and do not remember being dragged on my face through the gravel," he said. Arriving in minutes after Edgar's ground-abrading encounter, Kuettner, Klieforth and Woodward took him to the hospital and to a long recovery.

"I'll tell you what," Edgar grinned, "I'm very happy to be here today."

Dr. Joachim Kuettner closed the program with a talk on the Global Atmospheric Research Project (GARP) for which he was a project director. GARP was an international effort to investigate the world's atmosphere and the mechanics of its interaction with sea, land and mountains. Due to space limitations this phase of the Symposium will be covered in a later NMS Quarterly.

- (1) The exploration of the jetstream by sailplanes, My-Je '55, p. 11
 - Jet Stream Project, S-O '55, p. 22
 - Jet Stream Project - II, N-D '55, p. 2
 - Jet Stream Project - III, Ja-F '56, p. 2
 - Jet Stream Project - IV, Mr-Ap '56, p. 2
 - On the possibility of soaring on traveling waves in the jetstream, My-Je '52, p. 2

ISSN # 0892-0516

NSM is a publication of the National Soaring Museum, Harris Hill, R.D. 3, Elmira, New York 14903. Phone (607) 734-3128. 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 NSM. Material that is to be returned must be accompanied by a stamped, self addressed envelope. No compensation other than credit will be given.

Publisher — National Soaring Museum
Executive Director — Charles D. Smith Ph.D.
Editor — Bill Gallagher

The National Soaring Museum is an affiliate of The Soaring Society of America and, as such, is the official repository for all its artifacts and memorabilia.