

potential damage, in case of enemy attack, to the relatively inexpensive cargo-container. Once it is on the ground and detached from the aircraft, the XC-120's fuselage container can be unloaded at the most convenient time for the ground crews, then reloaded and stored away until it is ready to be picked up by another Pack-plane. To facilitate rapid handling of the cargo, the detachable portion has both front and rear clam-shell doors located very close to the ground.

In practice, the pre-loaded pack, mounted on its own undercarriage (comprising four dual-wheeled assemblies), will be towed in place between the twin booms of the flight structure and mated against the four ball-and-socket connections of the upper deck. The cargo pack is then raised by means of four electrical cable hoists, the space between the two structures being sealed off with rubber tubing which is pumped up with air to form an airtight connection. After removal and stowage of the wheels of the pack undercarriage, the combination is ready to take off—all of which said pack-drill takes only a few minutes. Upon reaching its destination, the pack is easily detached and towed away, while another pre-loaded container is rolled into position and hooked up.

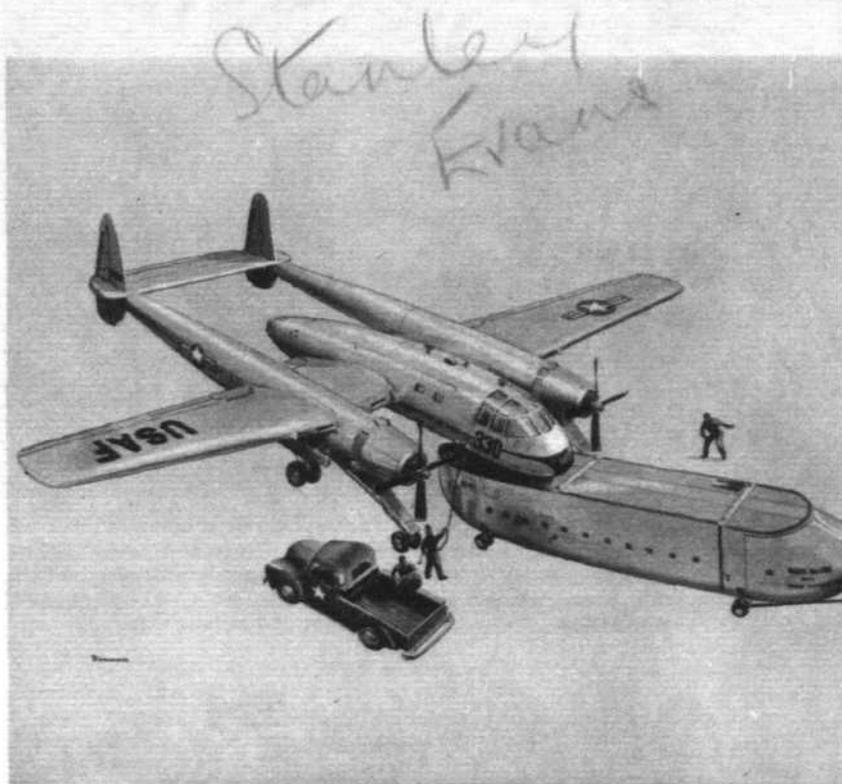
Design Highlights

By specifying a portable pack unit that had to be towed off forwards, the military planners clearly gave the designers of the XC-120 a difficult landing-gear problem to solve; indeed, the configuration and structural design of the landing gear—more particularly the auxiliary nose gear—must have provoked considerable cerebration since, obviously, the orthodox tricycle gear was out of the question and resort had to be made to a somewhat awkward-looking quadricycle layout. The structural awkwardness stems, of course, from the fact that the nose outriggers must be located well forward under the engine cowls, in order to provide a reasonable wheelbase for stable ground and braking characteristics, and also to accommodate large changes in the c.g. between the pod-on and pod-off conditions. Having satisfied these ground-handling conditions, the long cantilevered nose-gear structure must then be jack-knifed and retracted into the same nacelle opening as the main gear.

While this complex quadricycle solution is bound to come out a bit heavy on the weight budget and, in the early stages of development, the operational maintenance of the gear has not been free from trouble, these debits must fairly be charged against the peculiarly difficult design *desiderata* of a military cargo-carrier—as interpreted by the U.S. Air Force. When a military specification lays down the transportation of telegraph poles with both ends protruding from the open pod, orthodox design thinking must perforce be jettisoned along with the pod doors!

Superficially, the rest of the XC-120 flight structure looks like a C-119 with the cargo-hold sliced off, except that the vertical tail of the XC-120 follows the divided pattern of the earlier C-82. The C-82, begun in 1943, was the original design of Fairchild Packet, intended to support the invasion of Japan by hauling in paratroops, combat cargo and supplies, and evacuation of the wounded—or, logistically figuring, to haul a load of 12,000 lb over 2,000 miles. It had to operate from unprepared bases and be capable of rapidly loading and unloading heavy cargo, either into vehicles or on to the ground, without the aid of auxiliary loading equipment. Operation from rough terrain set the fashion for the high wing; tailboard loading requirements produced the rear-opening, low-to-the-ground nacelle; and the demand for optimum cargo utilization called for a fat box-car type of cargo-hold. All these features are worth recalling because they have influenced the Fairchild family strain right from the start.

The C-82 was, in fact, the first American production aircraft conceived *ab initio* as a combat cargo-carrier, and these intrinsic features were followed through in the C-119, a later version with more power and payload. In response to the requirements of mass parachuting and the need for improved angles of vision ahead and below for the flight crew, the front end was redesigned by shifting the cockpit from the top of the fuselage to the nose. The cargo hold was also widened and increased in volume from about 2,300 to



The pack unit is here shown being towed away from the basic flight structure of the XC-120. Upper and lower decks of the fuselage are connected by four ball-and-socket joints, with four electrical cable hoists to raise and lower the pack fuselage.

2,700 cu ft, while the gross weight was pushed up from 54,000 to 74,000 lb, and the overall dimensions scaled up to match. For the carriage of combat cargo loads up to front-line air-heads, within running distance almost of the battle-line, the C-119 Packet has thoroughly proven in recent military manoeuvres the inbred logic of its design conception.

Nevertheless, the military cargo operators have long been intrigued with the flexibility offered by an aerial version of the trailer-truck combination, and in the Pack-plane we see the birth of the guinea-pig to test this principle in full-scale practice. However—as the designer himself is careful to point out—the XC-120 was not designed as the complete answer to a rigorous specification. Rather, it was built as a test vehicle through which certain key logistics questions could be posed and answered *ad litem*, so to speak. This is because the military air transport planners are now in the process of resolving certain of the basic dimensions and techniques for future air transportability, and hence the XC-120 will function as the breeding instrument. In other words, the railroad box-car that inspired the first two Fairchildren is not necessarily the standard of the future, since a truly airborne army is likely to establish its own basic dimensions, regardless of the limitations imposed by rail transit.

Performance Logistics

Broadly speaking, the XC-120 may be expected to have much the same operating and handling characteristics as the C-119, for both types have similar power-plants and aerodynamic configurations. Thus, in both designs the wing

Top deck only: The XC-120 minus its pod. Wind-tunnel tests suggest that it will behave quite happily in the air under these conditions

