

Contra-rotating propellers



Contra-rotating propellers on a [Rolls-Royce Griffon](#) powered P-51 Mustang.

Contra-rotating propellers, also referred to as *coaxial contrarotating propellers*, are a complex way of applying the maximum power of a single [piston](#) or [turboprop aircraft engine](#). Contra-rotating propellers are common in some marine transmission systems, in particular for medium to large size planing leisure crafts. Two [propellers](#) are arranged one behind the other, and power is transferred from the engine via a [planetary gear transmission](#). The configuration can also be used in [helicopter](#) designs, where similar issues and principles of torque apply.

When airspeed is low the [mass](#) of the air going back through the propeller disk ([thrust](#)) causes a significant amount of [tangential](#) or rotational air flow to be created by the spinning blades. The energy of this tangential air flow is wasted in a single propeller design. To use this wasted effort the placement of a second propeller behind the first takes advantage of the already-disturbed airflow.

If it is well-designed, a contra-rotating propeller will have no rotational air flow, pushing a maximum amount of air [uniformly](#) through the propeller disk — resulting in high performance and low induced energy loss. It also serves to counter the [asymmetrical torque](#) effect felt from a conventional propeller. Some contra-rotating systems were designed to be used at take off, for maximum power and efficiency, allowing one of the twin propellers to be disabled during cruise to extend flight patrol time.

The efficiency of a contra-rotating prop is somewhat offset by the mechanical complexity that comes with its design however.

Nonetheless, contra-rotating propellers and [rotors](#) are moderately common in both the [military aerospace](#) industry and in [naval](#) armaments such as [torpedoes](#), where the added maintenance is not a concern to government budgets.

Significant aircraft

While several nations experimented with contra-rotating propellers in aircraft, only the United Kingdom and Soviet Union produced them in large numbers. The U.S. worked with several prototypes, including the [tail-sitting Convair XFY](#) and [Lockheed XFV](#) "Pogo" [VTOL](#) fighters, but [jet engine](#) technology was advancing rapidly and the designs were deemed unnecessary.

The British felt otherwise, however; some of the more successful British aircraft with contra-rotating propellers are the [Avro Shackleton MR Mk 3](#), powered by the [Rolls-Royce Griffon](#) engine, and the [Fairey Gannet](#), which used the [Double Mamba Mk.101](#) engine. Later variants of the [Supermarine Spitfire](#) and Seafire used the Griffin with contra-rotating props as well.

Soviet and Russian [design bureaus](#) produced a large number of contra-rotating helicopters and aircraft. The [Yak EG](#), Kamov [Ka-25](#), [Ka-32](#), and [Ka-50 Blackshark](#) are particularly prominent examples. Helicopters have no need for a [tail rotor](#) when equipped with contra-rotating rotors; this aids maneuverability and allows the design to be more compact in dimensions.

An especially noteworthy Soviet design was the [Tupolev Tu-95 Bear](#), the only contra-rotating turboprop bomber to enter service in the world as well as one of the fastest propeller aircraft; the [Tu-114](#), an airliner derivative of the Bear, [holds the world speed record](#) for propeller aircraft. The Bear was also the first Soviet bomber to have intercontinental range, allowing it to strike North American targets. [As of 2005](#) the Ukrainian design bureau [Antonov](#) is nearing certification of the [An-70](#) heavy transport, powered by contra-rotating [propfans](#).

External links

- [Aircraft.co.za - The Complete Aviation Reference](#)

Convair XFY



Convair XFY-1 Pogo

The **Convair XFY Pogo** [tailsitter](#) was an experiment in [vertical takeoff and landing](#). The Pogo had three-bladed [contra-rotating propellers](#) powered by a 5,500 hp [Allison YT40-A-6 turboprop engine](#). It was designed in hope for a high-performance [fighter aircraft](#) capable of operating from small [warships](#).

A weapon load of four 20-mm cannon or 46 x 70-mm Mighty Mouse unguided high-explosive rockets was proposed, but never fitted. Landing the XFY-1 was very tough, as the pilot had to look over his shoulder while carefully working the throttle to land. The Pogo's first transition from vertical to horizontal flight took place in November [1954](#).

