

THE OHIO-CURTISS AIRPLANE CONNECTION

An addendum

by Richard A. Morley

Author's note: An attempt was made to include all major data in the first article published in the Fall 1991 AAHS Journal. However, during preparation I was unable to reach the chief pilots as their whereabouts were unknown to me. After the article was submitted to the editor, one of my contacts, Fred Steele, notified me that he had contributed to a book, Whatever Happened to Curtiss-Wright? by Robert Fausel, the former Mili-

tary Liaison Manager of Curtiss-Wright. Through Fausel I was able to contact Red Hulse and Bill Webster, both former chief pilots at Columbus. Most of this addendum was based on contributions made by them. I thank them very much. Such is the generation of past history. There is always someone out there who has interesting data "stashed" away somewhere. And the fun of finding these people is the real challenge.

TEST FLIGHT SECTION—The Curtiss-Columbus Test Flight Section was organized during the construction of the new airplane production facility at Port Columbus, Ohio, in 1941. The Test Flight Section was headed by Barton T. "Red" Hulse and reported to the Sales Department—much to the dismay of the Test Flight Section

Curtiss-Columbus First Chief Test Pilot—Red Hulse was born in 1910 in New Jersey. He learned to fly while attending the College of William and Mary, receiving his license on June 3, 1932. Entering Naval Pilot Elimination training at Floyd Bennett Field, he was ordered to Pensacola in November 1935 as an Aviation Cadet in Class 84-C. Hulse was designated a Naval Aviator in November 1936. He was subsequently carrier and catapult qualified while aboard the *Saratoga*, *Enterprise*, *Lexington* and *Yorktown* flying F4Bs, F2Fs, F3Fs, O2Us, O3Us and TBDs, among others. He instructed in fighters for a year at Pensacola.

His service commitment completed in November of 1939, he joined the Curtiss Airplane Division in Buffalo, New York, as a test pilot. He was directly involved with SBC-4, CW-21 and 22, Hawk 75s, P40s, XO-52, XSO3C and XSB2C, among others. His test flying included the performance, development and demonstration phases. He was transferred to Columbus in November 1941.

Hulse was "promoted" from Columbus to the Research Division at Buffalo in January 1943. He left Curtiss-Wright the following December and was named Chief Test Pilot on the P-75 program at the Fisher Aircraft Division, General Motors Corporation. He transferred to the Allison Division in July 1945 as Chief Test Pilot. In 1948, he became the New York area Zone Manager for Allison, later moving to Okla-

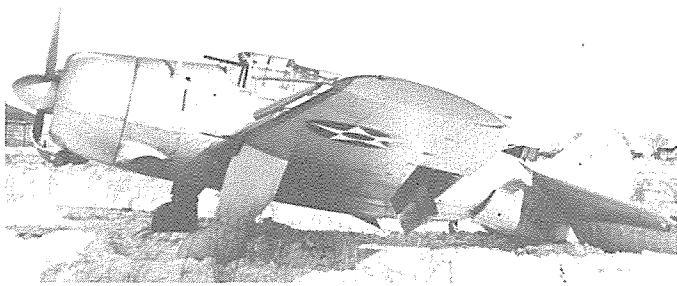
homa City. Red retired from General Motors in 1970 and is now living in Tallahassee, Florida.

The Helldiver—Hulse made his first flight in the XSB2C-1 on January 20, 1941, in Buffalo. On February 9, 1941, Bob Fausel, Military Liaison Manager and Assistant Chief Test Pilot, was flying the airplane when the engine quit and crashed on the approach to the runway. The fuselage broke in half aft of the pilot's cockpit. Fortunately, there was no observer in the rear cockpit. Investigation revealed a problem with the Holley carburetor. This crash was the beginning of a series of delays in the test program that would plague the *Helldiver* for the next two and a half years. The airplane had to be rebuilt and was not flyable until May 1941. Red's second flight in the *Helldiver*, July 17, 1941, resulted in a dead-stick landing at Lockport, New York, after losing all oil overboard due to a defective scavenge pump in the R2600 engine. After mechanics fixed the pump and replaced the oil, Red flew back to Buffalo the same day. Making two more flights in the airplane in July, he became the full-time project pilot in November 1941. He delivered the XSB2C-1 in a routine flight to Columbus, November 12, 1941.

