**Northrop T 38 Talon**

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| **T-38 Talon** | |
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| A T-38A from [560th Flying Training Squadron](https://en.wikipedia.org/wiki/560th_Flying_Training_Squadron), flying over the Texas countryside in 2001 | |
| **Role** | Advanced trainer |
| **National origin** | United States |
| **Manufacturer** | [Northrop Corporation](https://en.wikipedia.org/wiki/Northrop_Corporation) |
| **First flight** | 10 March 1959 |
| **Introduction** | 17 March 1961 |
| **Status** | Operational |
| **Primary users** | [United States Air Force](https://en.wikipedia.org/wiki/United_States_Air_Force) [United States Navy](https://en.wikipedia.org/wiki/United_States_Navy) [NASA](https://en.wikipedia.org/wiki/NASA) [Turkish Air Force](https://en.wikipedia.org/wiki/Turkish_Air_Force) |
| **Produced** | 1961–1972 |
| **Number built** | 1,146 |
| **Unit cost** | [US$](https://en.wikipedia.org/wiki/United_States_dollar)756,000 (1961 [constant dollars](https://en.wikipedia.org/wiki/Constant_dollars)) US$5.879 million (2013 dollars) |
| **Developed from** | [Northrop N-156](https://en.wikipedia.org/wiki/Northrop_F-5) |
| **Variants** | [Northrop F-5](https://en.wikipedia.org/wiki/Northrop_F-5) |
|  |  |



Air-to-air right side view of a USAF T-38 Talon aircraft from 560th Flying Training Squadron, Randolph AFB, TX as his lead performs a left pitchout



T-38C cockpit



USAF [Thunderbirds](https://en.wikipedia.org/wiki/U.S._Air_Force_Thunderbirds) flying T-38s in formation



Two T-38 chase planes follow [Space Shuttle *Columbia*](https://en.wikipedia.org/wiki/Space_Shuttle_Columbia) as it lands at Northrop Strip in [White Sands, New Mexico](https://en.wikipedia.org/wiki/White_Sands,_New_Mexico), ending its mission [STS-3](https://en.wikipedia.org/wiki/STS-3).



NASA Dryden's T-38 in flight over [Cuddeback Dry Lake](https://en.wikipedia.org/wiki/Cuddeback_Lake) in Southern California



Picture of the formation leader, taken from the backseat of a T38C, of the 479th Fighter Training Group, Moody AFB, Georgia, 2006



T-38 in [Portuguese Air Force](https://en.wikipedia.org/wiki/Portuguese_Air_Force) colors at [Air Base No. 11 (BA11 – Beja)](https://en.wikipedia.org/wiki/Beja_Air_Base)



A U.S. Air Force 25th Flying Training Squadron instructor pilot and his student walk to a T-38A to begin flight training at Vance Air Force Base, Oklahoma, on 23 November 1997.



X-15 in flight attached to B-52 mother ship, with T-38 chase plane (1961)



A T-38 takes off from Edwards Air Force Base with only one engine during single-engine takeoff testing, to evaluate recommended speeds for takeoff if an engine fails.

The **Northrop T-38 Talon** is a two-seat, twin-engined supersonic [jet trainer](https://en.wikipedia.org/wiki/Jet_trainer). It was the world's first supersonic trainer and is also the most produced. The T-38 remains in service as of 2015[[update]](https://en.wikipedia.org/w/index.php?title=Northrop_T-38_Talon&action=edit) in air forces throughout the world.

The [United States Air Force](https://en.wikipedia.org/wiki/United_States_Air_Force) (USAF) operates the most T-38s. In addition to training USAF pilots, the T-38 is used by [NASA](https://en.wikipedia.org/wiki/National_Aeronautics_and_Space_Administration). The [US Naval Test Pilot School](https://en.wikipedia.org/wiki/U.S._Naval_Test_Pilot_School) is the principal US Navy operator (other T-38s were previously used as USN [aggressor](https://en.wikipedia.org/wiki/Aggressor_squadron) aircraft until replaced by the similar [Northrop F-5 Tiger II](https://en.wikipedia.org/wiki/Northrop_F-5_Tiger_II)). Pilots of other [NATO](https://en.wikipedia.org/wiki/NATO) nations fly the T-38 in joint training programs with USAF pilots.

As of 2015[[update]](https://en.wikipedia.org/w/index.php?title=Northrop_T-38_Talon&action=edit), the T-38 has been in service for over 50 years with its original operator, the United States Air Force.

