

Telemaster X

Test airplane for a counter rotating propeller gearbox

March 13, 2018

by Paul Fleming

In 2016 Jim Lake and myself were discussing the possibilities of building a Douglas XTB2D Sky Pirate as a plane to enter in scale competition. As far as we can tell the last time someone entered one was in 1960. The plane was a torpedo bomber that was designed late in WW II and only two prototypes were built before the project was cancelled.

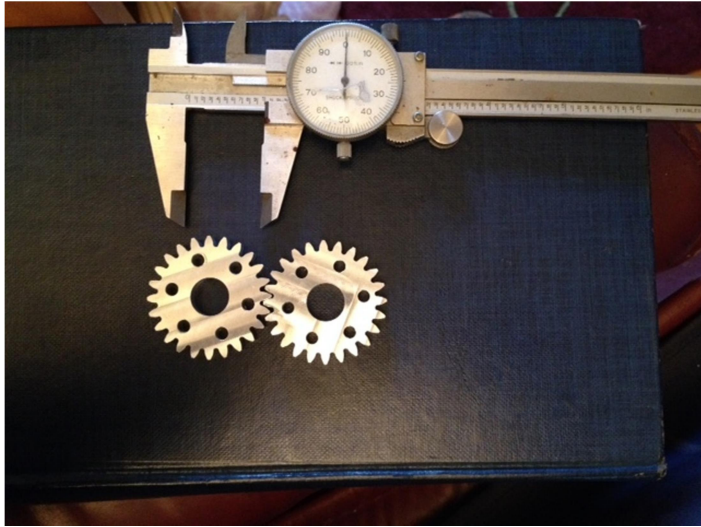
Three things make this a desirable plane to model. Tricycle landing gear, light wing loading and counter rotating propellers.



We want to build this plane with a 96" wingspan and a weight of no more than 28 pounds. I have the old Model Airplane News published plans and can convert them to modern materials and corrected for laser cutting. We decided the airframe would be the easy part. We know we can build the landing gear, but the power train was going to be the tough nut to crack.

We looked around on line to see what was available. There are some units available but the cost was prohibitive and there was no guarantee it could meet our specification. The only thing left was to build our own.

Jim undertook to build the gearbox. Over the next few months a gearbox came together.





We decided to use an AXI 5345/16 for power. Ok now we need to test this monster. Earlier we had built a test stand to test motor and propeller combinations. We conducted many tests at progressively higher power settings. The first time we ran it, it started rolling down the driveway.

We experienced a few problems had some bearing failures, loose gears that type of thing. We even had the propellers come in contact once.

Eventually Jim got it all worked out. Here is a link to a YouTube video of one of our last test runs (see https://youtu.be/Ypbw_v1RM0g). After another teardown and finding no internal problems we decided it was time for flight testing.

We ordered a Telemaster as a flight platform. When the ARF arrived we determined it was too lightly built to function as a test bed. So we beefed up the forward fuselage with 1/8" lightly installed carbon fiber rods in each longitudinal stringer in the aft fuselage. For CG purposes due to the weight and size of the gearbox motor combination we moved the firewall back 4 1/2", moved the main gear aft and installed a nose gear.



To change the angle of attack on the fuselage we ordered a new wider, taller and stronger aluminum main gear from TNT Landing Gear. The aircraft is now ready for flight test.



January 18, 2019

Flight Testing started in March of 2018 (see <https://youtu.be/Fxca2UeuDNk>). The "Telemonster" as it became known to us turned out to be less than an ideal test airplane. I suppose most of the problems encountered were the result of the changes we made to the airframe, but it was a real pain in the butt to fly.

The cool looking tricycle gear was the first thing to go. The darn thing kept tipping over when turned. Then we had a difficult time controlling the direction of take off until the tail came off the ground. We doubled the size of the rudder and that helped some. We even tried a gyro on the rudder, nothing was ever really successful. Till the end it remained a difficult airplane to take off.

During the flight testing we experienced several failures of the number two propeller. Each time the aircraft maintained level flight and landed safely. The only indication of trouble was the propeller sound changed dramatically. In the construction of the gearbox Jim used an adhesive to bond the final drive gear to the shaft. The Lock Tight bonding agent built for that purpose was not up to the job. Both the gear and shaft were re-machined to accept a woodruff key.

At one point we experienced an internal failure of the forward needle bearing. The problem was the bearing was too undersized for the load it was being required to carry. The result was a complete redesign of the front end of the gearbox. Using a larger bearing allowed Jim to double the diameter of both drive shafts eliminating other things that were of concern.

During the testing the gearbox was disassembled several times to access the wear patterns on the gears. The first gears were made from 6063 aluminum; they didn't really show significant wear, but we only flew 20 or so times. Jim felt for long term use we needed harder gears. We either anodize the 6063 or use a harder material. The final gears are 7075 aluminum. We felt the gear box was now ready for a Scale plane. With great pleasure we gutted the Telemonster and sent it's carcass to the dump.