Specifications (XFY)

General characteristics

- **Crew:** One
- **Length:** 22 ft 11 in (10.66 m)
- **[Wingspan](#):** 27 ft 7¾ in (8.43 m)
- **Height:** ()
- **Wing area:** ()
- **Empty weight:** ()
- **[Maximum Take-Off Weight](#):** 16,250 lb (7,370 kg)
- **Powerplant:** 1× [Allison YT40](#)-A-6 [turboprop engine](#), 5,500 hp (4,100 kW)

Performance

- **[Maximum speed](#):** 610 mph at 15,000 feet (980 km/h at 4,570 m)
- **[Range](#):** ()

Armament

never fitted; planned were

- 4× 20 mm [cannon](#), or:
- 46× 70 mm [‘Mighty Mouse’](#) rockets

Related content

Comparable aircraft

- [Lockheed XFV](#)

Designation sequence

- [XFV](#) - [F2W](#) - [F3W](#) - [XFY](#) - [F2Y](#)

Related lists

Tupolev Tu-95



Tu-95 'Bear'

The [Tupolev Tu-95](#) ([NATO reporting name Bear](#)) is the most successful Tupolev strategic [bomber](#) and missile carrier from the times of the [Soviet Union](#), still remaining in service as of 2005. The Bear is powered by four [Kuznetsov turboprop engines](#), each driving [contra-rotating propellers](#), and remains one of the fastest [propeller-driven](#) aircraft ever built. To this day it remains the only turboprop-powered bomber to have been deployed. A naval version is designated **Tu-142**.

Overview

For a long time, the Tu-95 was known to Western intelligence as the **Tu-20**. While this was, in fact, the original [Soviet Air Force](#) designation for the aircraft, by the time it was being supplied to operational units, it was already better known under the Tu-95 designation used internally by Tupolev and the Tu-20 designation fell out of use. Since the Tu-20 designation was used on many documents acquired by Western intelligence agents, the name continued in use there.

Like its American counterpart, the [B-52 Stratofortress](#), the Tu-95 has continued to operate in the Russian Air Force while several iterations of bomber design have come and gone. Part of the reason for this longevity was its suitability, like the B-52, for modification to different missions. Whereas the Tu-95 was originally intended to drop nuclear weapons, it was subsequently modified to perform a wide range of roles, such as the deployment of cruise missiles, maritime patrol (Tu-142 Bear-F), [AWACS](#) platform (Tu-126) and even civilian airliner ([Tu-114](#)). During and after the [Cold War](#), the Tu-95's utility as a weapons platform has only been eclipsed by its usefulness as a diplomatic icon. When a patrolling Tu-95 appears off the coast of the United States or one of its allies, it may not be the technological menace that it was in its heyday, but it is still a potent and visible symbol of the Russian capability to project military power over great distances.

The Soviet Union did not assign official "popular names" to its aircraft, although unofficial nicknames were common. Unusually, Soviet pilots found the Tu-95/Tu-142's NATO reporting name, 'Bear,' to be a fitting nickname, given the aircraft's large size, 'lumbering' maneuverability and speed, and large arsenal. It is often called Bear in Russian service. An anecdotal story states that it was actually a Russian crew who had the privilege of assigning the NATO reporting name; during the aircraft's Paris

Airshow debut, a Western reporter asked the crew what the plane's name was. The pilot responded, "it can't be anything but a *bear*."

History

Development of the turboprop powered Tu-95 began in the 1950s as an intercontinental bomber when the [Tu-4](#) showed that [piston engines](#) were not powerful enough to fulfill that role, and the AM-3 jet engines of the proposed T-4 intercontinental jet bomber did not provide it with enough range.^[1]

The Tu-95 development was officially approved by the government on [11 July](#) 1951, resulting in the test of the first prototype **95/1** on [12 November](#) 1952. Series production of the airplane started in January 1956.

Initially the [United States Department of Defense](#) did not take the Tu-95 seriously, as estimates showed it had a maximum speed of 400 mph (644 km/h) with a range of 7800 miles.^[2] This number has been revised numerous times.