**Design and development**

In 1952 Northrop began work on a fighter project, the [*Fang*](https://en.wikipedia.org/wiki/Northrop_N-102_Fang), with shoulder-mounted delta wing and a single engine. The proposed [General Electric J79](https://en.wikipedia.org/wiki/General_Electric_J79) engine, weighing nearly two tons, meant the resulting aircraft would be large and expensive. Then in 1953, representatives from [General Electric Aviation](https://en.wikipedia.org/wiki/General_Electric_Aviation)'s newly created Small Aircraft Engine Department showed Northrop a relatively tiny engine (around 400 lb installed wt.) capable of 2,500 lb of thrust, and Northrop VP-Engineering [Edgar Schmued](https://en.wikipedia.org/wiki/Edgar_Schmued) saw the possibility of reversing the trend toward the large fighters. Schmued and chief engineer Welko Gasich decided on a small twin-engine "hot-rod" fighter, the N-156. Northrop began its N-156 project in 1954, aiming for a small supersonic fighter jet capable of operating from the US Navy's [escort carriers](https://en.wikipedia.org/wiki/Escort_carrier). However, when the Navy chose not to pursue equipping its fleets in that fashion, Northrop continued the N-156 design using in-house funding, recasting it as a lightweight fighter (dubbed N-156F) and aimed at the export market.

In the mid-1950s the USAF issued a General Operating Requirement for a supersonic trainer, planning to retire its 1940s-era [Lockheed T-33s](https://en.wikipedia.org/wiki/Lockheed_T-33). Northrop officials decided to adapt the N-156 to this competition. The only other candidate was the two-seat version of the [North American F-100 Super Sabre](https://en.wikipedia.org/wiki/North_American_F-100_Super_Sabre). Although the F-100 was not considered the ideal candidate for a training aircraft (it is not capable of recovering from a spin), NAA was still considered the favorite in the competition due to that company's favored-contractor status with the Air Force. However, Northrop officials convincingly presented life-cycle cost comparisons which could not be ignored, and they were awarded the contract, receiving an order for three prototypes. The first (designated YT-38) flew on 10 March 1959. The type was quickly adopted and the first production examples were delivered in 1961, officially entering service on 17 March that year, complementing the [T-37](https://en.wikipedia.org/wiki/Cessna_T-37_Tweet) primary jet trainer. When production ended in 1972, 1,187 T-38s had been built (plus two N-156T prototypes). Since its introduction, it is estimated that some 50,000 military pilots have trained on this aircraft. The USAF remains one of the few armed flying forces using dedicated supersonic final trainers, as most, such as the US Navy, use high subsonic trainers.

The T-38 is of conventional configuration, with a small, low, long-chord wing, a single vertical stabilizer, and [tricycle undercarriage](https://en.wikipedia.org/wiki/Landing_gear). The aircraft seats a student pilot and instructor in tandem, and has intakes for its two [turbojet](https://en.wikipedia.org/wiki/Turbojet) engines at the wing roots. Its nimble performance has earned it the nickname *white rocket.* In 1962 the T-38 set absolute time-to-climb records for 3,000, 6,000, 9,000 and 12,000 meters, beating the records for those altitudes set by the F-104 in December 1958. (The F-4 beat the T-38's records less than a month later.)

The F-5B and F (which also derive from the N-156) can be distinguished from the T-38 by the wings; the wing of the T-38 meets the fuselage straight and ends square, while the F-5 has [leading edge extensions](https://en.wikipedia.org/wiki/Leading_edge_extension) near the wing roots and wingtip launch rails for [air-to-air missiles](https://en.wikipedia.org/wiki/Air-to-air_missile). The wings of both the T-38 and the F-5 family use conventional skin over spar-rib structure.

Most T-38s built were of the **T-38A** variant, but the USAF also had a small number of aircraft converted for weapons training (designated **AT-38B**), which were fitted with a gunsight and could carry a gunpod, rockets, or bombs on a centerline pylon. In 2015, 504 T-38s were still operational with the USAF, with many more in operation around the world. Most of the USAF variant aircraft (T-38A and AT-38B) have been converted to the T-38C through an avionics upgrade program. Improvements include the addition of a [HUD](https://en.wikipedia.org/wiki/Head-Up_Display), [GPS](https://en.wikipedia.org/wiki/GPS), INS ([Inertial Navigation System](https://en.wikipedia.org/wiki/Inertial_Navigation_System)), and [TCAS](https://en.wikipedia.org/wiki/Traffic_Collision_Avoidance_System). Most jets have also received PMP (a propulsion modification to improve low-altitude engine thrust). Approximately a third of the fleet (those that experience more severe usage) are currently undergoing structural replacements and upgrades, as well as receiving new wings, to extend their service life to 2029.

The fighter version of the N-156 was eventually selected for the US [Military Assistance Program](https://en.wikipedia.org/wiki/Military_Assistance_Program) and produced as the [F-5 Freedom Fighter](https://en.wikipedia.org/wiki/Northrop_F-5). Many of these have since reverted to a weapons training role as various air forces have introduced newer types into service. The F-5G was an advanced single-engined variant later renamed the [F-20 Tigershark](https://en.wikipedia.org/wiki/Northrop_F-20_Tigershark).

