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THE ERCOUPE
(and its offspring)

Certificated 32 years ago this month, the famed Ercoupe, as well as some of its later variants, boasted basic built-in lightplane safety designs that were 'revolutionary' (for both then and now)

■■Some of the airplanes discussed in this series are obviously antiques, by post-WW-II standards. Others, built just before the war, were advanced for their time and still look modern today. Such a design is the "Ercoupe," an almost-revolutionary lightplane that hardly deserves a "Yesterday's Wings" label since it has been kept up-to-date over a production span of 30 years: It also has the distinction of having had more parent companies in that time than any other airplane.

The Engineering and Research Corporation (Erco) of Washington, D.C., was formed in 1930 to develop and build production equipment for the aircraft industry. Later, it built controllable-pitch propellers and other airplane components. In 1937, it decided to build light airplanes and acquired the services of Fred E. Weick (AOPA 9893), an aeronautical engineer who had just developed a "safety plane," the W-1A, for the government's safe personal airplane competition of 1934–1935. [Weick's work-filled career was detailed in the April 1969 PILOT article, "Meet Fred Weick."—Ed.]

For Erco, Weick developed a unique side-by-side two-seat monoplane called the Erco 310. Loaded with features that were new, at that time, to the personal aircraft field, the 310 was powered by a 55 hp Erco IL-116 four-cylinder, air-cooled inverted engine. This airplane was later produced as the Model 415-C "Ercoupe" with the 65 hp Continental A-65 engine.

The structure was all metal. The fuselage used large panels of flat sheet aluminum wrapped around widely spaced, pressed sheet metal formers in the manner of the Ryan S-Ts of 1934 [March 1969 PILOT, page 41] and the Luscombe "Phantom" of 1935 [Sept. 1967 PILOT, page 51]. The untapered cantilever wing, itself a rarity on lightplanes, used two extruded aluminum spars and achieved torsional rigidity by arranging the stamped aluminum ribs in a Warren Truss pattern between the spars. The aluminum leading edge skin was for airfoil contour smoothness only; it was not a torsion box since it did not wrap all the way around the leading edge from the top of the front spar to the bottom. The airfoil was the relatively new NACA 43013, and the wing covering was fabric. The outer wing panels detached from the stub center section outboard of the landing gear.

The sheet aluminum tail surfaces were unique for single-engine airplanes of the period in that they featured two fins and rudders at the ends of the horizontal surfaces, in the manner of the famous twin-engine Lockheeds and the Beech 18s.

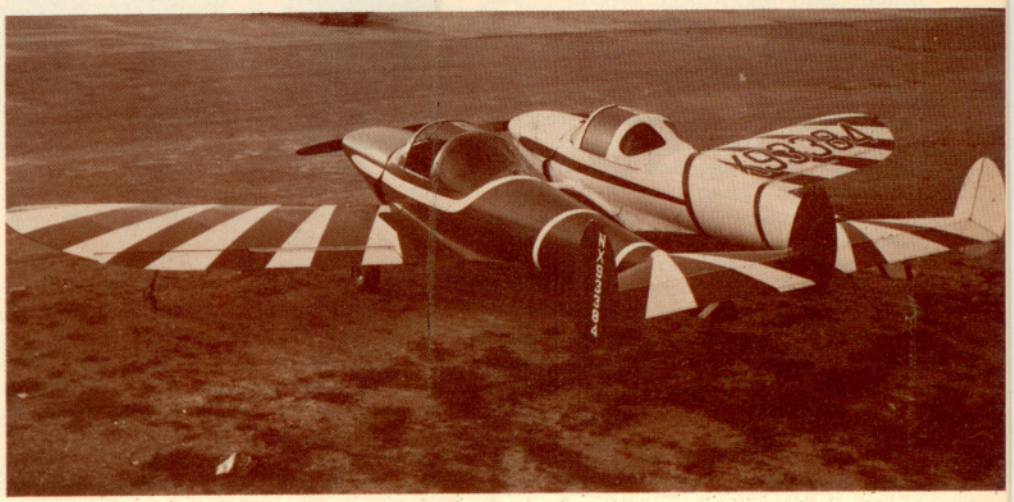
The final touch of newness was the tricycle landing gear. This had been widely used up to World War I. However, military design trends, from 1914 on, stressed performance in the air, not easy ground-handling, and the tricycle vanished from the scene. Not until the late 1930's did it begin to make a comeback. Although several planes in the 1935 competition used it and the winning Stearman-Hammond Y [Nov. 1963 PILOT, page 64] went into production with it in 1937, the Ercoupe usually gets the credit for putting nosewheels back into civil aviation.