The 33rd demonstration and last flight of the XSB2C-1 occurred December 21, 1941, with Red Hulse at the controls. He took off from Port Columbus at 0910 and proceeded to 22,500 feet generally south and east of the airport. After setting the bomb doors, cowl flaps, prop controls, diving flaps, trim tabs and photo observer, Red rolled the airplane into a dive. He started the pullout at 15,000 feet. Just after

Red Hulse in front of XSB2C-1, at delivery of airplane to Columbus from Buffalo, November 12, 1941.
(Curtiss-Wright via B.T. Hulse)





The result of a dead-stick landing at Buffalo, February 9, 1941. Bob Fausel, Military Liaison Manager for Curtiss-Wright, was flying the XSB2C-1 and experienced carburetor failure on the approach to the runway over Genessee Street. The airplane landed short of the runway, hit a mound of frozen construction dirt and nosed over. (Robert Fausel Collection)

Barton T. "Red" Hulse, Curtiss-Columbus first Chief Test Pilot, December 1941. (Curtiss-Wright via B.T. Hulse)

Curtiss-Wright XSC-1 *Seahawk*, serial number 34096, landplane version, three-quarter front view, April 26, 1944. (Curtiss-Wright)

Curtiss-Wright SC-1 *Seahawk*, serial number 35301, seaplane version, with bombs underneath the wings, three-quarter front view, September 5, 1944. (Curtiss-Wright)



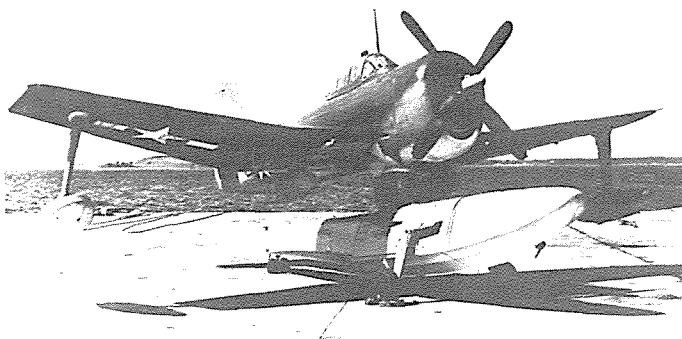
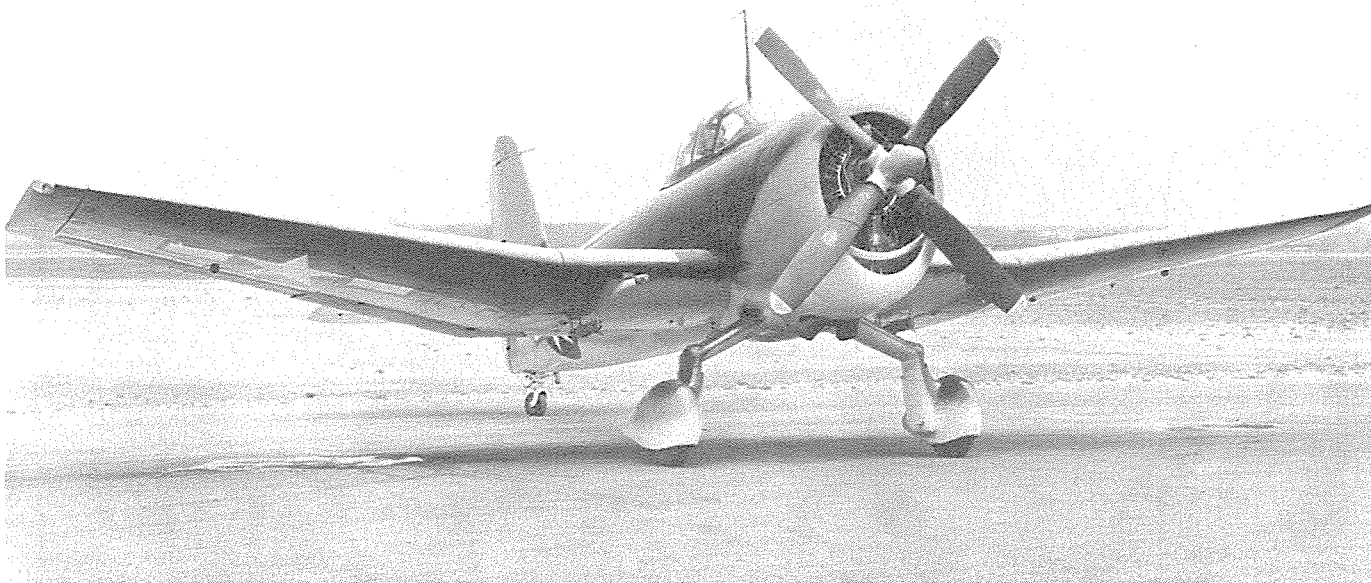
the start of the pullout, the right wing failed and left the airplane leaving about six feet of torn metal outboard of the wing fold. The airplane performed violent motions and the cockpit enclosure moved to the open position about one inch and jammed. After some struggle, he was finally able to fully open it. Red released his safety belt, stood up and was pulled out into the airstream. As he left the airplane, he noticed the entire empennage aft of the rear cockpit was completely torn away. Prior to pulling the ripcord, he seemed to stay near the airplane. His back was toward the airplane when his chute opened and he did not see it crash. The plane landed on the Smith farm, which was operated by Harold Derr, on Refugee Road near Reynoldsburg. Red landed about one-half mile away and was picked up by J.Y. Tischer of Pickerington who gave him a ride back to the crash site. Tischer called the plant to report Hulse's location. The photo observer was destroyed but another camera had been installed in the airplane pointing at the left-hand horizontal stabilizer. Red recovered the film from this "windup" camera for later developing by Eastman Kodak.

