= Platt @-@ LePage XR @-@ 1 =

The Platt @-@ LePage XR @-@ 1 , also known by the company designation PL @-@ 3 , was an early American twin @-@ rotor helicopter , built by the Platt @-@ LePage Aircraft Company of Eddystone , Pennsylvania . The winner of a United States Army Air Corps design competition held in early 1940 , the XR @-@ 1 was the first helicopter tested by the USAAF , flying in 1941 . The flight testing of the XR @-@ 1 proved troublesome , and although continued testing showed that the design had promise , other , improved helicopters were becoming available before the XR @-@ 1 was ready for service . As a result , the development of the aircraft was terminated in 1945 .

= = Design and development = =

Developed during 1939 from an earlier , unsuccessful design , the PL @-@ 1 , the Platt @-@ LePage Model PL @-@ 3 was the winner of a 1940 design competition , held under the terms of the Dorsey @-@ Logan Act , for the supply of a helicopter design to the United States Army Air Corps . Platt @-@ LePage 's submission was judged by the Army to be superior to its competitors , which included a helicopter submitted by Vought @-@ Sikorsky , and autogyros developed by Kellett and Pitcairn .

Following the selection of the Platt @-@ LePage design in May 1940 , a contract for the construction of a prototype and a static test airframe was issued in July of that year . The contract specified delivery of the flying prototype in January 1941 , however the aircraft was not completed until three months later than the contract schedule , a delay that led to Sikorsky receiving Dorsey @-@ Logan Act funding for development of its design , which became the XR @-@ 4 .

In its design , the XR @-@ 1 bore a strong resemblance to the Focke @-@ Wulf Fw 61 , a helicopter developed by Henrich Focke in Germany that , flown by Hanna Reitsch , had impressed Platt @-@ LePage co @-@ founder Wynn LePage during a tour of Europe . The XR @-@ 1 was powered by a Pratt & Whitney R @-@ 985 radial engine , mounted in a buried installation within the fuselage . The aircraft had two , three @-@ bladed rotors , mounted in a side @-@ by @-@ side arrangement on wing @-@ like pylons . The pylons were aerodynamically designed to produce some lift when in forwards flight , slightly unloading the rotors . The construction of the XR @-@ 1 was conventional by the standards of the time , with the aircraft 's frame consisting of a steel @-@ tube framework , which was covered with fabric . The XR @-@ 1 had tail surfaces similar to those of a conventional aircraft , and was equipped with a fixed , taildragger landing gear . The aircraft 's wheels freely castered for easier maneuvering on the ground .

The cockpit of the XR @-@ 1 seated the aircraft 's two crew members in a tandem arrangement , the pilot located ahead of the observer , and was extensively glazed to provide good visibility in the aircraft 's intended observation and army co @-@ operation role . During the development of the aircraft , Major General Robert M. Danford proposed to the War Department that the XR @-@ 1 be evaluated against the Stinson YO @-@ 54 and the Kellett YG @-@ 1B autogyro .

= = Operational history = =

Following several months of ground testing , the XR @-@ 1 conducted its maiden flight on May 12 , 1941 , although the aircraft was restrained by a tether for its early flights . On June 23 the aircraft conducted its first free flight , albeit remaining within a few feet of the ground . As flight testing continued and the aircraft 's performance envelope was expanded , the XR @-@ 1 's quickly proved troublesome , the testing showing a variety of troubles with the design . These included issues with the aircraft 's controls , insufficient control authority being present , and in addition there were resonance issues with the airframe that made the XR @-@ 1 prone to pilot @-@ induced oscillations . The aircraft was modified in an attempt to resolve these issues , and the Army modified Platt @-@ LePage 's contract to provide additional funding for improvements to the design , but despite this the XR @-@ 1 's problems continued . In addition , the company 's test pilot , Lou Leavitt , lacked confidence in the design , refusing to fly the aircraft to its full potential . The situation

was only resolved when Colonel H. Franklin Gregory , director of rotor @-@ wing projects for the Army Air Forces , flew the aircraft himself , reaching 100 mph (160 km / h) on his first flight in the aircraft .

With the worst of the aircraft 's problems believed to have been resolved , the XR @-@ 1 was submitted for service testing by the Army Air Forces in 1943 . During the course of the Army 's evaluations , the XR @-@ 1 's empennage failed during structural testing , the surfaces being strengthened as a result and testing , following the repairs , resuming in 1944 . Despite the modifications to the design , however , the XR @-@ 1 still proved to be deficient in control authority . In July 1943 , the XR @-@ 1 program suffered a setback when the aircraft crashed , seriously injuring test pilot Jim Ray , who had replaced Leavitt following the latter 's dismissal from the company . The crash was caused by an inspector 's error in leaving a suspect part on the aircraft , the rotor hub failing in flight as a result of the decision . The aircraft was repairable , but it would be a year before the XR @-@ 1 was ready to fly again .

