Buhl-Verville Airster

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AOPA 54408

The middle 1920's are significant as being the "transition" period of aviation. In private, commercial and military aviation the old World War I aerodynamic and structural concepts were finally giving way to new approaches. The surplus wartime equipment that had smothered early postwar production of new designs was finally wearing out and allowing a market for new production to open up.

A representative design of the period was the Buhl-Verville Airster of 1925-27, designed by Alfred Victor Verville.

Verville had been in aviation since 1912 and had turned out his first original design in 1915. From 1918 to 1925 he was with the U.S. Army Air Service Engineering Division and produced some notable designs such as the VCP fighters and racers, the tiny M-1 that is better known as the Sperry Messenger, and the R-3 racer that the Smithsonian Institution has declared to be one of the 12 most significant airplane designs of all time.

In February 1925 Verville left the Army and teamed up with Lawrence D. Buhl to form the Buhl-Verville Aircraft Co. of Detroit, Mich. This was a subsidiary of the well-known Buhl Stamping Co.

Design of the first Airster, designated CW-3, began in April, and the first prototype flew in December. While this was a contemporary of the new Travel Air and the Alexander Eaglerock, and like them used welded steel tubing for the fuselage and tail, it incorporated some more advanced features.

One, aimed at reducing the cost of spares and repairs, was to make the upper and lower wing panels interchangeable. This was achieved by adding a stub lower center section to match the span of the upper center section (which was wider than the fuselage) so that the wings were the same length. The rudder and elevators were also interchangeable.

The lower stub center section also permitted something new in landing gear for small commercial planes, a divided-axle type with the shock-absorber strut running straight up from the wheel to the wing instead of at a shallow angle to the fuselage as was common practice. Bending loads in the stub were taken out by short diagonal struts running upward to the fuselage. In keeping with the times, the prototype had no brakes, leaving that function to a steel-tube tailskid.

Seating was conventional, with the pilot at stick-type controls in a rear cockpit and two passengers side by

The original Buhl-Verville Airster was powered with the water-cooled Curtiss OX-5 engine. This view emphasizes the strut-braced stub center section for the lower wing and the separated landing gear units. Ailerons in both wings are connected by struts.

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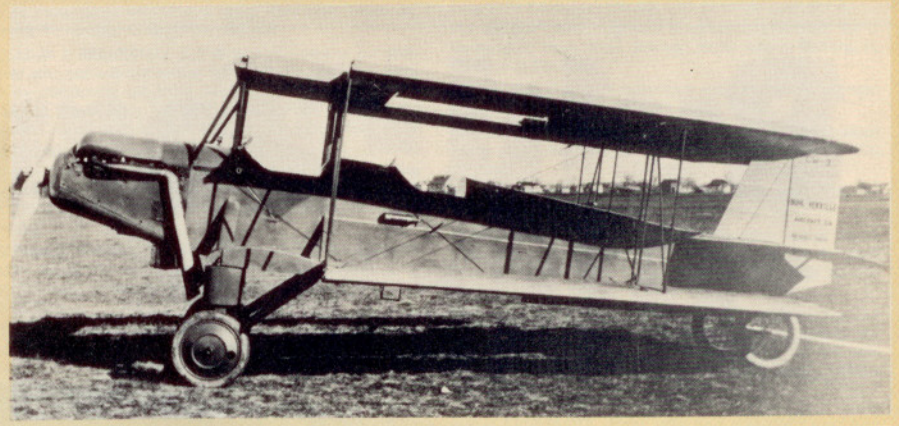
side in a front cockpit that was located right on the center of gravity where their presence or absence would not affect trim. Access to the front seats was simplified by a small door on the left side. Dual controls could be installed as an option.

A major innovation was the use of folding wings. Since the wings folded straight aft through hinges between the rear spars and the center sections, it was necessary for the hinge pins to be aligned with each other vertically. Because of this, there was no stagger to the wood-frame wings as was common practice then.

Like the other three-seaters of the time, the original powerplant was the war-surplus 90-hp Curtiss OX-5. This was a major cost-saving item; new OX-5's were available for around $250 compared to several thousand for later and more powerful production articles.

Although adequate, the OX-5 was not the optimum engine for the Airster, so the 200-hp Wright J-4 Whirlwind radial, which had just come on the commercial market late in 1925,



	CW-3 1925	CA-3A 1927
Specifications		
Powerplant	Curtiss OX-5 90 hp @ 1400 rpm	Wright J-5 Whirlwind 220 hp @ 1,800 rpm
Span	35 ft	35 ft 8 in
Length	25 ft	24 ft 7⅞ in
Wing area	300 sq ft	303 sq ft
Wing loading	7.1 lb/sq ft	10.1 lb/sq ft
Power loading	23.9 lb/hp	13.95 lb/hp
Empty weight	1,380 lb	1,686 lb
Gross weight	2,150 lb	3,069 lb
Performance		
High speed	95 mph	125 mph
Cruising speed	80 mph	108 mph
Landing speed	40 mph	52 mph
Initial climb	500 fpm	950 fpm
Service ceiling	10,000 ft	16,000 ft
Range at cruising speed	475 mi (40 gal)	700 mi (70 gal)

Nick Mamer (left) and Bruce McDonald placed third in the New York-to-Spokane stockplane race held in connection with the 1927 National Air Races that were held that year in Spokane, Wash. The plane is a standard Airster CA-3A with a Wright J-5 Whirlwind engine.

was installed. With this, the model designated J-4 Airster placed second in the 1926 Ford Air Tour and was also tested by the Army as a potential primary trainer.