**Operational history**

**Military**

The USAF [Strategic Air Command](https://en.wikipedia.org/wiki/Strategic_Air_Command) (SAC) had T-38s in service from 1978 until SAC's 1991 inactivation. These aircraft were used to enhance the career development of bomber copilots through the "Accelerated Copilot Enrichment Program." They were later used as proficiency aircraft for all [B-52](https://en.wikipedia.org/wiki/Boeing_B-52_Stratofortress), [B-1](https://en.wikipedia.org/wiki/Rockwell_B-1_Lancer), [Lockheed SR-71](https://en.wikipedia.org/wiki/Lockheed_SR-71_Blackbird), [U-2](https://en.wikipedia.org/wiki/Lockheed_U-2), [Boeing KC-135](https://en.wikipedia.org/wiki/Boeing_KC-135), and [KC-10](https://en.wikipedia.org/wiki/McDonnell_Douglas_KC-10_Extender) pilots. SAC's successors, the [Air Combat Command](https://en.wikipedia.org/wiki/Air_Combat_Command) (ACC) and the [Air Force Global Strike Command](https://en.wikipedia.org/wiki/Air_Force_Global_Strike_Command) (AFGSC), continue to retain T-38s as proficiency aircraft for U-2 pilots and B-2 pilots, respectively.

The [Air Training Command](https://en.wikipedia.org/wiki/Air_Training_Command)'s (ATC) successor, the [Air Education and Training Command](https://en.wikipedia.org/wiki/Air_Education_and_Training_Command) (AETC), uses the T-38C to prepare pilots for the [F-15C Eagle](https://en.wikipedia.org/wiki/McDonnell_Douglas_F-15_Eagle) and [F-15E Strike Eagle](https://en.wikipedia.org/wiki/McDonnell_Douglas_F-15E_Strike_Eagle), the [F-16 Fighting Falcon](https://en.wikipedia.org/wiki/General_Dynamics_F-16_Fighting_Falcon), [B-52 Stratofortress](https://en.wikipedia.org/wiki/Boeing_B-52_Stratofortress), [B-1B Lancer](https://en.wikipedia.org/wiki/Rockwell_B-1_Lancer), [B-2 Spirit](https://en.wikipedia.org/wiki/B-2_Spirit), [A-10 Thunderbolt](https://en.wikipedia.org/wiki/Fairchild_Republic_A-10_Thunderbolt_II), [F-22 Raptor](https://en.wikipedia.org/wiki/Lockheed_Martin_F-22_Raptor) and [F-35 Lightning II](https://en.wikipedia.org/wiki/F-35_Lightning_II). The AETC received T-38Cs in 2001 as part of the Avionics Upgrade Program. The T-38Cs owned by the AETC have undergone propulsion modernization which replaces major engine components to enhance reliability and maintainability, and an engine inlet/injector modification to increase available takeoff thrust. These upgrades and modifications, with the Pacer Classic program, should extend the service life of T-38s past 2020. The T-38 has an [availability](https://en.wikipedia.org/wiki/Availability) goal of 75% which it maintained in 2011, however in 2015 availability is 60%.

Besides the USAF, USN and NASA, other T-38 operators included the [German Air Force](https://en.wikipedia.org/wiki/German_Air_Force) (*Luftwaffe*), the [Portuguese Air Force](https://en.wikipedia.org/wiki/Portuguese_Air_Force), the [Republic of China Air Force](https://en.wikipedia.org/wiki/Republic_of_China_Air_Force), and the [Turkish Air Force](https://en.wikipedia.org/wiki/Turkish_Air_Force).

**NASA**

[NASA](https://en.wikipedia.org/wiki/NASA) operates a fleet of thirty-two T-38 aircraft and uses the aircraft as a jet trainer for its astronauts, as well as a [chase plane](https://en.wikipedia.org/wiki/Chase_plane). Its fleet is housed primarily at [Ellington Field](https://en.wikipedia.org/wiki/Ellington_Field) in [Houston](https://en.wikipedia.org/wiki/Houston), Texas. NASA's internal projections show the number of operational jet trainers falling to 16 by 2015. The agency spends $25–30 million annually to fly and maintain the T-38s.

**Accidents**

More than 210 aircraft losses and ejections have been documented over the lifetime of the T-38.

NASA's T-38s were involved in four separate fatal accidents in the 1960s and 1970s, and several non-fatal incidents.

* 1964 Oct 31: Astronaut [Theodore Freeman](https://en.wikipedia.org/wiki/Theodore_Freeman) was killed as a result of a bird strike.
* 1966 February 28 ([1966 NASA T-38 crash](https://en.wikipedia.org/wiki/1966_NASA_T-38_crash)): Astronauts [Elliot See](https://en.wikipedia.org/wiki/Elliot_See) and [Charles Bassett](https://en.wikipedia.org/wiki/Charles_Bassett) were killed when they struck a building in fog.
* 1967 October 5: Astronaut [Clifton "C.C." Williams](https://en.wikipedia.org/wiki/Clifton_Williams) was killed in a crash due to an aileron jam.
* 1972 Jan 20: NASA pilots Stuart M. Present and Mark C. Heath were killed when they crashed during an instrument approach in fog.

