Trainers

British Trainers
Canadian Trainers
Czech Trainers
French Trainers
International Trainers
Italian Trainers
Romanian Trainers
Russian Trainers
Spanish Trainers
Swedish Trainers
Swiss Trainers
Yugoslavian Trainers
US Trainers

Bulldog/Beagle Pup

Notes: This is a light primary trainer and liaison aircraft that is used as a counter-insurgency aircraft by many smaller air forces. There is also a civilian version without hardpoints called the Beagle Pup; these aircraft have a third seat behind the pilots' seats that can hold one adult or two children.

Twilight 2000 v1/v2/2,2/2013/Merc 2000: This aircraft found military employment as a liaison and aerial FALO aircraft; others were used by some lucky civilians to escape war zones

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Pup 100	$251,760	G, AvG	290 kg	776 kg	1+1	2	None	Enclosed
Pup 150	$255,460	G, AvG	290 kg	917 kg	1+2	2	None	Enclosed
Pup 160	$256,160	G, AvG	290 kg	943 kg	1+2	2	None	Enclosed
Bulldog	$300,620	G, AvG	290 kg	1.05 tons	1+1	2	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	
Pup 100	428	107 (90)	NA 27 6/3 50/20	170	27	4000	FF3 CF3 RF3 T3 W2
Pup 150	600	150 (90)	NA 38 6/3 50/20	170	46	4000	FF3 CF3 RF3 T3 W2
Pup 160	628	157 (90)	NA 39 6/3 50/20	170	49	4000	FF3 CF3 RF3 T3 W2
Bulldog	738	185 (90)	NA 46 6/3 50/20	170	64	4000	FF3 CF3 RF3 T3 W2

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Pup	None	500/400m Primitive Runway	None	None	None
Bulldog	None	500/400m Primitive Runway	None	4 Hardpoints	None

CL-41 Tutor

Notes: This Canadian aircraft is a trainer in peacetime and a light attack aircraft in wartime. They are simple aircraft that are easy to fly. They are also used by Malaysia, usually in a counterinsurgency role.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$2,069,840	AvG	1.59 tons	3.41 tons	2	6	None	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
1510	378 (100)	NA 95 6/3 60/30	1140	1301	10000	FF4 CF4 RF3 T2 W4

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
IFF, Transponder	440/400m Hardened Runway	+2	6 hardpoints	None

L-29 Delfin

Notes: This Czech aircraft is a trainer that can also be used as a light attack aircraft. It is a light aircraft with a light weapon load, but it is cheap and easy to maintain. It is used by most of the former Warsaw Pact (though in steadily decreasing numbers). It has also been exported outside of Europe, mainly to the Middle East. The two wingtip hardpoints may be used only for drop tanks.

Twilight 2000 v1 Notes: Delfins undertook an increasing number of attack and close-air support as the war went on

Twilight 2000 v2/2.2 Notes: Some former East German Delfins were put into use by Germany during the Twilight War.

Twilight 2013 Notes: Defins were old machines by 2013, rarely used even in the Czech Republic and Slovakia. Some other countries did still operate them, though. In addition, several Delfins had been sold to private collectors or museums.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$693,000	AvG	272 kg	3.18 kg	2	4	None	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
1310	328 (100)	NA 82 6/3 60/30	1120	865	10700	FF3 CF3 RF3 T2 W3

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
IFF, Transponder	440/400 Hardened Runway	+1	4 hardpoints	None

L-39/L-159 Albatros

The L-39 is the successor to the L-29 Delfin in Warsaw Pact service. There are three versions, the trainer/attack aircraft, and the dedicated attack aircraft (L-39ZA) with a cannon under the fuselage. This aircraft is used by all former Pact air forces except Poland, and several other allied air forces. The two wingtip hardpoints may only carry drop tanks.

The L-159 is an L-39 with a more powerful engine, redesigned nose, upgraded avionics, standard internal cannon, and hydraulic assist for its controls. It can carry heavier loads and is more responsive at high speeds. Like the L-39, the two wingtip hardpoints may only be used for drop tanks.

