

■ ■ "Commonality" is a term heard quite a bit in aviation these days, especially in military procurement circles. In the case of a design like the F-111A/111B (formerly TFX), the term means that a relatively high percentage of the parts used in one version of a basic design can be used in another that was built for an entirely different purpose and can almost be considered a different airplane. Commonality makes good sense in the commercial field, too, and is practiced to such a degree today that it's getting hard to tell various models in some of the leading manufacturers' "families" apart without the help of a parts catalogue and a price list.

It is highly unlikely, however, that anyone will be able to top the performance of the old Lockheed Aircraft Company of Burbank, Calif., which existed from 1926 to 1932. For several years the company built what was essentially a single airplane design. Merely by altering arrangements in a standard fuselage and repositioning a standard wing it managed to turn out five notably different models from the same tooling.

Back in the summer of 1927, as detailed in *The PILOT* for May 1962 (page 51), Lockheed produced a beautiful, all-wood high-wing cabin monoplane called the *Vega* (see page 80, October 1967 *PILOT*, for a photo of the prototype). It had amazing performance compared to contemporary 220 h.p. monoplanes. This was the result of extremely clean aerodynamic design made possible by use of a cantilever wing, which eliminated the need for struts and wires, and the sleek, fishlike fuselage that was formed in a concrete mold instead of being the traditional built-up box structure with rectangular cross-section.

The *Vega* caught on immediately and promptly began to rewrite the list of intercity speed records. As with most airplane designs, performance increases soon resulted from bigger engines and the addition of such extras as wheel pants and the then-new NACA (National Advisory Committee on Aeronautics) cowlings around the big radial engine. There wasn't much else that could be done to the *Vega*. After starting with the 220 h.p. Wright J-5 Whirlwind engine in Model 1, the *Vega* advanced through the 300 h.p. Wright J-6 Whirlwind and Pratt and Whitney

Wasp Jr. as Model 2 and ended up with the 450 h.p. P&W Wasp as Model 5. Between 1927 and 1934, 128 were built.

The versatile *Vega* was almost too good; there were areas in which it was ahead of customer requirements. Some of the long-established traditions of the aircraft business die hard, often to the detriment of progress. Since 1918, when the service started, airmail pilots had been in open cockpits. They wanted no part of closed cabins that robbed them of the "feel" of the airstream and the elements. Further, the cockpits were located quite far aft, at a point from where the pilot could see most of the airplane, and that's where the mail pilots insisted that they remain for several years after general aviation pilots had moved indoors.

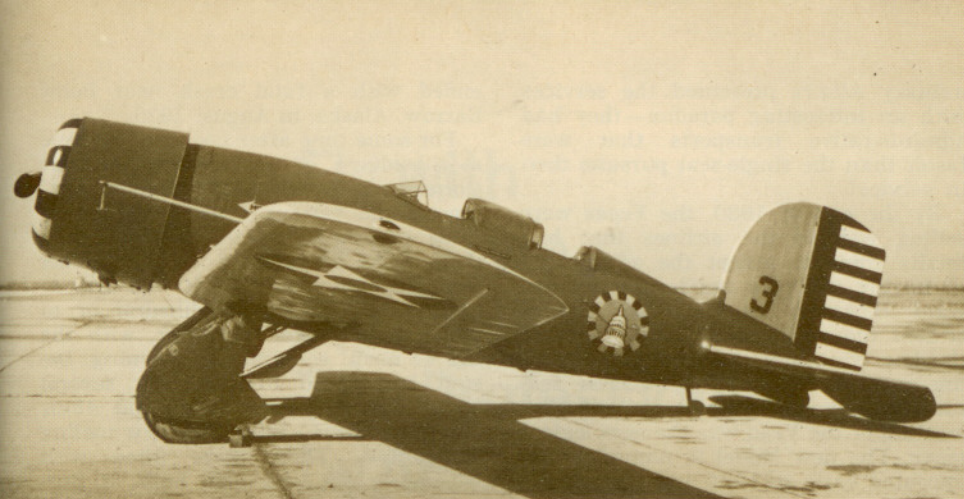
Western Air Express (WAE) had been flying open-cockpit mailplanes between Los Angeles and Salt Lake City since 1926 and was in the market for a faster model that could carry passengers in a proper cabin in addition to mail. Lockheed tried to sell *Vegas* to WAE, but ran into pilot resistance. The pilots didn't object to the passengers being inside, or even to replacing the traditional biplane with a monoplane, but they were adamant about the open cockpit and its aft location.