During our testing we researched several other airplanes that had counter rotating propellers: Spitfires, Sea Furies, Curtis P-46, Republic XP-72. The XP-72 is a highly modified P-47 Thunderbolt. Since I had just maiden my 85" Top Flite and it flies beautifully, it appeared to be the perfect candidate to modify into the XP-72. With the Telemaster Skypirate, besides designing the cutting files and building it, we would also have to build the custom landing gear. To save time and money we decided to go with an in-production plane and modify it. The Top Flite ARF airframe will easily carry the additional 2.5 pounds of gearbox.

Both the Telemaster and my P-47 use the AXI 5345/16 motor. With 17.5 pounds of thrust, there will be sufficient power to fly a 28 to 30 pound airplane. Since most of the modifications are forward of the firewall, the P-47 conversion will save us about a year.

One of the things we did on the Telemaster was build a quick change engine to firewall mount and two piece cowling that allowed us to remove and replace the power module. (Notice the size of the new nose bearing housing.)



The XP-72 project will be interesting in that we will build-in the airspeed indicator, G-meter and camera mounts. The next installment of this article will be the construction of the plane followed by the flight tests.

Here are a couple of photos of the XP-72, a drawing and a plastic model.



XP-72 No.2 (43-6599) with six-bladed contra-rotating coaxial propeller.

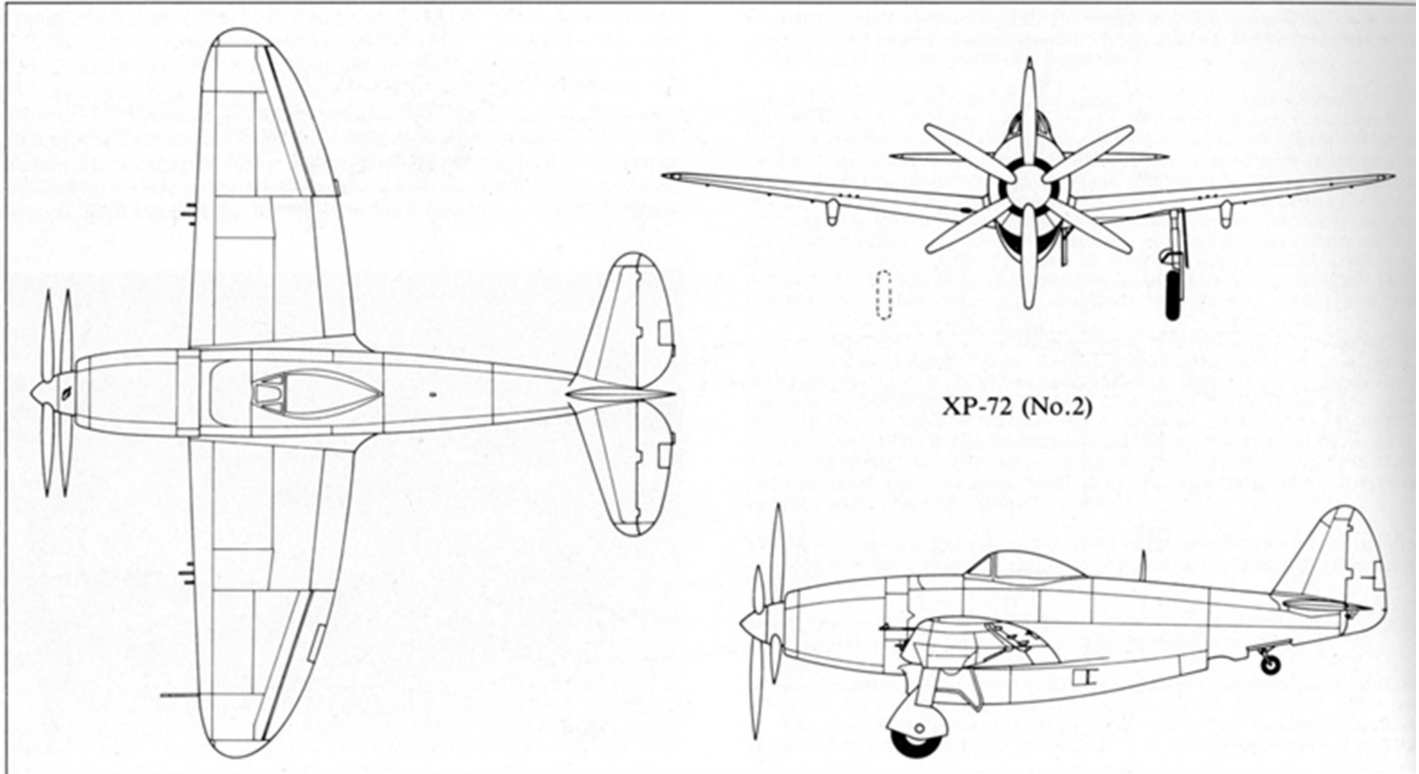
Technical data

XP-72 - Type: Fighter-bomber - Crew: 1 - First order: 2 - Order date: 6/18/1944 - First flight: 2/2/1944.

Power plant: Pratt & Whitney R-4360-13 turbo-supercharged, 3,450hp.