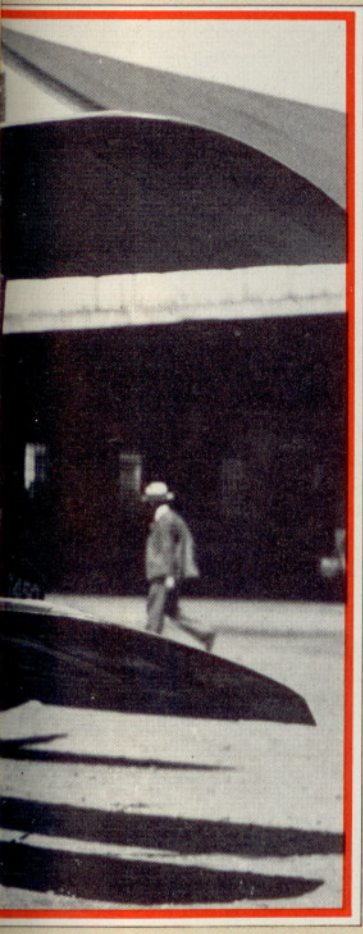
This performance, in spite of no military sales, encouraged the firm to go into real production, and CW-3 Airsters with the J-4 were put on the market. However, the small Detroit plant was not suited to efficient production, so a move was made to a new and larger plant in Marysville, Mich. Verville decided to stay in Detroit and form a new company under his own name, so another former Air Service engineer, Etienne Dormoy, replaced him as chief engineer.

Dormoy made some changes to the basic airframe, which now became the CA-3 model, still powered with the J-4. Noticeable outward changes were a slight lowering of the upper wing, use of ailerons on the lower wing only, deletion of the diagonal outer wing strut, squaring-off of the wingtips and an entirely new shape to the fin and rudder that eliminated the interchangeability feature. The vertical tail now looked like that of the wartime French Spad, which Dormoy had worked on before coming to the United States with the French Aviation Mission in 1917. Other changes were less apparent. The folding wing feature became a $300 option, brakes were standard equipment, and the wood-truss wing ribs were replaced by die-stamped aluminum. Fuel capacity was increased from 40 gallons in the upper center section to 70.

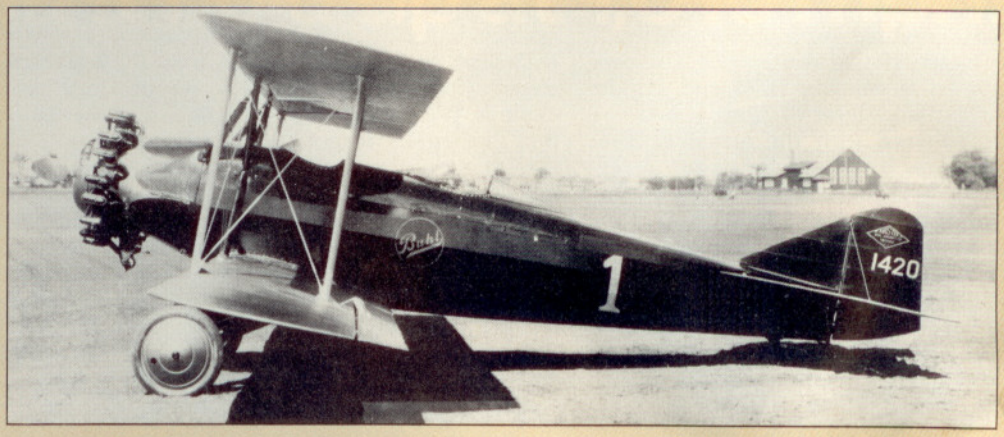
Early in 1927, Wright discontinued the J-4 engine in favor of the new 220-hp J-5 Whirlwind, the engine soon to be made famous by Lindbergh and all the other successful transatlantic flyers of 1927-28. When this engine was installed in the Airster, it became the CA-3A.

Changing times gave the Airster a historical significance that had nothing to do with the usual criteria of performance, production rate or famous flights. Prior to January 1927, civil aviation in the United States was unregulated; neither pilots nor airplanes required licenses, although there were Aero Club licenses for pilots, most of them signed by Orville Wright. In 1927, airplanes had to meet strict structural and aerodynamic standards in order to engage in commercial flying. Proof of compliance with these standards was shown by the issuance of an Approved Type Certificate (ATC) to a particular design by the predecessor organizations of the present Federal Aviation Administration. Since it was built to essentially military standards in the first place, the Airster had little trouble in meeting the new requirements. On March 29, 1927, the CA-3A was issued the first Approved Type Certificate, A-1.

This didn't have much effect on the subsequent production life of the Airster. However, the market was becoming flooded with many makes of three-seat open-cockpit biplanes, so Buhl went after a different market. The Airster was dropped late in 1927 in favor of a new line of closed-cabin Air Sedans, which Dormoy developed and which remained in production until the stock market crash of 1929 and the subsequent depression shut down most of the aircraft industry.□



Improved CW-3 Airster with 200-hp Wright J-4 engine placed second in the 1926 Ford Air Tour. Note the revision to lower center section struts and absence of fairings around the rubber-disk shock absorbers.



After Etienne Dormoy revised the CW-3 design, the Airster became the CA-3 with a J-4 engine and the C-3A with the J-5, shown. Note lowered upper wing, strut revision and new vertical tail shape.