More on the Helldiver—When the XSB2C-1 crash film was first shown at Columbus, Red sat with his back to the screen to try and reconstruct the time when the right-hand outer wing panel parted from the airplane. The wing was gone before the left-hand stabilizer failed in a downward direction. The elevator remained in place for a time and then blew off directly aft without an up or down motion. There was no feeling noticed in the stick. Fortunately, Hulse was wearing a Spencer corset and didn't feel the effects of at least 15 G. Doctor Joseph Foa, a refugee engineer from Macchi and working at the Curtiss Research Division in Buffalo, studied the reports and concluded the failure was due to torsional divergence. Without ever seeing the airplane or knowing where the failure really occurred, Foa marked a blueprint almost

exactly where the wing failed.

Hulse attempted to carry SB2C-1, factory No. 0001, through the Navy demonstrations. A permanent set appeared in the wings and stabilizer at 415 knots and 7.28 G similar to that which occurred in the X airplane. Hulse felt the airplane still could not meet the Navy requirement for a zero lift dive and 7.5 G. Because of the delays in completing the tests, Curtiss management asked that another pilot be assigned for the Navy demo at NAS Anacostia, Maryland. Hulse agreed, but with the provision that he be relieved of his position at Columbus. Byron Glover was hired by the Research Division to perform the demonstrations using 0001. Glover did not converse with Hulse to check on his background with the *Helldiver*. It was obvious that Glover did not have much flight test experience as he did not spend very much time in the air getting familiar with the airplane. He proceeded to V max and G max dives rather quickly without a gradual build-up to maximums. Glover was subsequently killed when, during a dive test in 0001, he abandoned the airplane. His shroud lines on one side were cut by the wreckage and the chute went into a "streamer." Glover's accident was not credited to Columbus inasmuch as the airplane was transferred to Buffalo and the pilot reported to their flight test department.

Red, now discouraged with Columbus quality, would not fly unless the airplane was close to perfect. It was under this condition that he was "promoted" to the Research Division at Buffalo. His first assignment was the preparation of a further flight test program on the SB2C-1 with exciter unbalance equipment and strain gauges mounted in the wing. The data from this equipment was transmitted to a ground station and was one of the first airborne telemetering installations. The airplane used for the continuation of the flight tests was SB2C-1, factory No. 00297. A surprise awaited



Hulse the first time he turned on the exciter. The wing performed an alarming "figure 8" motion in the horizontal direction.

To obtain better flying weather, an alternate flight test program was planned and the activity was moved to the old Timm Aircraft factory in Van Nuys, California. Hulse still felt the airplane could not successfully reach 7.5 G at terminal velocity clean. Hulse declined to fly 00297 and Vance Breese, a contract test pilot, was hired to perform the test. Breese was later replaced by Curtiss test pilot John Seal who completed the tests. It is not known if the original design speed and load factor were ever met.

After Hulse completed all the preparations for the Van Nuys operation, Ed Jenkins, head of the Structures Department, was placed in charge of the test program. Hulse said, "I felt it would be best if I left Curtiss-Wright since I had lost all confidence."

