

PANAVIA
TORNADO
AFS-design



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Summary

The Panavia Tornado is a family of twin-engine combat aircraft, which was jointly developed by the West Germany, United Kingdom and Italy. There are three primary versions of the Tornado; the Tornado IDS (Interdictor/Strike) fighter-bomber, the suppression of enemy air defences Tornado ECR (Electronic Combat/Reconnaissance) and the Tornado F.3 (only United Kingdom) a air defence variant. It is one of the world's most sophisticated and capable interdiction and attack aircraft, with a long range, large payload and high survivability.

Developed and built by Panavia, a tri-national consortium consisting of MBB of West Germany, British Aerospace, and Alenia Aeronautica of Italy. The Tornado first flew on August 14, 1974, and saw action with the RAF and AMI (Italian Air Force) in the Gulf War (Operation Desert Storm). International co-operation continued after its entry into service within the Tri-National Tornado Training Establishment, a tri-nation training and evaluation unit operating from RAF Cottesmore, England. Including all variants, 992 aircraft were built for the three partner nations and Saudi Arabia (first export customer).



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The Panavia Tornado of AFS-design

- Detailed outside and interior model inclusive animated virtual cockpit
- Highly soluble textures with surfaces reflecting
- Extensive light effects (e.g. Navigation and landing lights)
- Numerous animations (e.g. canopy, move in gear with spring system)
- Animation of all tax flaps (e.g. swing wings, airbrakes and spoilers)

- Realistic flight dynamics (inclusive different trim steps for optimal trim)
- Formation flight model with three PANAVIA TORNADO
- Fuel system for the air refueling
- Complete functioning autopilot
- Avionics for radio navigation

- Engine animation inclusive thrust reversing and afterburner
- Completely functioning virtual cockpit from view of the pilot and
- Completely functioning virtual cockpit from view of the weapon system officer
- 12 different missions of different airfields
- modified Scenery military airfield Rostock – Laage

The AFS-design Panavia Tornado product liveries the following:

- German airforce Bundeswehr Luftwaffe ECR (incl. Tigermeet)
- German airforce Bundeswehr Luftwaffe IDS (incl. specialpaint of the WTD)
- German airforce Bundeswehr Marine IDS (incl. Tigermeet)

- British RAF GR.4 (incl. "Operation Desert Storm" liveries)
- British RAF F.3 (with with longer radome)

- Italian and Saudi Arab Air Force (in both case with the IDS version)

System

System:	Windows 98 SE / Me / 2000 / XP or Vista
FS VERSION:	FSX (SP1, SP2, Acceleration Pack) and FS2004
Filesize:	40 MB
Filesize hard drive:	605 MB
INSTALLATION:	EXE. file
PUBLISHER:	AFS-design
HOMEPAGE:	http://www.afs-design.de
SUPPORT mailto:	info@afs-design.de
FS VERSION:	FSX (SP1, SP2, Acceleration Pack) and FS2004