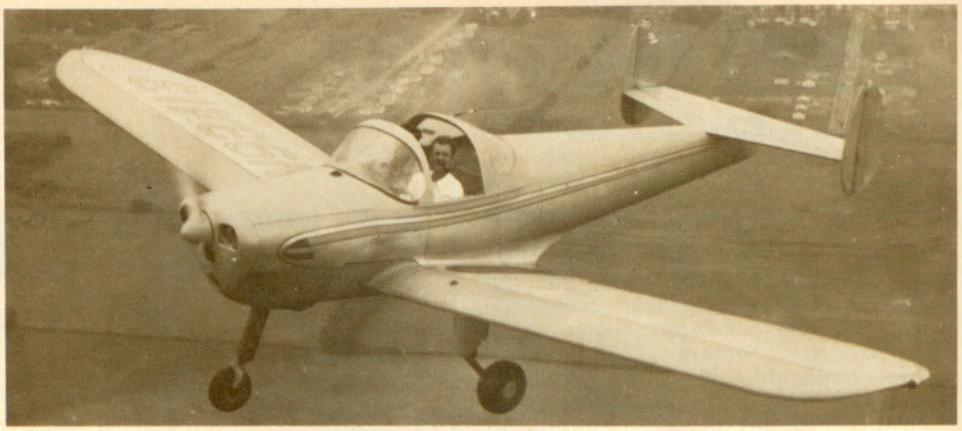
Since it was well known that open side-by-side cockpits produced excessive drag on small airplanes, the Ercoupe was designed with an enclosed cockpit. Instead of a sliding hatch or hinged panels, the Ercoupe used fixed, flat-wrap plastic for the windshield and rear window and fitted two single sheets of plastic into channels in the overhead structure. These slid downward into the sides of the fuselage for opening, but could be opened in flight. The occupants stepped from the wing root onto the seat, where a cloth flap was provided to keep muddy feet from soiling the seat.

The foregoing features are the obvious externals. The really unique features of the Ercoupe were not easily noticeable.

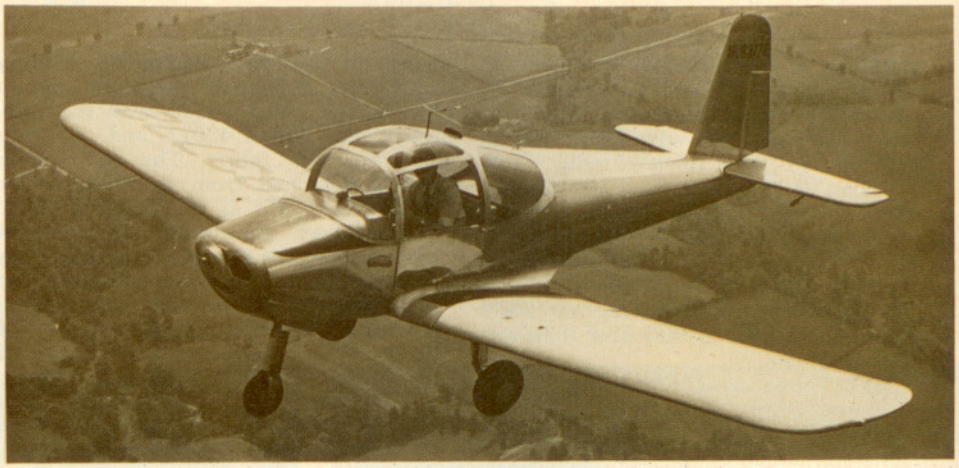
The essential difference between the Ercoupe and contemporary lightplanes was in its control system, which used only two controls instead of the traditional three. There were no rudder pedals; the rudder was tied into the aileron control system and moved automatically when the wheel was turned to initiate a bank-and-turn with the ailerons. The rudder travel was limited, with just enough outward movement

A real oddity. Two Ercoupes were "merged" in 1948 to make one airplane for air show work. It was rumored that Erco was sufficiently impressed to consider a production version. Photos by Peter M. Bowers unless otherwise indicated





Early post-WW-II Ercoupe 415-C with Continental C-75 engine. Later versions had a cutout in the elevator over the tail cone to permit a greater degree of down-elevator travel. No buffeting or control problems resulted from flying with the side windows open.