Max wingspan: 40ft 11in (12.47m) - Wing area: 300sq ft (27.87m²) - Length: 36ft 7in (11.15m) - Height: 16ft (4.87m) - Empty weight: 11,475lb (5,205kg) - Gross weight: 14,414lb (6,538kg) - Max T.O. weight: 17,492lb (7,934kg) - Cruising speed: 300mph (483km/h) - Max speed at: 25,000ft (7,620m): 490mph (789km/h) - Landing speed: 104mph (167km/h) - Climb: 20,000ft/5min (6,096m/5') - Service ceiling: 42,000ft (12,802m) - Range: 1,200mi (1,931km) - Max range: 1,330mi (2,140km) - Fuel capacity: 535USgal (2,025l)/755USgal (2,858l).

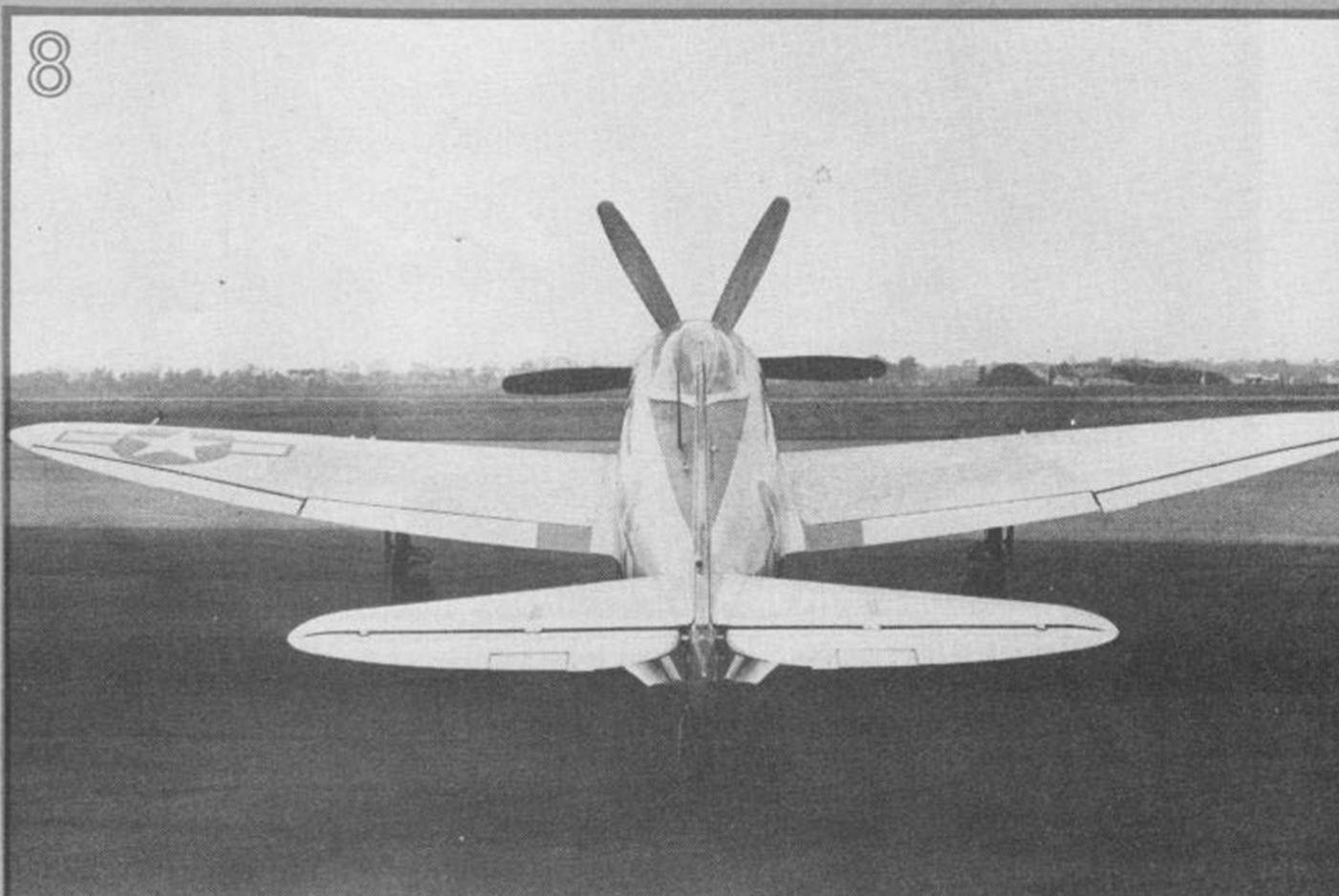
Armament: 6x.50in Mg; 2,000lb (907kg) B - Serial numbers: 43-6598/6599.



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I've sent this add to bunches of local clubs, Hope we don't have to bite the bullet and buy a new P-47.

WANTED Used P-47D



I would like to buy a used Giant Scale Top Flite or Hanger 9 P-47D. I don't want electronics or motor just the airframe. Repairable damage is acceptable. Contact Paul Fleming at 253 225-0780 or send photos and information to p6efleming@gmail.com