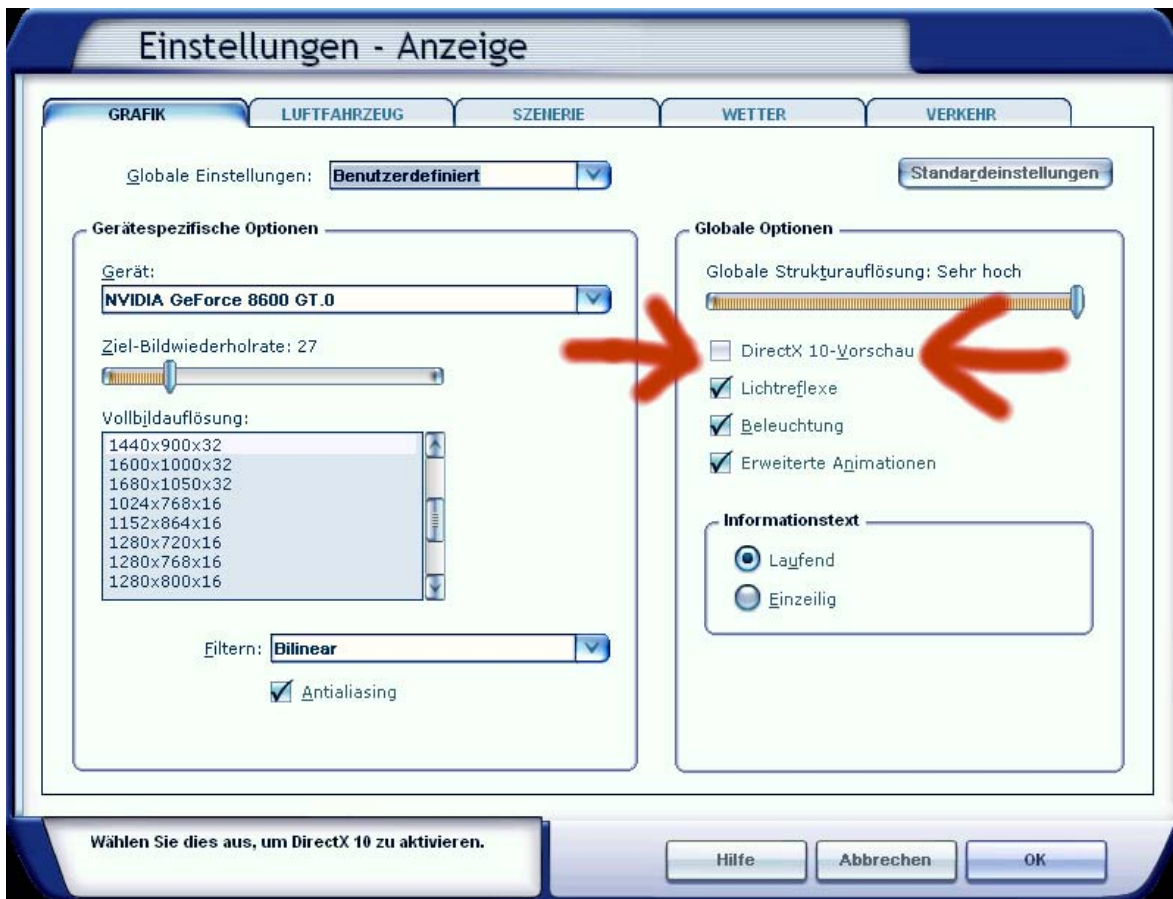
Installation

1. For FSX download the „AFS-Torn-FSX.exe“ to a temporary directory of your choice.
2. For FS2004 download the „AFS- Torn -FS9.exe“ to a temporary directory of your choice.
3. Please start the „AFS- Torn -FSX.exe“ or „AFS- Torn -FS9.exe“ and
4. Install the AFS-design Panavia Tornado.
5. Than you start the Flight Simulator
6. Choice a flight with Tornado, AFS-design
7. Choice a kind of fighter wing and the equipment
8. Control the loading
9. Than you start the Flight Simulator

Problem with DirectX in FSX (SP2)