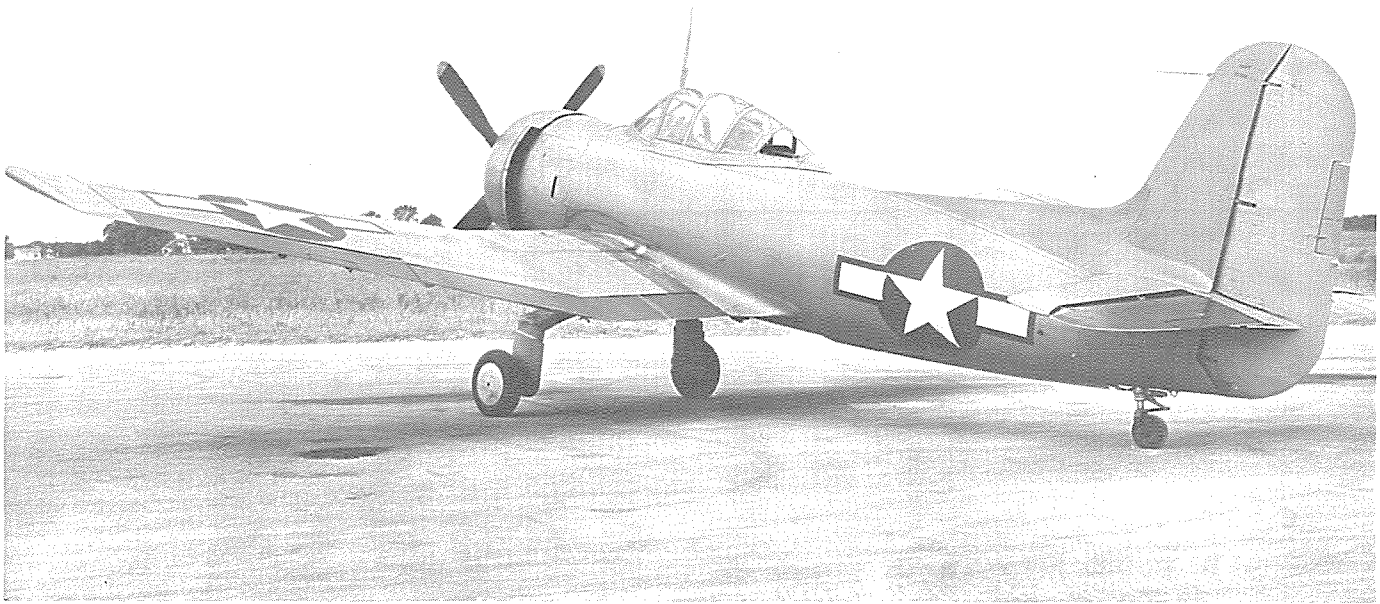
Curtiss-Wright had problems that were no worse or no better than normally encountered on any other X airplane. Some of the problems were loss of engine oil due to improper scavenging, loss of rear cabin hatch during spin tests, forced landing after aerobatics, loss of oil cooler cowl in a dive,

jammed slats, overspeed of engine due to failure of prop pitch change motor, fire in the rear cockpit due to a hydraulic leak, electrical failures, etc.

Hulse concludes, "Ray Blaylock as Chief Engineer was just that. He ran a rather tight organization. Fred Maxam did a creditable job as head of Flight Test Engineering. It was necessary to have Irwin Block on loan from Buffalo for the purpose of having good line inspection after numerous events with the *Helldiver*."

More on the Seagull—As Red Hulse states, "In all fairness to this airplane, its mission effectively ceased with the destruction of battleships at Pearl Harbor. The requirement of 10 to 12 hours' endurance made considerable fuel tank space necessary. It also assumed catapult launch. When the plane was flown from the water with full fuel tanks, it would not get off until 120–150 pounds of fuel had been consumed. This was in part due to the aft upsweep angle of the float being too shallow. At a high angle of attack, with the full span slats and flaps, the tail of the float would drag in the water. There is photographic proof somewhere showing the XSO3C-1 flying over the Potomac River with full slats, full flaps and at rated power, at a measurable angle of attack of 35 degrees!"

"The float problem was discussed with Edo and there was no way to get a tooling change to alter the upsweep angle in late 1941 or early 1942. A similar problem existed on the main wing forgings. All the rough forgings for 200 airplanes were in the plant in late 1941. Forging capacity in the United States was at a premium and any changes had to be made elsewhere. To obtain sufficient dihedral, the 40-degree upturned wingtips were installed and they worked. There is quite a story on this development. One Sunday in Virginia, my wife, Project Engineer Bruce Eaton, Bob Darby and I attended a model plane meet at an old Navy field, Whitehurst Farms, near Little Creek. I noted that many of the



Curtiss-Wright SC-1A *Seahawk*, serial number 35302, landplane version, three-quarter rear view, September 5, 1944. (Curtiss-Wright)

models had upturned wingtips and suggested to Darby, the coordinator of aero testing at NACA, that he try this on the powered model in the wind tunnel. They did try it the following week and it showed promise. I asked that tips be built for the plane and tried. It took considerable pressure on Ray Blaylock from the front office in Buffalo, namely Sales Manager Bill Crosswell. They were finally built and installed. The airplane was flown by me at Anacostia and checked by Commander Trapnell later that same day, September 11, 1941.

