



# The Command-Aire 5C3

A golden age biplane's German pedigree

PHOTOS AND ARTICLE BY GILLES ALLARD

**T**he golden age of aviation saw the birth of a multitude of airplane manufacturers going about their business with varying degrees of success. All of them, however, had one thing in common: The October 1929 Wall Street crash endangered their very existence. Worse yet, a ma-

ajority of them did not survive its ripples, and many brand names vanished forever from the aviation vocabulary.

Nevertheless, thanks to the efforts of a handful of passionate individuals, some long-gone manufacturers have been brought back from oblivion, and their products are still gracing the skies. One such phoenix is

Command-Aire 5C3 N997E, the only flying example of a rather popular airplane type in its time.

Command-Aire Inc. started life as the Arkansas Aircraft Co. Inc. in Little Rock, Arkansas, in 1926. The newly formed manufacturer occupied the former Climber Motor Corp. building at 1823 E. 17th Street. The ad-



adjacent piece of land—more than 20 acres—allowed for the creation of two runways. The new airfield rapidly became known as Command-Aire Field. Nowadays, the industrial buildings are still standing, while the airfield is only a faded memory.

In order to proceed with airplane manufacturing, Morton Cronk, a young graduate from the Massachusetts Institute of Technology, was hired to design the first company product. This phase was completed in the spring of 1927, and an airplane was built according to the defined specifications. Regardless of its good looks, the craft did not fly satisfactorily. A more experienced project engineer was needed to improve its flying characteristics. In spite of this, an application for an experimental license was filed on December 6, 1927.

Albert Vollmecke, a German citizen, earned his mechanical engineering degree from the Technical University at Braunschweig. Fresh out of graduation, he took a position with the Ernst Heinkel Aeroplane Factory at Warnemunde. He later came to the United States as a representative of Ernst Heinkel in license negotiations for the production of a training aircraft. Impressed with the advance-

ment of civil aviation in the United States, he decided to stay and began searching for a position. He learned of an opening for a chief engineer at the Arkansas Aircraft Co., applied for the job, and joined the company in September 1927. Relying heavily on European technology, he went to work immediately on redesigning the poor-flying model 3C3, substituting a thinner Aeromarine 2A airfoil and installing full-span slotted ailerons. With these improvements, the plane flew very well and was very stable.

An application for approved type certificate (ATC) was submitted to the aeronautics branch of the Department of Commerce, and ATC No. 53 was granted in July 1928. The first “official” model 3C3 was rolled out of the plant on January 1928 and was used for ferrying purposes, as the ATC had not yet been granted. The plane carried the NC6690 license number, serial number 515. Power was a war surplus Curtiss OX-5, serial number M-6660, manufactured by the Willys-Morrow Co., of Elmira, New York.

As the OX-5-powered Model 3C3 began rolling off the assembly line in the spring of 1928, the search was on to purchase and install different types of engines. Fitted with a 110-hp War-

“... some time later, I received a letter from Mr. Robert Snowden indicating that the original designer, Albert Vollmecke, was still in good health and living nearby.”



**Bob is checking the integrity of the Hamilton Standard prop during the American Barnstormers Air Tour 2006. The installation of a Wright R-760-8 engine required a supplemental type certificate that proved quite frustrating to obtain, even with the help of the original designer of the plane.**



**J. Carroll Cone, Director of Sales for Command-Aire with model 5C3, serial number W-65, manufactured March 1929. This aircraft was the second 5C3 from the assembly line and was flown to California by company Vice President Charles M. Taylor. Taylor was participating in the Aviation Country Clubs Tour in the spring of 1929. Ruth Nichols, famous aviatrix, wrote in her book, "At Dallas we were joined by another member of the Aviation Country Clubs, Charles Taylor of Little Rock, flying a new Command-Aire."**



