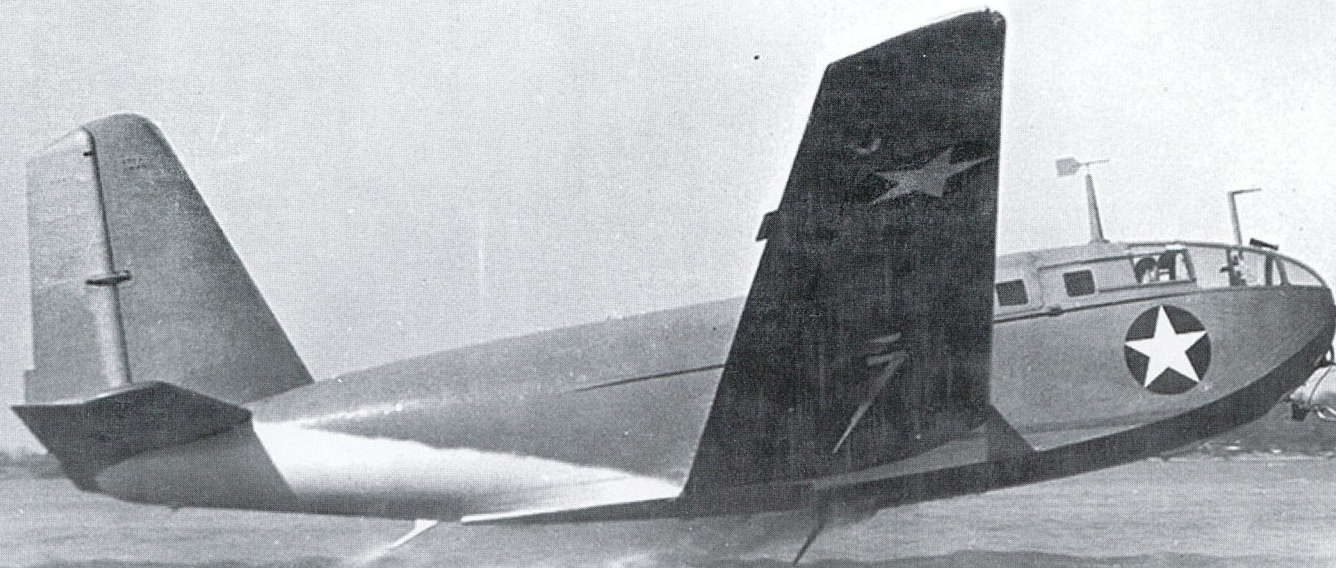
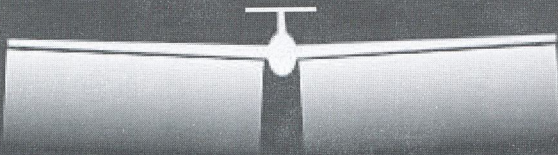


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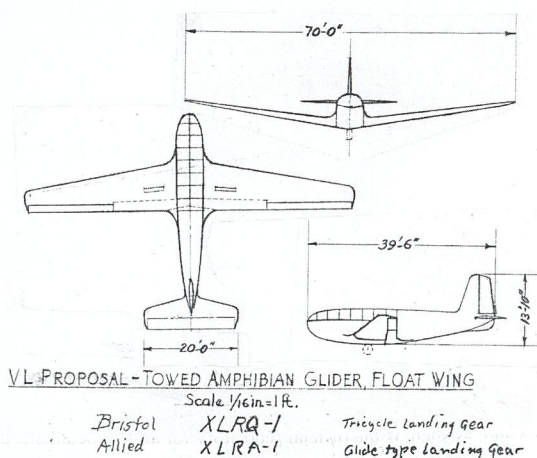
National Soaring Museum



The U.S. Navy's WWII Floatwing Assault Gliders

Military planners were stunned by the May 20, 1941, World War II German lightning glider and paratroop invasion and conquest of the British held Mediterranean island of Crete (Operation Merkur). Historically, never before had a position held by superior naval and land forces been overcome by an invasion army transported, supported, and supplied by air. The dramatic use of German gliders in Crete, and previously in 1940 at the Belgian fortress of Eben Emael, firmly established the transport glider as a martial weapon. Both in and out of military circles, it was generally agreed that gliders had a definite military value for the transportation of troops in time of war (1). Almost a year previous to the action on Crete, amid reports of transport glider development in Germany and England, the Navy began to show interest in designs for the development of a transport glider program.

Two weeks after the German gliders descended on Crete, Maj. Gen. T. Holcomb, Commandant of the U.S. Marine Corps, advised the Navy Bureau of Aeronautics that the technique of employing gliders for landing Marines was thought to be limited, "due to distances involved between bases in probable theaters of operation." However, he said, "the use of 'aquaplane' type gliders appears to have definite possibilities." General Holcomb recommended that consideration be given to development of that type. He added that a sufficient number would be required eventually to provide for the transport of one infantry



A three-view of the Allied and Bristol floatwing gliders.



A 1946 photo of Capt. Ralph S. Barnaby with a desk top model of the Allied XLRA-1 floatwing glider. This model is currently on display at the NSM.

battalion, with supplies.

Captain Marc A. Mitscher, then Assistant Chief of the Naval Bureau of Aeronautics, verbally directed that steps be taken to develop the construction of two different personnel and materiel gliders that could land on water (2). One of the proposed gliders was to carry 12 passengers, and the other, a twin-hulled model, was to accommodate 24. Because of the critical situation with respect to aircraft metals and aircraft manufacturers, it was decided that the gliders should be made from wood or plastics, procured from concerns not already committed to building fighters and other accepted military aircraft types as part of the rapidly expanding defense program (3).

Pursuant to Mitscher's directive, on April 30, 1941, Capt. D.S. Fahrnay sent a letter to the Naval Aircraft Factory, Philadelphia, requesting that, "a study be made for a glider capable of carrying 12 men at 250 pounds per man, and submit cost estimates of preparing the design and construction of two prototypes. "Capt. Fahrnay's decision to ask the N.A.F. to handle the study rather than the Engineering



Naval Aircraft Factory float-testing tank model for the new amphibian glider concept.

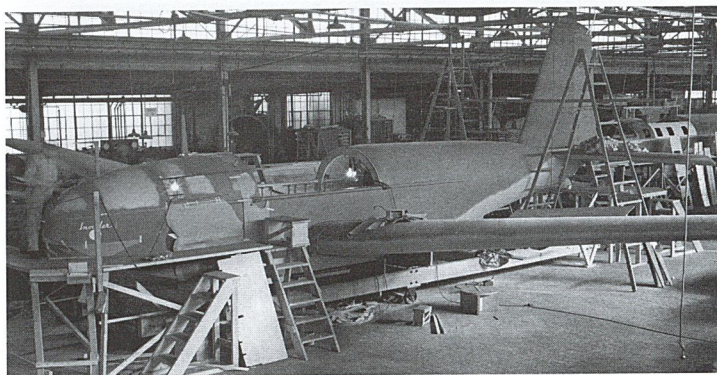
Branch of the Navy's Bureau of Aeronautics rested in part on Cmdr. Ralph S. Barnaby's being at the Factory. He had 32 years experience flying sailplanes and gliders, was president of the Soaring Society of America, and had expressed an interest in developing a transport glider for the Navy. He was expected to take charge of the project at the Naval Aircraft Factory." During a 1986 National Soaring Museum oral history session, then Capt. Barnaby USN Ret., chuckled, saying that in 1941, he was the nearest thing to a glider expert that the Navy had.

At this point, according to a report prepared by Maj. Gen. O.F. Echols, U.S.A.A.F., the Army Glider Program (design and procurement studies of 2-place, 8-place, and 15-place prototypes) had not advanced much further than that of the Navy (4).

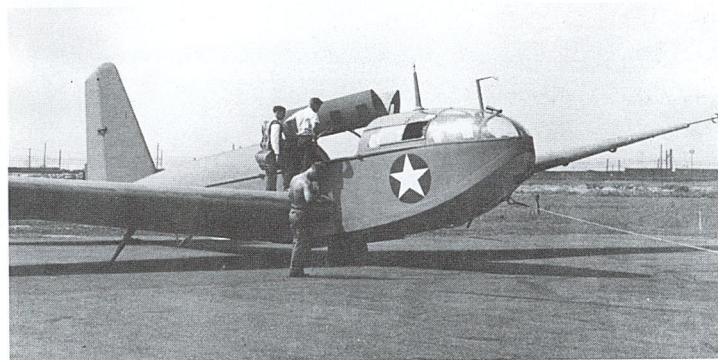
It is important to note that according to Lt. Cmdr. Brown's Study of the Navy's Transport Program, "the examined files do not contain any express statement as to the divisions of the Navy that were expected to use a transport glider, or the theaters of operation in which they were expected to be useful. Presumably the primary purpose was to have a prototype transport glider ready if needed." Conferences with high level Navy and Marine Corps officers "are good evidence that they (the designs) were drawn primarily with the Marine Corps in mind."

The initial letter sent to the Naval Aircraft Factory specified a 12-place land glider with a removable undercarriage and a watertight cabin. The N.A.F. requested permission to develop a truly amphibious glider, one that could tow off and land on both the water and the ground.