The first Ercoupe variant was the post-WW-II Aeronca "Chum," essentially a single-tail Ercoupe with a considerably modified cabin and car-type doors. This did not get into production. *Aeronca Aircraft photo*

of the "inside" rudder (20 degrees) to counter adverse yaw that was due to aileron movement. Inward rudder movement was only three degrees. There was a pedal on the floor, but it was a foot brake that applied both main wheel brakes simultaneously; there was no differential braking as an aid to steering.

Aileron action was unique, too. Each metal-skinned aileron covered the full span of its wing panel, and the differential movement was extreme by contemporary standards. In a turn, the "inside" aileron could move upward 40.5 degrees, but the "outside" aileron, which causes the adverse yaw, could move downward only 9.5 degrees for a differential of 4.2. A high degree of lateral stability was built in by the use of a generous seven degrees of dihedral.

Elevator action was by the traditional push-pull on the wheel, but again with a difference. Upward elevator travel was restricted to only 12 degrees, which limited nose-high attitudes to help prevent spins. Coupled with the limited rudder travel, this feature made the Ercoupe spin-proof. It was certificated as being "characteristically incapable of spinning"; pilots who learned to fly only in Ercoupes, back in the days when spins were "in," had to have a note on their licenses that limited them to nonspinnable planes.

The simplified controls made the Ercoupe practically a flying automobile as far as piloting technique was concerned. It was steered on the ground by the wheel and was stopped by the foot brake. What with its level ground attitude and the wheel steering, this writer always had a strong tendency to put out his arm to make turn signals when turning an Ercoupe at the taxiways.

The simplified controls were great for the so-called "Sunday Pilot" market, but the "pros" soon detected some notable shortcomings. The inability to cross controls made crosswind landings by the traditional sideslipping method impossible; one had to crab in and then make a coordinated turn to line up with the runway. This raised the upwind wing, definitely not the thing to do on a gusty day. Actually, the Ercoupe could be put on the runway in a crabbed attitude and the tricycle gear would straighten it for the roll-out.

The inability to cross controls brought other limitations, too. Ercoupes were tested as seaplanes but couldn't get certificated as such, because of the one-way controls and the limited rudder and elevator travel. Also, more than a few Ercoupes have been flipped over when taxiing downwind to the takeoff point in strong winds. As they turn crosswind to approach the runway, that big "inside" aileron moves up, and the wind, now quartering from behind, gets under the aileron and the high-dihedral wing; then over she goes. The principal salvation here is that most "Sunday Pilots" don't go out under such conditions.

The dissatisfaction of some pilots with the limited control system of the Ercoupes soon led to an optional three-control setup with rudder pedals. This made some cross-controlling possible but still wasn't of much help in taxiing because nosewheel steering was still by the control wheel.

The Ercoupe Model 415-C (Continental engine) was issued Approved Type Certificate A-718 on March 25, 1940, when production of this unit began at the Erco plant at Riverdale, Md. The first 112 built used the 65 hp Continental and carried 14 gallons of fuel. The later models used the "new" 75 hp C-75 Continental (not the old A-75, which was merely the A-65 turning over an extra 250 rpm), with 24 gallons of fuel in two cross-connected nine-gallon wing-stub tanks and a six-gallon gravity tank. The wing fuel was pumped to the gravity tank, by an engine-driven pump, and the overflow went back to the wing tanks.

The Ercoupe was well on its way to becoming every man's (nearly) foolproof airplane, when production was complicated by World War II. With an aluminum shortage shaping up in 1941, Erco redesigned the 415-C to use less of it; the aft fuselage structure was to be a plywood cone, the wings were to be steel frame, and the control surfaces were to be wood frames with fabric cover. It is not known whether any of the substitute-material Ercoupes were built.