"Bob Darby made numerous flights with me in XSO3C-1, serial No. 1385. I did not enter the program until June 27, 1941, at Norfolk. From that point forward, it was my project.

"Numerous flights were made on 1385 seaplane using the original wingtips and many changes were tried on the tail surfaces, dorsal, ventral fin and additions to the fixed and movable tail surfaces. None of these made any improvement in the adverse aileron trail. Rudder lock occurred when the yaw angle exceeded the rudder angle. One of the first times rudder lock occurred, a snap roll in the wrong direction was experienced when the rudder started to fly again. The maneuver was not expected and Bruce Eaton was quite upset about it, particularly since this airplane had sustained two saltwater immersions. The upturned wingtips corrected the adverse aileron trail and other problems associated with insufficient dihedral. Of course, as a landplane there was too much dihedral and dubious flying characteristics resulted.

"The Ranger engine had troubles. Bearing failures had the happy faculty of providing warning. This warning sounded like someone grinding coffee beans. Shortly afterwards the Cuno engine oil strainer would show many chips. Ron Hazen of Allison assisted in the solution of the bearing problem.

"The SO3C-1, serial No. 4739, was the production demonstration airplane. During dive tests, a permanent set

appeared in the wings. A series of small additions to the spar cap was made until the wing was reinforced from tip to tip. This was necessary to accomplish the demonstration without the permanent set showing.

"The pedestal float allowed sufficient deflection during rough water tests to permit the propeller to slice into the float. A cutout was made to provide for this contingency and then filled with balsa wood and painted grey to match the float. Filling the cutout returned the drag to normal.

"When Commander Sid Sherby was setting up the Navy test pilots' school, it was suggested that he acquire an SO3C-1 with both wheels and floats, with both straight and upturned wings to demonstrate these flying characteristics to the students." Hulse flew the production *Seagulls* until his return to Buffalo in January 1943.

A New Chief Pilot in Columbus—In January 1943, William O. "Bill" Webster was named Chief Test Pilot at Columbus replacing Hulse. He was born in 1916 in Buffalo. After graduating from Dartmouth College in 1939, he joined the Navy and learned to fly at Pensacola. Receiving his wings in July 1940, he was assigned to the battleship USS *Tennessee* flying the catapult-launched Curtiss SOC-4. He was discharged in December 1940 for violation of the "no marriage law" which was an old regulation that required Naval flight officers to remain single for two years after receiving their commissions. This was frequently violated and commanding officers usually "looked the other way." But with so many new aviators getting married, the Navy decided to start enforcing the regulation. Bill joined Curtiss-Wright Buffalo in March 1941 after extensive schooling at the Wright, Sperry and Curtiss propel-



William O. "Bill" Webster, Curtiss-Columbus Chief Test Pilot from January 1943 to the end of hostilities. (Curtiss-Wright via W.O. Webster)

ler plants. While at Buffalo, Bill did experimental flying, mostly on P-40s. Transferred to Columbus in January 1942, he stayed with Curtiss until the end of hostilities. Curtiss-Wright had no postwar aircraft plans, and limited flying, so he went with Peruvian International Airlines and flew converted C-54s until the company was forced into bankruptcy in 1949. He accepted a position at Beech as Chief Test Pilot but resigned shortly thereafter to work with Piper in sales. He left Piper to invest in a manufacturing plant. This was outside the aviation industry and it was financially successful. As Bill says, "I have always regretted leaving the flying business and I miss it very much." He has not flown since 1950 and hampered with a serious hip problem cannot pass the physical much less crawl behind the wheel of an airplane. Bill is now retired and living in Old Saybrook, Connecticut.

Bill Webster made several first flights while in Columbus, namely the XSC-1, XBTC-2, XBT2C-1 and XSB2C-6. At peak production in June 1945, 14 production pilots and two experimental pilots reported to him. His most outstanding incident was the spin tests on the SC-1 *Seahawk*. As he states, "This (SC-1) was a great little plane designed to be catapulted from the decks of cruisers and battleships. All of the preliminary tests were made in the landplane configuration although it was designed to fly as a seaplane. We breezed through all of the demonstration tests with no problems. It performed very well as a seaplane until we got to Patuxent Naval Air Station where I was to conduct the spin tests. Two full turns were required before recovery was (to be) attempted. After two turns she assumed a flat attitude and was very difficult to recover. Many flights required 10 to 15 turns to

pull out. A six-foot, anti-spin chute was installed which was of little effect. More than a year was spent on a program of aerodynamic changes to the empennage. Nothing helped and in my opinion things got worse. Towards the end of the program, which saw over 200 spins made, we were making all spins in a right-hand direction and using full power and engine torque in the recovery technique. On the last flight I lost power and was forced to abandon the airplane. Because of the flat attitude the plane pancaked into the ground and did not burn. All the flight recording data was recovered. This included position recorders on all controls, an attitude gyro (first time ever used), airspeed, clock, altimeter, etc. The spin was started at 20,000 feet. I left the plane after 42 turns, the film in the photo observer ran out after some 60 turns and she hit ground soon after this." Webster was the company pilot on all spin tests on the SC series airplane.