Twilight 2000 Notes: A few of these aircraft (mostly L-39ZOs) were used by Germany during the Twilight War. These were aircraft that were captured intact from Czechoslovakia early in the war.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
L-39ZO	$1,182,080	AvG	1 ton	3.7 tons	2	6	None	Enclosed
L-39ZA	$1,595,770	AvG	1 ton	3.7 tons	1	6	None	Enclosed
L-159	$2,545,900	AvG	1.81 tons	5.19 tons	1	10	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
L-39ZO/ZA	1392	348 (110)	NA 87 7/4 70/40	1405	1684	12000	FF4 CF4 RF3 W4 T3
L-159	2246	562 (110)	NA 141 7/4 70/40	1602	2674	12000	FF4 CF4 RF3 W4 T3

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
L-39ZO	Transponder	450/400 Hardened Runway	+1	6 Hardpoints	None
L-39ZA	Flare/Chaff Dispensers (30/20), RWR	450/400m Hardened Runway	+2	6 Hardpoints, 23mm autocannon	300x23mm
L-159	Flare/Chaff Dispensers (30/20), RWR, HUD, ECM 1	450/400m Hardened Runway	+2	23mm Autocannon, 7 Hardpoints	400x23mm

Magister

Notes: This light jet was originally produced as a trainer, but was used as a light attack aircraft by France and Israel. It was also built under license by Finland, Italy, and Germany, and used by Algeria, Bangladesh, Cameroon, El Salvador, Gabon, Ireland, Lebanon, Libya, Morocco, Senegal, and Brazil. Armament is light, and hardpoints are sparse, but the aircraft is cheap and easy to maintain, and has a long endurance. It is one of the few military aircraft in the world with a V-tail.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$903,280	AvG	135 kg	3.13 tons	2	4	None	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
1430	358 (110)	NA 90 6/3 60/30	1680	776	10700	FF3 CF2 RF2 T2 W3

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Secure Radios	440/400m Primitive Runway	+1	2xAAT-52, 2 Hardpoints	800x7.5mm

Hawk

Notes: The Hawk is a trainer and light strike aircraft used by the UK, Abu Dhabi, Dubai, Finland, Indonesia, Kenya, South Korea, Kuwait, Saudi Arabia, Switzerland, Zimbabwe, Australia, Malaysia, Oman, Qatar, Canada, and South Africa. It is also used by the US Navy as a trainer (the T-45 Goshawk). It is an unsophisticated, but cheap aircraft, with a limited capability. The fuselage hardpoint is normally fitted with a gun pod, since the Hawk has no internal gun.

Twilight 2000 Notes: In the Twilight War, the US Navy modified some T-45 Goshawks for the strike role. Other countries often used 2-seat Hawks as FAC aircraft.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Hawk 50	$1,676,430	AvG	3.08 tons	5.7 tons	2	8	None	Enclosed
Hawk 100	$4,978,450	AvG	3 tons	9.1 tons	2	12	FLIR (60 km)	Enclosed
Hawk 200	$17,255,750	AvG	3 tons	9.1 tons	1	12	Radar (50 km), FLIR (60 km), Image Intensification (4.5 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
Hawk 50	2076	519 (135)	NA 130 9/5 60/40	2400	2314	15240	FF3 CF3 RF3 T2 W3
Hawk 100	2076	519 (135)	NA 130 9/5 60/40	2400	2534	13545	FF3 CF3 RF3 T2 W3
Hawk 200	2034	509 (135)	NA 127 9/5 60/40	2400	2534	13715	FF3 CF3 RF3 T2 W3

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Hawk 50	None	550/495m Hardened Runway	+1	5 Hardpoints	None
Hawk 100	RWR, Laser Designator (4.5 km)	550/495m Hardened Runway	+3	5 Hardpoints	None
Hawk 200	RWR Flare/Chaff (50/40), Laser Designator (5 km)	550/495m Hardened Runway	+4	2x25mm ADEN, 7 Hardpoints	200x25mm