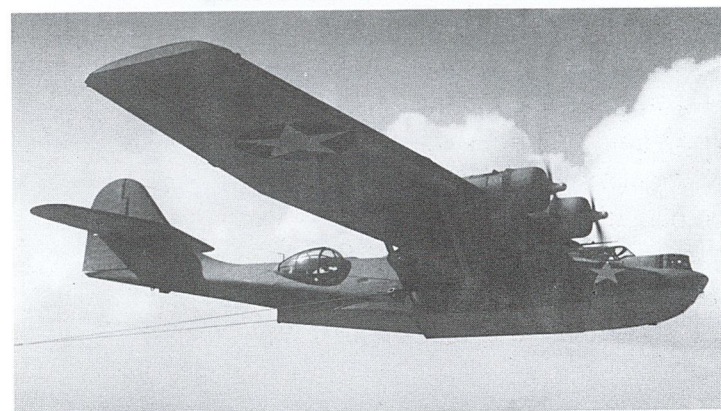
The following comments are from the late Capt. Barnaby's notes regarding that project (5). Barnaby (then Lt. Cmdr.) was Assistant Chief Engineer and later Chief Engineer at the Naval Aircraft Factory. He supervised and advised the Factory's engineers in the



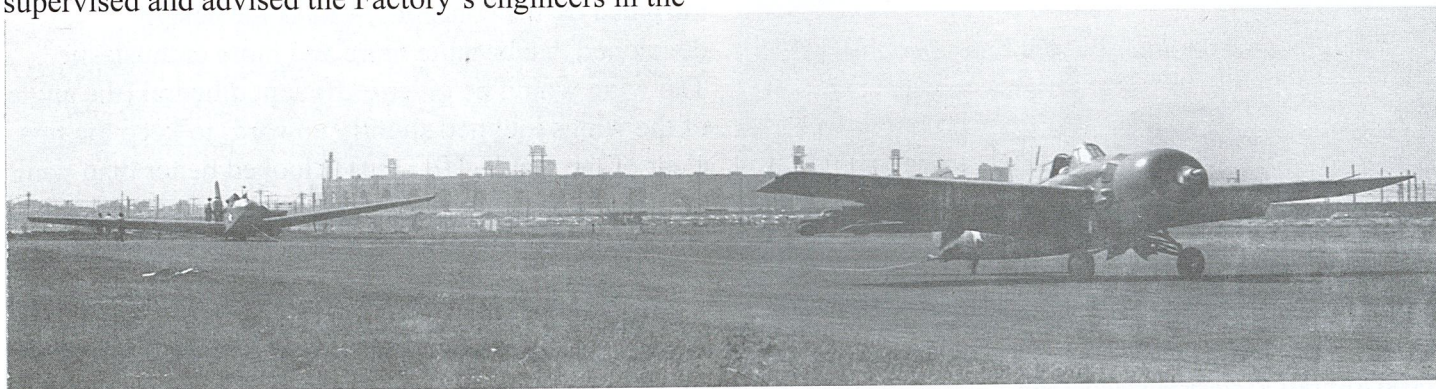
Allied XLRA-1 "Invader" floatwing glider under construction.



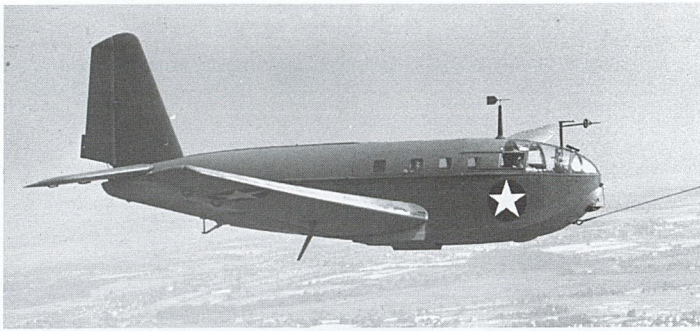
Allied XLRA-1 being pre-flighted for ground launch, Naval Aircraft Factory 1943. Note center-mounted, dual wheels, retractable landing gear, and mid-wing skids.



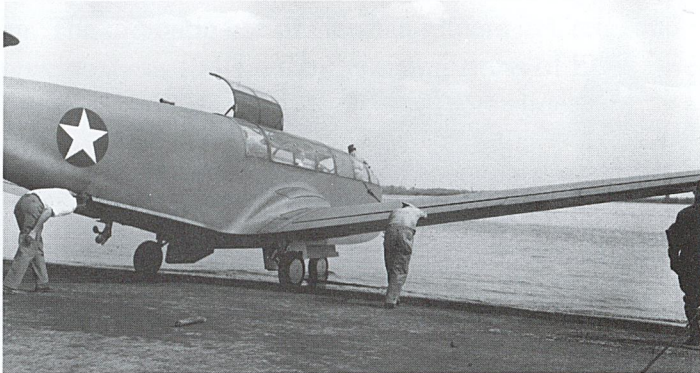
PBV-5A. Catalina flying boat, "Tugboat Annie" in flight, showing bridle glider tow arrangement.



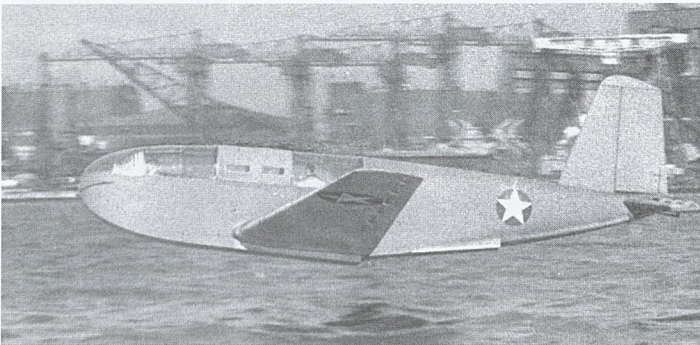
View of a Grumman F4F-3 tow plane, and the Allied XLRA-1 floatwing amphibian glider just prior to initial land take off.



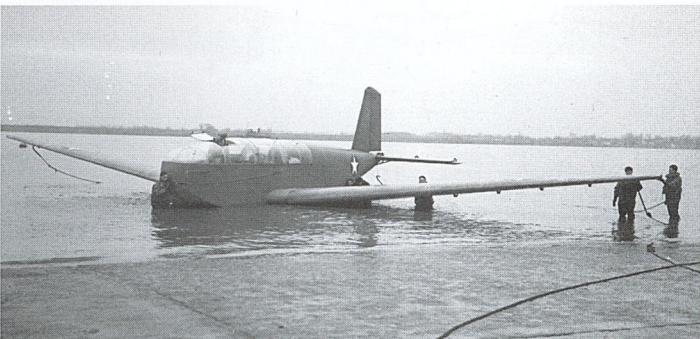
Allied XLRA-1 amphibian floatwing glider on tow over the Philadelphia area, with main landing wheels retracted, but doors not quite closed, 1943.



Bristol XLRQ-1 floatwing glider being readied for water launch in the Delaware River. Note tricycle landing gear and outboard motor for waterborne maneuvering.



Bristol XLRQ-1 being aero-towed off on the Delaware River, alongside the Philadelphia Navy Yard, 1943.



Bristol XLRQ-1, showing pronounced wing dihedral, at the Naval Aircraft Factory launching slip.

design/drafting group. His orders were to develop design specifications for an amphibious troop and cargo glider to carry two pilots with 10 passengers, or one engine as cargo. "The engine load was included because at that time the Navy had no aircraft capable of taking an engine of that size aboard for transportation, Barnaby said. In that capacity, he studied and critiqued several preliminary sketches that the group dreamed up.

Barnaby wrote that the group turned out a number of three-view drawings. Most of the designs submitted were of more-or-less conventional high-wing flying boat configurations "with the inevitable and indispensable excrescences—wing tip floats. Some like the Navy's Catalina PBY flying boat had floats that were designed to swing out and up to become blobs on the wing tips. Some floats were to stick up against the bottom surface of the wing. One design dodged the concept entirely, by using a catamaran, twin hull configuration; all of which left me cold," the Chief Engineer commented.

"A later design that appealed to me a little more was a conventional-looking hull with a high wing configuration, but with Dornier-type stub wings, or sponsons, for lateral stability on the water." Dornier designed sponsons for his Dolphin series, and for the monster, transatlantic Do-X.(5). Earlier Edson F. Gallaudet utilized the sponson concept in his 1913 Bullet Hydro Model. (6) American transoceanic Boeing B-314 and Martin M-130, 'Clipper' class flying boats of the mid 30s and 40s also utilized sponsons.

