

THE OHIO-CURTISS AIRPLANE CONNECTION

Curtiss-Wright Airplane Division in Columbus 1940-1950

by Richard A. Morley

The 50th anniversary celebration of Columbus International Airport in 1979 was to feature the last flying Curtiss-Wright SB2C *Helldiver*. But a last-minute blown cylinder delayed its arrival to this commemorative event until 1980. The airplane, one of over 5,000 built at the Columbus plant, is owned and was flown to Columbus by the Confederate Air Force. During its visit, fond memories of production and engineering struggles were rekindled by the many employees who worked at Curtiss-Wright Columbus during World War II. It was in Columbus that the airplane was plagued by modifications due to the original specification requirements and 889 design changes in addition to the political aspects. In spite of all the changes and delays in production and deliveries, its idiosyncrasies were tamed and the airplane went on to become the backbone of carrier bombers. The *Helldiver*, one of the first radar-equipped airplanes, proved itself in a variety of missions including torpedo bomber and anti-sub patrol. Because of the successful commitment by the service pilots, crews and factory personnel, the Navy justified their early faith in Curtiss-Wright and the SB2C. But still plagued, the tail wheel on the CAF *Helldiver* was damaged during landing at Columbus International Airport limiting the airplane as a static display.

Development of the Third-Generation *Helldiver*—On August 6, 1938, the Navy Department sent a request for designs and informal proposal on a Class VSB airplane to Curtiss-Wright at Buffalo and other aircraft manufacturers. Among the minimum requirements were a maximum power-off stalling speed, range at economical speed, service ceiling, takeoff in a 25-knot headwind and a maximum braked diving speed. The performance requirements were augmented with criteria for armament, power plant, radio and strength. The request also specified a critical and arduous requirement: "Minimum weight and size are desirable, but consideration will be given to designs of 9,000 to 9,500 pounds (in the 500-pound bomb condition with sufficient fuel for 1,000 miles' range at economical speed), if increased performance sufficient to warrant such weight increase proves attainable." Limitations as far as size were also specified: "Overall height

with wings folded shall not exceed 17 feet . . ."; "The limiting overall dimensions shall be those which will permit handling the airplane with wings folded on an elevator 41 feet by 48 feet with a clearance of not less than 12 inches all around. However, minimum dimensions are of greater importance. Attention shall be given to the possibility of handling two airplanes on an elevator of these dimensions." A perplexing situation because each contractor prepared open competition bids, so cost was of prime importance as the Navy request would result in only two experimental airplanes. The restrictions of the request would require a lot of airplane in a small package.

Other requirements imposed a number of "firsts": Installation of the Wright experimental R-2600 engine, a turret for the gunner, combined folding wings, double-split flaps and dive brakes of high capacity, alternate installation of imported 20mm guns, rebreather oxygen system and rubber deicer boots. Curtiss' Chief Engineer Don Berlin assigned Ray Blaylock as Project Engineer along with 300 engineers and the proposal was submitted to the Navy December 6, 1938.

In January 1939, Curtiss-Wright, winner of the VSB competition, was notified they would be awarded a contract based on the installation of a power-operated turret even though no actuators or controls were available at the time. Contract NO(a)66638 dated May 15, 1939, was issued for one Model XSB2C-1 airplane.

Delay in delivery of the first aircraft became evident almost immediately. Wind-tunnel testing revealed lift problems and as a result, wing area was increased from 385 to 422 square feet. All wing components had to be reanalyzed and evaluated for strength. This redesign caused an increase in weight. To save weight, many components were redesigned using magnesium.

Later in 1939 it became known the experimental R-2600 would not be available as predicted. With the airframe behind schedule, this new delay became a temporary saving grace. The engine was finally tested and delivered in August 1940.

Two orders, Contract NO(s)79082 and an amendment, were received for a total of 370 SB2C-1 airplanes November



Curtiss-Wright Columbus facility in October 1944 view looking southeast.
(C-W)



A first-generation *Helldiver*, the Wright-powered 02C-2(F8C).
(R.W. Cramer)



A second-generation *Helldiver*, the SBC-4. These airplanes were built up to the beginning of World War II in Buffalo and some were operational during the war.
(R.A. Morley)



The third-generation *Helldiver*, the XSB2C-1. This airplane destroyed during terminal dive, December 21, 1941.
(R.W. Cramer)

19, 1940, and the prototype had not yet flown. About the same time, formal groundbreaking ceremonies were taking place for an aircraft production facility on the southwest corner of Port Columbus Airport, Columbus, Ohio. This facility, designated as Plant 3, would be operated by Curtiss-Wright under the auspices of the Navy and would be the new home of the SB2C-1 *Helldiver*.

First flight of the XSB2C-1 was made in Buffalo by Lloyd Child, chief of the Flight Test Section, on December 18, 1940. Initial flight tests began in January 1941 and indicated several deficiencies. Among these were engine cooling, stability, buffeting, high control forces, strength of the hatches and difficulty in operating the trim tabs. After the 26th flight

SB2C-1 fuselage and final line in Building 3, December 30, 1942. View looking north. Note S03Cs in background. (C-W)

The S03C-1 *Seagull*.

(R.A. Morley)

Curtiss-Wright plant dedication and open house, December 4, 1941. XSB2C-1 and XS03C-1 are in the background. (C-W)

on February 9, 1941, the airplane was extensively damaged due to a nonresponsive engine during the approach for landing. The fuselage broke aft of the rear cockpit and the airplane nosed over. Design investigations continued and changes made as solutions were found. After rebuilding, the airplane was again flown on May 6, 1941. A further 95 flights were made until the airplane was transferred to Columbus on November 12, 1941, where final demonstrations would be made.

The National Defense Program Is Born—The war in Europe was at fever pitch in July of 1940. France and the Low Countries had fallen and the British were fighting an air war to save their existence. No one knew where the next blow would strike. Plans were being made in this country at a fast pace, not only in terms of men but also the necessary machines of war. The National Defense Program was established by the government in its role of "the arsenal of democracy." Quotas were set for types and quantities of military airplanes as part of this expansion effort. At that time, each of the aircraft manufacturers was directed to disperse their production facilities in case of a surprise attack.

Curtis-Wright, among others, was given the task of determining where to disperse their operations, and in addition, providing a plan to increase output of newer type aircraft. Curtiss-Wright was already producing aircraft in Buffalo, New York and St. Louis, Missouri. Expansion at these locations appeared logical, but an additional new location had to be selected as the demands for labor were just too great for these cities.

Enter Columbus, Ohio—Late in July of 1940, Charles W. Loos, vice president of Curtiss-Wright Corporation in New York City and Peter N. Jansen, general factory manager of the Airplane Division, and others visited several cities in the mid-west seeking a site for a new aircraft production facility. Among these cities on their tour was Columbus, Ohio. Their first contact was John Corrodi, a former chief pilot with Curtiss and owner-operator of a flying service at one of the local airports, Port Columbus. Corrodi was familiar with the land areas adjacent to the airport and he was able to pinpoint some of the problems. To the north was a deep canyon called Big Walnut Creek which would be a major landfill problem and to the south was the main east-west railroad artery in and out of Columbus which would restrict airport access. Two sites were considered, the farmland to the east and city-owned property to the west. Both were closely scrutinized and the east site was declared not feasible due to many construction problems.