Noise levels



Tu-95 'Bear'

The Tupolev 95 is one of the noisiest aircraft in the world. It is so loud that submarine crews could detect it during dives, picking up the clear signature of the plane's eight contra-propellers. This hampered the plane's utility in maritime patrol. During the Cold War, U.S. fighter pilots photographing Tu-95s in flight found them extraordinarily loud, even though these fighter pilots were in pressurised compartments and wearing head gear. The intercept pilots found the Bear to be uncomfortably loud and today, there are many hearing impaired former TU-95 crewmembers in Russia.

The Tu-95's contra-rotating propeller system was an incredible technological success, and the plane ranked well on fuel efficiency and range, but there were drawbacks from this system. An aspect of which being the aforementioned noise generated, but also the maintenance requirements of such a

Mischief in the Air

Due to the Tupolev 95 lumbering size and speed, many American and British fighters were often sent to watch the plane while it was in flight. Many stories abound from pilots where the Russian crew

would wave to the intercepting planes. Eventually, the Russian command assigned a [KGB](#) officer on board to stop such displays of openness.

During the time KGB officers were placed on the planes, American and British pilots began to play games, where they would move their planes back and forth between the front and back in order to make the KGB officers work much harder to stop crews from waving.

According to one British [Phantom](#) pilot:

In the daytime the mission was straightforward, and there was time for a little play with the "Bears". As far as the Soviets went, this got a little out of hand, for they started putting a KGB officer on board to stop the crew waving at us.

Some "Bear" variants had a crawl way between the front and back compartments -- a long and uncomfortable journey that involved clambering over unprotected wing spars and other obstructions. We soon worked out that by moving our jet forwards and backwards we could get this poor idiot to spend hours crawling back and forth down this tunnel, just to stop the crew from waving at us.

On the American side, the stories sometimes involved American pilots using offensive signs and gestures in reply to the Russians waving. Some US Navy pilots claim that they would fly alongside the Russian planes and hold up the latest issue of Playboy, for the edification of the Soviet pilots. These stories are unconfirmed.

Concerning the performance of the aircraft, it has been reported by many fighter pilots that the Tu-95 was able to out-accelerate them for a short distance, especially with the [SEPECAT Jaguar](#). There are also tales of the Russian pilots suddenly swerving to push the escorts off course or cause them to rapidly decelerate. This went both ways however, in the 1980s a [Royal Norwegian Air Force F-16](#) collided with a Tu-95 whilst escorting it out of [Norwegian](#) airspace. Apparently, the Norwegian pilot had been edging closer and closer to the Tupolev before being caught in the propwash and having a wingtip torn off in the resulting collision. Both planes landed safely.

Variants

- **Tu-95/1** - Prototype.
- **Tu-95/2** - Prototype.
- **Tu-95K** - Experimental version for air-dropping a MiG-19 SM-20 jet aircraft.
- **Tu-95M-55** - Missile carrier.
- **Tu-96** - high speed bomber project, never got off the ground.
- **Tu-119** - Nuclear powered aircraft project. Just like the Tu-96 it did not fly.
- **Tu-142LL (Letayushchaya Laboratoriya - Flying Laboratory)** - Engine testbed aircraft.
- **Bear A (Tu-95/Tu-95M)** - Basic variant of the long-range strategic bomber and the only model of the aircraft never fitted with a nose refuelling probe.
- **Bear-A (Tu-95U - Uchebnyy)** - Training version.
- **Bear B (Tu-95K/Tu-95KD)** - Designed to carry the monstrous [AS-3 Kangaroo air-to-surface missile](#). The Tu-95KD aircraft were the first to be outfitted with nose probes.
- **Bear C (Tu-95KM)** - Modified and upgraded versions of the Bear B, most notable for their enhance reconnaissance systems. These were in turn converted into the Bear G configuration.
- **Bear D (Tu-95RTs - Razvedchik Tseleukazatel')** - Variant of the basic Bear A configuration, redesigned for maritime [electronic intelligence \(ELINT\)](#) for service in the [Soviet Naval Aviation](#). This aircraft was featured in [Tom Clancy's](#) techno-thriller [Red Storm Rising](#).
- **Bear E (Tu-95MR)** - Bear A modified for [photo-reconnaissance](#) and produced for Naval Aviation.
- **Bear F (Tu-142/Tu-142M)** - Originally designed as a maritime surveillance aircraft to supplement the Bear D, the Bear F evolved to become the premier [anti-submarine warfare \(ASW\)](#) aircraft of the [Soviet](#)

[Navy](#) during the [Cold War](#). The ASW variants were designated as Tu-142M2 (Bear F Mod 2), Tu-142M3 (Bear F Mod 3), and Tu-142M4 (Bear F Mod 4).