In response to the [1973 OPEC oil embargo](https://en.wikipedia.org/wiki/1973_OPEC_oil_embargo), from 1974 to 1983, the [U.S. Air Force Thunderbirds](https://en.wikipedia.org/wiki/U.S._Air_Force_Thunderbirds) aerobatic display team adopted the T-38 Talon, which used far less fuel than the [F-4 Phantom](https://en.wikipedia.org/wiki/McDonnell_Douglas_F-4_Phantom_II). The [Blue Angels](https://en.wikipedia.org/wiki/Blue_Angels) downsized to the [Douglas A-4 Skyhawk](https://en.wikipedia.org/wiki/Douglas_A-4_Skyhawk) at roughly the same time. After the infamous 1982 "[Diamond Crash](https://en.wikipedia.org/wiki/Diamond_Crash)" incident that killed four of the Thunderbirds' six demonstration pilots, the T-38 was replaced in this role by the front line [F-16A Fighting Falcon](https://en.wikipedia.org/wiki/General_Dynamics_F-16_Fighting_Falcon).

Two fatal crashes in 2008, on 23 April at [Columbus Air Force Base](https://en.wikipedia.org/wiki/Columbus_Air_Force_Base) in Mississippi and on 1 May at [Sheppard Air Force Base](https://en.wikipedia.org/wiki/Sheppard_Air_Force_Base) in [Wichita Falls](https://en.wikipedia.org/wiki/Wichita_Falls), [Texas](https://en.wikipedia.org/wiki/Texas), resulted in four fatalities, causing the Air Force to temporarily ground the aircraft. On 21 May 2009, a T-38 crashed just north of [Edwards Air Force Base](https://en.wikipedia.org/wiki/Edwards_Air_Force_Base) in the [Mojave Desert](https://en.wikipedia.org/wiki/Mojave_Desert).

**Replacement**

The USAF has launched the [T-X Program](https://en.wikipedia.org/wiki/T-X_program), to replace the T-38. [*Aviation Week & Space Technology*](https://en.wikipedia.org/wiki/Aviation_Week_%26_Space_Technology) reporters wrote in 2010 "there appears to be no rush to purchase T-38 replacements"; "the service is conducting an analysis of alternatives" with results "not expected to be ready until the [Fiscal 2013 budget](https://en.wikipedia.org/wiki/United_States_federal_budget)". In subsequent years, the Air Force indicated it would launch a competition for the T-38's replacement. Likely bidders include: A partnership of [BAE Systems](https://en.wikipedia.org/wiki/BAE_Systems) and Rolls Royce, offering the [Hawk trainer](https://en.wikipedia.org/wiki/BAE_Systems_Hawk), equipped with Rolls' Adour Mk951 engine offering 6,500 lb of thrust and [FADEC](https://en.wikipedia.org/wiki/FADEC); [Lockheed Martin](https://en.wikipedia.org/wiki/Lockheed_Martin) and [Korea Aerospace Industries](https://en.wikipedia.org/wiki/Korea_Aerospace_Industries), offering the [T-50](https://en.wikipedia.org/wiki/KAI_T-50_Golden_Eagle); and [General Dynamics](https://en.wikipedia.org/wiki/General_Dynamics) and [Alenia Aermacchi](https://en.wikipedia.org/wiki/Alenia_Aermacchi) offering the [M-346](https://en.wikipedia.org/wiki/Alenia_Aermacchi_M-346_Master), an aircraft whose design originated with the Russian [Yak-130](https://en.wikipedia.org/wiki/Yak-130).

**Civil**

There are seven privately owned T-38s in the U.S. [Boeing](https://en.wikipedia.org/wiki/Boeing) owns two T-38s, which it uses as [chase planes](https://en.wikipedia.org/wiki/Chase_plane). Thornton Corporation owns two T-38s and three F-5s and the [National Test Pilot School](https://en.wikipedia.org/wiki/National_Test_Pilot_School) owns one T-38. In addition, ILOAJP HOLDING and Wayne L. Siltanen own one each.

**Variants**

* **N-156T**: Northrop company designation.
* **YT-38**: Prototypes, two built with YJ85-GE-1 engines, later designated YT-38A and four pre-production aircraft with YJ-85-GE-5 engines, later designated T-38A.
* **T-38A**: Two-seat advanced training aircraft, production model, 1,139 built.
* **T-38A(N)**: Two-seat astronaut training version for NASA. See T-38N below.
* **AT-38A**: A small number of T-38As were converted into weapons training aircraft.
* **DT-38A**: A number of US Navy T-38As were converted into drone directors.
* **GT-38A**: Permanently grounded aircraft, often due to flight or ground mishap, converted into ground procedural trainers or aircraft maintenance trainers.
* **NT-38A**: A small number of T-38As were converted into research and test aircraft.
* **QT-38A**: Unmanned target drone aircraft.
* **AT-38B**: Two-seat weapons training aircraft.
* **T-38C**: A T-38A with structural and avionics upgrades.
* **T-38M**: Modernized Turkish Air Force T-38As with full [glass cockpit](https://en.wikipedia.org/wiki/Glass_cockpit) and avionics, upgraded by [Turkish Aerospace Industries](https://en.wikipedia.org/wiki/Turkish_Aerospace_Industries) under the project codename "ARI" ([Turkish](https://en.wikipedia.org/wiki/Turkish_language): *Arı*, for [Bee](https://en.wikipedia.org/wiki/Bee)).
* **T-38N**: Former USAF T-38As bailed to [NASA](https://en.wikipedia.org/wiki/NASA) and T-38As directly assigned to NASA that received an Avionics Upgrade Program (AUP), modernizing communications and navigation systems, replacing outdated avionics, and adding a weather radar, flight management system, altitude alert systems, and modern controls and displays.
* **N-205**: "Space trainer" variant proposed in May 1958, with triple rocket engines for vertical launch. Capable of Mach 3.2 on its way to an altitude of 200,000 feet (61,000 m).
* **ST-38** or **N-205B**: Revised proposal in April 1963 for the new Aerospace Research Pilot School, with a rolling takeoff, top speed of Mach 3.3 and a ceiling of 285,000 feet (87,000 m), high enough to qualify its pilots for [astronaut wings](https://en.wikipedia.org/wiki/Astronaut_Badge).
* **T-38 VTOL** Proposed vertical takeoff variant with four lift nozzles behind the pilot.

