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INTRODUCTION

The Twin Otter Extended is a follow up project on the previous Twin Otter projects we did. The reason we do so many Twin Otters is simple, we love the aircraft and we feel it should always be in our hangars made to the current State-Of-The-Art.

Like other aircraft Aerosoft has done internally, it is one of those aircraft that just seems to keep on flying because nobody has ever made an aircraft that does the same tasks with the same flair and reliability. If you are not a fan of aviation you might not like to be a passenger as the aircraft is small, unpressurized and above all noisy. The turbines have a high whine that really gets on your nerves. But it's the capabilities that set the Twin Otter apart. Just type in "Twin Otter" on YouTube and you will find some amazing landings and take-offs. When there is some wind the Twin Otter seems to jump into the air as soon the wheels start to turn and a runway seems optional. It flies with skis, floats and wheels and some weird combination of them. In the end, the Twin Otter is the ONLY aircraft that British Airways could use for the only scheduled daily route to a beach (Glasgow to Isle of Barra, Scottish Outer Hebrides). In 2013 that is nothing short of amazing.

THE MANUALS

There are 4 separate documents that make up the manual. Do note that we speak of FSX only, but all will apply for P3D as well.

- **Vol 1 _ In FSX.pdf:** You are reading it now. Contains information on using the aircraft in FSX and more general information.
- **Vol 2 _ Systems.pdf:** Contains an in-detail description of all systems.
- **Vol 3 _ Checklist.pdf:** Full checklist for use in the cockpit.
- **Vol 4 _ Data.pdf:** Data and tables you need.

Also note that the readme.txt always contains the information on the latest updates. Before contacting support do make sure you installed the latest version!

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CREDITS

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|--------------------------------------|------------------------------------------------------------------------------|
| Concept: | Aerosoft |
| Modeling/Texturing/Animation: | Stefan Hoffmann (Aerosoft) |
| Project Management: | Mathijs Kok (Aerosoft) |
| Manual, documentation: | Mathijs Kok (Aerosoft) & Finn Jacobsen (Aerosoft) |
| XML coding: | Finn Jacobsen (Aerosoft) |
| Flight modeling: | John Cagle |
| Sounds: | Turbine Sound Studios, Military Sound Studio, , Sonic Solutions, Aerosoft |
| Installer: | Andreas Mügge |
| Fuel/Load Planner: | Ross Carlson |
| Additional liveries: | Many fine people |
| Digital Flight Data Recorder add-in: | Thomas Molitor |
| Pictures: | Nick Churchill |
| Testers: | A group of good friends that will be rewarded |

We like to thank Dave Rees at Viking, that is one seriously cool company with great plans for a great aircraft! They have been a tremendous help. Another special thanks to André Aepfelbach (<http://www.twinotter.de/>) he does know that aircraft in all details!

SYSTEM REQUIREMENTS

- Minimum Intel Core 2 Duo E6850 CPU (Core 2 Quad recommended)
- 2 GB RAM (4 GB recommended)
- DirectX 9 compatible Graphics Card with minimal 512 MB (1 GB recommended)
- Microsoft FSX (SP2, Gold or Acceleration) or Lockheed Martin Prepar3D
- Windows XP, Windows Vista, Windows 7, Windows 8 (fully updated), 64 bit versions recommended
- Adobe Acrobat® Reader 8 minimum to read and print the manual ⁽¹⁾

⁽¹⁾ Available for free, download at: <http://www.adobe.com/prodindex/acrobat/readstep.html>

CONTACT SUPPORT

Support for this product is done by Aerosoft. We prefer to do support on the support forum for one simple reason, it is fast and efficient because customers help customers when we are sleeping.

- Twin otter Extended FAQ (please check this first):
<https://aerosoft.zendesk.com/forums/22269476-Twin-Otter-Extended>
- Twin Otter Extended forums:
<http://forum.aerosoft.com/index.php?/forum/588-twin-otter-extended/>
- If you prefer support by email (and can afford to wait a bit longer):
https://aerosoft.zendesk.com/anonymous_requests/new

We feel strongly about support. Buying one of our products gives you the right to waste our time with questions you feel might be silly. They are not.

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INSTALLATION AND REMOVAL

Installation is simple-- start the .exe file you downloaded and follow the instructions on screen. Make sure FSX (P3D) is closed and we do advise you to reboot your system before installing. After installing it can help to defragment your hard disk (unless it is a SSD drive that should not be defragmented)

Removal should **never** be done manually but only using the software removal applet you will find in the Windows Control panel.