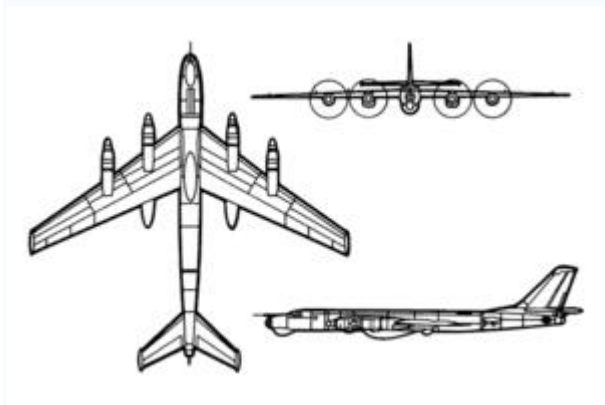
- **Bear G (Tu-95K22)** - Conversions of the older Bear bombers, reconfigured to carry the [AS-4 Kitchen](#) missile and incorporating modern avionics. A number of these bombers are still operational within the [Russian Air Force](#).
- **Bear H (Tu-95MS/Tu-95MS6/Tu-95MS16)** - Roughly similar to the Bear G, but based on the Tu-142 airframe. This variant became the launch platform of the [Kh-55 \(AS-15 Kent\)](#) [cruise missile](#)
- **Bear J (Tu-142MR - Morskoy Razvedchik)** - Variant of the Bear F modified for use in submarine communications as well as other command, control and communications (C3) duties.
- **Bear T (Tu-95U)** - Training variant, modified from surviving Bear A's but now all have been retired.

Several other modification of the basic Tu-95/Tu-142 airframe have existed but these were largely unrecognized by Western intelligence or else never reached operational status within the Soviet military. One of these modified Bears, known as the Tu-95V, was used to drop the [Tsar Bomba](#).

Operators

- India, Russia, Ukraine.

Specifications (Tu-95MS)



General characteristics

- **Crew:** Seven - two pilots, one tailgunner, four others
- **Length:** 49.50 m (162 ft 5 in)
- **[Wingspan](#):** 51.10 m (167 ft 8 in)
- **Height:** 12.12 m (39 ft 9 in)
- **Wing area:** 310 m² (3,330 ft²)
- **Empty weight:** 90,000 kg (198,000 lb)
- **Loaded weight:** kg (lb)
- **[Maximum Take-Off Weight](#):** 188,000 kg (414,500 lb)
- **Powerplant:** 4× [Kuznetsov NK-12MV turboprops](#), 11,033 kW (14,795 shp) each

Performance

- **[Maximum speed](#):** 925 km/h (500 kt, 575 mph)
- **[Range](#):** 15,000 km (8,100 nm, 9,400 mi)
- **[Service ceiling](#):** 12,000 m (39,000 ft)
- **[Rate of climb](#):** 10 m/s (2,000 ft/min)
- **[Wing loading](#):** 606 kg/m² (124 lb/ft²)
- **[Power/mass](#):** 235 W/kg (0.143 hp/lb)

Armament

- **Guns:** 1 or 2x [AM-23](#) 23 mm [cannon](#) in tail turret
- **Missiles:** Up to 15,000 kg (33,000 lb), including the [Kh-20](#), [Kh-22](#), [Kh-26](#), and [Kh-55 air-to-surface missiles](#)

References

1. [^] [FAS.org - "Tu-95 BEAR \(TUPOLEV\)"](#)
2. [^] [Aviation.ru - "Tu-20/95/142 Bear: The fastest prop-driven aircraft."](#)