**Operators**

[Germany](https://en.wikipedia.org/wiki/Germany)



* The [German Air Force](https://en.wikipedia.org/wiki/German_Air_Force) has 35 in use as of January 2009, all of them with USAF markings at [Sheppard Air Force Base](https://en.wikipedia.org/wiki/Sheppard_Air_Force_Base)

[Republic of China (Taiwan)](https://en.wikipedia.org/wiki/Taiwan)



* [Republic of China Air Force](https://en.wikipedia.org/wiki/Republic_of_China_Air_Force) has 40 in operation as of January 2009.

[Turkey](https://en.wikipedia.org/wiki/Turkey)



* [Turkish Air Force](https://en.wikipedia.org/wiki/Turkish_Air_Force) has 67 T-38M in use as of November 2008.

[United States](https://en.wikipedia.org/wiki/United_States)



[**United States Air Force**](https://en.wikipedia.org/wiki/United_States_Air_Force) has 508 T-38 trainers in service as of September 2012.

[**Air Combat Command**](https://en.wikipedia.org/wiki/Air_Combat_Command)

* [9th Reconnaissance Wing](https://en.wikipedia.org/wiki/9th_Reconnaissance_Wing) – [Beale AFB](https://en.wikipedia.org/wiki/Beale_AFB), [California](https://en.wikipedia.org/wiki/California)

[1st Reconnaissance Squadron](https://en.wikipedia.org/wiki/1st_Reconnaissance_Squadron)

* [325th Fighter Wing](https://en.wikipedia.org/wiki/325th_Fighter_Wing) - [Tyndall AFB](https://en.wikipedia.org/wiki/Tyndall_AFB), [Florida](https://en.wikipedia.org/wiki/Florida)

[2d Fighter Training Squadron](https://en.wikipedia.org/wiki/2d_Fighter_Training_Squadron)

[**Air Education and Training Command**](https://en.wikipedia.org/wiki/Air_Education_and_Training_Command)

* [12th Flying Training Wing](https://en.wikipedia.org/wiki/12th_Flying_Training_Wing) – [Randolph AFB](https://en.wikipedia.org/wiki/Randolph_AFB), [Texas](https://en.wikipedia.org/wiki/Texas)

[435th Flying Training Squadron](https://en.wikipedia.org/wiki/435th_Flying_Training_Squadron)

[560th Flying Training Squadron](https://en.wikipedia.org/wiki/560th_Flying_Training_Squadron)

* [14th Flying Training Wing](https://en.wikipedia.org/wiki/14th_Flying_Training_Wing) – [Columbus AFB](https://en.wikipedia.org/wiki/Columbus_AFB), [Mississippi](https://en.wikipedia.org/wiki/Mississippi)

[49th Flying Training Squadron](https://en.wikipedia.org/wiki/49th_Flying_Training_Squadron)

[50th Flying Training Squadron](https://en.wikipedia.org/wiki/50th_Flying_Training_Squadron)

* [47th Flying Training Wing](https://en.wikipedia.org/wiki/47th_Flying_Training_Wing) – [Laughlin AFB](https://en.wikipedia.org/wiki/Laughlin_AFB), Texas

[87th Flying Training Squadron](https://en.wikipedia.org/wiki/87th_Flying_Training_Squadron)

* [71st Flying Training Wing](https://en.wikipedia.org/wiki/71st_Flying_Training_Wing) – [Vance AFB](https://en.wikipedia.org/wiki/Vance_AFB), [Oklahoma](https://en.wikipedia.org/wiki/Oklahoma)

[25th Flying Training Squadron](https://en.wikipedia.org/wiki/25th_Flying_Training_Squadron)

* [80th Flying Training Wing](https://en.wikipedia.org/wiki/80th_Flying_Training_Wing) – [Sheppard AFB](https://en.wikipedia.org/wiki/Sheppard_AFB), Texas

[88th Flying Training Squadron](https://en.wikipedia.org/wiki/88th_Flying_Training_Squadron)