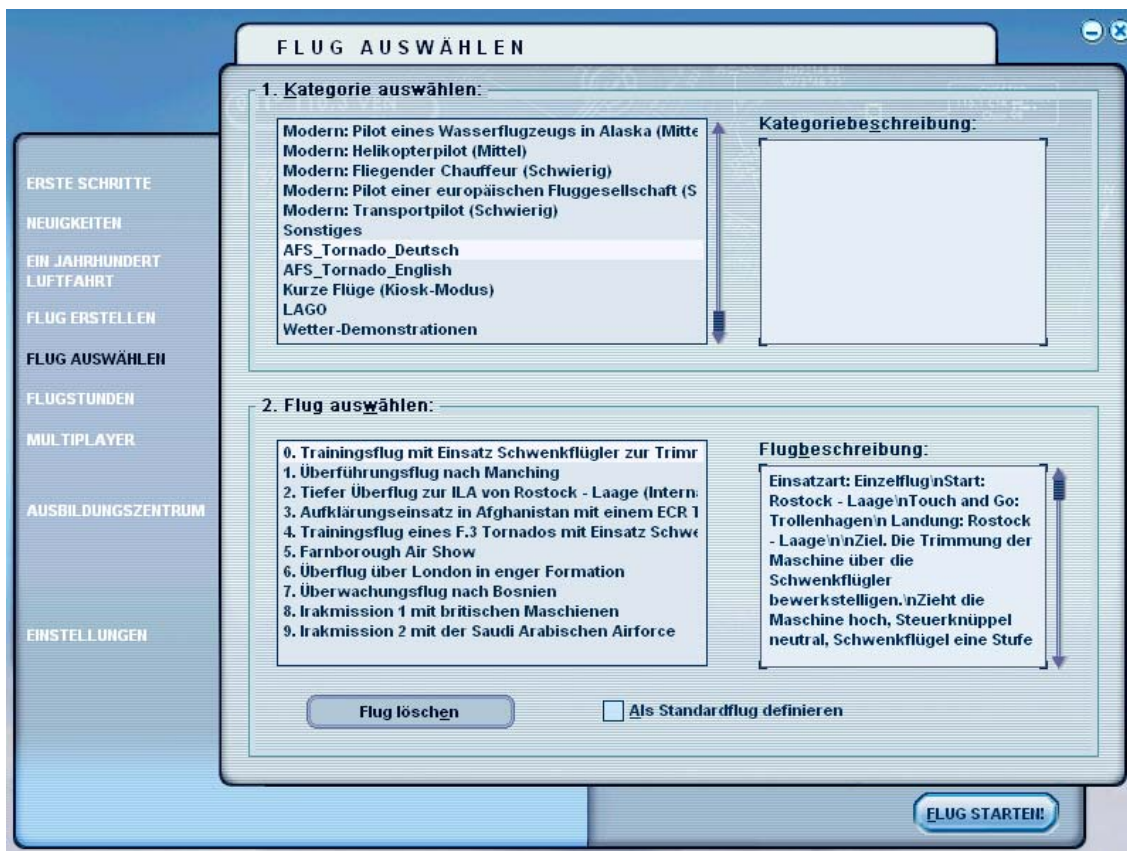
This program use DirectX9 only. Please switch out DirectX 10 trailer !

1. Install this add-on
2. Start the Microsoft FSX
3. Choose a plane your choice
4. Start the simualotion (click start)
5. In the simulation switch button "ALT"
6. Choose options / adjustment / display (graphic settings)
7. In the graphic settings windows choose graphic
8. deactivate "DirectX 10 trailer" in small box (without camisole)
9. Exit the FSX, and start the FSX new !



Mission selection and free flight

Select „flight select“ with FS2004 or „Missions“ with FSX the category: „AFS_Tornado_English“ and select you one of the existing missions. Then click to „Take Off“.



“Flight select“ in FS2004 (german version)

In order to accomplish a free flight, please under „free flight “and „aircraft select “the Tornado, AFS Design select.



“Free flight“ in FS2004 (german version)

Keyboard

Please use a joystick adequate for the Microsoft Flight Simulator. Other are all Keyboarddefinitions like in standard manual of Flight Simulator.

Importance notice for FSX:

Please operate keyboard combination onto call: “STRG” and “E”

Therewith the start of engines. After you can switch the engines with panel switch normal.

engine on	STRG E
canopy open / close:	shift E
tailhook down or up in FS2004	shift W
tailhook down or up in FSX	strg W
gear	G
air brake	#
Thrust reversing	F1 then F2
Trim	7 and 1 (Number block out)
Landing flaps down (step 4 and 5)	F7
Landing flaps up (step 3 and 4)	F6
Landing flaps down (step 2 and 3)	F7
Landing flaps up (step 1 and 2)	F6
Zoom in virtual cockpit: (not numeral field, but letter field)	+ -



The panel of pilot



- A – climbing announcement
- B – HUD
- C – g - Kraftmesser
- D – HUD operating unit
- E – Navigation keys
- F – Light switch
- G – Radarscope
- H – Radar illusion receiver
- I – Control unit for engine control
- J – Landing flap and swivel wings announcement and flaps lever
- K – Climbing announcement
- L – Speed measurer
- M – Altimeter
- N – Artificial horizon
- O – Course indicator