The west site appeared most logical but remained uncertain because of the possibility the area was too small as a 25-acre minimum was required for the building alone. They went to City Hall and contacted Floyd F. Green, mayor of Columbus. He was enthusiastic about the possibilities of the



Curtiss plan. He called in Paul Mantel, chief engineer of the city, and discussions took place over the blueprints of the airport grounds. It was agreed the site on the southwest corner would be satisfactory to allow sufficient room for the plant, employee parking, railroad access, support buildings, and most important, accessibility to the airport and room for future expansion. The group explained a report had to be prepared for the government along with recommendations in just three days. Almost two months passed while the government analyzed the report, made their investigation, came to a decision and completed negotiations for the site. The Civil Aeronautics Administration gave their stamp of approval along with Lester R. Waugh of the Reconstruction Finance Corporation. The City Council of Columbus held a special meeting on November 1, 1940, and approved the leasing arrangement between Curtiss-Wright, the Defense Plant Corporation and the city. Soon after, on November 28, 1940, groundbreaking ceremonies were held. Among those present were Guy Vaughn, president of Curtiss-Wright, Burdette S. Wright, vice president, J.A. Williams, the new general manager of the Columbus plant, and Mayor Floyd Green.

Construction Begins—An immediate temporary facility was required to house the administrative, training and critical production functions. A lease was signed with the State of Ohio for the use of the cattle exhibition barns at the Fairgrounds in the northern section of Columbus with the proviso that the premises be vacated before the next fair to be held the following summer. There was no heating system as the barns were designed for fair weather summer use only, so portable heaters were rented and installed. The barns were



cleaned and renovated. On December 10, 1940, machines, desks, files and people began moving in. Employment offices, training, plant layout and other administrative functions were operated from the cattle barns. The coming move into the new airport site was planned and scheduled. New machinery and material procurement were expedited. All this at the direction of the Development Planning Committee that included Don Berlin, Ray Blaylock, J.A. Williams and John Corrodi.

Fabrication of sheet metal details and machining of components for the SB2C, S03C and P-40 were started. E.K. "Bob" Fry, sheet metal general foreman, and others were sent back to Buffalo to beg, borrow or otherwise "requisition" raw material to get the operation going. The original factory team was temporarily housed in the old Fort Hayes Hotel in downtown Columbus. Actual excavation at the airport site began January 20, 1941, under the supervision of M.A.Jensen, Curtiss-Wright plant engineer.

There was no doubt the country roads leading to the airport were not built to handle the anticipated traffic to the site of the new plant. With cooperation from the city, construction of new access roads and renovation of the older streets began so that getting to and from the plant would be possible without major traffic tieups. Coordination with the railroads was necessary as access to the new plant had to be provided for transportation of incoming parts and material.

Starting in June 1941 personnel began moving from the cattle barns into the completed portion of the plant at Port Columbus. All P-40 details were transferred back to Buffalo. By this time a training complex had been established at 309 South Fourth Street in downtown Columbus under the direc-

tion of Ray Watkins. The syllabus was the same as the other Curtiss plants in St. Louis and Buffalo. From the original 13 people in November 1940, the work force would grow to 13,000 before the end of 1942 and 25,000 at the end of the war.

Just 147 days after construction began, people, equipment and machines were moved into the plant and after 318 days full production was under way. With the myriad of planning and construction problems out of the way, the formal dedication of the plant took place with an open house December 4, 1941. On hand for the dedication was Rear Admiral John Towers, Chief of the Bureau of Aeronautics; Artemus Gates, Assistant Secretary of the Navy for Air; Merrill Meigs, Chief of the Aircraft Section, Office of Production Management; Colonel Philip Schneeberger, Industrial Planning Head, USAAC, Wright Field; Thomas Wilson, President, Columbus Chamber of Commerce; John W. Snyder, Defense Plant Corporation; and Mayor Floyd Green. Representing Curtiss-Wright was Guy Vaughan, President; Burdette Wright, Vice President; Charles Loos, Vice President; and J.A. Williams, General Manager of the Columbus plant. (Admiral Towers was involved with Curtiss from the early days of Naval aviation having learned to fly from Glenn Curtiss in 1911. Towers was the Navy test pilot during the Curtiss/San Diego operation. He was also pilot of the Curtiss NC-3 during the first Atlantic crossing in 1919. Author's note.)

Who's in Charge?—The management team was led by J.A. Williams, a 20-year veteran of the Curtiss organization. Starting his career in 1921 in the experimental department at Garden City, Long Island, he was former assistant to Burdette



S. Wright, general manager at Buffalo. He attended Baltimore Poly and MIT. He was born June 28, 1896.

The factory manager was Stanley I. Vaughan, who started with Curtiss in 1915 training fliers at Newport News, Virginia. He was promoted to project engineer in 1917 at Garden City and later supervised experimental engineering at the Buffalo plant. Stan was vice president of the "Early Birds," a nationwide group of those who flew man-made wings before World War I. Stan is credited with the assembly of the first Curtiss JN-4 *Jenny*.

Raymond C. Blaylock was chief engineer and was involved with the engineering activity on the P-6E, XP-23, XF-12C, XSBC and the XSB2C. He joined Curtiss in 1929 after graduating from the University of Michigan. He was born September 1, 1904.

The sales manager in charge of contracts was G.B. "Jerry" Clark. An ex-Marine, Jerry earned his wings at Squantum, Massachusetts. After more training at Pensacola, he served aboard the carrier USS LEXINGTON. Joining Curtiss in 1932, he went to the Far East as technical advisor to the Chinese Air Force. In 1938, he test flew Curtiss airplanes in France and witnessed the battle going on there. Born in New York City, he was reared in Virginia.

The quality manager, George T. Bauman, was born in Cleveland, Ohio. His experience included work on the Great Lakes XTBG-1 *Torpedo* bomber, Sikorsky, Chance Vought, Monocoupe, Curtiss-St. Louis, and finally to Curtiss-Buffalo. There he worked on the P-36, YP-37, SOC-4 and P-40. He attended Miami of Ohio, Ohio State University, and Tri-State College in Indiana.

William J. Flood was comptroller and came to Curtiss from the Crosley Corporation and Fairchild Aviation. He studied

Helldiver and *Seagull* final assembly in Building 3, August 3, 1942. (C-W)

business administration, commercial law and accounting at Pace and Pace Institute in New York City.

W.P. Kennedy was one of the two assistants to J.A. Williams, general manager. After graduating with a Master's degree in aeronautical engineering, he joined the Martin Company where he did design work on two-engine bombers and four-engine transports. He started at Curtiss-Buffalo in 1939.

The other assistant to J.A. Williams was John T. Corrodi, a native of Columbus. After graduation from Ohio State, he earned his wings in the Air Corps in 1929. Joining the Curtiss Flying Service at Port Columbus Airport in 1930, he became chief pilot in 1931. Corrodi maintained the flying service after Curtiss discontinued operations at Port Columbus. He rejoined Curtiss in October 1940.

Test Flight—Barton T. "Red" Hulse was named chief test pilot in November 1941. Hulse, a veteran flier, graduated from the Naval Air Training Station at Pensacola and did most of the flight test work. He was flying the XSB2C on its 33rd demo flight when the airplane broke up during a terminal dive December 21, 1941. Hulse parachuted to safety, coming down on Harold Derr's farm on Refugee Road just east of Reynoldsburg. He was not injured during his separation from the airplane but he did step in a hole in the ground and sprained his ankle. He also performed engineering and production flights on the SB2Cs and S03Cs during his tenure at Columbus. His staff consisted of test pilots Bill Meyer, Elwood Collins, Harry Hill, Lee Miller, Bill Webster and Lynn Hurst. Meyer, Hill and Collins were ex-Ferry Command;



A combat-ready SB2C-1C prior to delivery with test pilot Hank Morganthaler at the controls.
(R.W. Cramer)

Webster was ex-Navy; Miller, ex-civilian instructor; and Hurst was ex-Navy and ex-AVG. Hulse was upset with the quality of the airplanes and was promoted to the Research Division in January 1943. He moved back to Buffalo, remaining there for a short time before going to work for General Motors.