The Army evaluated one standard 415-C, calling it the YO-55 observation plane, when the military was testing other lightplanes for this role in 1941; it also tested two with 125 hp Franklin engines, and called them XPQ-13 radio-controlled targets, but found them unsuited to military work. Ercoupe production ended in 1942 for the duration of World War II.

Production was resumed in 1946 with the 75 hp powerplant. The limited control concept was licensed to Aeronca,

SPECIFICATIONS AND PERFORMANCE

	Erco Ercoupe 415-C (1940)	Alon A-2 Aircoupe (1965)
Wingspan (ft)	30.0	30.0
Length (ft)	20.75	20.33
Wing area (sq ft)	142.6	142.6
Engine	Continental C-75 75 hp @ 2,300 rpm	Continental C-90-16F 95 hp @ 2,625 rpm
Empty weight (lb)	725	930
Gross weight (lb)	1,760	1,450
Maximum speed (mph)	117	129
Cruising speed (mph)	105	124
Climb (fpm)	700	640
Service ceiling (ft)	13,000	17,300
Range (mi)	525 (27 gal)	455 (24 gal)
Price	$2,650	$7,825

While wheelpants were never original equipment on Ercoupes, or the later Aircoupes, approved installations have been available in recent years from special-parts companies. Such accessories do much to keep even the older-model Ercoupes looking up-to-date.

Final production configuration of the basic Ercoupe was the Mooney M-10 Cadet of 1969–1970. Notable changes were further revision of the canopy and addition of a single vertical tail, in the established Mooney shape that has been a Mooney trademark since the M-18 "Mite" of 1947.

which intended to produce a single-tail version known as the Aeronca "Chum." This was built, but only as a prototype.

Erco made improvements to keep the Ercoupe even with the new competition. Enough minor changes, including an elevator trim tab, were added to the 75 hp 415-D version to rate a new ATC—787. The 415-E followed with the 85 hp C-85 Continental and the 415-F had the 90 hp C-90. By 1949, production was standardized on two models, the 85 hp 415-G and the 75 hp 415-H. The "G" was a deluxe model with a new molded windshield, plus a third seat for a 75-pound passenger in the luggage area. This was marketed as the "Club-Air," while the "H" model was called the "Standard." By 1951, only the "G" was in production. Production ended soon after though, because of Erco's work for the Korean war effort.

In April 1955, the Forney Manufacturing Company of Fort Collins, Colo., bought the design rights and set up an aircraft division to manufacture the Ercoupe again, only under a new name. Production of the Forney F-1 "Aircoupe" began in September 1956. By 1959, when production ended, this airplane was available in three versions: the bare "Explorer"; the moderately equipped "Expeditor"; and the loaded "Executa." These were still Aircoupes, but they were also referred to as "Fornairs." All three aircraft had the option of a full, three-control system, with the additional change of nosewheel steering by the rudder pedals.

Forney sold its aircraft division and the Aircoupe design to the city of Carlsbad, N.M., and the city turned around and leased the manufacturing operation to the Air Products Company. Production of the aircraft under this arrangement ended in 1962 and another owner entered the picture in December 1963. This time it was Alon, Inc., of Wichita, Kan., that bought the design. The basic airplane went back into production in October 1964, as the Alon A-2 (A-2 for two-place) Aircoupe with a 90 hp C-90 engine, a sliding canopy, and metal-skinned wings. The main Alon innovation of a spring-steel main landing gear came a bit later.

Production by Alon, Inc., continued at McPherson, Kan., until 1967, when Alon merged with the Mooney Aircraft Corporation of Kerrville, Tex. The surviving organization, Mooney, moved production to Kerrville, redesigned the Aircoupe to a single-tail configuration, put in toe-controlled differential brakes, and renamed it the Mooney M-10 "Cadet."

Mooney production was short-lived, ending in 1970, but that did not mean that the end had come at last for the 1937 design. The rights were transferred to the Aerostar Aircraft Corporation by Butler Aviation International, parent firm of both Mooney and Aerostar, on Oct. 1, 1970. Depending on the resolving of Aerostar's current problems, Fred Weick's classic, of which more than 6,000 have been built, may yet see its fourth decade of production. □