As Barnaby's brainstormers studied and sketched, an idea slowly emerged: Why not do away with the high wing altogether, and extend the sponsons laterally to become the main wing? Barnaby said that he thought it was his idea "but the other two or three in the group thought it was theirs; it really didn't matter." All were intrigued by the concept. "And as the design developed, we became more and more enthusiastic." The wing would be given sufficient dihedral (the angle of the wings inclined slightly upward) to keep the tips clear of the water. "To me that looked better than wing tip floats. Certainly it was simpler than floats; plus it eliminated the necessity of a float retracting gear, for which gliders would have no power to operate." He said that maybe the layout was not all that could be desired, but to him and his engineers, it seemed the nearest practical solution to what was required. "The

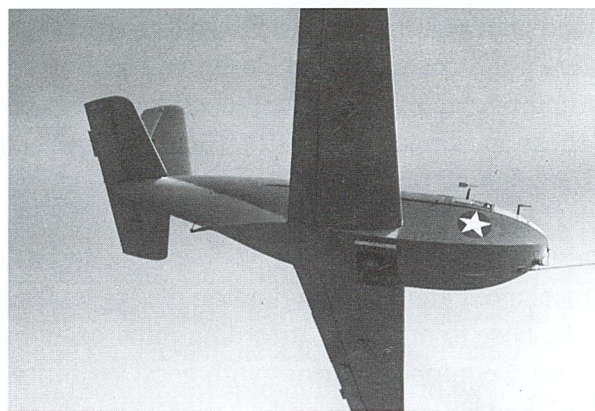
next day there was a three-view of the new aquaglider concept awaiting me. It became our proposed configuration. We called it the "floatwing."

It had very clean lines for a seaplane. The floatwing had none of the wingtip float blobs and few of the other, typical drag-inducing externals. Barnaby said that it looked a little like a Douglas DC-3, which was the most successful commercial airliner of that period. (The C-47 was its military version). The floatwing had no engine nacelles but it did have a slightly increased dihedral to its wings and a conventional V-shaped bottom to form the fuselage.

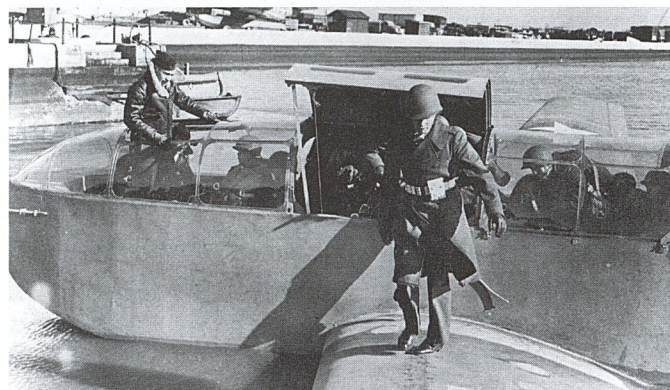
The next big question was its water-handling characteristics. They decided to build a flyable scale model. From a friend at the Philadelphia's Franklin Institute, they got the name of Paul Karnow, a young model builder. "He turned out a beautiful job, a 52-inch span, which we ballasted for draft and cg.(center of gravity) location," Barnaby noted.

The model was taken to the N.A.F. Building II float-testing tank. Trim was corrected, and a series of tow tests were made, the length of the tank. Barnaby said that the configuration seemed to run clean, rise on the step easily, and show indications of a satisfactory performance.

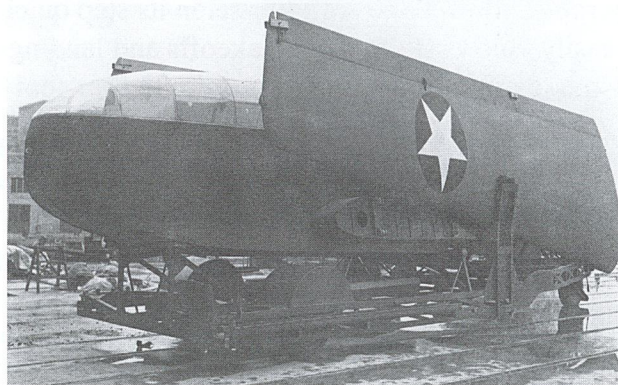
The Floatwing was a new and controversial concept. At that time there was a prevalent feeling in Congress and the Navy Department that gliders were a relatively simple item to build, and arranging for their manufacture should not be a problem. This and later experiences showed this not to be the case. Wind tunnel tests were inconclusive, and it was necessary to build prototypes for actual testing and training. It was directed that aircraft firms that were currently engaged in high priority defense projects not bid, which cut down the list of prospective manufacturers. The Naval Aircraft Factory negotiated contracts with two companies to build a fleet of 12-man gliders to N.A.F. specifications in October 1942. They were the Bristol Aeronautical Corporation of New Haven CT, whose ship was designated XLRQ-1 (X-experimental, L-glider, R-transport. Q-Bristol Aeronautical Corporation), and the Allied Aviation Corporation of Baltimore, MD, to build the XLRA-1 (A- for Allied Aviation Corporation.) (7). Static tests and limited flight tests started in January 1943, with the first test model being delivered the following May. The single-engine J2F5 Grumman (OA-12 Duck), the Grumman



Allied XLRA-1 on tow, showing wing and empennage plan-forms



Twelve fully equipped Marines debarking after the first trial of a fully loaded Bristol XLRQ-1, at the Philadelphia Navy Yard, 1943.



Bristol XLRQ-1 floatwing glider, de-rigged and mounted on a trailer.

F4F-5 (Wildcat) , and the twin engine Consolidated PBV-5A ('Tugboat Annie') acted as tow planes.

The XLRQ-1, and XLRA-1 (named the Invader) were similar: both of wood construction, with a thick impregnated plywood fuselage and wing skin to act as the main floatation. The Allied Aircraft and Bristol Aeronautics impregnated plywood process for aircraft was an advancement of a process began in 1928, when it was used in the production of the Lockheed Vega fuselage (8). Not only was the plastically molded

plywood water and insect proof, but the bond between the plies was stronger than the original wood itself, and when fabricated it was hard enough to absorb the high shear and impact loads (9). The floatwing had a two-step planing hull, spoilers, and wing tip skids. The "Q" had a span of 70.5 feet, and a 43 1/2 inch fuselage, while the "A" had a 72-foot span and a 40-foot fuselage. Paneled plexiglass on the 'Q' extended from the nose to mid-ship, affording pilot, co-pilot and the 10 fully equipped marines with good visibility. The "A" had a plexi nose and a series of windows aft. Both had provision for a 32-horsepower outboard motor for water maneuverability (one archive photo of the "Q" shows the outboard mounted and operational). The "Q" had a tricycle landing gear, while the "A" had center-mounted, glider-type dual wheels; both ships' landing gears were manually retracted, and both ships had wing tip skids.

Lt. Cmdr. Barnaby noted that the absence of wing tip floats resulted in a very "clean" low-drag seaplane, that compared favorably with a conventional land plane. Its water stability and handling qualities were excellent. At rest under a normal load, the wing tips were five feet clear of the water. With a man standing out on the wing tip, the clearance was still three feet. The additional water planing surface given by the wing roots, allowed the craft to rise on its step quickly and easily. Successfully towed takeoffs and landings were made in water ranging from calm to four-foot seas. "I personally made these flights," the Navy's expert said, adding that "there is no doubt that from the point of view of access and egress, the general comfort and roominess, plus handling of lines and mooring, are much simpler from a flying boat type." At the conclusion of a December 5, 1943, flight, test pilot, Robert V. Reilly Lt. U.S.M.C. reported "...The glider(XLRQ-1) is very well designed, has good water and flying characteristics. The few small difficulties encountered, I believe can be ironed out by more familiarization, a larger tow plane, and keeping the towline out of the water."

The Marine Corps was never basically satisfied with the low wing concept because it was suspected that this arrangement would not allow paratroops to be discharged quickly. Also, the successful development of amphibious warfare in the South Pacific Theatre provided all the assault capability needed by the Marine Corps.

Both companies were plagued with weak financial

positions; additionally, there were critical production interruptions due to unfamiliarity with this type of aviation work. In April 1943, it was recommended that the Marine Corps glider program be terminated. All of these and other Navy amphibious glider contracts and proposals, with the exception of the top secret "Glomb" glider/bomb experiments, were cancelled. The few 12-place gliders that had been delivered by June, 1943, the date that the Marine Corps commandant ordered the program's termination' were turned over to the U.S.Army Air Force(10).

"No evidence has been found that the Germans had developed anything as advanced as the type of glider contemplated by the Navy's request; that is, a glider which would both take off and land on water, and which would be suitable for both land and water operations," appeared in a footnote on page 13 of the History of the Navy's Transport Glider Program 1941-1943.

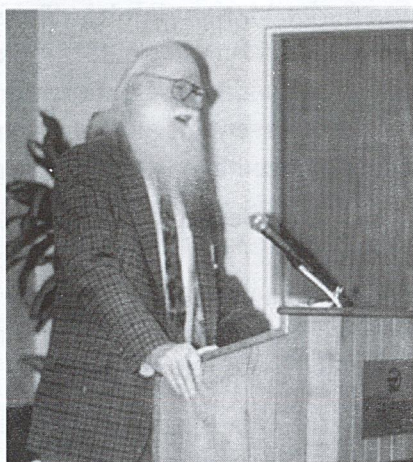
As far as is known, no other full scale amphibian assault or transport gliders were ever built by either the American, British or Axis powers during W.W.II.