**In this factory photograph by R.D. Wolff a horizontal stabilizer of a model 3C3 is being load tested. Holding the sign is none other than designer Albert Vollmecke. Albert always designed with a great margin of safety in all his ships.**



**1929 photograph by R.D. Wolff of factory building and employees. This photo was taken at the height of production, before the stock market crash in October of 1929.**

ner "Scarab" radial engine, the plane became the model 3C3-A (ATC No. 118). When Command-Aire acquired a few Siemens-Halske engines, the basic 3C3 airframe was modified to accommodate it and became the 3C3-B (ATC No. 120). ATC No. 150 was granted in May 1929 to the Model 3C3-T, a training version of the standard 3C3, of which 25 were built.

Having experimented with all sorts of engine variations, a new model was needed. Albert Vollmecke redesigned the 3C3 into its next evolutionary step: the 5C3.

The model 5C3 (ATC No. 184) was a three-place open-cockpit biplane of

**Below: Albert Vollmecke, chief designer (left) and Charles Taylor, former vice president of Command-Aire, with model 5C3, NX925E, on November 12, 1983. The occasion was Vollmecke's induction into the Arkansas Aviation Hall of Fame, November 11, 1983, in north Little Rock.**



THIS PAGE PHOTOS COURTESY BOB LOCK

typical Command-Aire configuration. Powered by a six-cylinder 170-hp Curtiss Challenger engine, the fuselage and empennage were the same as the Curtiss OX-5-powered Model 3C3. Wing design was slightly different, but retained the Aeromarine 2A airfoil. Fuselage framework was classic welded chromoly steel tubing, lightly faired to shape with fairing strips and fabric-covered. The wings were built up of solid spruce spar beams with spruce and plywood ribs, the completed framework fabric-covered.

A wide choice of engines was also offered for the model 5C3. Powered by a 150-hp U.S.-built Hispano-Suiza (Hisso) engine, the plane became the 5C3-A (ATC No. 185). Only one of this type was built, and its stability was demonstrated by Ike Vollmecke's flight from San Diego to Los Angeles—a distance of more than 100 miles—from outside the cockpit. Equipped with a Siemens-Halske, the airplane became the 5C3-AT, of which four were built under ATC No.

209. A 150-hp Axelson engine fitted on a basic 5C3 airframe became the Model 5C3-B (ATC No. 214). Last but not least, the ultimate Model 5, the 5C3-C (ATC No. 233), of which five were built, was powered by a Wright J-6-5 engine.

The relative success of the 5C3 series could not ensure the survival of the company, and Command-Aire officers filed for bankruptcy in 1931. It was a far cry from the proud statement of

its president, Bob Snowden, who said, during his presentation of the Little Rocket at the 1930 St. Louis show (as reported in *Time*): "Command-Aire is the only production airplane which has never killed somebody...never seriously hurt anybody."

But safety was not enough of an edge over the competition. Between 1928 and 1930, The Command-Aire Corp. delivered 230 aircraft of various marques, making it, for a short time,



## Command-Aire 5C3 Specifications

**Engine: 170-hp Curtiss Challenger engine**

**Length: 24 feet 5 inches**

**Height: 8 feet 4 inches**

**Wingspan (same for upper and lower wing): 31 feet 6 inches**

**Wing chord (same for upper and lower wing): 60 inches**

**Upper wing area: 169 square feet**

**Lower wing area: 139 square feet**

**Total wing area: 303 square feet**

**Empty weight: 1,482 pounds**

**Useful load: 883 pounds**

**Payload with 55 gallons fuel: 340 pounds**

**Gross weight: 2,465 pounds**

**Max speed: 123 mph**

**Cruise speed: 103 mph**

**Rate of climb: 850 fpm for the first minute at sea level**

**Service ceiling: 14,000 feet**

**Gas capacity: 55 gallons**

**Oil capacity: 5 gallons**

**Range at cruise speed: 500 miles**

**Price at the factory: \$6,325 (reduced to \$5,950 in 1930)**

### NC997E Performance

(as defined in STC SA4957NM)