CHECKLIST

The Aerosoft Twin Otter Extended comes with a very clever checklist system. Not only does it show you all the steps you need to perform, it will even do it for you when asked. Because it is not always easy to know where the instrument is located you need to check, the viewpoint will change automatically!

USING THE CHECKLIST

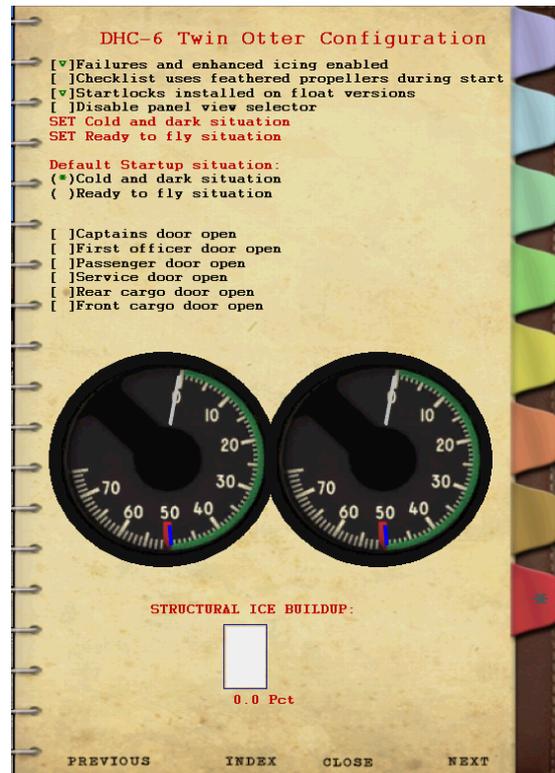
If you left click the first item on a checklist (for example **[] CONTROL LOCKS** on the Pre-Start checklist) you will either see a red **x** or a green **v**. Red means the action has not been done and green that this item is checked and okay. If it is red you have two options, either manually do the action or right-click the item to have the checklist perform the action for you. Doing that you can go from a cold and dark aircraft to one ready for take-off by just right clicking checklist items!

Do note you have to click on the **[]** section of the checklist item to check or set it. If you click on the text behind it the view will be set to the right panel. If you click on the checklist title, it will reset that section of the checklist.

CONFIGURATION

There are settings used by the aircraft that cannot be set by standard FSX dialog screens. These can be changed by the configuration page of the Checklist. Because it is not always easy to see the most important engine parameters and because ice on the structure cannot be seen there are indications for that on this page as well.

- **Failures and enhanced icing:** Enables the non-standard failures.
- **Checklist uses feathered propellers during start:** Will set the checklist to expect prop levers set in feather during startup. Airline specific - both ways of startup procedures are used. Feathered: will assure that oil pressure builds up quicker during startup, since the prop governor won't affect it. Full forward: Will assure a cooler start-up.
- **Start locks installed on float versions:** These are optional fitted on floatplanes. They prevents the prop blades from feathering during shutdown. Since the blades are in flat pitch for the start this way, no forward thrust will be generated during startup, which normally are caused by the props unfeathering. Prop lever must be full forward and Power levers at idle for the start locks to disengage.
- **Disable panel view selector:** Will prevent the panel view selector from automatically popping up when loading the aircraft. [Shift] [3] can still be used to toggle it on/ off on the screen.
- **Disable checklist change camera views:** Turns off the camera view selection when clicking the checklist item text.
- **Set Cold and Dark:** Powers the aircraft down and sets all switches off.
- **Set Ready to fly:** Starts the aircraft and sets all switches to the state normally used during taxi.
- **Default start up situations:** Set the state in which the aircraft will be loaded
- **Doors:** FSX only utilizes 4 doors. Since the Twin Otter has 6 doors we chose to make the pilot doors custom. The pilot doors can be opened by clicking on the door handles in the Virtual cockpit. Additionally all doors can be opened closed via the checklist gauge on the configuration page.