More on the Seahawk—Three airplanes were used for spin demonstrations, XSC-1, serial No. 34096; SC-1A, serial No. 35302, and SC-1, serial No. 35301. Spin tests began at Columbus April 17, 1944, using 34096 in the landplane configuration. Prior to spins, complete NACA spin tunnel tests were made and results indicated unsatisfactory recoveries with all slats fully extended and elevator full down. A six-foot, anti-spin chute was installed on 34096 based on recommendations by NACA. Spins as a landplane were made and excellent recoveries were made without the use of the chute. Since the actual spin recovery data did not support the NACA tests, it was agreed by Curtiss and Navy personnel that the wind-tunnel tests were pessimistic.

Spin tests using 35302 in the seaplane configuration began July 14, 1944, at Patuxent NAS. Several changes had been made due to stability requirements. NACA had completed spin tunnel tests and results indicated satisfactory recoveries with slats fully extended. Since landplane spins indicated that the wind-tunnel spins were pessimistic, the seaplane recoveries should be excellent. Actually, inconsistent spin recoveries were encountered. 35302 was converted back to the landplane configuration and spin tested in Columbus August 21, 1944. Spins were conducted in both landing and clean conditions. Recoveries were satisfactory. Since spec requirements had generally been met, 35302 was turned over to the Navy for their flight tests.

SC-1, serial No. 35301, began spin tests September 25, 1944, at Patuxent River NAS as the seaplane version. The configuration was similar to the stability changes as made to XSC-1, serial No. 34096, seaplane. The conditions included slat rework to smooth contour, main and tip floats, slat inter-connecting cables, large dorsal fin, rudder travel plus and minus 25 degrees to centerline of the vertical, anti-spin chute, ventral fin strip, bombs with weight and center of gravity per specification. Recoveries again were inconsistent. As a result of a Bureau conference, a test program was established to investigate improvements to spin recovery. Recoveries were satisfactory with no bombs carried and rudder throw changed to plus and minus 30 degrees to airplane centerline. Recoveries were satisfactory with or without bombs only when the increased area and large ventral fin were installed. Other items tested had either no effect or adverse effect. Seaplane spins as a scout were accepted without the increased rudder area and ventral fin. Spins with



SC-1, serial number 35301, after failed spin recovery, February 18, 1945. The airplane was abandoned by Bill Webster during the 41st turn of the second spin attempt. (Curtiss-Wright)

Bob Fausel, left, and Bruce Eaton, designer of the Curtiss-Wright SO3C Seagull and the SC-1 Seahawk after a flight in the XSO3C, December 1939.

Lee "Whitey" Miller, Curtiss-Columbus last Chief Test Pilot, shown with two unidentified military pilots, Curtiss-Wright XP-87 Blackhawk at Muroc, California, circa 1948. (Curtiss-Wright via R.W. Cramer)



bombs were waived and the airplane was converted to the land configuration. Results of these tests were sent to NACA for comments and the Navy placed restrictions on all spinning until further tests were completed.

As a landplane, 35301 began spin tests December 9, 1944, at Patuxent River NAS. The conditions were similar to the seaplane version except small wheel fairings were installed on the landing gear and the bombs were removed. The resulting spin tests were unacceptable and further minor changes were made. Recoveries were still unacceptable so the airplane was flown to Columbus by Webster for further tests.

Another conference was held in Columbus to instigate a second test program. This included the installation of the large seaplane rudder and a rudder with increased chord at the lower rib. Neither rudder improved spin characteristics.

A third conference was held on February 2, 1945, and it was decided to restore 35301 to the original XSC-1, serial No. 34096 configuration which had excellent spin recovery. In addition, recommendations were received from NACA and were implemented.