MB-326

Notes: This aircraft is used as a trainer and a light strike aircraft. It is known as the Impala in South African service and the Xavante in Brazilian service. It has a light weapons load, but is easy to maintain and cheap to operate. It has been widely exported, to countries such as Argentina, Australia, Brazil, Paraguay, South Africa, Togo, Congo, Zambia, Dubai, Ghana, and Tunisia. There is a two-seat version used as a trainer and FAC aircraft. These aircraft do not carry internal guns or have a gunsight.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
MB-326GB	$1,047,630	AvG	1.81 tons	5.22 tons	2	8	None	Enclosed
MB-326K	$2,204,480	AvG	1.81 tons	5.9 tons	1	8	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
MB-326GB	1734	434 (110)	NA 108 7/4 70/40	2700	1513	11890	FF3 CF3 RF3 T2 W3
MB-326K	1770	442 (110)	NA 111 7/4 70/40	2880	1777	14325	FF3 CF3 RF3 T2 W3

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
MB-326GB	None	500/400m Primitive Runway	None	6 Hardpoints	None
MB-326K	None	500/400m Primitive Runway	+2	2x30mmDEFA, 6 Hardpoints	250x30mm

MB-339

Notes: The MB-339 is an upgraded version of the MB-326 noted above. The MB-339 has a redesigned, sleeker silhouette and slightly better avionics and somewhat better performance. The two wingtip hardpoints may only be used for drop tanks. The A model corresponds is a trainer/attack version; the C Model is upgraded in the area of the engine and avionics; and the K model is a dedicated light attack aircraft with greatly upgraded avionics and armament.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
MB-339A	$1,573,430	AvG	2.04 tons	5.9 tons	2	8	None	Enclosed
MB-339C	$4,226,110	AvG	1.81 tons	6.35 tons	2	10	None	Enclosed
MB-339K	$5,553,590	AvG	1.94 tons	6.35 tons	1	10	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
MB-339A	1634	409 (110)	NA 102 8/4 80/40	2880	1777	14325	FF3 CF4 RF3 T3 W3
MB-339C	1634	409 (110)	NA 102 8/4 80/40	2880	1777	14325	FF3 CF4 RF3 T3 W3
MB-339K	1854	464 (110)	NA 116 8/4 80/40	3030	1777	14325	FF3 CF4 RF3 T3 W3

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
MB-339A	Flare/Chaff (25/20)	500/400m Primitive Runway	+1	6 hardpoints	None
MB-339C	Radar Warning Receiver, Flare/Chaff (25/30), HUD, Laser Designator (6 km)	500/400m Primitive Runway	+2	6 Hardpoints	None
MB-339K	Radar Warning Receiver, Flare/Chaff (25/20), HUD, Laser Designator (6 km), ECM 1	500/400m Primitive Runway	+2	2x30mm DEFA, 6 Hardpoints	300x30mm

IAR-99 Soim

Notes: This Romanian aircraft is used for training pilots in attack missions during peacetime, and as a strike aircraft during wartime. It began production in 1992, but production was slow, and it is a relatively rare aircraft. It is a simple and easy to maintain aircraft with a light load, used mainly for ground support.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Standard	$8,481,910	AvG	1 ton	4.4 tons	2	10	Radar (75 km)	Enclosed
Upgraded	$9,707,110	AvG	1 ton	4.4 tons	2	10	Rada (90 km)r	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
(Both)	1718	430 (100)	NA 107 6/3 60/30	1355	1171	12900	FF4 CF4 RF4 T3 W4

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Standard	RWR, Flare/Chaff Dispensers (30/20)	440/400m Hardened Runway	+2	23mm Autocannon, 4 Hardpoints	200x23mm
Upgraded	RWR, Flare/Chaff Dispensers (35/25), HUD, Helmet Sight Interface, ECM 1, Inertial Navigation	440/400m Hardened Runway	+3	23mm GSh-23-2 Autocannon, 4 Hardpoints	200x23mm

Yak-130

Notes: This Russian aircraft is used as an advanced operational trainer and light attack aircraft. It was designed to replace the L-29/L-39/L-59 series of aircraft in Russian and Czech service, and also had some orders from Italy. The controls are fly-by-wire and very responsive, and the Yak-130 is maneuverable enough to be used as an aerobatic stunt plane. The Yak-130 can use both Eastern and Western weapons.