- 1) Monographs of Naval Aviation. "The Navy's Transport Glider Program, 1941-1943" Naval History Unit Op-519B, by Lt. Cdr. Vance Brown, U.S.N.R.
- 2) Mitscher later became a Vice Admiral leading the Navy's famed Task Force 58 during the Pacific island-hopping campaign.
- 3) Ibid 1
- 4) Ibid 1
- 5) "The Floatwing- A New Concept In Seaplane Design", notes by Capt. Ralph S. Barnaby
- 6) Prof. Dr. Cladius Dornier was a gifted German designer and a pioneer of metal construction for land aircraft, and flying boats. "He became one of the most important components of the aircraft industry in wartime Germany," William Green wrote in 'Warplanes of the Third Reich.'
- 7) W.W. I Aero, Journal of The Early Aeroplane, #181- August 2003. Gallaudet referred to them as wave guards.
- 8) 'Sea Going Gliders, An Experiment In Failure', by Edward Owens - December 1973, Air Classics.
- 9) Aero Digest January, 1942
- 10) 'Silent Wings' by Gerard M. Devlin, Growing Pains, p. 71
- 11) Ibid. 1

On The Cover:

From a 1943 press release:

First picture of America's newest invasion weapon, the XLRA-1, an amphibian transport glider produced of molded plywood and other non-strategic materials, for the U.S. Navy by the Allied Aviation Company of Baltimore and Winston-Salem.



“People, Planes, and How to Profit from Volunteering”

Bernald S. Smith Delivers the 2003 Ralph S. Barnaby Lecture

Bernald S. Smith retraced a half a century in flight, volunteering, and the people he met along the way, as he delivered the 32nd Annual Ralph S. Barnaby Lecture. He was introduced by National Soaring Museum President, Robert Gaines on September 13 at the Dallas TX Radisson Hotel.

These lectures are named for and sponsored by the late Capt. Ralph S. Barnaby, USN, and presented by the NSM. Barnaby was a pioneering naval aviator, author, sculptor, and musician. He held the first American glider pilot's certificate, signed August 18, 1929, by his friend Orville Wright. Designing, building and flying a hang glider type in 1909 qualified the 16 year-old Barnaby as a member of the “Early birds,” American pilots who flew before 1916.

Emcee Gaines commended, “The main lady making it all possible was Janice Armstrong, who has been handling the Barnaby Lectures for some time.” Gaines looked toward Bernald Smith, and jokingly said, “We have to accept Bernald, flowing beard and all.” He explained: “Bernald, you must know, was a graduate of UC Berkeley. He missed the 60s, so he's trying to make up for it. Up to his retirement he lived with rules: his mother's, the Navy's, United Airlines'. But on retirement, no rules, just let it grow. So now he is known as Papa Noel-Santa Claus throughout all Europe.”

Gaines quoted famous French author and pilot, Antoine de Saint-Exupery, “I'm happy among my French and American comrades. In my first mission in a P-38 Lightning (Lockheed) they discovered my

age—43. What a scandal; your American rules are inhuman. At 43 years of age, one does not fly a fast plane like the Lightning.... Long white beards get tangled in the controls!”

More seriously, Gaines said that Bernald has been with the Soaring Society of America a long time: “on the board, president, the Sailplane Development Panel, the I.G.C. (International Gliding Committee) and I could go on and on. He's done a lot of important things.” He said that there are people in this world who are takers, and there are people who are givers. “Bernald Smith is a giver, and a true ambassador for us.”

Lanky, bearded Bernald S. Smith, looking more like a three-piece suited, biblical sage out of Genesis than a guy who's been flying 55 years; has flown not only gliders, but almost everything with two or more means of propulsion that the Navy, and United Airlines, had. The retired United Airlines Captain and Navy Commander with 35,000 hours worth of flying moved to the rostrum and said that his talk was going to be extemporaneous. “I'm going to wander around, wave my hands, and be speaking about planes, the spoils of volunteering, and the people I've met and talked to”

**Smith flew the
venerable
Grumman J2F-
1 “Duck” off
the largest
aircraft carrier
in the world,
Johnston
Island in the
Pacific.**



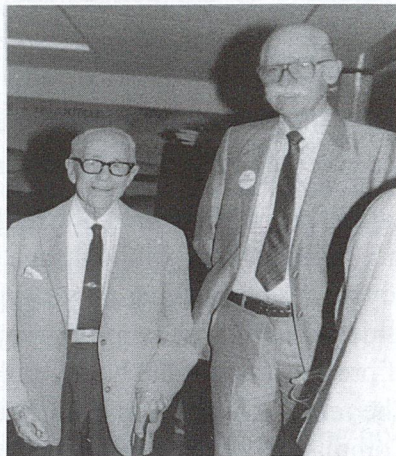
He “soloed” back in the 30s by attaching boards, flapping his arms, and running for greater distance. He used his mother's umbrella to slow his descent. “But then I inverted her umbrella, and that was the end of that.”

Smith mentioned flying the Navy's venerable and memorable Grumman two-place, J2F-1 amphibian “Duck” off the largest aircraft carrier in the world, Johnson Island in the Pacific. Venerable because the ship was designed and first built in the early 30s, and memorable because it required 46 hand -cranks to raise the landing gear. “I took a whole bunch of guys up once, and on landing was told that I shouldn't do that because they didn't have seat belts. What did I know...I was an ensign.”

Smith has logged 35, 000 flying hours. “I know that's hard to believe, because some of it was in this

kind of stuff where we didn't have an auto pilot and in other kinds of equipment. And yes, flying long periods of time, sometimes we were in a bunk." He mentioned that on flight from Bradley Field CT, to New Delhi, India and back, he was in the airplane 107 hours in a 168-hour week. "We spent one night in a hotel, the whole time."

Bernald Smith (r) with Ralph S. Barnaby at the National Soaring Museum. Smith said, "Capt. Barnaby was the second president of the SSA, and I had the pleasure of serving with him on the Museum's Board of Trustees. He was a great raconteur. Some of his stories have passed into soaring legend."



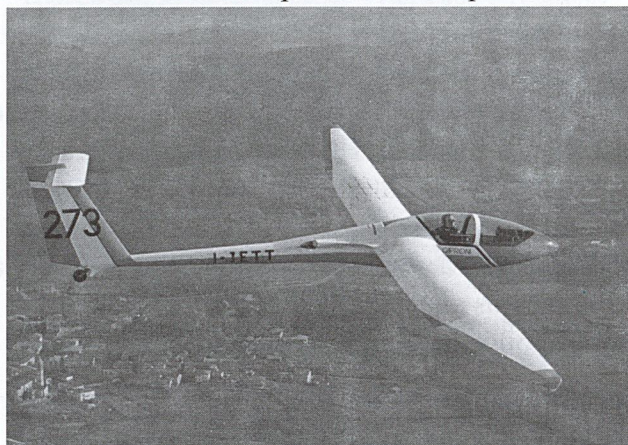
Smith said that he did a lot of the test flying of the unique Caproni jet-powered sailplane. "The noisiest plane in the world, it was not a centrifugal-flow engine, it was an axial-flow jet engine. The Caproni side-by-side two-place "was a lot of fun to fly and was pretty good at staying up." He spent 15 years volunteering to test and play around with the single jet Caproni, and twin-jet C 22-J trainer. He showed the Caproni at Transpo '72, to the air shows in Paris and Farnborough (GB) and said that it was interesting to see people that you meet in places like that. Bernald laughed as he said once at the Paris Air Show he met and talked with the future president of Egypt, Hosni Mubarak. "How did that happen? He probably doesn't remember me, but I remember him. He was Secretary of Defense at that time, and we talked about setting up a production operation in Egypt." Smith explained that the people at the Italian Caproni organization wanted Smith to speak with him because they thought his English was better than theirs. When later he learned that this gentleman became president, Smith thought, "Well, what do I want to get from Egypt that I could ask the president for?" Bernald Smith said that A.J. Smith (no relation) and a lot of other people found flying the Caproni jet glider an interesting experience."

He mentioned Marion Griffith, the first pilot in the US noted to fly the supersonic Concord. Smith said, "I

always wondered why Marion didn't call me up and invite me to fly it. Chuckling he said, "I took him up in the Caproni. It seems like turnabout is fair play." He added, "the first convention of the Soaring Society of America was organized by Griffith."

As the lecture unfolded Bernald interjected vignettes of many friends and other memorable people in and outside of the national and international soaring community with whom he has been associated throughout his flying years.

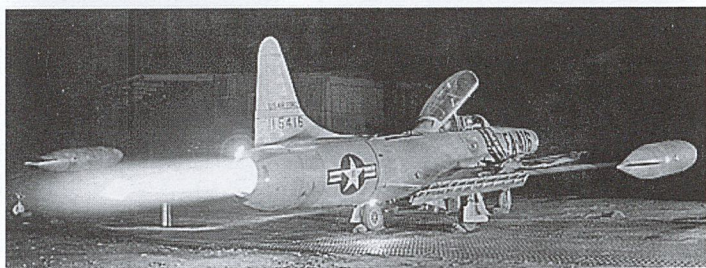
He showed photos of some of the aircraft that had some significance in his aviation career; all the ships in the United Airlines inventory, the Navy's Stearman N2S, PBY, PB4Y-2, and a few more land and amphibian Navy types. "I love to land on water," he said. "Every landing is good, or better be good or the water will come back right through you!" He slid a shot on the projector of his first glider, the LNE-1. "Ralph Barnaby was responsible for the Navy getting that thing. I think Jan Scott (former president of the Vintage Sailplane Association and the NSM) still has one. Those of us who fly the big side-by-side LNE-1 know how difficult a ship it is to take apart.