Related development

- [Tu-96](#)
- [Tu-99](#)
- [Tu-114](#)
- [Tu-116](#)
- [Tu-119](#)
- [Tu-126](#)
- [Tu-142](#)

Designation sequence

- **Tupolev sequence:** [Tu-89](#) - [Tu-90](#) - [Tu-91](#) - **Tu-95** - [Tu-96](#) - [Tu-98](#) - [Tu-99](#)
- **Soviet Air Force sequence:** [Tu-12](#) - [Tu-14](#) - [Tu-16](#) - **Tu-20** - [Tu-22](#)/[Tu-22M](#) - [Tu-24](#) - [Tu-26](#)

Related lists

- [List of bomber aircraft](#)
- [List of military aircraft of the Soviet Union and the CIS](#)

Tupolev Tu-114



Aeroflot Tu-114

Type Airliner

Manufacturer [Tupolev OKB](#)

Maiden flight [1957-11-15](#)

Introduced [1961-04-24](#)

Retired 1975

Primary users [Aeroflot](#)
[Japan Airlines](#)

Built 31

The [Tupolev Tu-114 Rossiya](#) ([NATO reporting name](#) **Cleat**) is a [turboprop](#) powered medium-range airliner designed by the Tupolev design bureau.

The Tupolev design bureau was instructed by the government of the [Soviet Union](#) to develop an airliner with intercontinental range based on the [Tupolev Tu-95](#) strategic bomber. The result was a large airliner powered by 4 powerful [contra-rotating propellers](#) just like the [Antonov An-22](#). It came as a surprise to Western observers that a propeller-driven aircraft could operate at jet-like speeds. It was huge by [1950s](#) standards, the largest airliner of its time, with accommodation for 120 to 220 passengers.

Technological features

This airliner has certain unique technological features of its time such as

- swept back wings as in high speed subsonic airliners
- powerful Kuznetsov NK-12MV turboprops, the most powerful ever, each driving two AV-60H counter-rotating four-bladed reverse-pitch propellers
- lower deck galleys
- lower deck crew rest area
- long landing gear due to its large propeller diameter

Variants

Tu-114

The Tu-114 was the production standard. Including a totally redesigned fuselage of greater diameter than the Tu-95, the Tu-114 also included a wing mounted lower on the fuselage, and a nose very similar to that of the Tu-95. The navigator sat in the tip of the nose, behind a glazed window.

By the standards of the [1950s](#), the main cabin was gigantic, seating as many as 220 passengers. The plane set a number of records, most notably one for fastest turboprop-powered aircraft that has not yet been broken. Following this, the Tu-114 went into service with Aeroflot. Though used for long-range domestic routes, the Tu-114 was also flown to [Copenhagen](#), [Havana](#), [Montréal](#), [New Delhi](#), [Paris](#), [Belgrade](#) and [Tokyo](#) (in flights operated jointly by [Japan Air Lines](#), flown by a mixture of crews).

In [1971](#), the Tu-114 was replaced by Aeroflot by the [Ilyushin Il-62](#). The phaseout was complete by [1975](#).

Tu-114D/Tu-116

During the design process of the Tu-114, the Tupolev OKB decided to convert three disbanded military Tu-95s. The purpose of these planes was testing, such as propulsion tests, analysis of compatibility issues with civil airports, and route/scheduling studies. Designated Tu-116, these planes were converted by removing the gun turret and adding a pressurised cabin to the aft fuselage. The sole customer for the Tu-116 was [Aeroflot](#), which later redesignated it Tu-114D.



Computer-generated graphics of the Tu-114 (top), and its ancestor, the [Tupolev Tu-95](#) strategic bomber.

Tu-126

Of the disbanded Tu-114s, a number were converted to [AWACS](#) platforms, receiving the new designation Tu-126 (NATO reporting name *Moss*). They were used by the Soviet Navy, until being replaced by the [Beriev A-50](#).