Orders Keep Coming—The initial order of SB2Cs had grown from 370 to 3,865 airplanes by June 1942. All this before the flight of the first production SB2C-1. The existing plant did not have the capacity to handle the orders for the SB2C, S03C and newly won contract for the SC, a Navy scout airplane.

A new facility, Building 3A, was finished in late 1942 for SB2C subassembly and final assembly operations. This building was located directly west of Building 3. Building 3 was rearranged to manufacture the detail components of the airplanes, continue delivery operations and flight activity. In addition, S03C and SC production final assembly were performed in Building 3A.

Problems with the SB2C were evident from the very first flight of the prototype with a troublesome engine (Wright Aeronautical was having quality problems with the R2600 at their Lockland, Ohio facility) and others as noted previously.

Curtiss was at a disadvantage in that the prototype airplane had been destroyed. Production continued, however, while the flight test activity was at a standstill as another airplane would not be available for six months. Delays under these circumstances were inevitable. When the first production SB2C-1 flew June 30, 1942, Hulse reported the results were

even worse than with the prototype.

The airplane empty weight had increased over 40 percent to 10,200 pounds. This decreased top speed and increased landing speed and most of the original problems persisted. Adding to the problems were a complex, heavy hydraulic system and a weak tailwheel and hook. Deliveries started in December 1942 with the first sea trials beginning with VS9 squadron aboard the carrier USS ESSEX. The results were so bad that the airplanes were assigned to VB17 squadron aboard the escort carrier SANTEE and other shore-based units to work out the hook and tailwheel problems. No matter how hard the Navy flight and ground crews worked, the airplane was not suitable for routine flying let alone combat. Many changes were made by service crews but still the airplane could not be used in a combat role.

War plans called for replacing the obsolete but reliable Douglas SBD, an outgrowth of the Northrop BT-1. Reliability and capability of the SB2C was certainly questionable as the replacement. The Navy needed greater range, speed and load capacity than the SBD could provide. It was necessary to carry the war to the Japanese and time was running out. Curtiss received the bomber contract in 1939 and as of October 1943 had yet to deliver a combat-ready airplane. Washington was upset by the delays not only by Curtiss but also by other major contractors as well. (The Martin Company was also under fire for the B-26 *Marauder* as being deficient for use in combat.) A Special Committee, headed by then Senator Harry Truman, set out to look into the entire National Defense Program. The examination of Curtiss began in January 1943 and culminated in executive hearings in April. An announcement in the plant paper, the *Curtiss-Wright-er* of January 15, 1943, stated J.A. Williams,

Columbus general manager, was returned to the main plant in Buffalo in a "staff function." He was replaced by J.P. "Jack" Davey who had been works manager at Buffalo and St. Louis and earlier helped establish Curtiss-Wright in St. Louis. Davey remained in this position in Columbus until November 1950.

The Truman Report—On July 10, 1943, the full text of the "Truman Report" was released to the public. It stated: "Hopelessly behind schedule, Curtiss-Wright to date has not succeeded in producing a single SB2C which the Navy considers usable as a combat airplane. . . . The inability of Curtiss-Wright to produce a satisfactory *Helldiver* has caused a loss of production by subcontractors of great value, the extent of which cannot be ascertained. . . . One of the most important losses is due to the psychological effect on the workmen in the plant. . . . The knowledge of the inactivity at the plant has become widely known among the friends and relatives of the workmen and throughout the area adjacent to Columbus and has a bad effect on the morale in that area. . . . Despite this most unsatisfactory performance, Curtiss-Wright has advertised the *Helldiver* as the 'world's best dive bomber.' . . . The committee particularly condemns advertising . . . which was intended to give the public the erroneous impression . . . such eulogistic self praise [has cost] the sum of \$12,448.95."

One of the original requirements on the XSB2C-1 was the addition of a power-operated gun turret. Curtiss had relied on Emerson Electric for the production of turrets but they were unable to take on the added work. The turret was Curtiss-designed, as no other turret was suitable for installation in the SB2C. Problems in obtaining satisfactory sources for detail parts necessitated Curtiss to select Norge, then a division of Borg-Warner, to manufacture the complete turret. By letter of intent of May 23, 1942, Norge was authorized to proceed with the tooling. After mock-up board review and resulting changes made, Norge was then authorized to release 50 turrets for production, November 1942. The first turret was delivered to Columbus, January 1943, and was termed unsatisfactory in that tests revealed "excessive sight vibration, inconsistent sight tracking with erratic and excessive fire interruption." It was decided at this time by the Navy to install a hand-operated twin .30-caliber turret in the SB2C-1 and the SB2C-1A (A-25). The Truman committee recommended to the Navy "the matter be investigated vigorously to ascertain whether or not the Curtiss turret was the best turret." (Further development by Curtiss/Norge and testing by the Navy resulted in cancellation of the power turret, December 18, 1945.)

In deference to Curtiss-Wright, heavy self-sealing fuel tanks and armorplate were not a part of the original invitation to bid for the Class VSB airplane. In fact, the design requirements and limitations were so herculean, the Brewster SB2A, Curtiss' competition, was in far worse shape than the *Helldiver*. Further, it should be noted that a realistic design approach for combat airplanes did not exist in 1938. It is extremely difficult to make a production airplane out of an experimental airplane. When the bids were prepared, cost was most important because only two aircraft were involved. As a result, hard tooling was not considered nor was there any



Some days don't go too well! SB2C-1 tangles with truck on taxiway north of parking lot, August 30, 1943. (C-W)

look forward to production design. As the airplane progressed from experimental to production, it became seriously overweight from the original design concept. By this time, SB2Cs were being manufactured in Canada. The facilities there were not as modern and in keeping the Navy-imposed standardization policy, some aspects of the SB2C were not utilizing the latest technology. One other aspect which plagued Curtiss was the drafting of key workers into the armed services which created replacement and training problems. The Investigating Committee didn't consider these problems and criticized both the Navy and Curtiss regarding delivery delays and effectiveness of the *Helldiver*. But fortunately, the Navy was more aware of the potential of the *Helldiver* and on July 15, 1943, Curtiss received a wire from Artemus Gates stating, "The Navy intends to continue the *Helldiver* program . . . we are confident that design difficulties will be overcome . . . that the plane will play an important part in the defeat of the Axis."

In passing, Senator Truman made a follow-up visit to the Columbus plant later in 1943. Because of ill feelings as a result of the report, he was quickly escorted in and out of the plant by the management. Unfortunately for Curtiss, he became President after Roosevelt's death in April 1945. Whether or not he was influenced with Curtiss will never be known, but they never received a production airplane contract after that.

SB2C Goes to the Navy—Deliveries continued and the USS YORKTOWN departed in May 1943 with SB2C-equipped VB4 and VB6 squadrons. The results were no better and J.J. Clark, the ship's captain, recommended the program be scrapped. The airplanes were placed ashore where the second series of modifications were made. Still the Navy did not give up and in July 1943, VB17 squadron embarked on the USS BUNKER HILL where yet another series of modifications was found to be necessary.

With time a factor, the decision was made to continue full production of the SB2C to attain a rate of 85 airplanes per month. The plan, with full concurrence of the Navy, funneled airplanes directly from final assembly to a modification center to be located in a new building north of Building 3A and designated Building 3B. Here, in the Mod Centet, every

airplane would be upgraded to the latest configuration. The airplane designation was changed from -1 to -1C. In addition, a complement of 50 airplanes was updated and modified for the first SB2C combat squadron, VB17. The changes were a result of the trials just experienced by them.