Caproni A-21SJ Jet Motorglider - "The noisiest plane in the world. It was a lot of fun to fly, and was pretty good at staying up." Bernald Smith

After theatrically scanning the room to be sure that there were no FAA reps. about, Smith did admit to some "questionable" piloting. However, he somberly maintains that he did not fly under the Golden Gate Bridge. Flying the rock-strewn Yosemite Valley was something else, "but it was not in a National Airlines 747," he defensively maintained. The retired Navy Commander quietly added, "It was a Navy plane." He recalled meeting the second president of the SSA, Capt. Ralph Barnaby. "He was a great story teller, and I had the pleasure of serving with him on the National Soaring Museum Board of Trustees."

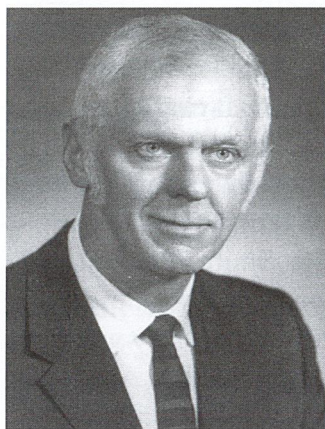
Smith said that he flew DC-4s all over the world, and once carried 1,700 live monkeys from the Far East (India or The Philippines) to Indianapolis. "When we got back no one would come close to us. You don't know what B.O. is until you've had 1,700 monkeys on an airplane." Smith and his crew suffered the smell of their feces, their urine and their body odor, while flying in an unpressurized airplane, with no air conditioning! The DC-4 had to fly at 7,000 or 8,000 feet because they didn't want the monkeys to pass out. The animals were wanted to produce vitally needed serum from their kidneys. "The body heat from all these monkeys actually produced rain inside the aircraft. . . We're sitting up in the cockpit and this water that had the smell of feces, urine and body odor, was dripping all over us." When they got home their wives wouldn't let them in the house. " 'Oh! Take off your clothes...don't come near me.' It was horrible."



When flying alongside Smith's airliner at night, the glowing afterburner of a darkened F-94 Starfighter was identified to co-pilot and passengers, tongue-in-cheek, as a flying saucer.

His next photo was of a flying saucer. He had been flying for Trans Ocean, working with Japan Airlines, coming down from over Misawa that is in the northern end of Sapporo, in Hokkaido, northern Japan. The picture taken from his aircraft showed little blue marks that Smith identified as windows of a flying saucer. "It was at night, and they were really from the afterburner of an Air Force F-94." But another pilot on Smith's plane, who was back visiting with the passengers, didn't know that, and Smith had him convinced for a little while that it really was a flying saucer. Smith said that this was during the Korean War, and it was not uncommon for F-94 pilots to slide alongside with their lights off to identify an aircraft, then kick in their afterburners and dart away trailing little blue lights.

His best flying saucer story was about an incident that occurred while driving to a Saturday morning Navy Reserve meeting at Alameda, CA. He got caught in a traffic jam, with cars crawling along. People were gawking at something that looked like a flying saucer



Bill Ivans:

Smith remembered walking up and sitting down at his first SSA meeting, Bill looked at him and asked, "Who are you?" Smith quipped, "and I've been trying to answer that question ever since. Ivans took me to the international scene; a wonderful person, and a great guy to work with."



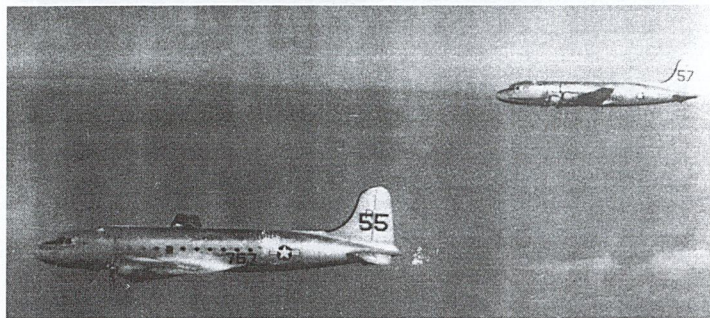
E.J. Reeves:

"The epitome of a Texan: a cool guy, and a pleasure to be with, he's an example of some of the fine people you meet volunteering."

behind a wire fence enclosure. Then Army trucks pulled up and guards jumped out and took up positions around the perimeter. Smith stopped for a look. "...And my god, there's a flying saucer sitting right in the middle of this tennis court. It had an antenna on top of its rounded dome and the ship would move just a little bit." After Navy muster, he called his wife Marilyn excitedly describing the scene: "Honey I saw it! If you hear on the news that a flying saucer just landed, I saw it. I'm going back and try to find out more." When he and some of the other Reservists went back, they were just in time to see the hatch of the flying saucer pop open. Out jumped a guy in red underwear waving his arms, and urging people to come to a National Guard Barn Dance that was to be held locally. "I had to call Marilyn back and cancel my flying saucer discovery."

Smith found himself in the middle of a Cold War flash point: the Berlin Airlift. He logged 163 trips to that beleaguered former German capitol. "We flew at three -minute intervals, and we didn't have any radar. I got to know Simine Short over there some time before she met Jim. She was about three or four years old, and every time I took off she'd wave at me, and I'd dip my wings or something." Years later while talking with Simine, he found out that she was one of the people that they were airlifting coal, food, and supplies to. As usual with such an aero-funster as Bernald, one-upmanship was the rule. Flying DC-4s, he and two

other squadron mates who also didn't know any better decided that they would take off from Berlin's Templehoff Airdrome in formation. Having successfully executed that risky maneuver, and with no noticeable parts of the their DC-4s chewed up, shot up, or missing on return, the C.O., a crusty four-striper, called him on the carpet. "Ensign Smith," he said, "If we weren't so short of plane commanders, you'd be back to co-pilot. But Smith allowed, "as they were short of plane commanders I stayed on. The Airlift was a great operation for a young kid learning how to fly. It seemed like we were on instruments most of the time."



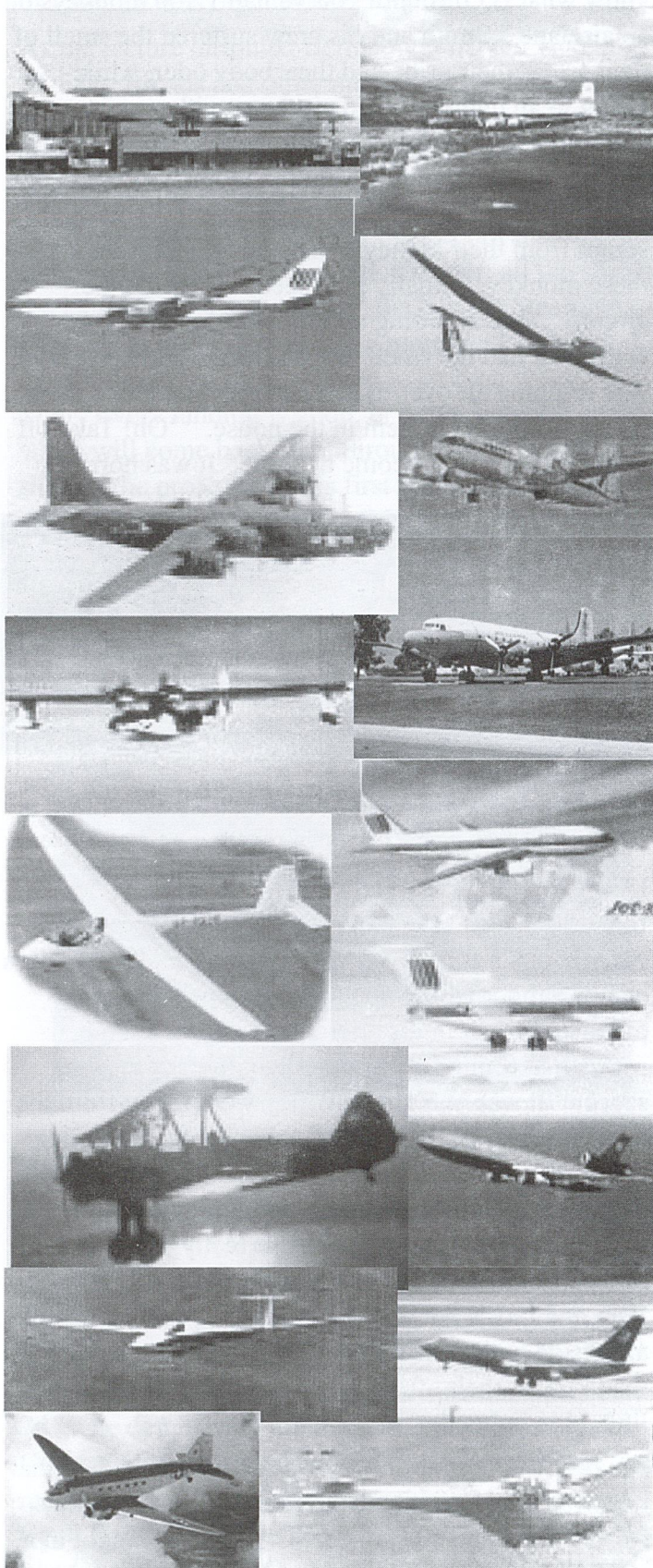
Navy Douglas R5D's (DC-4's) on the Berlin Airlift, where Smith flew 163 missions.