[90th Flying Training Squadron](https://en.wikipedia.org/wiki/90th_Flying_Training_Squadron)

[469th Flying Training Squadron](https://en.wikipedia.org/wiki/469th_Flying_Training_Squadron)

[**Air Force Reserve Command**](https://en.wikipedia.org/wiki/Air_Force_Reserve_Command)

* [340th Flying Training Group](https://en.wikipedia.org/wiki/340th_Flying_Training_Group) – Randolph AFB

[43d Flying Training Squadron](https://en.wikipedia.org/wiki/43d_Flying_Training_Squadron) (Columbus AFB)

[96th Flying Training Squadron](https://en.wikipedia.org/wiki/96th_Flying_Training_Squadron) (Laughlin AFB)

[97th Flying Training Squadron](https://en.wikipedia.org/wiki/97th_Flying_Training_Squadron) (Sheppard AFB)

* [413th Flight Test Group](https://en.wikipedia.org/wiki/413th_Flight_Test_Group) – Randolph AFB

[415th Flight Test Flight](https://en.wikipedia.org/wiki/415th_Flight_Test_Flight)

[**Air Force Global Strike Command**](https://en.wikipedia.org/wiki/Air_Force_Global_Strike_Command)

* [509th Bomb Wing](https://en.wikipedia.org/wiki/509th_Bomb_Wing) – [Whiteman AFB](https://en.wikipedia.org/wiki/Whiteman_AFB), [Missouri](https://en.wikipedia.org/wiki/Missouri)

[394th Combat Training Squadron](https://en.wikipedia.org/wiki/394th_Combat_Training_Squadron)

[**Air Force Materiel Command**](https://en.wikipedia.org/wiki/Air_Force_Materiel_Command)

* [96th Test Wing](https://en.wikipedia.org/wiki/96th_Test_Wing) – [Eglin AFB](https://en.wikipedia.org/wiki/Eglin_AFB), [Florida](https://en.wikipedia.org/wiki/Florida)

[586th Flight Test Squadron](https://en.wikipedia.org/wiki/586th_Flight_Test_Squadron) ([Holloman AFB](https://en.wikipedia.org/wiki/Holloman_AFB), [New Mexico](https://en.wikipedia.org/wiki/New_Mexico))

* [412th Test Wing](https://en.wikipedia.org/wiki/412th_Test_Wing) – [Edwards AFB](https://en.wikipedia.org/wiki/Edwards_AFB), [California](https://en.wikipedia.org/wiki/California)

[445th Flight Test Squadron](https://en.wikipedia.org/wiki/445th_Flight_Test_Squadron)

[**United States Navy**](https://en.wikipedia.org/wiki/United_States_Navy) has ten aircraft in use as November 2008.

[**Naval Air Warfare Center Aircraft Division**](https://en.wikipedia.org/wiki/Naval_Air_Warfare_Center_Aircraft_Division)

* [United States Naval Test Pilot School](https://en.wikipedia.org/wiki/United_States_Naval_Test_Pilot_School) – [Naval Air Station Patuxent River](https://en.wikipedia.org/wiki/Naval_Air_Station_Patuxent_River), [Maryland](https://en.wikipedia.org/wiki/Maryland)

[**NASA**](https://en.wikipedia.org/wiki/NASA) has approximately 32 aircraft bailed from USAF.

**Former operators**

[Portugal](https://en.wikipedia.org/wiki/Portugal)



* [Portuguese Air Force](https://en.wikipedia.org/wiki/Portuguese_Air_Force) received 12 aircraft in 1977. Initially operated by [201 Sqn. "*Falcões*"](https://en.wikipedia.org/wiki/201_Squadron_(Portugal)) (Falcons) at [Air Base No. 5](https://en.wikipedia.org/wiki/Monte_Real_Air_Base), in 1980 they were transferred to [103 Sqn. "*Caracóis*"](https://en.wikipedia.org/wiki/103_Squadron_(Portugal)) (Snails) being stationed in [Air Base No. 11](https://en.wikipedia.org/wiki/Beja_Air_Base). They were retired in 1993.

[Republic of Korea](https://en.wikipedia.org/wiki/South_Korea)



* [Republic of Korea Air Force](https://en.wikipedia.org/wiki/Republic_of_Korea_Air_Force) leased thirty T-38A from the US in April 1999. All units were returned to the US by 2009 after near completion of production of [T-50 Golden Eagle](https://en.wikipedia.org/wiki/KAI_T-50_Golden_Eagle) supersonic trainer.