Twilight 2000 Notes: As it was not introduced into service until early 1995, it is a rather rare aircraft. In Italian service, the Yak-130 is often armed with AIM-9 Sidewinders and Maverick missiles.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$3,019,680	AvG	3 tons	9.5 tons	2	14	None	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
2074	519 (110)	NA 130 9/5 70/50	2165	4328	13000	FF4 CF3 RF3 T3 W4

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
RWR, Flare/Chaff (20/15)	495/450m Hardened Runway	+2	7 hardpoints	None

C.101 Aviojet

Notes: This is a Spanish made trainer used to train pilots for ground attack during peacetime, and as an actual combat support aircraft during wartime. It is capable of carrying a wide array of weapons and is armed with one cannon or twin machineguns. It is also used by Chile (where it is known as the A/T-36 Halcon), Honduras, and Jordan.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
MG-Armed	$2,879,000	AvG	1.84 tons	6.3 tons	2	8	None	Enclosed
Cannon-Armed	$2,952,230	AvG	1.84 tons	6.4 tons	2	8	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
(Both)	1612	403 (100)	NA 101 6/3 60/30	1730	1905	12800	FF4 CF3 RF3 T3 W3

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
MG-Armed	None	440/400m Hardened Runway	+2	2xM-2HB, 6 Hardpoints	375x.50
Cannon-Armed	None	440/400m Hardened Runway	+2	30mm DEFA Autocannon, 6 Hardpoints	160x30mm

Saab 105

Notes: In peacetime, this Swedish aircraft is used as a trainer in every stage from basic training to advanced tactical training. In wartime, this aircraft is also used as a light attack aircraft, usually for the direct support of ground troops. In addition to Sweden, the Saab 105 is also used by Austria.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Aubisque Engines	$1,103,520	AvG	1 ton	4.02 tons	2	8	None	Enclosed
FJ44-1C Engines	$1,167,140	AvG	1.05 tons	4.02 tons	2	8	None	Enclosed
J85-GE-3 Engines	$1,422,960	AvG	1.22 tons	4.02 tons	2	10	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
Aubisque Engines	1540	385 (100)	NA 96 8/5 40/30	1000	1454	12200	FF4 CF4 RF4 T3 W3
FJ44-1C Engines	1614	403 (100)	NA 101 8/5 40/30	1000	1598	12200	FF4 CF4 RF4 T3 W3
J85-GE-3 Engines	1882	470 (100)	NA 118 8/5 40/30	1000	2180	12200	FF4 CF4 RF4 T3 W3

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
(All)	None	550/495m Primitive Runway	+2	6 Hardpoints	None

Pilatus PC-7

Notes: This Swiss-built trainer was designed for basic training and the teaching of aerobatic maneuvers. It is easy to fly and a very forgiving aircraft. Many were sold in Africa, Latin America, and Europe. Though not normally armed, they do have this capability. It has no ejection seats and is not capable on in-flight refueling.

Twilight 2000 Notes: These aircraft were often armed as COIN aircraft during the Twilight War.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$395,560	AvG	1 ton	2.7 tons	2	4	None	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
824	206 (100)	NA 52 7/4 70/40	1370	195	10060	Ff3 CF3 FF3 T2 W3

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
None	500/400m Hardened Runway	None	6 Hardpoints	None

Pilatus PC-9

Notes: Developed from the PC-7, this aircraft has had 70% of it redesigned. It has a pressurized cockpit, more powerful engine, and greater range. It is used by several countries, including the US, who uses them as the T-6A Texan II.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$432,510	AvG	1 ton	3.2 tons	2	4	None	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
995	249 (100)	NA 62 7/4 70/40	2015	344	11580	HF4 CF4 FF3 T2 W3

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
None	500/400m Hardened Runway	None	6 Hardpoints	None

G-2A/G-3 Galeb/J-1 Jastreb

Notes: This Yugoslavian aircraft is an operational trainer, meaning that it can be used as a trainer and a combat aircraft. It was used by all former Yugoslav republics as well as Libya and Zambia. It is a light aircraft with a limited weapon load and few avionics. The Jastreb is a single seat dedicated ground attack version. It has a more powerful British-designed engine for improved lifting capability.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
G-2A	$1,482,320	AvG	300 kg	4.3 tons	2	8	None	Enclosed
G-3	$1,565,870	AvG	360 kg	4.82 tons	2	8	None	Enclosed
J-1	$2,933,210	AvG	1.2 tons	4.68 tons	1	10	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
G-2A	1624	406 (100)	NA 102 6/3 60/30	1560	1106	12000	FF3 CF3 RF3 T2 W3
G-3/J-1	1706	426 (100)	NA 107 6/3 60/30	1560	1330	12000	FF3 CF3 RF3 T2 W3