**Engine: Wright R-760-8**

**Propeller: Hamilton Standard 540AR/4350F, 102 inches (8 feet 6 inches) diameter**

**Maximum weight on takeoff: 2,365 pounds**

**Fuel capacity: 45 gallons**

**Oil capacity: 5 gallons**

**Stall speed: 46 mph IAS**

**Cruise speed at 1750 rpm: 95 mph IAS**

**Engine rpm max: 1900 rpm**

**Fuel consumption at 1700 rpm: 11.5 gph**

**Fuel consumption at 1800 rpm: 14 gph**

**Oil consumption: One quart per hour per four flight hours**



**The instrument panel of the Command-Aire is classic, and the instruments well-laid-out. The only modern addition is the GPS mount in the center of the panel.**



**Over the years, the exhaust collector had oxidized to acquire a pretty impressive array of colors, as depicted here.**



**One special feature of the Command-Aire is the ground- and air-adjustable tail incidence. The big lever seen in this picture allows it to be adjusted.**

one of the major players in the airplane-manufacturing arena. Only 14 are still registered, of which five are flyable and three are flown regularly.

Command-Aire NC997E—the C stands for commercial—(c/n W-136), is now the only flyable model 5C3. It was manufactured on October 15, 1929, at the Little Rock, Arkansas, factory. The aircraft was configured with a pair of 22-gallon tanks in the upper wings and a forward fuselage removable cross brace that would allow later conversion to a duster aircraft. Sold to the Curtiss Flying Service of

Delaware, incorporated at 27 W. 57th Street in New York, it flew as NC997E until early 1931. The plane was later modified for crop dusting by the Curtiss Flying Service of Houston, Texas. Licensed as NR997E—R for restricted—it was used in an attempt to eradicate the troublesome boll weevil creating havoc in the cotton fields of the South. Curtiss Flying Service had at least 16 5C3s in the “duster version” in service and treated 200,000 acres of cotton in 1929 alone.

In June 1931, the Command-Aire was returned to NC status by removal

of the dusting hopper and wing tanks, and installation of the seat, controls, and instruments in the front cockpit. The work was done by the Curtiss Flying Service, a Command-Aire distributor. In May 1932, the aircraft was transferred to Eagle Airplane Co., of Rocky Mount, North Carolina. Records show that this company operated NC997E for only 200 hours between 1932 and December 22, 1942. At this date, total time was 542 hours. The plane was then sold to J.R. McDaniel of Fort Pierce, Florida, who registered it in the Restricted category after converting it back to a duster configuration. On July 22, 1945, a Continental R-670 engine of 220 hp was installed to increase reliability for crop dusting.

The last license for N997E was May 6, 1952. At this date the plane had a total time of 1,625 hours, of which



202 were logged between May 1951 and May 1952. The plane was acquired from Don Williams of Newhall, California. N997E was shipped, along with two other 5C3s, from Florida to California in the early '60s. The plane was stored in Hanford and later Reedley, California, when limited restoration work began.

Bob Lock, a longtime pilot and airframe and powerplant mechanic, found the plane in Newhall, California, near his hometown, as he explained in an interview:

"In 1967, I had the chance to acquire the remains of three 1929 Command-Aire 5C3s. Just after beginning the restoration process, I placed an ad in the EAA *Vintage Airplane* magazine requesting correspondence with everyone associated with Command-Aire during its short production period. I received only one letter, informing me that the president of the company was still alive and living in Memphis, Tennessee. I wrote, and some time later, I received a letter from Mr. Robert Snowden indicating that the original designer, Albert Vollmecke, was still in good health and living nearby. I wrote him and received a letter in return. This was the beginning of a relationship that made this restoration even more meaningful. Mr. Vollmecke had kept files from the original company after bankruptcy had been filed in 1931.