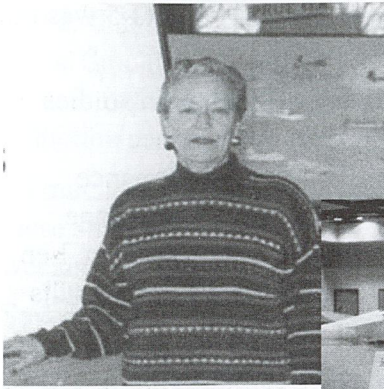
Mentioning Paul Schweizer who was in the audience and Floyd Sweet who was unable to attend, Smith said that we should be grateful for the added measure of background and experience. "It's always important to have a mix of old-timers and middle-timers."

He then moved to the National Soaring Museum. "You volunteer and what do you get to do? How about a special NSM Trustees' private tour of Howard Hughes' Spruce Goose Flying Boat? It was arranged by Larry Woods's brother Richard, the head man when it was at Terminal Island in Long Beach (CA)." Floyd took Smith's picture sitting in Hughes's seat. Moving through the winged behemoth, Smith walked into the engine nacelles, climbed the ladder into the vertical stabilizer, and walked down into the bilge. . . "One of the thrills of my life," he said.

"Volunteering," he exclaimed, "... it's the great people that you meet; it's fantastic: like Shirley Sliwa (retired Director of the NSM). She dealt with all of us on the NSM Board in such a wonderful way. Now I don't want you to use my last name as a reason to think ill of the current Director of the National Soaring Museum (Peter W. Smith). We aren't all bad Smiths. We got a good one there..."

Some of the aircraft types in which Bernald Smith logged 35,000 hours during his 55 year flying career.

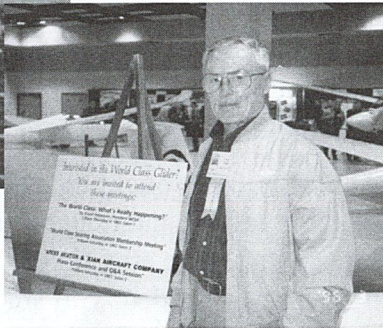




**Shirley Sliwa, former
Director of the National
Soaring Museum**

Oran Nicks:

"I really don't think that we would have a world glider class, the PW-5, if it weren't for Oran Nicks. He played a major role in the negotiations for its development," Smith said.



There was a string of other sailplane, airline, and people stories: conning the maitre'd out of a table in a packed **** restaurant with no reservation in Sidney, a Hail Mary take off from Warsaw in a Russian-built

AN-2 transport (The co-pilot kept shifting the luggage to change the plane's center of gravity as they were bouncing down the runway straining to become airborne). He finished by saying, "...And when I grow up, I still want to be a pilot."

Following the Barnaby Lecture, Bob Gaines called on Robert Ball, NSM Past President to make a presentation. Ball said, "Bernald didn't say a whole lot about his tenure, perseverance, and phenomenal support of the National Soaring Museum." To the audience he said, "The next time you're in the Museum's lobby, read when the building was dedicated: 1978. The president at that time was Bernald S. Smith." To Smith he said, "We want to present to you the Gold Medal Award of the National Soaring Museum." On the reverse side was engraved, "Presented to Bernald S. Smith for his continuous leadership and innovation, benefiting the National Soaring Museum from its inception."

The Gold Medal is the highest honor awarded by the National Soaring Museum.

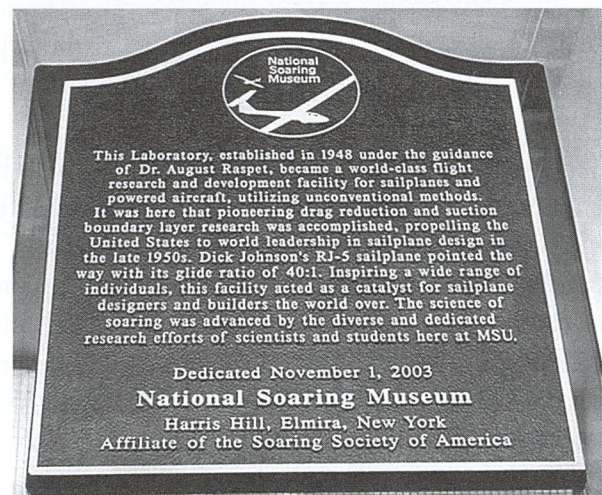
National Landmark of Soaring No. 13

Raspet Flight Research Laboratory Mississippi State University, Starkville, MS

By Simine Short

November 1, 2003, Starkville, MS. With no football game scheduled for this particular Saturday, the Mississippi State University campus was invaded by glider folks, young and old. Pilots, builders and soaring enthusiasts came not only from nearby communities, but many also traveled from all over the United States. The 13th Landmark of Soaring dedication was a good reason to be here.

This Laboratory, established in 1948 under the guidance of Dr. August Raspet, became a world-class flight research and development facility for sailplanes and powered aircraft, utilizing unconventional methods. It was here that pioneering drag reduction and suction boundary layer research was accomplished, propelling the United States to world leadership in sailplane design in the late 1950's. Dick Johnson's RJ-5 sailplane pointed the way with its glide ratio of 40:1. Inspiring a wide range of individuals, this facility acted as a catalyst for sailplane designers and builders the world over. The science of soaring was advanced by the diverse and dedicated research efforts of scientists and students here at MSU.



National Landmark of Soaring No. 13, Raspet Flight Research Laboratory, Mississippi State University, Starkville, MS.

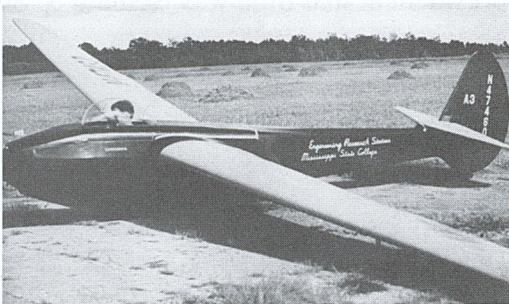
It is worthwhile to reflect on why the Raspet Flight Research Laboratory in Starkville, MS was chosen to be the 13th Landmark of Soaring.

During the 1950's, the meticulous flight test methods, extensive instrumentation and aggressive exploration of a wide range of drag reduction techniques at Mississippi State University resulted in some of the best sailplane performance attained up to that time. This established the design parameters for future sailplane designs.

Careful improvements to the Tiny Mite sailplane improved its L/D from 20 to 1 to 26.7 to 1 and demonstrated for the first time an aircraft with a drag coefficient lower than a turbulent flat plate.

Drag reduction studies based on carefully gathered flight test data had already been done on a number of other sailplanes when Dick Johnson brought the partially completed Ross-Johnson RJ-5 to Starkville in late 1949. Harland Ross had spent considerable time and effort on this new high-performance design, when Dick Johnson decided to make this aircraft his academic research project.

Flight test of a flat-top Laister Kauffmann TG-4A had shown a significant increase in span efficiency for a high wing sailplane over



The flat top TG-4A, used for research in 1950. Copied from SOARING Magazine, January 1950.

a mid-wing plane, so the originally planned mid-fuselage position for the RJ-5 was changed to a high wing configuration even before its first flight. Initial flight tests resulted in an L/D of 30 to 1 that was enough for Johnson to win the 1950 Nationals. Detailed flight tests followed and proved that the wing construction was not adequate to reap the full benefits of the laminar flow airfoil, which was a pioneering application to this sailplane. The ribs were rebuilt and special care was taken to smooth the transition from the metal leading edge to the fabric section at the 50% chord point. Extensive sealing and modifications to the canopy increased the RJ-5's glide ratio to 36 to 1 by 1951 when Johnson set the world distance record flying from Odessa, TX to Salina, KS.



Dick Johnson and his RJ-5. This sailplane started out as a design by Harland Ross and was continually improved by Dick Johnson at Mississippi State until it reached the magic L/D of 40 to 1. (Dave Raspet Photo)

The airfoil still did not yield all its potential, so research continued: a meticulous wing smoothing

finally raised the L/D to over 40 to 1. The RJ-5 was the first sailplane to reach this mystical goal.

Data from the RJ-5 and other drag reduction studies provided the necessary information for Bruce Carmichael to bring the entire set of performance parameters together and point the way to sailplane designs that would optimize cross-country speed. Len Niemi used Tiny Mite and RJ-5 parasitic drag results to predict the performance of his Sisu-1.

Dick Schreder brought the HP-8 to Starkville in 1959 for flight testing and drag cleanup. Again, the test showed that more attention to the waviness profile of the wing was needed. Tuft studies showed that the wing root - fuselage intersection was causing separation and premature stall. Fillets were used to better treat the intersection. This reduced the stalling speed from 55 to 47.5mph, yielding a significant improvement in thermalling performance.