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
G-2A/G-3	RWR	515/475m Hardened Runway	+1	2xDShK, 2 Hardpoints	300x12.7mm
J-1	RWR, Flare/Chaff (25/20)	515/475m Hardened Runway	+2	3xDShK, 8 Hardpoints	500x12.7mm

G-4 Super Galeb

Notes: This is the replacement for the G-2 in Yugoslav service, and also is used by Burma. The SOKO factory in Bosnia was dismantled in 1992, and production ceased at that time; however, the existing stocks of the Super Galeb were used by both Yugoslavia and Bosnia. The Super Galeb has a more aerodynamic shape and better performance than the Galeb, as well as better avionics. The G-4M is a dedicated light attack aircraft with further improved avionics and attack ability.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
G-4	$2,015,900	AvG	1.28 tons	6.3 tons	2	12	None	Enclosed
G-4M	$4,647,170	AvG	1.68 tons	6.14 tons	1	14	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
G-4/G-4M	1680	420 (105)	NA 210 7/4 70/40	1215	1777	12850	FF3 CF3 RF3 T2 W3

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
G-4	RWR, Flare/Chaff (35/25)	530/490m Hardened Runway	+2	23mm GSh-23L Autocannon, 4 Hardpoints	250x23mm
G-4M	RWR, Flare/Chaff (35/25), HUD, Laser Designator (11 km), Inertial Navigation	530/490m Hardened Runway	+2	23mm GSh-23L Autocannon, 4 Hardpoints	250x23mm

T-33 Shooting Star

Notes: Initially developed in 1948 as a two-place training variant of the P-80 Shooting Star, the first variants of the T-33 were designated the TP-80C (and later TF-80C, then T-33A). The type was designed for jet transition training – for pilots who were already proficient at flying propeller-driven fighter aircraft to learn how to fly the then-new jet aircraft. The Navy also used a version of the T-33, designated TV-2, then later the T-33B. T-33s served as the basis for an advanced two-seat interceptor, which became the F-94 Starfire. Though primarily used as a trainer by most countries using it, the T-33 was also developed into a reconnaissance platform, used as OPFOR aircraft, drone direction, target towing, drone targets, and ELINT aircraft. The last T-33 in US service, a research aircraft for NASA designated NT-33, was retired in 1997, though some continue to be used in some smaller air forces as trainers. In the 1980s, the Boeing AT-33 Skyfox attack platform, a vastly upgraded T-33C, was pitched to some countries' air forces who were already using the T-33, but this design was ultimately unsuccessful. T-33s have also been somewhat successful in sales to civilians; a noted owner of a civilian T-33 was Michael Dorn, who played LT Worf on several *Star Trek* franchises. Boeing also operated a number of T-33s until 2020, using them as chase planes when testing their airliner aircraft. All told, some 30 countries were equipped with T-33s at some point.

The T-33A

Also known among pilots as the T-Bird, the initial T-33s were P-80C/F-80Cs with a fuselage lengthened by one meter, and the space used for a rear cockpit with a full set of controls for the instructor and emergency cutoff controls that allowed the instructor to take away flight controls from his student. The first such variants retained their air-ground capability, including a reduced load of two M3 machineguns, to allow for ground-attack practice and firing as ground and aerial targets. (These were later omitted as the T-33 became a pure initial trainer.) These were designated TP-80C, and later TF-80C, then T-33A. Only 20 TP-80s were built, being supplanted by the later T-33A. The T-33As and its predecessors were basically straightforward two-seat versions of the F-80A – somewhat heavier, but for the most part operating like the F-80A.

The DT-33A was used as a drone director. Drone director aircraft were used to control drone aircraft in the days before effective ground drone control stations were available, and the rear cockpit had controls for a drone in the air to provide a maneuvering target for training fighter pilots. Sometimes these drones were QT-33As, which are essentially T-33As turned into radio-controlled target drones.