- P – Map announcement
- Q – Autopilot
- R – Instrument panel for engine control
- S – Trim wheel
- T – Freezing up switch and pitot heat
- U – Stop clock
- V – Compass
- W – Multi-functional unit (built-in functions of the ms Flight Simulator)
(here switch to panel 2)



Panel of the weapon system officer



- A – climbing achievement
- B – Altimeter
- C – Autopilot
- D – Rear view mirror
- E – Tornado GPS mission unit 1
- F – Tornado GPS mission unit 2
- G – RADAR
- H – Control unit Tornado GPS 1
- I – Control unit Tornado GPS 2
- J – Control unit of the radar
- K – Landing flap and swivel wings announcement and flaps lever
- L – Stop clock
- M – Speed measurer
- N – Multi-functional unit (built-in functions of the ms Flight Simulator)
(here switch to panel 2)

Trim

With the Tornado the trim is used, in order to bring the rudder forces necessary for a stable flight situation on zero. In addition, the trim can be used in temporary flight conditions, like e.g. in the dive, in order to reduce the rudder forces which can be applied by the pilot and to improve so the controllability of the airplane.

With increase of the trim the lift emphasis shifts to the rear. Thus the Tornado becomes top-heavy. The airplane must be trimmed nose-up. In the case of reduction of the trim the lift emphasis shifts forward. Thus the Tornado becomes nose-down. The airplane must be trimmed top-heavy.

For trim 2 possibilities stand for the Tornado for order.

- Trim over the trim wheel (or push **7** and **1** (Number block out))
- Trim change by swivel wings employment

During the change of the trim the heaviness can be changed over the trim wheel in the panel.

However the more elegant method for trim is to select the swivel wings position with which the best rudder trim is.

If the airplane is top-heavy, a stage swivel wings forward place. Is turned around if the airplane nose-down, a stage after swivel wings reset.

The Tornado is not only optimally trimmed, but always also the swivel wings position is adjusted.

Table for optimal trim:

600 kn	Swivel wings up	Swiveling position A
450 kn	Swivel wings in middle position	Swiveling position B
300 kn	Swivel wings down	Swiveling position C
200 kn	Landing flaps position start	Flaps position 2
150 kn	Landing flaps position landing	Flaps position 3

Technical data of the PANAIA TORNADO IDS (Gr.4)

Length:	16,72 m
Span:	8,60 m (65° swivel) 13,91 m (25° swivel)
Height:	5,95 m
Wing area:	26,60 m ²
Empty mass:	14.501 kg
Takeoff weight:	20.411 kg
max. weight:	27.216 kg
internal tank:	4.660 kg
Employment radius:	1.390 km
maximum range:	2.560 km
Transfer:	3.890 km
Engine:	two Turbo-Union RB199-34R Mk-103
Achievement without afterburner	38,48 kN
achievement with afterburner	82,77 kN
max. speed:	2,337 km/h Mach 2.2 on over 10.975 m 1,480 km/h Mach 1.2 on sea level
Service ceiling:	15.240 m
Climbing rate:	165 m/s
Climbing time on 9.000 m:	1 min 30 s
Take-off run:	1.000 m
Landing run:	900 m
Crew:	2 Mann

Technical data of the PANAIA TORNADO F.3

(Royal Airforce (RAF))

Length:	16,72 m
Span:	8,60 m (65° swivel) 13,91 m (25° swivel)
Height:	5,95 m
Wing area:	26,60 m ²
Empty mass:	14.501 kg
Takeoff weight:	20.411 kg
max. weight:	27.216 kg
internal tank:	4.660 kg
Employment radius:	1.390 km
maximum range:	2.560 km
Transfer:	3.890 km
Engine:	two Turbo-Union RB199-34R Mk-103
Achievement without afterburner	38,48 kN
achievement with afterburner	82,77 kN
max. speed:	2,337 km/h Mach 2.2 on over 10.975 m 1,480 km/h Mach 1.2 on sea level
Service ceiling:	18.182 m
Climbing rate:	165 m/s
Climbing time on 9.000 m:	1 min 30 s
Take-off run:	1.000 m
Landing run:	900 m
Crew:	2 Mann