Testing was , however , able to continue in the meantime , as Platt @-@ LePage had re @-@ negotiated the XR @-@ 1 contract to cover a second flight @-@ test aircraft . Built to a revised and improved version of the XR @-@ 1 's design and designated XR @-@ 1A , the second aircraft had flown for the first time in May 1943 . The XR @-@ 1A featured a revised cockpit covering compared to that of the XR @-@ 1 , with the area of glazing being increased for improved visibility , and the pilot and observer 's positions being reversed , the pilot now seated in the rear cockpit . During flight testing the XR @-@ 1A was found superior in flight performance to the XR @-@ 1 ; however , the controls were still proving troublesome , although the worst of the bugs did seem to have been worked out .

Following a cross @-@ country flight to Wright Field in Ohio from Platt @-@ LePage 's Pennsylvania plant , testing of the XR @-@ 1A continued until a mechanical failure in the rotor hub led to a crash landing on 26 October 1944 , the company deciding to sell the wreckage for scrap .

The XR @-@ 1 , having been repaired in the meantime , was once again flying , and a contract had been awarded to Platt @-@ Lepage for the construction of seven pre @-@ production aircraft , to be built to an improved version of the XR @-@ 1A design , and designated YR @-@ 1A . Motivated by Congressional concerns about potential favouritism towards Sikorsky Aircraft , which had in the meantime been given a contract for development of an improved version of their VS @-@ 300 experimental helicopter , the contract called for delivery of the first YR @-@ 1A to the Army in January 1945 . However , due to continued financial and flight @-@ testing problems , Platt @-@ Lepage proved incapable of meeting this schedule .

Although the XR @-@ 1 's problems seemed to be approaching resolution by late 1944 , the protracted development of the aircraft meant that alternative , improved helicopters , such as Sikorsky 's XR @-@ 4 , less expensive and more maneuverable than Platt @-@ LePage 's aircraft , were becoming available . In addition , even the XR @-@ 1A 's improvements had failed to cure the aircraft of all of its control and vibration problems , and the AAF 's Air Material Command considered the company " inept " in its work , applying a " hit @-@ or @-@ miss method " to research and development . As a result of this assessment , the Army 's contracts with the company were universally cancelled in early April 1945 .

Following the cancellation of the Army 's contract , the XR @-@ 1 was returned to the company , Platt @-@ LePage believing that the design had potential as a civilian aircraft . The planned civilian version , the PL @-@ 9 , would have been an enlarged , twin @-@ engined aircraft ; however Platt @-@ LePage was by now in serious financial difficulty following the cancellation of its Army contract , and in mid 1946 the XR @-@ 1 's flight test program was concluded , the aircraft being retired to the Smithsonian Institution .

In the meantime , the company 's former test pilot , Lou Leavitt , had purchased the wreckage of the XR @-@ 1A at a price of 4 cents per pound . Leavitt had formed a new company , Helicopter Air Transport , intending to provide helicopter flight training in anticipation of a postwar aviation boom , and he returned the XR @-@ 1A to flying condition . The projected boom failed to materialise , however , and HAT quickly entered bankruptcy , Leavitt selling the XR @-@ 1A to Frank Piasecki , another former Platt @-@ LePage employee who had now started his own helicopter company .

Piasecki soon grounded the aircraft due to airworthiness concerns , and used the airframe in the development of the PA @-@ 2B , a planned tiltrotor which failed to proceed beyond the mock @-@ up stage .

= = Survivors = =

Following the conclusion of flight testing , the XR @-@ 1 was returned to the Army Air Forces , who placed the aircraft in storage before donating it to the Smithsonian Institution 's National Air and Space Museum . The unrestored aircraft is stored at the Paul Garber Restoration and Storage Facility in " remarkable condition " .

= = Variants = =

XR @-@ 1
First prototype ; one built .
XR @-@ 1A
Second prototype with increased cockpit glazing and improved engine ; one built .
YR @-@ 1A
Seven pre @-@ production aircraft ordered ; contract cancelled before any completed .
PL @-@ 4
Proposed armed variant of the XR @-@ 1 , fitted with four machine guns in a reprofiled nose .
PL @-@ 11
Proposed Utility / Mail single seat helicopter .
PL @-@ 12
Proposed five place civil helicopter , partially built in May of 1945
Piasecki PA @-@ 2B
Proposed tiltrotor based on XR @-@ 1 airframe ; not built .

= = Operators = =

United States
United States Army Air Forces

= = Specifications (XR @-@ 1A) = =

Data from Connor and Lee 2000 ; Lambermont 1958
General characteristics
Crew : Two (Pilot and observer)
Length : 29 ft 4 in (8 @.@ 94 m)
Wingspan : 65 ft 0 in (19 @.@ 81 m)
Height : 9 ft 0 in (2 @.@ 74 m)
Gross weight : 4 @,@ 730 lb (2 @,@ 145 kg)
Powerplant : 1 × Pratt & Whitney R @-@ 985 @-@ AN @-@ 1 radial piston engine , 450 hp (340 kW)
Main rotor diameter : 2 × 31 ft 6 in (9 @.@ 60 m)
Performance
Maximum speed : 110 mph ; 96 kn (177 km / h)
Disk loading : 4 @.@ 1 lb / sq ft (19 @.@ 9 kg / m2)
Power / mass : 10 @.@ 8 lb (4.9kg) / hp