Relocating the pilot was only a minor redesign problem, but since the *Vega's* monoplane wing rested right on the fuselage instead of being above it as on most biplanes, the pilot's forward visibility from a rearward cockpit would be greatly impaired if it were left there. Since the pilot had to be aft or there was no sale, it became necessary to raise the *Vega* wing above the fuselage on struts. The new Model 3, named *Air Express*, became, in effect, a traditional open-cockpit biplane without the lower wing. The performance requirements dictated the use of the Wasp engine and the increased weight was partly offset by a 1½-foot increase in the span of the wing, which was otherwise identical to that of the *Vega*. The *Air Express* did the job it was developed for, but never became popular because of its decreased versatility and the fact that it was actually a backward step. In fact, of eight Model 3's built, one was later converted to a *Vega*.

In an era of transoceanic and other long-distance flights, it was logical for







The Altair model was made when retractable landing gear was added to the Sirius. Airplanes of this type could top 225 m.p.h. with the 550 h.p. Wasp. Pictured is Air Corps' C-23.

Photo by Fred E. Bamberger

With gross weight at 4,500 pounds, this seven-place Vega 5C, powered by 450 h.p. Wasp engine, could top 185 m.p.h. The plane cost \$20,000.

Photo by E. M. Sommerich

With a few changes to the standard Vega fuselage, this company was able to turn out other different models

Yesterday's Wings:

# COMMONALITY AT LOCKHEED

by PETER M. BOWERS  
AOPA 54408

The Orion 9D airliner could carry seven passengers at a top speed of 226 m.p.h. The plane's gross weight was 5,800 pounds; it used the 550 h.p. Wasp engine and cost \$25,000.

Photo by A. U. Schmidt



pilots to think of long-range versions of the clean Vega, but again the closed cabin and forward pilot position found disfavor with the "old pro's." So it was back to the drawing board for Lockheed and another shuffle of the standard parts. For Model 4, named *Explorer*, the rear cockpit of the *Air Express* was retained but the drag of the struts and gap of the parasol wing were eliminated by putting the wing at the bottom of the fuselage. Drag was further reduced by the opportunity that this afforded to use shorter landing gear struts by attaching the gear directly to the wing. Because of the low position of the wing, it was necessary to add some dihedral for stability purposes. The enormous fuel loads planned called for more wing area to carry the weight, so the span of the basic wing was increased from the Vega's 41 feet to 48 feet and the Wasp engine was again used. Only four *Explorers* were built, one special being designated Lockheed Model 7.

Similar to the *Explorer* but much more versatile was the Model 8 *Sirius*. This was another low-wing design with fixed gear and the pilot aft, but it had two cockpits. Some had a small cabin forward for additional passengers. Because of the reduced fuel and range requirements, the wing span was

shortened to 42 feet 9 inches, only three inches longer than that of the *Air Express*. Of 15 *Siriuses* built, the first and most famous was the one belonging to Charles A. Lindbergh, for whom it had been designed. Fitted with its original Wasp engine, the new *Sirius* carried the Lindberghs to a new one-stop transcontinental speed record of 14 hours 45 minutes when they took it home on Easter Sunday, 1930. Later in the year Lindbergh installed a 575 h.p. Cyclone prior to fitting the ship with twin floats for the exploration flights he and his wife made over the North Atlantic and Pacific Oceans to develop air routes for Pan American Airways. This *Sirius* ended up with a 710 h.p. Cyclone, mak-

ing it the most powerful of the 186 wooden Lockheeds built.

The most significant change to the *Sirius*, however, was one that Mrs. Lindbergh brought about. She was able to break the "old pro's" edict on open cockpits and have transparent sliding canopies built over the drafty openings. Many of the other 14 *Siriuses* and the similar *Altairs* utilized this new feature.