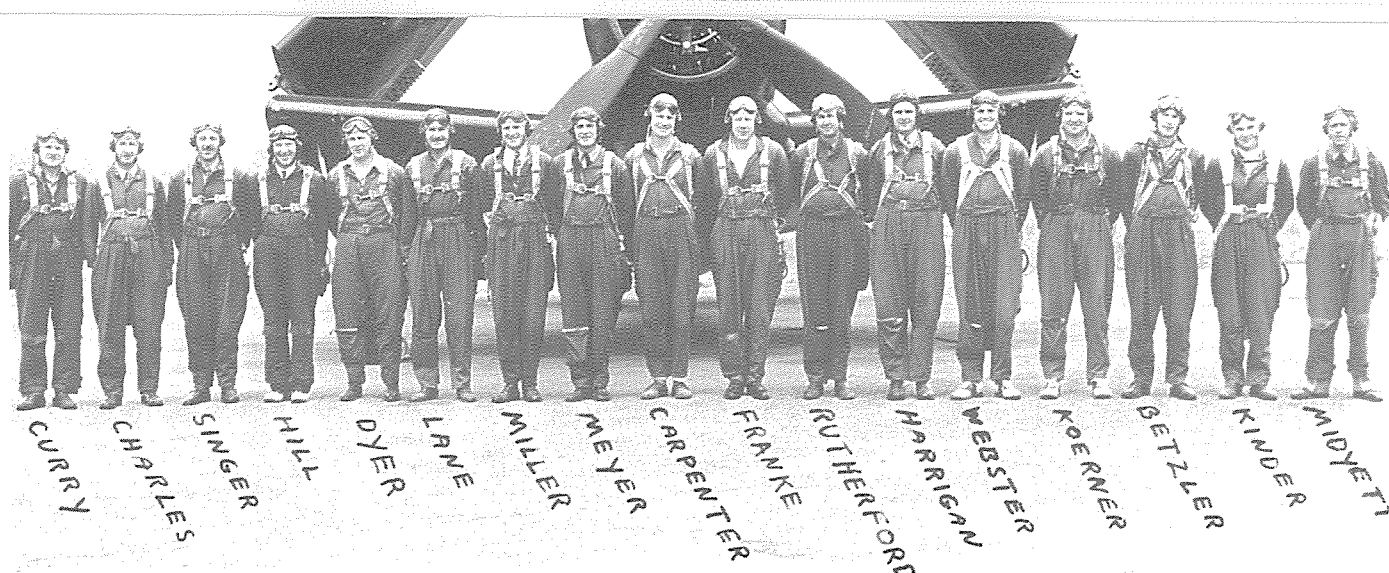
On February 18, 1945, SC-1, serial No. 35301, on its 80th flight was spin tested by Bill Webster. The first spin was in the right-hand direction, in a clean condition with the canopy open. Recovery was completed in one and one-half turns. On the second spin with the same conditions, the nose came up and the airplane went flat. He was unable to recover due to engine failure. Part of the recovery technique was to gun or jog the engine. According to the observation crew, Bill Harrigan and Milt Kuska flying chase in an SB2C-4, Webster released the anti-spin chute during the 23rd turn. The chute blossomed perfectly at 90 degrees to the centerline of the airplane but had no effect on recovery. They also reported the propeller was turning very slowly at this time. They stated that Webster abandoned the airplane on the 41st turn. The plane continued to spin before the anti-spin chute broke away and maintained that attitude until it crashed. The total

number of turns was between 60 and 70.

The airplane crashed at 12:48 on a farm belonging to Paul D. Meek, located one-fourth mile south of East Broad Street at Columbia Center, Ohio. Bill Webster was uninjured but was grounded pending the outcome of a Navy and company investigation. Webster was cleared and returned to flying status on March 5, 1945.

Bruce Eaton, as the project engineer on the SC series airplane, used ideas from a captured Japanese *Zero* being repaired at Curtiss-Buffalo. He was previously assigned as project engineer on the SO3C *Seagull*. Other personnel involved were Fred Maxam in Flight Test Engineering and Bob Eisiminger in Aerodynamics. Bob Fausel, in his capacity as corporate assistant Chief Test Pilot, performed check flights in XSC-1, serial No. 34095, in the landplane configuration and serial No. 34096 in the seaplane configuration.