The T-1A/T-33B

The US Navy, having had experience with P-80A/F-80A-based transition trainers (most notably the TO-1 and TV-1), decided to get their own version of the T-33A. This version, the T2V SeaStar, was later redesignated the T-1A, then towards the end of its career the T-33B. This version was suitably modified for carrier landings and takeoffs, with an arrestor hook and generally strengthened airframe, as well as strengthened landing gear and harder tires. The wings were hinged just outside of the wing hardpoints. The T-33B was a bit heavier than the T-33A due to being navalized, but the more aerodynamic nose and different engine (still a variant of the J33) partially made up for this performance-wise.

Canadair CT-133 Silver Star

The CT-133 was a license-produced T-33A, sometimes referred to as the Canadair T-33. They differed from the standard T-33A in being powered by license-produced British Rolls-Royce Nene 10 turbojets instead of Allison J33s. The wingtips also carried fuel tanks almost twice the capacity of those on the T-33A. The CL-133s were not retired from Canadian Forces until 2005, and the Canadians still retain five in flying condition in storage. A noted use of the CL-133 was as the Red Knight aircraft on the Canadian Forces Aerobatic Team. Some 40 CL-133s were sold to Bolivia after refurbishment into AT-33A aircraft in the 1970s; these were later shipped back to Canada in units for a SLEP, with Bolivian AT-33As not being retired until 2007.

The CT-133 was also modified into several other variants. The CE-133 was an EW training aircraft, used to train electronic warfare officers to use their equipment while in a maneuvering aircraft. The CX-133 was used to test several ejection seat types and fittings. The ET-133 was an OPFOR aircraft, the same as a CT-133 but lacking armament and weapon hardpoints. The TE-133 served the same role, but was used by OPFOR units in simulated attacks on ships.

Some other users of CT-133s included France, Greece, Portugal, and Turkey.

The AT-33A

The AT-33A (not to be confused with the AT-33 Skyfox below) was a conversion of the T-33A into an attack aircraft, developed over the period of 1972-1975. These were simply T-33As with the F-80C machinegun complement returned, hardpoints restored, and appropriate bombsights and gunsights added. They were not proceeded with for the most part by the USAF, but were used for a short time as air-to-ground trainers. The AT-33A also proved popular in some foreign countries' air forces.

Some Bolivian AT-33As were actually based on Canadian CT-133s (see above). These retained the Nene engines and larger wingtip fuel tanks, but otherwise had the same equipment as T-33A-based AT-33As.

The AT-33 Skyfox

The AT-33 Skyfox, more properly known as the Boeing Skyfox, is an extensive redesign of the T-33 originally envisioned by Flight Concepts, which was later renamed to Skyfox (hence the name of the aircraft). Even later, the company was bought out by Boeing, with the Skyfox design being marketed to countries still using the T-33 starting in the 1980s and continuing, unsuccessfully until 1997,

when the design was dropped. The single prototype was fully restored and placed into the Palm Springs Air Museum in California. The Skyfox was featured as a new US Air Force strikefighter in the third episode of the TV series *Airwolf*.

The Skyfox features a heavily reworked airframe, becoming more streamlined and made of lighter but stronger materials than that of the T-33A. This was coupled to a pair of Garrett TFE731 turbofan engines mounted in external nacelles, replacing the single fuselage-mounted Allison J-33. These two engines are, together, only 60% of the weight of the Allison J33, and also consumed 45% less fuel than the Allison. The turbofans had a power output of 3700 pounds thrust each. Since the fuselage no longer housed the engine, fuel tankage could be increased dramatically, enough so that Boeing felt they could delete the wingtip fuel tanks. This in turn allowed the Skyfox to increase g-loading and maneuverability on the airframe. The hardpoints had increased weight-carrying ability, distributed among four wing hardpoints, two of which were wet. Though it was not implemented on the prototype, Boeing intended to replace the two M3 machineguns with a pair of 20mm M39A2 autocannons on production examples. Each hardpoint could also mount a Sidewinder AAM or two Stinger ATAS missiles. It may be noted that the original Skyfox was based on a CT-133, though this had no effect on the eventual design other than that the CL-133 was newer-build than most T-33As.