By February 1944 over 1,000 SB2Cs had been built. Most of the bugs had been worked out and the Navy declared more of the airplanes were needed so the rate was increased to 23 per day. To achieve the production of almost one airplane per hour, Department 38, Final Assembly, under the direction of R.W. "Bob" Cramer, simply sped up the already mechanized line. A bell sounded to alert everyone when production was going to stop usually due to a lack of parts. When this occurred, even on the third shift, Cramer was notified along with his boss, S.J. "Soc" Gailey, the SB2C manufacturing superintendent. The wheels started rolling and the shortage area determined, lack of parts traced to the source and immediate "on-the-spot" corrective actions were taken so that interruptions were held to a minimum. Many foremen and leadmen had sleepless nights for sure.

First flight of each SB2C was made from the ramp area just north of Building 3B, also under the supervision of Bob Cramer. After company and Navy acceptance, the airplanes were towed to Building 3 where they were painted, squawks worked off and otherwise readied for delivery. This department was directed by Charles Bollech.

Success at Last—In his book, *Helldiver Squadron*, Robert Olds describes the successful efforts of VB17, "The many years of constant pioneering of the air by the Navy paid off with great dividends. Bombing 17 was called upon to play the role of pioneer in one small but vital phase of this development. In addition to carrying out these duties, the squadron

Forward visibility was limited on the SB2C and a relaxed approach to taxiing resulted in the above mishap, September 13, 1944. (C-W)

helped create the tidal wave of offensive power which in late 1943 and 1944 swept the enemy thousands of miles westward across the Pacific." VB17's success was accomplished with new pilots and new airplanes, the SB2C. From their first mission at Rabaul in November 1943 to their final relief after Tinian and Saipan in February 1944, VB17 proved themselves and showed the way with the *Helldiver*.

Hatching the Seagull—The S03C *Seagull* was a second-generation Curtiss scout-observation airplane which could be equipped with wheels to operate from land bases, or with floats to be catapulted from battleships or cruisers for long-range observation.

Early in 1937, Curtiss received an invitation to bid, Bureau of Aeronautics Design No. 403, for a new type of single-wing, scout-observation airplane. Earlier Curtiss SOs were radial engine-powered and the new airplane would be equipped with an in-line, 12-cylinder, inverted V, air-cooled engine, a military first. A single-point attachment for the float and folding wings were specified as the airplane would have to fit into a space 14.5 feet square. The gross weight could not exceed catapult capability of 6,350 pounds.

The design assignment was given to Bruce Eaton, a development engineer at the Buffalo facility. By August 1937 the paper airplane version was approved by management. The submittal consisted of 10 drawings, four books of specifications and a guarantee of maximum speed, landing speed, range and delivered price. Louis Raiche, later to become chief inspector at Columbus, was assistant project engineer.

After three months of deliberation and investigation by the Navy, Curtiss received a contract award November 1937. The mock-up and wind-tunnel models were built and in June 1938 the Navy approved the mock-up. On October 6, 1939, the XS03C-1 was flight-tested with wheels.

In January 1940, the XS03C-1 was taken to Washington, D.C., for the final demonstrations as a landplane for the





Navy Board of Inspection and Survey, called the Trial Board. At the end of January it was taken to Norfolk, Virginia, for the seaplane tests and final contractor demonstrations. The airplane was turned over to the Trial Board the middle of March 1940 for their final testing.

Problems began to show in the airplane. All during the flights engine cooling plagued the Curtiss engineers. An engine failure occurred and the XS03C-1 sank until only one foot of the plane was showing. The airplane was rebuilt by Curtiss in Buffalo where cooling tests were performed but the engine persisted in operating too hot to run properly. Production engineering was begun in September 1940 and it was decided to take the XS03C-1 to the Langley Field full-scale wind tunnel in September 1940. The cooling problems were finally solved by enlarging the air scoop and adding extra cowl flaps. Another engine failure in November at Buffalo necessitated a forced landing, the airplane nosed over and the front end was damaged.

In December 1940, when Curtiss moved into the cattle barns at the Ohio State Fairgrounds, production of S03C parts began. Flight testing continued at Buffalo and other changes were made as a result. The vertical fin and rudder were enlarged to improve directional stability and the distinctive winglets were added to improve lateral stability. On March 4, 1942, the first S03C-1 was flown by Red Hulse in Columbus and deliveries began.

Six hundred thirty-nine S03Cs were built in Columbus; 250 of these were delivered to the British under the terms of a Lend-Lease agreement. But the airframe was too heavy for the powerplant so they were used for training purposes and drone work only. Before production ended, the Navy and the British began withdrawing them from operating squadrons. The official name of the S03C was *Seagull*. The British renamed it *Seamew* while the Navy nicknamed them "Socks." But to the Curtiss employees, it was known as the "Reluctant Dragon"—reluctant to take off and always draggin'.

Another Hawk—Probably the most successful Curtiss Ohio airplane was the SC series *Seahawk*. This would be the last production contract received by Curtiss-Wright in Columbus and it would also be the last scouting airplane used aboard battleships and cruisers.

Conceived as a high-altitude, armed, powerful and fast

scouting airplane, it was intended to keep up with fighters of the day. It was catapult-launched and was convertible from wheels to floats. The Navy requested designs and proposals in June 1942. The Curtiss proposal won over the competition and they received a letter of intent the end of October 1942. The contract for five prototypes was signed in March 1943 and the production order was finalized the following June.

Required as a replacement for existing shipboard catapult-launched scouts, the SCs were delivered as landplanes. The floats were procured by the Navy from Edo for installation prior to assignment to ships. A fast performer, it utilized an R-1820 engine manufactured by Wright Aeronautical and featured a four-bladed Curtiss Electric propeller. The overall design was as simple as possible to allow for quick manufacturing and rapid delivery. Flight of the first prototype was made eight months later on February 16, 1944. The first production delivery was made in July of 1944. A further order of 240 airplanes was received for an upgraded airplane designated SC-2 in May 1945. The SC-2 had a one-piece canopy, rescue equipment, and a 1,425-hp R-1820-76 engine. At the end of the war only 10 airplanes had been delivered with one bailed to the company for development of air-sea rescue equipment, this airplane being delivered in 1948.

Test Flight Activity—The Test Flight Activity at Columbus included both production and experimental flying. Production test pilots fly airplanes as they come out of final assembly while experimental test pilots fly new, untried planes or production models which are undergoing major changes.

Prior to the initial flight of a production airplane, it was put through a preflight checkout by a "ground pilot," a member of the inspection department. The preflight consisted of operation of the engine, prop and controls, canopy, hydraulic systems and finally, a taxi test. The taxi test included simulating a brisk ground loop, first in one direction, then the other. This was necessary to check integrity of the landing gear. The airplane was then taxied slightly faster than normal and the brakes applied to check for proper tracking and brake response. E.L. Bradley, superintendent of flight inspection, was responsible for this activity. One of his "ground pilots" was Dolly Heberding, a local flight instructor and the only female performing this function at Columbus.

When the airplane was accepted, it was turned over to a

test pilot for flight demonstration. During these "shake-down" flights, the engine was checked at all ranges of power and the resultant indicated airspeed matched to acceptable limits. Flying qualities were checked to ensure proper balance of the airplane. Then the airplane was put through specific mission-oriented tests. The SB2C was taken to 22,000 feet and put into a high-velocity dive. The dive brakes were opened to guarantee a maximum airspeed of 250 mph and ensure integrity of the airplane. Another example was a specific test on the SCs which was to attain 35,000 feet before reaching downtown Columbus just 10 miles away.