While flight testing had shown significant improvements for conventional sailplane design, much effort also went into tests of unconventional sailplanes. The German Horten IV wing surface was carefully profiled and then tested. Unfortunately, the inherent drag of the reflexed airfoil could not match the low drag of conventional airfoils and the performance of even the cleaned up Horten IV was disappointing.

Al Backstrom became interested in flying wings as an undergraduate student at Mississippi State. After he built his Plank flying wing sailplane in Dallas, he returned for a graduate degree, bringing along his ship. Extensive drag reduction studies and evaluation of unique methods of generating directional control were used to evaluate and improve its performance.

The Research Laboratory was also the site for bird flight research done by Dr. Raspet. This research quantified the superiority of soaring bird drag performance over that of the best aircraft. The Black Buzzard in gliding flight showed a skin friction coefficient 30%



Gus Raspet ready for take-off in his Kirby Kite. (Dave Raspet Photo)

higher than a laminar flat plate while the best aircraft of the time (the Phoenix) was 330% higher. Clearly, there is much to be learned from birds about drag reduction and variable geometry.

So much for the events of the past fifty years. Many of these stories and incidents were re-lived on the weekend of October 30, and November 1, 2003.

Several out-of-towners arrived on Friday, October 30. Bryan Airport and its adjacent Raspet Flight Research Laboratory (RFRL) hangars were like busy beehives. As organizers were making last minute adjustments for the big event, small groups were seen everywhere. They were exchanging memories and recent news, standing by the lab's airplanes, powered and un-powered. Some, like this writer, were wondering how the airplane hangars could be so sparkling clean and the floors so shiny. This was a working research laboratory, not a showcase set up for a movie! I was told that this was just good paint; it certainly was beautiful and eye catching.

A few pilots brought their ships which were assembled and flown. It was interesting to see that the lab's immaculately restored original Stearman was used as the towplane, just as in bygone days. This Stearman has been flown by pilots of the RFRL since 1948!

Next morning, a bright blue sky greeted all. The Honda Annex hangar was the place for the day's scheduled activities.

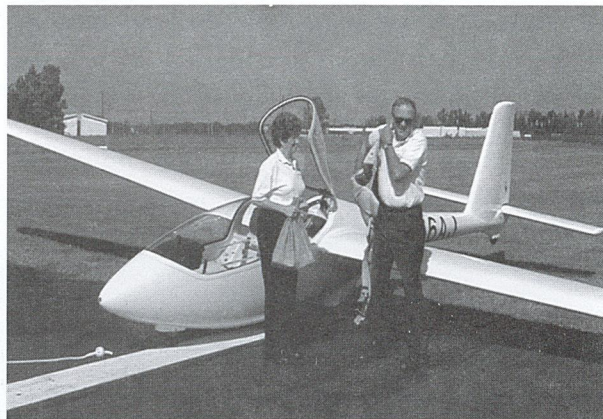
The United States Postal Service set up a colorful and impressive booth for the morning, not only applying a special commemorative postmark, but also displaying and selling all kinds of different items.

The hottest items were the colorful picture postcards showing twenty different airplanes, including a Piper Cub and a Stearman, but also the recently issued Wright Brothers' First Flight stamp. A large poster of this stamp was drawing attention from everyone walking by. This poster was later signed by many members of the RFRL and current participants and then given to the NSM for display.

The first event of the day was the traditional mail-carrying glider flight. Dr. George Bennett, former



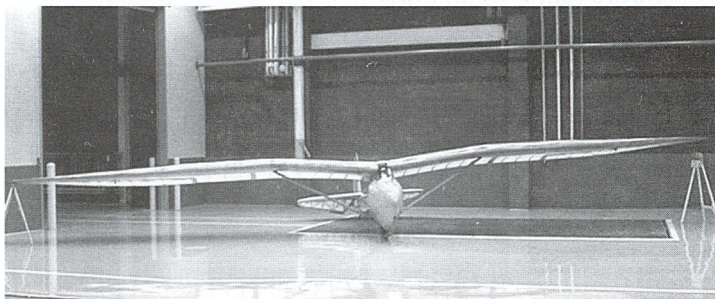
Director of the Raspet Flight Research Laboratory, piloted the MSU Glider Club's newest addition, a PW-6, for the flight demonstration. This ship, N76AJ (AJ by the way, stands for Alice Johnson, the donor of the sailplane) was the ideal sailplane for this demonstration flight. There was plenty of room for Katherine Wood, Officer-in-Charge, MSU Post Office, and her mail bag. This was her first time flying in a sailplane, and she was excited!



George Bennett, retired RFRL Director, and Kat Wood, USPS, getting ready for the traditional mail-carrying glider flight and flight demonstration over Bryan Airport.

The shiny maroon (MSU colors) Stearman with Phil Bridges as the pilot and Dave Raspet (oldest son of the lab's founder) in the front seat (to take pictures) was readied. The PW-6 was aerotowed twice over the airport so everyone could admire the two aircraft in flight. George then released, made some gentle turns and landed about half an hour later back on the airport. Several newspaper reporters were present and got Ms. Wood's comments on how she enjoyed her first flight in a sailplane.

A sack lunch was served in the Honda Annex hangar. Tables were set up and covered with red cloths. Everything looked very festive. Adding to the celebratory mood, Bob Gaines exhibited his recently restored Kirby Kite in an adjacent section of the hangar. Dr. Raspet used a similar sailplane for much of his research work on bird flight.



Bob Gaines's recently restored Kirby Kite was used as decoration during the festivities.

At 1:15 p.m., the dedication of the Landmark plaque took place at the entrance to the original Raspet Flight Research Lab. David Lawrence, its current director, was master of ceremonies. Dr. Linda Smith, MSU Professor of Music, sang the National Anthem with every one participating. Greetings were given from MSU's Vice President for Research, Dr. Jonathan Pote; Dean of Engineering, Dr. Wayne Bennett; and Aerospace Engineering Department Head, Dr. Tony Vizzini. They were followed by NSM President, Bob Gaines; Board Chairman of the Soaring Society of America, Jim Short; and President of the Vintage Sailplane Association, David Schuur.



From left to right: Simine Short (NSM), Dave Schuur (VSA), Jim Short (SSA), Bob Gaines (NSM), Jonathan Pote, MSU Interim Vice President for Research; retired Raspet Director George Bennett; A. Wayne Bennett, Dean of the MSU College of Engineering; Dave Raspet; Anthony J. Vizzini, chairman of the MSU Dept. of Aerospace Engineering; and Raspet Director Dave Lawrence. Photo credit: Office of University Relations, MSU.

David Raspet made an interesting presentation on why the Raspet Flight Research Laboratory was chosen as the newest Landmark of Soaring.

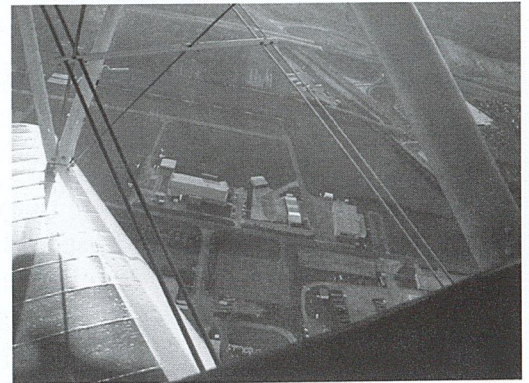
Then the plaque was officially dedicated by Gaines and accepted for MSU by Lawrence. Dr. Smith closed with everyone joining her in singing "America the Beautiful." Another successful Landmark dedication ceremony came to an end.

In the afternoon, Bennett and Dave Raspet led a round-table discussion back in the Honda Annex. About 100 people, many alumni from the 1950's and 1960's, were present. Some brought their scrapbooks, pictures, and memories. George and Dave had selected slides of the golden age of soaring, and then asked the old-timers directly to answer their prepared questions. This kept the discussion lively and interesting for those who were not as well informed. It was fascinating to hear

the stories and see the slides, and many wished the session could be extended.

The afternoon came to an end, and this writer was privileged to get a scenic ride in the MSU Stearman circling above the local area.

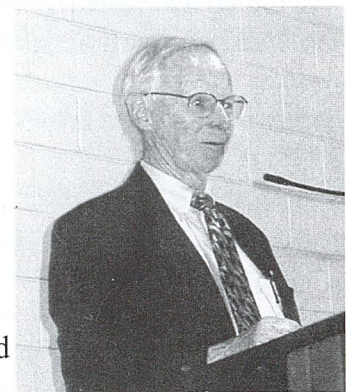
This provided a neat opportunity to take pictures of Bryan Airport and the RFRL from above.



The Raspet Flight Research Laboratory at Bryan Airport today.

There was hardly enough time to prepare for the evening banquet. The tables were set with white table cloths and candles, and a country-style buffet brought a variety of foods.

Dr. Paul MacCready, internationally known as the Father of Human powered Flight, was the evening's speaker, talking on *Continuing the Exploration of Efficient Flight*. He recalled Gus Raspet as a mentor, scientist, philosopher and catalyst, and described how Raspet's enthusiasm spread to others, including himself. Many of the statements heard earlier in the afternoon were repeated, but now from a different angle. Now, all could see how Gus Raspet's special legacy, his inspiration of others to be curious and excited about the scientific journey, played a part in Paul's life as well. In his presentation, Dr. MacCready highlighted some of his activities that were outside the sailplane field, but that evolved from ideas and contacts associated with his soaring experiences. These experiences include hang gliders, bird flight, and a wide range of vehicles for land or air that carry on the dedication to efficiency that is also a hallmark of soaring.