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DIGITAL FLIGHT DATA RECORDER

Not standard equipment in the Twin Otter (though many have it retrofitted) we have installed a Digital Flight Data Recorder in the Twin Otter. It will log many flight parameters and will save them on your hard disk. These data files can be read and displayed with a tool that is delivered with the Twin Otter Extended. A far better tool to read these files is Flight Simulator Flight Keeper, a tool that is used by dozens of Virtual Airlines and thousands of serious enthusiasts

Events the DFDR module records: Block events OUT (Engine on), OFF (TO), ON (LA), IN (Engines off)

- Engines On/Off
- Flaps
- Spoiler
- Gear
- Lights
- Autopilot On/Off
- Transponder Code
- Pressure
- Altimeter
- Taxi and Flight Path (invisible on the details dialog as it is only used for KML and FSFK export)
- Position (only if there has been no other event triggered - on a regular interval)
- Aircraft Crash
- FDR Test (after pressing the corresponding button)
- FDR Event (after pressing the corresponding button)

This data is recorded for all events:

- Altitude
- GroundAltitude
- IAS
- TAS
- GroundSpeed
- WindHeading
- WindSpeed
- Fuel
- OAT
- TAT
- Latitude
- Longitude
- Heading
- TrueHeading
- GlideslopeNeedle
- LocalizerNeedle
- VerticalSpeed
- PitchAngle
- BankAngle
- GForce
- AileronTrim
- ElevatorTrim
- RuderTrim
- EventTime
- EventDate
- EventTimeZone
- EventTimeOfDay
- FramesPerSecond

With each event time, speed, heading, trim, fuel, glide slope, localizer, weather and some more data are recorded. This a powerful tool to see where you can increase your flying skills.

The DFDR panel has a button to activate or de-activate the flight logging and an EVENT button. If you press that button a DFDR Event is logged. You can use this to 'bookmark' the log file. This can be useful if have a problem and want to study that situation later.



To see your flight log you use the AS_RecorderManager (you can find that in the FSXMainFolder\Aerosoft\Flight Recorder but also via the Windows Start menu). All your flights will be shown there. Double click one and all events will be displayed.

Aerosoft Flight Recorder - Manager

File Flight Units Help

Summary

Flights Stored: 42
 Flown Distance: NaN nm
 Flight Time: 04:39:29
 Block Time: 04:39:29
 Flight Fuel: 213 kg
 Block Fuel: 317 kg

Most flown Model: AIRBUS A320 [36]
 Most flown Aircraft: Airbus A320 NEO [20]
 Most flown Airline: AIRBUS INDUSTRIES [20]

Stored Flights

| Date | Type | Model | Variation | Tail Number | Airline | Flight Number | Flight Time | Block Time | BI |
|------------------|--------|-------|-----------------|-------------|-------------------|---------------|-------------|------------|----|
| 12/09/2012 14:34 | AIRBUS | A320 | Airbus A320 NEO | F-WWBT | AIRBUS INDUSTRIES | | 00:00:02 | 00:00:02 | |
| 11/09/2012 19:26 | AIRBUS | A320 | Airbus A320 NEO | F-WWBT | AIRBUS INDUSTRIES | | 00:05:20 | 00:05:20 | |
| 11/09/2012 19:17 | AIRBUS | A320 | Airbus A320 NEO | F-WWBT | AIRBUS INDUSTRIES | | 00:00:02 | 00:00:02 | |
| 10/09/2012 13:07 | AIRBUS | A320 | Airbus A320 NEO | F-WWBT | AIRBUS INDUSTRIES | | 00:00:02 | 00:00:02 | |
| 10/09/2012 10:10 | AIRBUS | A320 | Airbus A320 NEO | F-WWBT | AIRBUS INDUSTRIES | | 00:00:30 | 00:00:30 | |
| 07/09/2012 09:07 | AIRBUS | A320 | Airbus A320 NEO | F-WWBT | AIRBUS INDUSTRIES | | 00:03:38 | 00:03:38 | |
| 05/09/2012 09:04 | AIRBUS | A320 | Airbus A320 NEO | F-WWBT | AIRBUS INDUSTRIES | | 00:00:15 | 00:00:15 | |

Successfully imported 6 flights.

You will find buttons to see your flights in Google Earth (get that here: www.google.com/earth/index.html), to open it with FS Flight Keeper, delete a flight, import a flight or to save a flight. A saved file can be shared with other people, for example your Virtual Airline.

Flight Details

Summary

Aircraft Title: Airbus A320 NEO
 Recorded On: 15/09/2012 15:40
 Time OUT: 14/09/2012 23:40
 Time ON: 15/09/2012 03:43
 Block Time: 03:06:54

Aircraft Type: AIRBUS A320
 Payload: 15,127 kg
 Fuel: 15,672 kg
 Fuel: 7,713 kg
 Flight Time: 02:58:57

Airline: AIRBUS INDUSTRIES
 Tail Number: F-WWBT
 Time OFF: 14/09/2012 23:44
 Time IN: RAW
 Flight Fuel: 7,739 kg

Flight Number: FL360
 Flight Level: 1,429.86 nm
 TO IAS: 145 kts
 LA IAS: 136 kts
 LA VS: 1256 ft/min