Reference informations

total weight of aircraft with full tanks	56.000 Lbs
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V_{MO} – limit speed	330 KIAS
M_{MO} - limit speed Mach	0,84 Mach
Limit speed in turbulences	280 KIAS/0,84 Mach
V_{LO} - limit speed for gear	270 KIAS/0,82 Mach
V_{LE} - maximum speed for down gear	270 KIAS/0,82 Mach

V_{LE} – limit speed with gear open	92 KIAS
Canoby open	60 KIAS

Limit speed for flaps

Flap position (degrees)	KIAS
1	250
2	250

V_{REF} - landingspeed flaps step 3, gear down

35.000 Lbs (flaps down, land)	157 KIAS
35.000 Lbs (flaps down, aircraft carrier)	131 KIAS

PANAVIA TORNADO Check list

Aktion	Combination of keys...
GPS in +/- fades	shift +3
Radio in +/- fades	shift +4

PUT back (if at a gate one parked)

<input type="checkbox"/> putting back	REQUIREMENT (pressures it UMSCHALT+P and afterwards 1 for a tail movement to the left or 2 for a tail movement to the right. Press then UMSCHALT+P for stopping.)
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BEFORE THE START

<input type="checkbox"/> Parking brake	TIGHTEN (pressures it STRG+PUNKT.)
--	------------------------------------

START THE ENGINE

Press STRG+E for the automatic engine start.

AFTER THE START

<input type="checkbox"/> snow and ice removal	AS REQUIRED
<input type="checkbox"/> flight control	EXAMINING
<input type="checkbox"/> autopilot	ADJUSTING AND OUT
<input type="checkbox"/> of instruments	EXAMINED
<input type="checkbox"/> brake mechanism	RTO (ABORTED TAKE-OFF)
<input type="checkbox"/> avionics switch	on
<input type="checkbox"/> avionics	ADJUST (pressures it UMSCHALT+2 to indicate around the group of radio.)
<input type="checkbox"/> trimming	ADJUST
<input type="checkbox"/> Switch for round ambient light	on

BEFORE THE START

<input type="checkbox"/> flaps	FOR START ADJUSTING (pressures it as often as necessarily F7.)
<input type="checkbox"/> Flight Director	on
<input type="checkbox"/> Automatic efficiency control swivel wings	ACTIVATE (on use of the TO/GA mode when starting) down with F7 of startposition

START

<input type="checkbox"/> brake	SOLVE (pressures it the POINT KEY.)
<input type="checkbox"/> Flashlights	on
<input type="checkbox"/> Transponder	OLD (pressures it UMSCHALT+2 to indicate around the group of radio.)
<input type="checkbox"/> Vertical adjustment lock lever	LET US PUT forward ON 1,05 EPR (pressures it as often as necessarily F3 or F2.)
<input type="checkbox"/> Vertical adjustment lock lever - or -	SLOWLY ON 100% N1 INCREASING (pressures it as often as necessarily F3 or F2.)

<input type="checkbox"/> TO/GA-modus	ACTIVATE (pressures it STRG+UMSCHALT+R.)
<input type="checkbox"/> Achievement	EXAMINE WHETHER SUFFICIENT FOR START
<input type="checkbox"/> Airspeed 80 KIAS	ANNOUNCEMENT "80 KNOTEN"
<input type="checkbox"/> Airspeed V1	ANNOUNCEMENT "V1"
<input type="checkbox"/> Airspeed VR	ANNOUNCEMENT " TRICKS "

- RAISING ON APPROXIMATELY 10 DEGREES OF PITCH ATTITUDE -

<input type="checkbox"/> Airspeed V2	ANNOUNCEMENT "V2"
<input type="checkbox"/> Gear	BRING in (AS SOON AS CLIMBING RATE REACHES POSITIVES) (pressures it G.)
<input type="checkbox"/> autopilot- Course selector switch	AN AS REQUIRED
<input type="checkbox"/> Airspeed	V2 + 15 KIAS MAINTAINED
<input type="checkbox"/> Autopilot	ACTIVATE
<input type="checkbox"/> Flaps	LET US BRING WITH 1.000 FOOT in ABOVE GROUND (pressures it as often as necessarily F6.)