Generally, retests were not common, although some anxious moments were experienced by Red Hulse when he found during takeoff that his ailerons were crossed. He also had a hair-raising episode when his control stick came out of the socket during a test flight. One can only imagine his attitude upon completion of these flights. Ralph Charles flew two and sometimes three SB2Cs daily during his year and a half as a test pilot at Columbus. His only in-flight malfunction was a prop that remained in low pitch. He returned to Port Columbus and while taxiing to the Curtiss flight ramp,



he tried the prop control one more time. The prop responded normally so he turned around and took off again, completing the test flight.

The performance of the tests could be accomplished in 15 to 30 minutes. The Navy, however, stipulated that each airplane would be flown a minimum of two hours. This gave each pilot a chance to peruse the countryside by flying down to the Ohio River or up to Lake Erie to check on the local fishermen there.

Charlie Betzler had more hours in the SB2C than any other Curtiss test pilot. Bill Meyer had a stuttering problem. It was almost impossible to comprehend what he was saying, but when he flew an airplane his words came over the radio crisp and clear as a bell. According to several former employees and unknown to Chief Pilot Bill Webster was that one pilot always came to work inebriated. After clearing himself with oxygen, he would test-fly his assigned share of airplanes. It was not known if he had a fear of flying. During the tenure of Curtiss-Wright in Columbus only one test pilot was lost in a crash, Lynn "Tex" Hurst.

Columbus-Built Experimental Helldivers—The first experimental *Helldiver* was the XSB2C-2. This airplane was originally the same as the first prototype built in Buffalo. It was converted to a twin-float seaplane. Intended to be delivered to the Navy for evaluation, it performed satisfactorily, but like most seaplanes, it was a sitting duck for fast enemy fighters. The Navy reevaluated their need for this type airplane and they canceled the program in April 1944.

The next "X" *Helldiver* was the production prototype for

Seahawks in flight. Note pants on airplanes 4th and 6th from left. (C-W)

SC-1 on float with wings folded, March 28, 1944. (C-W)

The SC-1 shown on floats; 566 were delivered as landplanes from Columbus. (Smithsonian No. 89-16873)





The XBTC-2 shown above with distinctive counter-rotating prop driven by an R4360 P&W engine with Bill Webster at the controls.

(Smithsonian No. A47243)

Columbus test pilot staff as of April 1944 in front of early SB2C-3. L to R: Bill Webster, chief pilot; Howard Pemberton; Lee Miller; Hank Morganthaler; Bill Harrigan; Omar Midyett; Charles Betzler; Roy Franke; Harry Hill; Charles Curry; Albert Lane; Ralph Charles; Bill Meyers. Not present, Collins, Koerner, Kinder, Rutherford, Singer, Brooks. Occasion was Navy Press Party and featured flight demo by Collins, Koerner and Pemberton.

(C-W)

the SB2C-5. It incorporated all -5 features for development and tests in advance of production. The XSB2C-5 was a modified SB2C-4E.

Two SB2C-3 airplanes were equipped with P&W R-2800 engines and redesignated XSB2C-6. The fuselage length was increased and the vertical, horizontals and wingtips were modified. The cowling was revised with new airscoops. No production orders were received for this airplane as the war was nearly over.

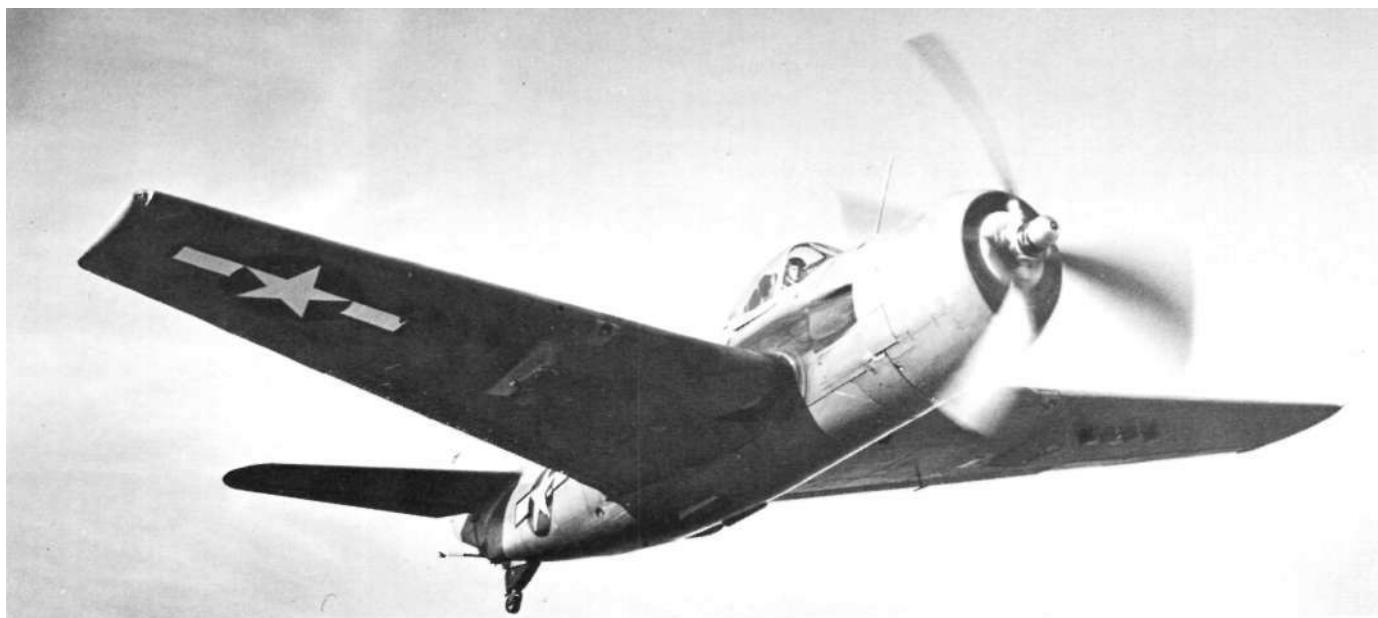
Worth mentioning is the XSB3C-1. No flying airplane was built under this designation although a mock-up was constructed. It featured a nose gear, power turret, increased payload capability and the Wright R-3350 engine. Canceled by the Navy, the Army was interested for a time as the XA-40-CS but no production orders evolved. Some of the features, however, were incorporated on the XSB2C-6.

Other "X" Airplanes—In December 1943 Curtiss received a contract for a dive bomber-torpedo airplane designated XBTC-1. Changes in the airplane were made and it became the XBTC-2. It featured a P&W R-4360 engine with counter-

rotating propellers, a payload of nearly 4,000 pounds and firepower consisting of four 20mm cannons in the wings. Development delays resulted in delivery of the airplane 2.5 years later.

Curtiss received a contract for 10 XBT2C-1 combination dive bomber-torpedo airplanes in March 1945. Looking much like the XBTC-2, it used the Wright R-3350 engine and a four-bladed Hamilton prop. With a payload of 4,000 pounds, two 20mm cannons, AN/APS-4 radar and substantial armor, the XBT2C-1 was outclassed by the Douglas BT2D. Nine airplanes were delivered by late 1946 but no orders were received for production.

Three prototype fighters, designated XF-15C-1, were built



for the Navy in Buffalo with Fred Steele as project engineer. When that operation ceased in 1945, two XF-15Cs were flown to Columbus, one having been lost in a fatal accident. Here, a modification to the airplane tail was made and flight test activity completed. The airplane was single place and powered by a P&W R-2800 engine in front and a mid-fuselage-mounted British Halford H-1B jet engine built by Allis-Chalmers. This program was completed in October 1946 when the last prototype, and last Curtiss Navy fighter, was delivered to the Naval Air Test Center at Patuxent River, Maryland.