Flight Events

| Type | Event | Time | Fuel (kg) | IAS (kts) | Altitude (ft) |
|------|----------------|---------------------------------------|-----------|-----------|---------------|
| 92 | Autopilot mode | IAS 135° HDG 258° ALT 0000° | 7,740 | 138 | 2,395 |
| 93 | Autothrottle | Off | 7,714 | 135 | 1,061 |
| 94 | ON | ON 03:43 /FOB 7,713 kg /LAW 60,238 kg | 7,713 | 136 | 1,053 |
| 95 | Spoilers | fully Deployed | 7,713 | 134 | 1,053 |
| 96 | Autopilot mode | IAS 120° HDG 258° ALT 0000° | 7,712 | 131 | 1,052 |
| 97 | Lights | NAV BCN LAND TAXI WING LOGO | 7,710 | 73 | 1,050 |
| 98 | Spoilers | Down | 7,708 | 40 | 1,050 |
| 99 | Autopilot mode | IAS 119° HDG 258° ALT 0000° | 7,708 | 34 | 1,050 |
| 100 | Position | N18° 45.7284' / E98° 57.9012' | 7,656 | 12 | 1,050 |
| 101 | Flaps | Up | 7,611 | 0 | 1,050 |
| 102 | Autopilot mode | IAS 179° HDG 258° ALT 0000° | 7,610 | 0 | 1,050 |
| 103 | Lights | NAV BCN TAXI WING LOGO | 7,602 | 0 | 1,050 |

Close



Please keep in mind that the display tool is just a small sample of what Flight Simulator Flight Keeper can do. Do check it out at: <http://www.aerosoft-shop.com/products/fsfk/fsfk.html>.

The recorded flights are stored in \Documents\AerosoftFlightRecorder. This path is chosen because we will add this module to more aircraft models.

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FUEL PLANNER / LOAD MANAGER

Included with the Twin Otter Extended is a fuel planning tool. Actually it does a bit more as it also allows you to load passengers and cargo. By just adapting a few basic parameters (amount of passengers and departure/arrival airport) it will calculate the fuel needed. All these parameters can be manually changed when needed. When all is set you click the [Load Fuel and Payload] and the data will be sent to FSX. Note that FSX has to be running at that time

Note that every airline has got its own layout of seats and additional equipment and every airline has its own specific rules about fuel load. Even simple things and the Zero Fuel Weight can vary far more than we expected. What we used is an average of many airlines and might not be spot on for your preferred airline. If you want you can edit the aircraft.xml file (to be found in the C:\Users\YourName\Documents\Aerosoft\AerosoftTwinOtterExtended folder) to change your preferred layout.

NAVDATAPRO

The Fuel Planner uses our NavDataPro database to find the locations for the airports. This database is the same that the majority of airlines uses and comes from Lufthansa Systems. The database we install is dated December 2012. If you have a NavDataPro license your more current version will always be used. For more information check out <http://www.aerosoft-shop.com/products/navdatapro/navdatapro.html>

USING THE SWITCHES AND KNOBS

As there are many switches that have more than one setting (something that is not common in modern aircraft) we decided to use the same method for all controls. You can either left click for one direction or right click for the other direction or use the mouse wheel. Using the mouse wheel for all controls is far more natural, just put the cursor on the control and wheel up or down. Imagine the mouse wheel to be the switch and it all will seem very natural. This will work for rotary controls and switches. A tool tip will almost always give you the detailed setting.

ANIMATIONS

There are a few nonstandard animations that can be triggered from the Virtual Cockpit. Just click on the locations indicated in the images. The Gust Lock prevents the flight controls moving when the wind picks up. Clearly it should be removed before flight!



GUST LOCK



OPEN DOOR

ARM REST

FSX SETTINGS

There are a few settings that influence this aircraft.