With the landing gear of the *Explorer* and *Sirius* models attached to a nice, thick wing, it was easy to take the obvious next step and retract the gear into the wing. This was done in September 1930 on a Model 8 variant that was originally called the *Special Sirius*. The company didn't think the change significant enough, structurally, to justify a new model number, but did change the name to *Altair*. The new feature was so successful that five *Siriuses* were converted. Only six *Altairs* were built as such, and one of these was converted to the later *Orion*.

In 1931 the Army Air Corps bought two *Altairs*, both of which had been *Siriuses*, and gave them the Army transport designations of C-23 and C-25. The Navy quickly followed suit and bought one *Altair* as XRO-1 and indulged in a bit of interservice one-upmanship by specifying a 625 h.p. Cyclone. These



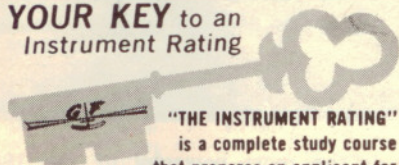


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military *Altairs* presented the services with an interesting paradox—they had administrative transports that were faster than the single-seat pursuits then in service!

By the end of 1930, the *Vegas* were selling well to the airlines that had finally come to accept the advantages of having the pilot inside and up forward. However, the *Altair* had demonstrated the performance advantages of the low wing and the retractable landing gear. A combination of these features with the passenger cabin and pilot location of the *Vega* was the next logical move. The new Model 9, named *Orion*, appeared early in 1931 and was an immediate success. Thirty-five were built with engines ranging from 450 and 550 h.p. Wasps to 575 and 650 h.p. Cyclones. One additional *Orion* resulted from the conversion of an *Altair*, and a long *Explorer* wing was fitted to the fuselage of a damaged *Orion* by an enterprising used aircraft dealer. This special was sold to Wiley Post, who fitted it with floats and started a westward flight around the world in company with comedian Will Rogers that

ended with a fatal crash near Point Barrow, Alaska, in August 1935.

For some time after Lockheed became a subsidiary of the Detroit Aircraft Corporation in July 1929 "commonality" among the various models was pretty close to 100%. Spare fuselage shells that could be adapted to any model were kept on hand and it was easy to build new wings with dihedral or to make them longer. However, with the age of metal construction dawning, Detroit had metal fuselages for several *Vegas* and one each *Sirius* and *Altair* (later an *Orion*) built with new tooling at Detroit. These were fitted with wooden wings and tails built at Burbank. While the new construction might have added years to the service life of the basic models, there was little chance to demonstrate it. Detroit Aircraft collapsed in October 1931 as a result of the depression, and Lockheed folded with it but continued to operate for a while in receivership. The present Lockheed Aircraft Corporation dates from June 1932 when the assets were purchased by the nucleus of the present management for \$40,000. □

## British STOL Aircraft Offered In U.S.

A British-made twin-engine STOL aircraft, the BN-2A *Islander*, recently made its debut in the United States. Manufactured by Britten-Norman Ltd., Isle of Wight, England, the 10-place, 520 h.p. plane will be distributed in the Western Hemisphere by Jonas Aircraft and Arms Company of New York.

The aircraft is designed for short-haul commuter and freight operations between outlying airfields and trunkline terminals.

Pointing to specific features of the *Islander* that make it suitable for short-haul operations, Desmond Norman, president of Britten-Norman, cited the quick-change design of the plane which allows the pilot to release, fold and stow

the seats in the luggage compartment, and be ready to load up to a full ton of cargo in less than five minutes.

The *Islander* has a takeoff run with flaps of 900 feet and a short-field landing capability with brakes of 650 feet. Maximum cruising speed with 75% power at 6,500 feet is 156 m.p.h. Useful load is 2,495 pounds.

First deliveries of the *Islander* were made in June this year. Jonas Aircraft accepted its demonstrator in October. Production of the plane is projected to reach two a week by the middle of next year, company officials said.

Price of the standard model BN-2A *Islander* is \$62,000. Transatlantic ferry charge and import duty is \$7,000. □

Britten-Norman Ltd., of England has received 50 orders for its new BN-2A *Islander* STOL aircraft from short-haul operators in 12 different countries. The plane was introduced in the United States in October.