**Aircraft on display**



A T-38 Talon on display at the [Frontiers of Flight Museum](https://en.wikipedia.org/wiki/Frontiers_of_Flight_Museum)

T-38A

* 58-1196 – [California Science Center](https://en.wikipedia.org/wiki/California_Science_Center), in [Los Angeles, California](https://en.wikipedia.org/wiki/Los_Angeles,_California)
* 59-1601 – On base display, [Air University](https://en.wikipedia.org/wiki/Air_University_(United_States_Air_Force)) area, [Maxwell AFB](https://en.wikipedia.org/wiki/Maxwell_AFB), Alabama
* 59-1602 – On base display, [United States Air Force Academy](https://en.wikipedia.org/wiki/United_States_Air_Force_Academy), in [Colorado Springs, Colorado](https://en.wikipedia.org/wiki/Colorado_Springs,_Colorado). Painted as "Thunderbird 1"
* 59-1604 – [National Naval Aviation Museum](https://en.wikipedia.org/wiki/National_Naval_Aviation_Museum), [NAS Pensacola](https://en.wikipedia.org/wiki/NAS_Pensacola), Florida; former USAF aircraft bailed to [USN](https://en.wikipedia.org/wiki/United_States_Navy) and utilized by the [U.S. Naval Test Pilot School](https://en.wikipedia.org/wiki/U.S._Naval_Test_Pilot_School) at [NAS Patuxent River](https://en.wikipedia.org/wiki/NAS_Patuxent_River), Maryland.
* 59-1605 – On base display, USAF History and Traditions Museum, [Lackland AFB](https://en.wikipedia.org/wiki/Lackland_AFB), Texas
* 60-0549 – Prairie Aviation Museum, in [Bloomington, Illinois](https://en.wikipedia.org/wiki/Bloomington,_Illinois)
* 60-0558 – American Legion Post 233 in [Edinburgh, Indiana](https://en.wikipedia.org/wiki/Edinburgh,_Indiana)
* 60-0570 – Edward F. Beale Museum, [Beale AFB](https://en.wikipedia.org/wiki/Beale_AFB), California
* 60-0574 – On base display, [Laughlin AFB](https://en.wikipedia.org/wiki/Laughlin_AFB), Texas
* 61-0817 – Oklahoma Welcome Station, near [Tinker AFB](https://en.wikipedia.org/wiki/Tinker_AFB), [Oklahoma](https://en.wikipedia.org/wiki/Oklahoma).
* 61-0838 – On base display, in front of Randolph Inn Visiting Officers Quarters (VOQ), [Randolph AFB](https://en.wikipedia.org/wiki/Randolph_AFB), Texas
* 61-0854 – [Pima Air and Space Museum](https://en.wikipedia.org/wiki/Pima_Air_and_Space_Museum), adjacent to [Davis-Monthan AFB](https://en.wikipedia.org/wiki/Davis-Monthan_AFB) in [Tucson, Arizona](https://en.wikipedia.org/wiki/Tucson,_Arizona), on display in the markings of the [479th Tactical Training Wing](https://en.wikipedia.org/wiki/479th_Tactical_Training_Wing) at [Holloman AFB, NM](https://en.wikipedia.org/wiki/Holloman_AFB,_NM), circa 1982.
* 61-0858 – Sheppard AFB Air Park, [Sheppard AFB](https://en.wikipedia.org/wiki/Sheppard_AFB), Texas
* 61-0902 – [Science Spectrum](https://en.wikipedia.org/wiki/Science_Spectrum) in [Lubbock, Texas](https://en.wikipedia.org/wiki/Lubbock,_Texas).
* 63-8125 – Sheppard AFB Air Park, Sheppard AFB
* 63-8224 – [Evergreen Aviation & Space Museum](https://en.wikipedia.org/wiki/Evergreen_Aviation_%26_Space_Museum) in [McMinnville, Oregon](https://en.wikipedia.org/wiki/McMinnville,_Oregon); painted in NASA colors, suspended from the ceiling in the Air and Space Exhibit Hall.
* 65-10405 – On base display, [Columbus AFB](https://en.wikipedia.org/wiki/Columbus_AFB), Mississippi
* 65-10426 – On base display, [Vance AFB](https://en.wikipedia.org/wiki/Vance_AFB), Oklahoma
* 66-8381 / NASA 901 (N901NA) – Assigned directly to [NASA](https://en.wikipedia.org/wiki/NASA) as the second NASA T-38 to be designated as 'NASA 901' and 'N901NA'; on display at Aviation Heritage Park, [Bowling Green, Kentucky](https://en.wikipedia.org/wiki/Bowling_Green,_Kentucky)

GT-38A

* 60-0592 – Dyess Linear Air Park, [Dyess AFB](https://en.wikipedia.org/wiki/Dyess_AFB), Texas
* 60-0593 – [March Field Air Museum](https://en.wikipedia.org/wiki/March_Field_Air_Museum) at [March ARB](https://en.wikipedia.org/wiki/March_ARB) (former [March AFB](https://en.wikipedia.org/wiki/March_AFB)) in [Riverside, California](https://en.wikipedia.org/wiki/Riverside,_California), on display in Thunderbirds markings.
* 61-0824 – [Hill Aerospace Museum](https://en.wikipedia.org/wiki/Hill_Aerospace_Museum) adjacent to [Hill AFB](https://en.wikipedia.org/wiki/Hill_AFB), [Utah](https://en.wikipedia.org/wiki/Utah).