Operators

Civil

- [Aeroflot](#)

Military

- [Soviet Navy](#)

Specifications (Tu-114)

General characteristics

- **Crew:** 5
- **Capacity:** 120-220 passengers
- **Length:** 54.10 m (177 ft 4 in)
- **[Wingspan](#):** 51.05 m (167 ft 6 in)
- **Height:** 15.44 m (50 ft 8 in)
- **Wing area:** 311.1 m² (3,349 ft²)
- **Empty weight:** 91,000 kg (200,000 lb)
- **Loaded weight:** 131,000 kg (289,000 lb)
- **[Maximum Take-Off Weight](#):** 171,000 kg (377,000 lb)
- **Powerplant:** 4× [Kuznetsov NK-12](#)MV [turboprops](#) driving contra-rotating props, 11,000 kW (14,800 hp)^[1] each

Performance

- **[Maximum speed](#):** 960 km/h (520 kt, 600 mph)
- **[Cruise speed](#):** km/h (kt, mph)
- **[Range](#):** 6,200 km (3,300 nm, 3,900 mi)
- **[Service ceiling](#):** 12,000 m (39,000 ft)
- **[Rate of climb](#):** m/s (ft/min)
- **[Wing loading](#):** 421 kg/m² (86.2 lb/ft²)
- **[Power/mass](#):** 168 W/kg (0.102 hp/lb)

Notes

1. [^] Originally measured as 15,000 [PS](#).

Related content

Related development

- [Tupolev Tu-95](#)
- [Tupolev Tu-142](#)

Comparable aircraft

- [Boeing 707](#)
- [Douglas DC-8](#)
- [Ilyushin Il-62](#)
- [Vickers VC-10](#)

Designation sequence

- [Tu-105](#) - [Tu-107](#) - [Tu-110](#) - **Tu-114** - **Tu-116** - [Tu-119](#) - [Tu-121](#)

Related lists

Antonov An-70



Antonov An-70

The **Antonov An-70** is a next-generation four-engine medium-distance [transport aircraft](#), and the first large aircraft to be powered by [propfan](#) engines. Developed by the [Antonov](#) design bureau to replace the obsolete [An-12](#) military transport, work on the An-70 began in the early 1990s.

[Maiden flight](#) of the first prototype took place on December 16, [1994](#) in [Kiev](#), [Ukraine](#).

History of production and marketing

[Russia](#) and Ukraine have (as of [2002](#)) agreed on a 50-50 risk-sharing deal on production. Particularly, there were plans to establish serial production of the model in both Kiev and [Samara, Russia](#), guaranteeing employment of about 80,000 people in two countries. The Russian government has shown interest in purchasing 160 planes for its military.

The first prototype [was lost in 1995 during test flight](#). The second prototype suffered damage in a [2001](#) emergency landing during cold weather testing in Russia, but was repaired. Soon after the first crash, Russian authorities started to question the An-70's abilities and demanded further development.

In May 2005, senior officials of [Russian Air Force](#) claimed that bilateral development and further testing of the plane continue, though inside sources (Piort Butowski) report that the An-70 is rapidly losing ground to the upgraded IL-76MF, with the Tu-330 and IL-214 coming up strongly on the outside. In November 2005, Ukraine's Defence Ministry announced plans to buy five AN-70s for the [Ukrainian Air Force](#). In December 2005, Antonov maintained that production of the aircraft remains a priority.

In April 2006, Russia announced its complete withdrawal from the project. The head of the Russian Air Force Vladimir Mikhailov claimed that An-70 has grown into a heavy expensive cargo plane — an inferior competitor to modernized [IL-76MF](#) and other projects, which, considering the Ukrainian plans for NATO integration, renders any Russian involvement in the program pointless. [\[1\]\[2\]](#)

As of [2006](#), the plane was fully tested and internationally certified, though Russian and any potential [Western](#) customers have yet to purchase or invest in the serial production of the An-70.

Technology

Fully [fly-by-wire](#), the An-70 features a [glass cockpit](#) and uses [composite](#) materials throughout. It is powered by four [Progress D-27 turboprop engines](#), each turning a pair of [contra-rotating propfans](#), and reaches 90% efficiency (claimed) in cruise at [jet](#) speeds.