To support an Army Air Force requirement for an all-weather jet fighter, in November 1945 Curtiss received a contract for one multi-engined airplane, the XP-87 *Blackhawk*. Walt Tydon was project engineer with Charles Zimmerman as group engineer. Two Westinghouse J-34 engines were housed in a nacelle in each wing. The crew consisted of the pilot and a radar operator. The airplane featured hydraulic-powered control surfaces and gun turrets in the tail and nose. But delays in delivery of the turret necessitated building the airplane without the armament. It was overweight and

XBT2C-1 in flight with Lee Miller at controls.

(C-W)

The conservative and cautious test pilot, Lee Miller, January 2, 1945. Lee would replace Bill Webster as chief. At North American Aviation, he was Chief over Production Test Pilots and Transport Operations.

(C-W)

XBT2C-1 shown with wings folded.

(C-W)

thus performance requirements were not met. The XP-87 (later XF-87) was shipped by truck to Muroc for testing. It met with an accident just 30 miles west of Columbus in the town of West Jefferson when the airplane tail struck an underpass.

All roads had been surveyed for clearance before shipment by a team headed by Stan Vaughn, Jr. But just before they returned to Columbus and unknown to them, the State of Ohio Highway Department added two inches of blacktop to the underpass where Route 40 meets Route 42 at West Jefferson. The airplane was returned to the factory for repairs thus creating delay in beginning flight test. When the airplane was prepared for transport to Muroc, it met with another incident in Tulsa, Oklahoma. The driver of the rear truck carrying the wing fell asleep and damaged the fuselage

mounted on the forward truck. Otto Acker, Engineering Structures Test, was sent out to survey the damage. To save time, replacement parts were made in Columbus and repairs made at Muroc in California. Bill Harrigan and Lee Miller were the XP-87 test pilots.

Numerous other accidents at Muroc delayed flight tests and the program was canceled in October 1948. This would be the last military airplane built by Curtiss.

Retrenchment—Vacating Some of the Facility—When World War II was over in August 1943, Curtis-Wright Columbus laid off 22,000 people. The Buffalo, St. Louis and Louisville plants were closed. The headquarters for Curtiss-Wright Airplane was transferred to Columbus in December 1945. Three thousand people were retained as part of this operation.

The S03C program had been completed in early 1944 and the production contracts for the remaining SB2Cs and SCs were canceled. With no new airplanes on the board, no marketing and an apparent lack of interest in building airplanes on the part of management, the result was a greatly reduced business volume. In just five short years, Curtiss-Wright Airplane went from the largest airframe manufacturer to almost oblivion while the other major aviation companies were concentrating on and investing in the future.

Curtis-Wright retrenched to Building 3, the first Columbus plant. Buildings 3A and 3B were now empty and responsibility reverted to the War Assets Administration. In 1948, WAA leased these buildings to Carl Strandlund, president of the Lustron Corporation, manufacturers of porcelain-enamelled homes. These homes were designed for mass production and included built-in wiring, plumbing and major utilities—the answer to an existing veterans housing problem. Several Lustron homes were erected in the Columbus area and are still attractive. Unfortunately, the building trades unions objected and in less than two years the Lustron Corporation was bankrupt. The facilities set up by Lustron were left intact in Buildings 3A and 3B in 1949.

To keep the doors open, Curtiss received contracts to overhaul and repair B-17s, C-46s, R5Gs and R4Ds. Control surfaces for the Republic F-84, ailerons and flaps for the Boeing B-47 and wing ribs for Aeronca were manufactured by Curtiss. Bumpers were stamped out for Twin Coach, a bus manufacturing company. Detail parts were made for Joyce-Gridland auto lifts. An overhaul program on airborne auxiliary power units kept 120 people busy.

A Navy target drone, the KD2C, was developed by Curtiss-Wright beginning in 1947. The drone was similar to the German V-1 buzz bomb. The powerplant was a pulse jet and was in-flight tested mounted under the bomb bay of a B-26. No production contracts resulted and the program was canceled in 1948.

B-29 Reconditioning Program: The End in Sight—In February 1950 Curtiss began negotiations with the Air Force for the overhaul and repair of B-29s. In July 1950 the North Koreans invaded South Korea. President Truman involved the United States in this "police action" through the U.N. Almost overnight our armed forces had to be brought to strength. As a part of the plan, the Air Force decided to



The Curtiss-Wright XF-15C-1 built in Buffalo and finished in Columbus. Shown here under jet power only with Lee Miller in the cockpit. September 3, 1946. Airplane flew at speeds up to 450 mph during tests of the T-tail. (C-W via Fred Steele)

The XP-87 Blackhawk, the last Curtiss airplane, over the Mojave during tests at Muroc. (R.W. Cramer)

R4D overhaul in low bay area, Building 3. View looking west. (CW)

utilize existing long-range bombers and base them in Japan. The problem was there weren't enough of these giants available in flying status. Curtiss-Wright was contracted to overhaul and repair 200 B-29s presently in storage condition at Pyote Field, Texas. The total number of airplanes actually reconditioned was 55. The remainder was finished by Lockheed-Georgia. This would be the last military airplane contract awarded to Curtiss-Wright.

While the master plan for this work was being updated at Columbus, George Ohl of Flight Inspection was sent to Pyote to get the preliminary details under way. Records were reviewed and airplanes selected for the program. Mechanics were hired along with other personnel to ready the airplanes for the ferry flight to Columbus. Flight crews had to be qualified and this was accomplished at McDill AFB, Florida. The Curtiss flight crews were Lee Miller, now chief test pilot, Paul Van Keuren, a former Buffalo test pilot, George Cochran, Charlie Betzler, and Flight Engineers Dick Gast and John Roshon.

On August 17, 1950, Production Planning, under the supervision of Vernon Sanford, finalized the Master Plan. The plan specified 56 airplanes in-work with a delivery rate to reach a maximum of 20 per month.

Fourteen stations were utilized with four airplanes at each station. A moving line (with all airplane moves being made on weekends) originated at Station 1 with the receipt of the airplane after arrival from Pyote. Disassembly, teardown and removal of overhaul items began in Stations 2, 3 and 4. The



airplanes were then moved inside for structural repairs, installation of engines and props, control surfaces, fuel cells, instruments, turrets, squawk clearance and systems checkout at Stations 5 through 9. Next the airplanes were moved outside where cabin pressure, water and fuel flow tests were performed and armament was installed at Stations 10 and 11. Engine ground checks were made and loose items were installed at Station 12. Outer wing panel installation, systems servicing and preflight were made at Station 13. Final check, flight and acceptance were made at Station 14. So far, everything was going very smoothly until the middle of November 1950 when Columbus had the biggest snowstorm in its history. But a bigger storm was about to hit the Curtiss operation.

North American Aviation, The New Tenant—North American Aviation, managed by J.H. "Dutch" Kindelberger, needed more space for the production of jet fighters for both the Navy and Air Force. The Navy-operated Columbus plant came under scrutiny as Buildings 3A and 3B were occupied by the now-defunct Lustron Corporation. Negotiations for turn-over from Curtiss to NAA were completed prior to Thanksgiving 1950. Final negotiations for remaining Curtiss capital assets were accomplished in the Building 3 basement criteria between "Dutch" and Jack Davey the night before the NAA takeover. The major tasks facing NAA were not only establishing themselves within the Columbus community but also finishing the Curtiss contracts and cleaning out the equipment and materials left over by Lustron. Expansion was necessary in these areas as NAA needed all the space they could muster. NAA did not desire to finish the B-29 program and the result was the transfer of that program to Lockheed. NAA brought to their new Columbus facility the *AJ Savage*, the *FJ Fury*, the *F-86 Sabre Jet*, and an 824 T-6 *Texan* overhaul program, all of which began a 38-year tenure in central Ohio.