Dr. Paul MacCready

The spirit and legacy engendered on the Starkville Municipal Airport in the 1950's and 1960's continues today, as people continue to be inspired by the



scientific flight research done at the Mississippi State University Raspet Flight Research Laboratory.

The Landmark of Soaring plaque is displayed in the lobby of the Honda Annex hangar, below a painting of Dr. August Raspet, founder of the Raspet Flight Research Laboratory.

In closing, I would like to thank the members of the NSM Landmark Committee: Janice Armstrong, Bob Ball and Bob Davis.

A very special thanks goes to the organizers at Mississippi State University, especially to George Bennett, David Lawrence and David Raspet. Without their willingness to do the work for this Landmark, we could not have had National Landmark of Soaring No.13.

Remarks on the Landmark Program

By Simine Short

It was just about twenty-five years ago that the new National Soaring Museum opened its doors atop Harris Hill. A national program to honor the most significant pioneering American soaring sites (i.e. Landmarks) was envisioned. At that time this was only a dream and some rudimentary ideas. But when these were presented to the Board of Trustees of our Museum, the vision was shaped into a national program honoring and recognizing the spirit of the people and the events that contributed so much to make the sport of soaring what it is today.

At times, we still have to explain to power pilots that airplanes without engines can also fly, but I think this continuing education will need to go on for many more years.

The very first landmark, dedicated in 1981, was on Cape Cod, one of the most easterly parts of the United States. Here, in 1929, Capt. Ralph Barnaby broke the 1911 Wright Brothers' soaring duration flight record. Barnaby's 15-minute flight is considered the beginning of modern soaring in the USA.

Landmark No.9 was dedicated fifteen years later near Honolulu, Hawaii, one of the most western sites in the

United States. Here we recognized the duration flight of 2nd Lt. William A. Cocke, who flew along the cliffs on Oahu in 1931 for 21 hours and 34 minutes. Cocke's world record flight was done only two years after Barnaby's flight at Cape Cod!

Landmark No.13, in Starkville, MS, is a centrally located flat-land monument. It recognizes the contributions of Dr. August Raspet and all the people who have helped in sailplane development during the past fifty years, at Mississippi State University.

I was very fortunate to have been part of this program since the beginning. Many wonderful people were involved with each of the landmarks. Many friends were made and several of them are here today. I had the pleasure of traveling to all these places where the heritage of our motorless sport is so deeply rooted. Generally, these are sites not regularly visited by tourists, but in many ways they are more beautiful and pristine than those visited by the non-soaring public.

Being a volunteer for the NSM for all these years, I surely enjoyed the privileges and "spoils" of being a volunteer. Each group, responsible for the next landmark, was always happy to show off their glider field, their community and their countryside. Each Landmark was a wonderful learning experience for me. No two Landmarks were alike.

Let us enjoy our heritage, use the technology and tools which motorless flight is supplying and continue to promote the sport of soaring!

Starkville, MS

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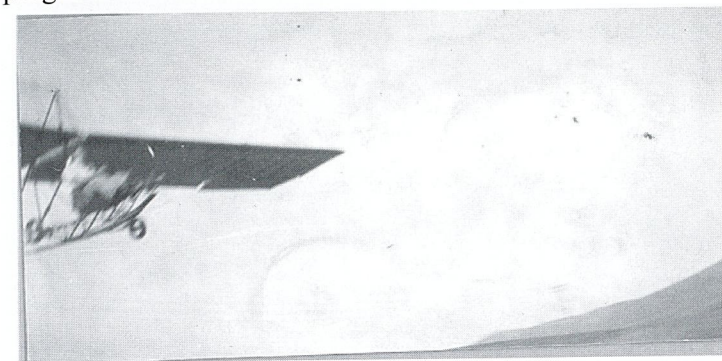
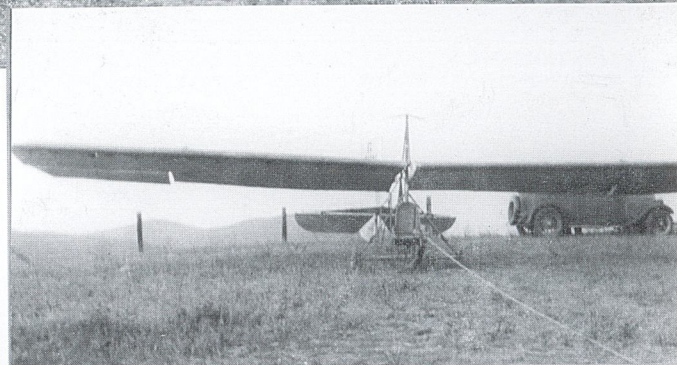
Anyone is invited to contribute material and pictures with identification about historical soaring activities, renovation of old sailplanes, soaring pioneers, unusual uses of sailplanes, etc. Manuscripts are subject to whatever revisions, additions, or deletions are necessary to make the material conform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

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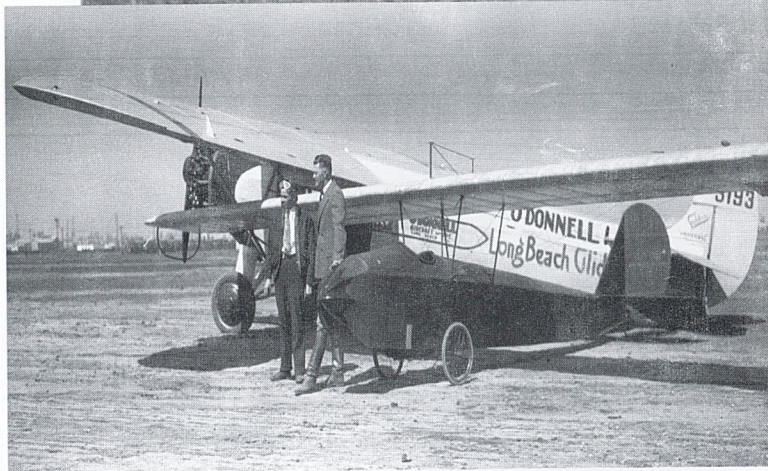
The National Soaring Museum is an affiliate of the Soaring Society of America and, as such, is the official repository for all its documents and artifacts.

From the Archives:

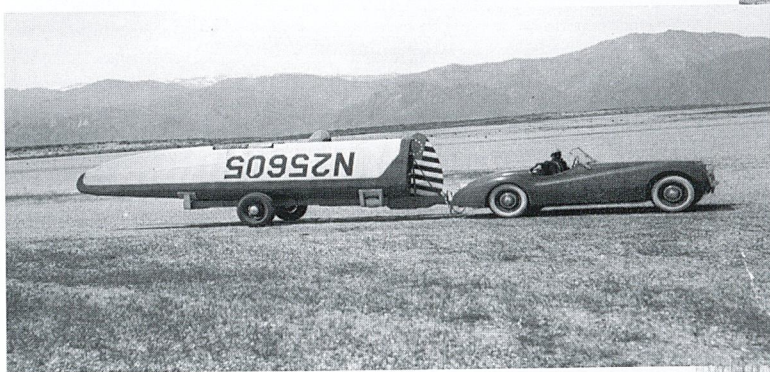
William "Gus" Briegleb's (1912-2002) first primary glider, later called the BG-1 was built in 1928-29, with materials bartered from an airplane junkman. Gus is pictured at the controls, **(Right)** and launching **(Below)**. The wings were constructed in a church basement with the help of attendees, as a Daily Vacation Bible School Project for boys. Briegleb later pioneered in the field of do-it-yourself sailplane construction. He offered moderately priced sailplane kits that enthusiasts could build easily and fly safely. His work extended into the 1970's when he helped develop the M2-F1 Lifting Body, in which several of the early astronauts flew as part of the space program.



(Right) "America's 'First Flying Train' Goes 175 Miles" (From an undated newspaper clipping of the late 1920's or early 1930's) "A thrilling new kind of cross-country flying was introduced in the United States when Dale Drake, a Pacific coast glider pilot attached a motorless craft to a Fokker (FV II) monoplane piloted by Lloyd O'Donnell, and was aero-towed 175 miles over southern California at the end of a 500 foot rope. Near San Fernando, the towrope broke. Drake soared skillfully for ten miles and coasted to a safe landing in a barley field. Next day, the 'flying train' -plane and glider- took off again. The photo **(Right)** shows the machines and pilots standing side by side."



(Left) Trailing With Pizzazz: Rex Richards, Seattle, Washington, tows his Bowlus Baby Albatross behind a Jaguar sports car. (1956)



(Right) Just before takeoff for mid-winter ridge soaring, Gatineau Gliding Club, Ottawa, Ontario, Canada. Temperature, below zero-wind, 20 miles per hour. "Shorty" Bondreault is in the cockpit of the club's De Havilland Tiger Moth tow plane, with a Pratt Read LNE-1 in the background. - January 31, 1954.