The Last Curtiss-Columbus Chief Pilot—Immediately following World War II, Curtiss-Wright consolidated all aircraft activity in Columbus. Bill Webster left C-W and Lee "Whitey" Miller was named his successor as Chief Test Pilot. Lee was born in New Albany, Ohio, February 13, 1911. He graduated from Linden High School in Columbus and he subsequently received a certificate from a local barber college. He used the money earned by cutting hair to take flying lessons at the Sullivant Avenue airport on Columbus' west side. He soloed in 1928 and became a flight instructor in 1934. He was hired by Curtiss-Wright as a production test pilot in November 1941. Lee was ever so cautious as a result of his early test flying experiences in the *Helldiver*. While in



charge of the Test Flight Section at C-W and later as Chief Production Test Pilot at North American Aviation, he never lost a production test pilot and therefore did not have to notify any widows. With C-W he flew all the production type airplanes including overhauled R4Ds, R5Cs and B-29s. He also flew experimental types such as the XF-15 and the XP-87 *Blackhawk*. With NAA he flew the T6, FJ, F-86, F100, AJ and RA5. Lee also ran the company transport operations. In 1964, while performing a production flight test on an RA5C *Vigilante*, Lee had a heart attack. Fortunately he was on full oxygen and was able to return safely to Port Columbus. He never returned to test flying and died on January 22, 1971.

Conclusion—Bill Meyer was one of the first pilots hired to perform test flying at Curtiss-Columbus. Bill had a stuttering problem and it was most difficult to understand him while he was on the ground but in the air he came across on the radio clear and crisp. Once, while flying an SB2C, he found that he did not have lateral control of the airplane. When he moved the stick to the right, the airplane lost airspeed. When he moved the stick to the left, the airplane again lost airspeed. He noticed that the ailerons were not coordinated properly. Movement of the stick to the right caused both ailerons to move to the down position acting as a speed brake. And likewise, when the stick was moved to the left, both ailerons moved to the up position. He managed to bring the airplane back to the airport and land. During the debriefing, it took another three hours for the engineers to determine the problem due to Bill's stuttering.

Ralph Charles, who probably had more flying time than any of the other test pilots, once landed an SB2C with gear up and locked. Asked by one of the Navy investigating officers when he noticed that the landing gear handle was in the up position, he replied, "When the propeller began getting shorter."

In those days, formal training for test pilots was unheard of as there were no schools for this purpose. The extent of training, in most cases, was military flying. The safety record at Curtiss-Columbus was a very good one. There were no fatalities and only four emergency bailouts. Unknown were such phenomena as boundary layer, max Q, speed of sound, etc. These men penetrated these areas almost on a daily basis, trying to find the outside of the envelope. Their contribution to the war effort and development of later aircraft is immeasurable. □

Curtiss-Columbus test pilots, June 1945. Bill Webster, Norm Koerner and Bill Harrigan did the experimental work while the rest did the production flying. (Curtiss-Wright via W.O. Webster)

SOURCES

The following former Curtiss-Wright employees provided data:
Barton T. "Red" Hulse, Columbus Chief Test Pilot, correspondence, August 21, 1990 (Tallahassee, Florida).
William O. "Bill" Webster, Columbus Chief Test Pilot, correspondence, September 6, 1990 (Old Saybrook, Connecticut).
Arlene Kelley, Secretary to Columbus General Manager Jack Davey, correspondence, September 17, 1990 (Columbus, Ohio).
Robert W. Fausel, Buffalo Assistant Chief Test Pilot and Military Liaison Manager, correspondence, March 23, 1990 (Winter Park, Florida).
The following provided data through correspondence:
Jerry Kishpaugh, Teledyne, September 16, 1990 (Torrance, California).

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ACKNOWLEDGEMENTS

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Special thanks to Fred Steele and Bob Fausel for leading me to Red Hulse and Bill Webster. Thanks also to Red and Bill for their kind patience in answering my questions, for corrections to the original article and for the critique and review of this article.

FIRST FLIGHTS — CURTISS-WRIGHT/COLUMBUS AIRPLANES

Model	First Flight Date	Test Pilot
XSO3C-1	October 6, 1939 ¹	H. Lloyd Child
XSB2C-1	December 18, 1940 ¹	H. Lloyd Child
SO3C-1	March 4, 1942	Barton T. "Red" Hulse
SB2C-1	June 30, 1942	Barton T. "Red" Hulse
XSB2C-2	March 12, 1943	William Harrigan
XSC-1	February 17, 1944 ²	William O. "Bill" Webster
SC-1	June 30, 1944	William Harrigan
XSB2C-6	January 17, 1945 ³	William O. "Bill" Webster
XBTC-2	January 20, 1945	William O. "Bill" Webster
XSB2C-5	February 19, 1945	Norman Koerner
XBT2C-1	August 7, 1945	William O. "Bill" Webster
XP-87	March 1, 1948 ⁴	B. "Lee" Miller

1. First flight at Buffalo, New York. 2. Navy records indicate February 16 but Webster's log shows February 17. 3. Webster's log indicates "Shakedown flight." 4. First flight at Muroc, California.