The Skyfox was meant to be both a trainer and a light attack aircraft, and was primarily aimed at smaller air forces who already employed the T-33A and AT-33A. The conversions could be put on any T-33 variant, and were of surprisingly low RL cost compared to most new attack jets of its time.

In the end, even though Portugal signed a letter of intent for 20 Skyfoxes, there was little interest from the international marketplace in the Skyfox, and Boeing felt that the cost of gearing up a new production line was not worth the order from Portugal, and in 1997, gave up on the Skyfox.

Twilight 2000 Notes: The T-33 had generally been long out of service in many first-line countries. In several Second and Third-World countries it remained in service, generally upgraded into the AT-33A or RT-33A standard. However, with war clouds closing in, some countries, including the US and Canada, began upgrading their T-33s into the Skyfox standard, with the type becoming a surprising standout ground support aircraft in the latter half of the Twilight War.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
T-33A (Early Production)	$668,310	JP-A	907 kg	6.83 tons	2	10	None	Enclosed
T-33A (Main Production)	$728,560	JP4	907 kg	6.83 tons	2	10	None	Enclosed
T-33B	$728,560	JP5	907 kg	7 tons	2	10	None	Enclosed
CT-133	$745,310	JP4	907 kg	7.63 tons	2	10	None	Enclosed
AT-33A (T-33A-Based)	$1,719,000	JP4	907 kg	7.01 tons	2	11	Image Intensification	Enclosed
AT-33A (CT-133-Based)	$1,758,521	JP4	907 kg	7.81 tons	2	11	Image Intensification	Enclosed
AT-33 Skyfox	$1,488,497	JP4	2.7 tons	9.07 tons	2		FLIR, 2nd Gen Image Intensification, VAS (30 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling	Armor
T-33A (Early Production)	1529	425 (100)	NA 71 5/3 50/30	3350	1219	13716	FF2 CF2 RF1 W1 T1
T-33A (Main Production)	1750	486/569* (100)	NA 81/94* 5/3 50/30	3350	1399	13716	FF2 CF2 RF1 W1 T1
T-33B	1709	475/566* (95)	NA 79/92* 5/3 50/30	3350	1399	13716	FF2 CF2 RF1 W1 T1
CT-133	1738	483 (100)	NA 80 5/3 50/30	3950	1516	14000	FF2 CF2 RF1 W1 T1
AT-33A (T-33-Based)	1706	474/555* (100)	NA 79/92* 5/3 50/30	3350	1399	13716	FF2 CF2 RF1 W1 T1

AT-33A (CT-133-Based)	1695	483 (100)	NA 78 5/3 50/30	3950	1516	14000	FF2 CF2 RF1 W1 T1
AT-33 Skyfox	2117	588 (90)	NA 95 7/4 70/40	2950	1302	15000	FF3 CF3 RF2 W2 T1

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
T-33A (Early Production)	Radios (300 km, 2 km)	820/680m Hardened Runway	+1	2xM3 Machineguns, 2 Hardpoints	450x.50
T-33A (Main Production)/CT-133	Radios (300 km, 2 km), IFF	820/680m Hardened Runway	+1	2xM3 Machineguns, 2 Hardpoints	450x.50
T-33B	Radio (300 km), IFF	820/680m Hardened Runway	+1	2xM3 Machineguns, 2 Hardpoints	450x.50
AT-33A	Secure Radios (300 km, 30 km, 2 km), IFF, Flare Dispensers (10)	820/680m Hardened Runway	+1/+2	6xM3 Machineguns, 2 Hardpoints	1800x.50
AT-33 Skyfox	Secure Radios (300 km, 30 km, 2 km), IFF, ECM/ECCM 1, Flare/Chaff Dispensers (20 Each), Inertial Positioning	780/600m Hardened Runway	+1/+3	2x20mm M39A2 Autocannons, 4 Hardpoints	1146x20mm

*The T-33A, T-33B and AT-33A (except for those that are based on the CT-133) are equipped with a water/alcohol injection system, which increases the speed and acceleration to the figures on the right side of the slash for up to 20 seconds total.