CLIMB

<input type="checkbox"/> Automatic efficiency control	off
<input type="checkbox"/> Landing lights	off WITH OVER 10.000 ft NN
<input type="checkbox"/> Altimeter	WHEN THE EXCEEDING 18.000 FOOT NN TO 29,92 ADJUSTING

CRUISING

<input type="checkbox"/> Vertical adjustment lock lever	As required (pressures it as often as necessarily F3 or F2.)
<input type="checkbox"/> Trimming	If necessary (pressures it as often as necessarily 6 or 7 on the numeric keyboard.)
Swivel wings	Up with F6 according to speed

DESCENDING FLIGHT

<input type="checkbox"/> Airspeeds (VREF, VAPP)	COMPUTED AND ADJUSTED (see side reference on the knee board)
<input type="checkbox"/> Brake mechanism	AS REQUIRED
<input type="checkbox"/> Snow and ice removal	AS REQUIRED
<input type="checkbox"/> autopilot	AS REQUIRED
<input type="checkbox"/> Vertical adjustment lock lever	AS REQUIRED (pressures it as often as necessarily F3 or F2.)
<input type="checkbox"/> Altimeter	WHEN THE EXCEEDING 18.000 FOOT NN ON RESTAURANT ADJUSTING
<input type="checkbox"/> Avionik	ADJUST (pressures it UMSCHALT+2 to indicate around the group of radio.)
<input type="checkbox"/> Airspeed	<250 KIAS WITH UNDER 10.000 FOOT NN
<input type="checkbox"/> Landing lights	A WITH UNDER 10.000 FOOT NN
<input type="checkbox"/> Approach procedure	REPEAT

APPROACH

<input type="checkbox"/> Aispeed	As required
<input type="checkbox"/> Vertical adjustment lock lever	As required (pressures it as often as necessarily F3 or F2.)
<input type="checkbox"/> flaps	As required (pressures it as often as necessarily F7.)
<input type="checkbox"/> autopilot	As required
Swivel wings	Down F7

LANDING

- Airspeed As required
- Vertical adjustment lock lever As required (pressures it as often as necessarily F3 or F2.)
- gear DRIVEN out and CONFIRMED (pressures G.)
- flaps As required (pressures it as often as necessarily F7.)
- spoiler ACTIVATE (pressures SHIFT + # [NUMERIC CHARACTER].)
- autopilot As required
- Automatic efficiency control ACTIVATE (on use of the TO/GA mode with the touch-and-go)

LANDING RUN

- Vertical adjustment lock lever CLOSED (pressures it as often as necessarily F3 or F2.)
- Automatic efficiency control EXAMINE WHETHER OUT
- Spoiler lever EXAMINE WHETHER WHOLE BROUGHT in (pressures you SWITCH + # (NUMERIC CHARACTER), until the flaps brought in.)
- Vertical adjustment lock lever REVERSE THRUST (pressures you F2, to reverse thrust one activates.)
- Vertical adjustment lock lever NO-LOAD OPERATION WITH 60 KIAS (pressures it F3, until the engines are in the no-load operation.)
- Brake mechanism off
- prake If necessary (pressures it the POINT KEY.)
- autopilot EXAMINE WHETHER SWITCHED OFF

IN HERE ROLES

- Spoiler lever DOWN (pressures it # [numeric character].)
- lights AS REQUIRED
- Flap lever BRING in (you bring the flaps in with F6 completely.)
- Transponder STBY

PARKS

- Parking brake TIGHTEN (pressures it STRG+PUNKT.)
- Switch for the regulation of the fuel supply INTERRUPTION (pressures it STRG+UMSCHALT+F1.)
- Snow and ice removal off
- lights AS REQUIRED
- Flight Director off

NOTE: The check lists for this aircraft, used in the real air traffic, were changed for the use in Flight simulator.

Right

This product is a Add-On for the Microsoft Flight Simulator. It is build with FSDesign Studio 3, PHP and XML.

Please use a licenceversion of the Flight Simulator only.

You may the addition use private only. Every dissemination or publication is forbid.

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