OPTIONS | SETTINGS | DISPLAY

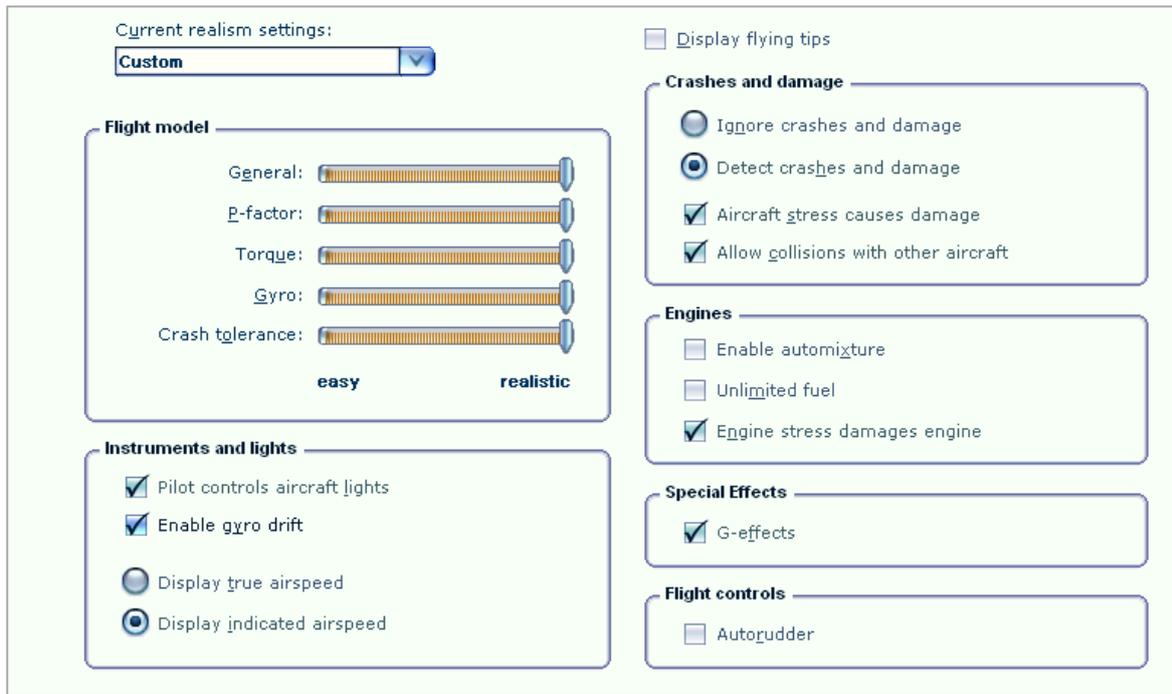


- **Advanced animations** needs to be ON
- **Preview DirectX 10** can be activated, but to avoid problems we advise you to keep it OFF



- **Aircraft casts shadows on the ground** can be left ON as it will hardly affect frame rate.
- **Aircraft casts shadows on itself** can be ON when you have a fast machine, but it will hurt frame rate in external views.

AIRCRAFT | REALISM SETTING



The most important settings are in the Aircraft settings: realism dialog.

- **Flight model:** Set it to full realistic. Believe us; it will fly easier that way.
- **Instrument and lights:** You do want to control the lights and the gyro drift is not hard to handle (in fact you can ignore it). Of course we want indicated airspeed, true airspeed is totally useless.
- **Crashes and damage:** Not too important. You might gain a bit of FPS setting this all **OFF**.
- **Engines:** Set as shown, but it does not really matter.
- **Special effects:** Yes, you do want special effects!
- **Flight Controls:** To prevent FSX messing things up best keep this **OFF**.

FSX TWEAKS

We are not big fans of any modification to FSX. A good deal of our support is caused by these changes. There is one tweak however that is almost obligatory these days and that is the HighMemFix trick. This change to the fsx.cfg file allows FSX to better handle texture addressing modes when using high levels of video memory. It also helps a lot when memory is scarce and for products like the Airbus X A320/A321 (formally known as the Airbus X Extended) it is almost obligatory. There are no negative effects reported. In our opinion, the HighMemFix line should be added to everyone's fsx.cfg file.

HighMemFix must be added manually to the fsx.cfg file as shown below:

```
[GRAPHICS]  
HIGHMEMFIX=1
```

Note this tweak is not needed for P3D.

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FLYING THE TWIN OTTER

Flying the Twin Otter is remarkably easy. The aircraft is stable, reliable and even close to the ragged edge of the flight envelope will be predictable. YouTube is full of videos of Twin Otters doing the most amazing things. From landings in high winds to going vertical after delivering a load of parachutists to their departure altitude. And you should fly the Twin Otter like that. It can do things that almost no other aircraft can do, so why not do it? Don't spend too long on knowing your exact Vr speed, the Twin Otter will most likely start to fly before you reach it. Landing speed is so low that the Twin Otters are regularly landed at far higher speeds to prevent other aircraft from having to go around behind you.

There is just one thing you always need to keep an eye on. Turbo shaft engines like the PT6A are highly reliable but the moment you stop thinking about them they go wrong. You will need to keep an eye on the engine instruments at all time and always use them with respect. They combine low weight with a lot of power but they are complex and small problems can spiral out of control in an amazing pace.