YT-38A

* 58-1192 – [South Dakota Air and Space Museum](https://en.wikipedia.org/wiki/South_Dakota_Air_and_Space_Museum) at [Ellsworth AFB](https://en.wikipedia.org/wiki/Ellsworth_AFB), [South Dakota](https://en.wikipedia.org/wiki/South_Dakota).

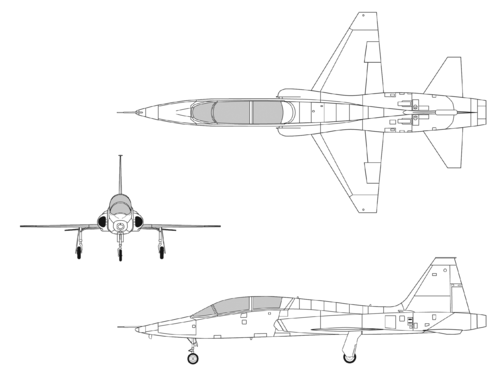
AT-38B

* 60-0576 – On base display, [Holloman AFB](https://en.wikipedia.org/wiki/Holloman_AFB), [New Mexico](https://en.wikipedia.org/wiki/New_Mexico).
* 65-10441 – [National Museum of the United States Air Force](https://en.wikipedia.org/wiki/National_Museum_of_the_United_States_Air_Force) at [Wright-Patterson AFB](https://en.wikipedia.org/wiki/Wright-Patterson_AFB) in [Dayton, Ohio](https://en.wikipedia.org/wiki/Dayton,_Ohio). This aircraft was retired in 1991, came to the museum in 1999, and was placed on display in 2004.

T-38N

* 65-10329 / NASA 969 (N969NA) – On display at Kennedy Space Center Visitor Center, [NASA](https://en.wikipedia.org/wiki/NASA)/[John F. Kennedy Space Center](https://en.wikipedia.org/wiki/John_F._Kennedy_Space_Center), [Merritt Island, Florida](https://en.wikipedia.org/wiki/Merritt_Island,_Florida)
* 66-8381 / NASA 901 (N901NA) – Assigned directly to NASA as the second NASA T-38 to be designated as NASA 901 and N901NA; on display at Aviation Heritage Park, Bowling Green, Kentucky

**Specifications (T-38A)**



*Data from* USAF factsheet

**General characteristics**

* Crew: two: student and instructor
* Length: 46 ft 4.5 in (14.14 m)
* [Wingspan](https://en.wikipedia.org/wiki/Wingspan): 25 ft 3 in (7.7 m)
* Height: 12 ft 10.5 in (3.92 m)
* Wing area: 170 ft² (15.79 m²)
* [Empty weight](https://en.wikipedia.org/wiki/Manufacturer%27s_empty_weight): 7,200 lb (3,270 kg)
* Loaded weight: 11,820 lb (5,360 kg)
* [Max. takeoff weight](https://en.wikipedia.org/wiki/Maximum_takeoff_weight): 12,093 lb (5,485 kg)
* [Powerplant](https://en.wikipedia.org/wiki/Aircraft_engine): 2 × [General Electric J85](https://en.wikipedia.org/wiki/General_Electric_J85)-5A (J85-5R after PMP modification) afterburning [turbojets](https://en.wikipedia.org/wiki/Turbojet)
  + Dry thrust: 2,050 lb (9.1 kN) each
  + Thrust with [afterburner](https://en.wikipedia.org/wiki/Afterburner): 2,900 lbf (17.1 kN) each

Performance

* [Maximum speed](https://en.wikipedia.org/wiki/V_speeds#Regulatory_V-speeds): [Mach](https://en.wikipedia.org/wiki/Mach_number) 1.3 (858 mph, 1,381 km/h)
* [Range](https://en.wikipedia.org/wiki/Range_(aeronautics)): 1,140 mi (1,835 km)
* [Service ceiling](https://en.wikipedia.org/wiki/Ceiling_(aeronautics)): 50,000 ft (15,240 m)
* [Rate of climb](https://en.wikipedia.org/wiki/Rate_of_climb): 33,600 ft/min (170.7 m/s) ()
* [Wing loading](https://en.wikipedia.org/wiki/Wing_loading): 69.53 lb/ft² (339.4 kg/m²)
* [Thrust/weight](https://en.wikipedia.org/wiki/Thrust-to-weight_ratio): 0.65

**See also**

|  |  |
| --- | --- |
|  | [***United States Air Force portal***](https://en.wikipedia.org/wiki/Portal:United_States_Air_Force) |

Related development

* [Northrop F-5](https://en.wikipedia.org/wiki/Northrop_F-5)
* [Northrop F-20 Tigershark](https://en.wikipedia.org/wiki/Northrop_F-20_Tigershark)
* [T-X program](https://en.wikipedia.org/wiki/T-X_program)

Related lists

* [List of active United States military aircraft](https://en.wikipedia.org/wiki/List_of_active_United_States_military_aircraft)
* [List of spaceflight-related accidents and incidents](https://en.wikipedia.org/wiki/List_of_spaceflight-related_accidents_and_incidents)
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