Specifications (An-70)

General characteristics

- **Crew:** 3-5
- **Capacity:** 300 troops, 206 wounded, or up to 47t cargo
- **Length:** 40.7 m (133 ft 6 in)
- **Wingspan:** 44.06 m (144 ft 7 in)
- **Height:** 16.38 m (53 ft 9 in)
- **Wing area:** m² (ft²)
- **Empty:** 66,230 kg (146,000 lb)
- **Loaded:** 108,860 kg (240,000 lb)
- **Maximum takeoff:** 130,000 kg (lb)
- **Powerplant:** 4x [Progress D-27 propfans](#), 10,350 kW (13,880 hp)

Performance

- **Maximum speed:** 780 km/h (420 knots)
- **Range:** 8,000 km (4,320 [nm](#)) ferry flight, 6,600 km (3,600 nm) with 20t cargo
- **Service ceiling:** 12,000 m (40,000 ft)
- **Rate of climb:** m/min (4,900ft/1,493m per minute)
- **Wing loading:** kg/m² (lb/ft²)
- **Power/mass:**

References

- **(Russian)** Reports on design progress by *Aviatsiya i Vremia* journal in Issue 2 and 3 of 1994
- **(Russian)** Первый полет Ан-70 // Авиация и Время. - К. : 1995. - №1. - Стр.25. (Report on first flight of the An-70 by *Aviatsiya i Vremia* journal,including photogallery of the plane)
- **(Russian)** ["Interfax-Ukraine"](#) news lines of December 1 and December 28, 2005; November 11, 2005; May 17, 2005
- **(Russian)** [Russia and Ukraine do not cease work on the developing of An-70](#) (Russian govt. E-zine reporting on bilateral development of the plane; May 17, 2005)
- **(Russian)** [Optimistic Future](#) (Russian govt. E-zine article on bilateral development of the plane; Jun 7, 2004)
- **(Russian)** [Our plane, common ground and their alliance](#) (Ukrainian Glavred e-zine article on the disagreement over An-70 purchase; May 5, 2003)

External links

- [Antonov product page](#)
- <http://www.aeronautics.ru/archive/vvs/an70-01.htm>

Related content

Comparable aircraft

- [Airbus A400M](#)

Designation sequence

Lockheed XFV



The XFV-1.

The **Lockheed XFV** (sometimes referred to as the **Salmon** or the **Vertical Riser**) was a [tailsitter prototype](#) built by [Lockheed](#) to demonstrate the operation of a [vertical takeoff and landing](#) fighter for protecting convoys. Starting with a brief hop on [December 23, 1953](#) piloted by [Herman "Fish" Salmon](#), the aircraft made a total of 28 flights, demonstrating transition between vertical and horizontal flight. Performance was disappointing, and the project was cancelled in June of [1955](#).

The single flying prototype ended up at the [National Museum of Naval Aviation](#) in [Pensacola, Florida](#). The second prototype, which was never completed, serves as a gate guardian at [NAS Los Alamitos, California](#).

Specifications

General characteristics

- **Crew:** 1
- **Length:** 36 ft 10.25 in (11.23 m)
- **[Wingspan](#):** 27 ft 5 in (8.36 m)
- **Height:** 36 ft 10.25 in (11.23 m)
- **Wing area:** 246 ft² (22.85 m m²)
- **Empty weight:** 11,599 lb lb (5,261 kg kg)
- **Loaded weight:** 16,221 lb (7,358 kg kg)
- **[Maximum Take-Off Weight](#):** 16,221 lb (7,358 kg kg)
- **Powerplant:** 2x 1 Allison XT40-A-6 turboprop, () each

Performance

- **[Maximum speed](#):** 580 mph (930 km/h)
- **[Cruise speed](#):** 410 mph (660 km/h)
- **[Range](#):** unknown ()
- **[Service ceiling](#):** 43,300 ft (13,100 m)
- **[Rate of climb](#):** 10,820 ft/m (3,300 m/min)
- **[Wing loading](#):** 65.9 lb/ft² (322 kg/m²)
-

Armament

4 20 mm cannons or 48 2.75 in rockets *Note: Performance estimates are based on XFV with YT40-A-14 engine.*

References and external links

Green, William, Gordon Sanborough, *The Great Book of Fight*