The North American Aviation operation, later becoming Rockwell International, was very successful in Columbus. The transition from Curtiss-Wright was made easier by the experienced and dedicated Curtiss-Wright employees. NAA maintained a shop rating system where all facets of the operating methods of production departments were considered. Included were attendance, schedule, parts rejections and budget among others. Department 38, Production Flight Test, won the top rating award almost continuously for the first three years of NAA. A monthly dinner was given for the winners of the award. The management of Department 38 was all ex-Curtiss-Wright employees. The people learned their trades sometimes the hard way, but in spite of the problems the employees of Curtiss-Wright managed to build over 6,000 airplanes in Columbus. Without these airplanes, World War II could have lasted longer than it did. The first Columbus employee was Dick Thomas in personnel and the last employee was Ruth Krick who closed the financial books on the Curtiss-Wright Airplane Division.

The Curtiss-Wright Effect on Columbus—Before World War II, Columbus, Ohio's capital city, was called "an overgrown country town." Folks in Columbus took pride in this and referred to it the same way. This was the way they wanted it. Columbus was a quiet community and the primary business was wholesaling and retailing to the central Ohio area. It also manufactured products for this market in addition to the business of education and government, the former revolving around Ohio State and Capital Universities.

When Curtiss-Wright came to Columbus, the existing labor pool was 40,000 workers. The primary task was to train people in the necessary factory skills needed. Some of the local industries were understandably upset by the high-priced defense business entering the labor market and especially when the UAW demanded a whopping 75 cents an hour

minimum wage for the factory workers. But by war's end, Curtiss-Wright had trained 84,000 people. Peripheral subcontractors had trained another 16,000 making a total of 140,000 skilled workers. This available labor pool supported General Motors in locating its Ternstedt Division in Columbus in 1945, the new Westinghouse plant and almost every other industry in Columbus and Franklin County.

According to the Columbus Chamber of Commerce, Curtiss-Wright changed every facet of the community. Between 1940 and 1950, their labor pool was the basis for other industries in the area. Every business was affected and Columbus owes its economic growth to Curtiss-Wright.

The End of the Tailwheel Saga—Curtiss-Wright's surplus store was generally busy on weekends with the local handymen coming in to look for bargains. So it was with Ray Bausch of Curtiss' Tooling Department. In June of 1945, Ray was trying to find a strong wheel so he could properly suspend the plow on the back of his Shaw garden tractor. He bought an SB2C tailwheel hoping to adapt it later. But this tailwheel hung in his garage from that time until the CAF *Helldiver* had the unfortunate landing in Columbus for the airshow in 1980. The word spread fast throughout the Rockwell plant about the broken tailwheel. Ray brought his tailwheel into the plant the next day where it was installed on the airplane by mechanics from Flight Test. This enabled the last flyable SB2C to perform for the airshow and make it to its next destination in Canada.

A Pilot's Report on the SB2C—The following is a pilot's report on the SB2C by John Hale, now retired TWA pilot. Mr. Hale flies the SB2C for the Confederate Air Force and made the flight to Columbus in 1980.

"One of the greatest pleasures of coming to Columbus with the SB2C was meeting with Charlie Betzler, a test pilot [with Curtiss] with hundreds of hours in the Beast [the nickname bestowed on the SB2C by the wartime pilots and crew]. I flew him to Dayton for a photo opportunity and airshow, and he told me afterward that the flight was his first time in the rear cockpit. He placed a lot of trust in a pilot with 25 hours in type at the time.

"The *Helldiver* was a favorite of mine among the single-engine types I flew with the Confederate Air Force, possibly because most of my flying experience has been with big, heavy planes. It has a roomy cockpit that a big man can feel comfortable in, with most essential controls and gauges easily accessible. I would have liked the ammeter placed higher in the field of vision: with a Curtiss electric prop, constant monitoring of the generator is desirable unless one likes a fixed-pitch prop at the wrong pitch.

"The Wright R-2600 engine available at the design stage did not make for fighter-type performance in climb. The state-of-the-art hydraulic system contributes materially to overall weight. The one thing the rugged *Helldiver* does well in flight is dive.

"Like most WWII combat aircraft, the *Helldiver* is a stable platform—if the pilot holds it so. Unlike modern light aircraft which seek stability with hands off, the Beast tends to wander left, right or down—mostly down. With power on, it glides like a set of car keys.

"Takeoffs are made from the fuselage tank, since excess fuel bypassing the carburetor feeds back into this tank.



The last flying *Helldiver*, an SB2C-5, Bureau s/n 83589, factory s/n 4597, owned and operated by the Confederate Air Force flown into Columbus in 1980. (Bottom) John Hale, the pilot, with airplane on Rockwell's east ramp. Note broken tailwheel. (Rockwell via George Ohl)

Unfortunately, this is also the smallest tank, so a pilot on a mission takeoff must remember to switch to a wing tank in climb unless a coughing engine reminds him to do so.

"Perhaps the most enjoyable feature of a *Helldiver* flight is the landing. The Beast has, with full flaps, a beautiful ground cushion comparable to that of a P-47. At partial power, short of the touchdown point, a veritable mattress can be felt at about five feet above the runway. At this time, ease off power while attaining a three-point attitude, and a sensual touchdown results.

"Ironically, the *Helldiver* was designed for carrier operations where pretty landings were low priority. 'Get the SOB aboard any way you can and try to snag the third wire.' The Beast was stressed for hard landings, and many were made. In this vein, some (including those who flew the *Helldiver* in combat) maintain that the designation SB2C really means Son of a Bitch with 2 Cockpits."

A Brief Curtiss-Wright Background—Glenn Curtiss started his aviation career building a frail, but successful, little flying machine he called the *June Bug* in 1908. The Wright brothers promptly took him to court for infringement of their patents. Many years were spent in court and Curtiss tried many ideas trying to find a way around the Wright's rights. Curtiss built many machines for the Navy and the Army with his early successes being the JN-4 *Jenny* and the NC flying boats. After Curtiss retired and moved to Florida, controlling interest was sold to North American Aviation, a conglomerate and holding company. In 1929, through the efforts of Clement Keyes, the Director of NAA, Curtiss Aeroplane, Wright Aeronautical and other aircraft companies were combined to form the Curtiss-Wright Corporation. Curtiss-Wright was later folded under Sperry Gyroscope and was sold when NAA went into receivership in 1933. While the Wrights are recognized as the first to fly, they thought their patents would prevent others from advancing the art of aviation. What they really did, however, was to stop their own advancement. It is ironic after all the problems endured in court that Curtiss and the Wrights would finally get together.

During World War II, Curtiss Airplane Division operated

the Columbus plant; the St. Louis plant where the A-25s and AT-9s were built; the Louisville plant where C-46s and C-76s were built; and the Buffalo and Kenmore plants, the home of the P-40. When Curtiss closed its Buffalo operation in December 1945 the Research Division was donated to Cornell University.