"The restoration became a mechanic's dream of working with the man who designed the airplane. Not only the pieces were in poor shape, but drawings and data were sparse. A search of the Federal Records Storage Facility in Suitland, Maryland, turned up no drawings."

The frame was in remarkably good condition, but required several welded repairs to bring it back to air-worthy condition. The duster frame had to be returned to standard. The engine mount had been modified to carry a 220-hp Continental W-670 engine. Early in the project, Bob had

**POLY FIBER:  
Accept No Substitutes...  
But Then There Really Aren't Any**

**Poly Fiber...In A Colorful Class Of Its Own**  
There's no contest: Poly Fiber gives the finishing touch its touch of class. Nothing outshines a Poly Fiber Finish. Nothing.

Poly Fiber is a Division of  
Consolidated Aircraft Coatings

**POLY FIBER**  
ALUMINUM FINISHES



**Left: A family picture— Bob Lock flying loose formation with Rob Lock in the Waldo Wright Flying Service new Standard D-25 on their way to Oshkosh. This was the first time that father and son flew together in those planes. The picture was taken from Clay Adams' Travel Air 4000. Clay was leading the fleet of 14 airplanes on the last leg of the American Barnstormers Tour 2006.**

decided to deviate from the original Wright R-600 Challenger engine to a more reliable Wright R-760. This design change required a supplemental type certificate (STC), an approval that proved to be a long and frustrating ordeal. Another deviation from the original design was the installation of a pressure feed fuel system, similar to the one found on the Naval Aircraft Factory N3N. This change, discussed with the designer, was deemed necessary because of the proximity of the fuel tank outlet and carburetor inlet—the outlet line being at the same level as the carburetor.

Another big-ticket item was the landing gear: “It took about 120 hours of cutting, fitting, and gas welding to make a new gear. I found that the gear legs were the same dimensions as a Stinson L-5 front-lift strut. Stock Stearman axles and Hayes dual servo hydraulic brakes—the same as used on Vultee BT-13—would fit the Bendix 30-by-5 wheels.

“The wings were built new. My father helped by building new wing ribs. Trial assembly and rigging of the aircraft took place in 1985. The aluminum portions of the plane, such as seats, baggage compartment, fuel and oil tank, engine cowling, and fuselage metal were hand-fabricated.”

The big day finally came: “On July 11, 1989, at 9:30 a.m., I climbed in and made the first flight. I took off from Lakeland Municipal Airport, climbed to altitude, and stayed near the airport for the next 15 minutes, then headed to a sod strip 6 miles south of Lakeland where I made three very good landings. Then it was back to Lakeland for a landing on concrete—no problems. With the aircraft license in Experimental category, I put in 15 hours of flight in the local area.

“The airplane was as stable as advertised. The ground-handling characteristics are very good, even in a 90-degree crosswind—something that a good steerable Scott tail-wheel adds over to the old tail skid. Nominal right rudder pressure needs to be applied at full power (1850 rpm) to counteract the engine torque on takeoff. The takeoff roll on a hard surface runway is approximately 200 feet. Forward visibility is quite good in the three-point attitude. Cruise at 1750 rpm is 95 mph indicated airspeed (IAS), stall is at 46 mph IAS. The rigging is excellent. The aircraft will fly hands-off at cruise power for extended periods of time in calm air. It is a pure delight to fly, but I do not attempt aerobatics due to the high drag and shape of the airfoil. Final approach speed is 55 mph IAS. The rate of sink is pretty low. Only three-point landings are advised, and no wheel landings should be attempted.”

As Bob’s son Rob grew up, he saw the plane slowly resurrected from a pile of broken parts and pitted metal. Years later, during the 2006 American Barnstormers Tour, Rob finally felt ready to try on the Command-Aire for size. It was a very exciting time for the father-son team as Rob became the third person checked out in the aircraft since 1964. This will ensure that the plane will be flying for many more years to come, keeping the memories of the Command-Aire Corp. alive. 