SUMMARY — CURTISS-WRIGHT AIRPLANES BUILT IN COLUMBUS

Model	Qty.	Cum.	Description
3B2C-1	200	200	Production version of <i>Helldiver</i> .
XSB2C-2	1	201	SB2C-1 converted to twin floats for Navy test.
SB2C-1C	778	979	Production airplanes equipped with 20mm cannons and improved flaps.
SB2C-3	1110	2089	Production airplanes equipped with more powerful model of Wright R-2600 engine.
SB2C-4	1500	3589	Production airplanes equipped with perforated flaps and improved airplane balance.
SB2C-4E	544	4133	Production airplanes with AN/APS-4 radar.
XSB2C-5	-	4133	(1) Modified SB2C-4E for preproduction flight test and evaluation of SB2C-5.
SB2C-5	9 70	5103	Production airplanes with revised cockpit and increased strength.
XSB2C-6	2	5105	SB2C-3 airplanes with P&W R-2800 engine, long fuselage and modified empennage, wingtips
S03C-1	141	5246	Production version of <i>Seagull</i> .
S03C-2	200	5446	Production airplanes with tail hook and bomb rack
S03C-2C	259	5705	Production airplanes with more powerful engine and improved electrical, radio, hydraulics.
S03C-3	39	5744	Production airplanes with weight reduction and improved performance.
XSC-1	5	57 49	Prototype shipboard cat-launched scout airplane.
SC-1	566	6315	Production version of <i>Seahawk</i> .
SC 2	10	6325	Production airplanes with engine change, clear canopy and modified rudder.
XBTC-2	1	6326	Experimental dive bomber-torpedo airplane with P&W R-4360 engine and counter-rotating propeller.
XBT2C-1	9	6335	Experimental dive bomber-torpedo airplane with Wright R-3350 engine.
XP-87	1	6336	Prototype all-weather night fighter with 4 Westinghouse J-34 jet engines.

SOURCES

The following former Curtiss-Wright employees provided data:

- Russell H. Keyser, Plant Layout, correspondence, 9/3/88 (Phoenix AZ).
 - Dick Thomas, Employment, correspondence, 9/6/88 (Ocala FL).
 - John Janczyk, General Foreman, Tube-Stacks, correspondence, 8/1 5/88 (Ocala FL).
 - E.K. "Bob" Fry, General Foreman, Sheet Metal, correspondence, 11/29/88 (Ft. Meyers Beach FL).
 - Vernon D. Sanford, Planning, correspondence, 11/20/88 (Columbus OH).
 - George H. Ohl, Flight Inspection, correspondence, 8/8/88 (Columbus OH).
 - Robert H. Kibele, Hydraulics, Engineering, telephone interview, 12/5/89, 12/6/89 (Columbus OH).
 - Robert W. Cramer, Superintendent of Flight Test, personal interview, Carlsbad CA. 4/12/88.
 - Ralph Charles, Test Pilot, personal interview, Somerset OH, 9/19/89.
 - Ken Knowlton, correspondence, 10/21/89 (Columbus OH).
 - Arlene Kelley, Secretary to Jack Davey, correspondence, 8/1 4/89 (Columbus OH).
 - Leo Diehl, Purchasing, correspondence, 9/23/88 (Columbus OH).
 - Earl Shafer, via Gene Reynolds, 5/21/89 (Columbus OH)
 - Stan Vaughn, Jr., Flight Test, telephone interview, 12/28/89 (Columbus OH).
 - Otto Acker, Structures Test, telephone interview, 1/5/90 (Columbus OH).
 - Fred Steele, Project Engineer, telephone interview, 1/29/90 (St. Louis MO).
- The following people provided data through correspondence:
- Russell G. Sherman, former Lustron employee, 10/10/88 (Columbus OH).
 - Gene Reynolds, Rockwell International, 5/21/89 (Columbus OH).
 - Louis E. Miller, Broward County Aviation Dept. 7/14/89 (Hollywood FL).
 - Mrs. Ray Bausch, 12/18/88 (Grove City OH).

- James C. Gorman, Gorman-Rupp Company, 1/23/89 (Mansfield OH).
- Dent Williams, Rockwell International, 8/8/88 (Columbus OH).
- Don McCabe, Rockwell International, 8/12/88 (Columbus OH).
- John Hale, CAF *Helldiver* pilot, 1/18/89 (Halesite NY)
- Hal Andrews. Aviation Historian, many letters 1/7/89 through 12/10/89 (Arlington VA).

REFERENCES

Publication, *Curtiss Fly Leaf* of the following issues:

- Vol. XXIV. No. 5. November-December 1941.
- Vol. XXV, No 6. January-February 1943.
- Vol. XXVI. No. 2, May-June 1943.
- Vol. XXVII. No. 3. July-August 1943.
- Vol. XXVI. No 4. September-October 1943.
- Vol. XXVI. No. 6, January-February 1944
- Vol. XXVII. No. 2. May-June 1944.
- Vol. XXVII. No. 3, July-August 1944.
- Vol. XXVII, No 4, September-October 1944.

Publication, *Columbus Curtiss-Wright-er* of the following issues:

- Vol 1. No 1, September 5, 1941.
- Vol. 1, No. 11, December 3, 1941.
- Vol. 1. No. 27. March 6, 1942.
- Vol. 1, No. 34, April 24, 1942.
- Vol. 1. No. 35, May 1, 1942.
- Vol. 1. No. 41, June 12, 1942.
- Vol 2. No. 16, December 18, 1942.
- Vol. 2, No. 20, January 15, 1943

Newspaper, *Columbus Dispatch* of the following issues:

- February 16, 1943
- February 18, 1943
- February 19, 1943
- February 23, 1943
- April 9, 1943
- April 10, 1943
- July 10, 1943
- July 12, 1943
- July 13, 1943
- July 15, 1943
- July 17, 1943
- August 21, 1943

Truman Report, Extract Page 14 entitled "Investigation of the National Defense Program," Curtiss SB2C *Helldiver*, June 1943

Verbatim report, "Special Committee Investigating the National Defense Program," Subcommittee Hearing, Wright Aeronautical, April 1943.

Document, Curtiss-Wright. "History of the Engineering Development of the *Helldiver* Airplanes." no date.

"SB2C *Helldiver* in Action," Aircraft No. 54, by Robert Stern, Squadron/Signal Publications, 1982.

Helldiver, by Robert Olds, Dodd, Mead & Company. 1944.

Dive Bomber! by Peter C. Smith. Moorhead Publishing. U.K., 1982.

"Columbus Grows Up," Columbus Chamber of Commerce, published by the Ohio State Journal, February 1952.

Publication, Rockwell News, Vol. 8, No. 7, August 1. 1980.

Document, "Curtiss-Wright Master Plan, B-29 Reconditioning Program," August 17, 1950.

ACKNOWLEDGEMENTS

My personal thanks and deep appreciation to the following:

- Gene Reynolds who took many hours of his personal time to run errands in and around the Columbus Public Library for me.
- Hal Andrews, Aviation Historian, for his knowledge of Curtiss-Columbus, leading me around the Smithsonian looking for photos and especially for taking the time to write many letters on the subject.
- Rod Ross of the National Archives and the people at NASM for information searching.
- And all of the ex-Curtiss employees who had data stashed away and let me use it.

ABOUT THE AUTHOR

Richard A. Morley is now retired in Tucson, Arizona, after 30 years with Rockwell International (North American Aviation) and 10 years with Teledyne. His specialty was test equipment design for aircraft hydraulic, pneumatic and fuel systems and engines. He designed test equipment for the AJ, FJ, T2, F100, A5, OV10 and B-1 aircraft for Rockwell and most commercial airliners for Teledyne. He is an instrument-rated commercial pilot. A member of the SAE, he was on the A-6 and AGE-2 committees and wrote several articles on test equipment. He always had an avid interest in Curtiss-Wright and in particular the SB2C *Helldiver*. His address is 14526 North Sky Trail, Sun City, Tucson, Arizona 85737.

