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THE NEXT ISSUE OF **PC PILOT** (ISSUE 109) WILL BE ON SALE IN UK SHOPS ON **APRIL 20**

PC PILOT

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COVER CD
If you would like us to include your freeware file, programme demo, movie, flight plan (or anything else likely to be of interest to PC Pilot's readers) on the free cover CD, write to us at mail@pcpilot.net.

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PC PILOT LOGO: NEW-LOOK!

In our continuous endeavour to improve PC Pilot, we have decided to give our logo (known in the trade as the masthead) an overhaul, an example of which accompanies this Editorial, and which you will see on the cover of the next issue **(May/June No. 109)**. Like aircraft, mastheads need updating from time to time. Our aim with the new design is to give a fresh and contemporary look to the masthead and our magazine as a whole, while at the same time retaining the bold and vibrant qualities of the original. So look out for the new-look PC Pilot which will be on sale in UK shops on **April 20**. We hope you like it and we hope you enjoy this issue.

Happy flight simming!
Derek
Editor

Mungo - A Tribute

As we were going to press, we received the news, with shock and extreme sadness, that Mungo Amyatt-Leir had passed away.

Mungo was very well known and much-liked within the flight sim industry and achieved a great deal in his all-too brief life. Among his most notable achievements within our industry, were the co-founding of Just Flight and PC Pilot, before the title was acquired by Key Publishing, as well as the setting up of Flight1 Europe as Managing Director.

On a personal note, I will remember Mungo as the life and soul of the party. He was also a warm, generous and sensitive soul, who was full of enthusiasm and boundless and creative energy. Our thoughts are with his family and many, many friends. He will be sorely missed.

By Derek Davis

LETTERS

PC Pilot Jan/Feb issue

Dear PC Pilot

Thank you for publishing my letter about on-line flying in your Jan/Feb issue. I would not normally respond to that, but the same edition has items on which I would like to comment.

I wholeheartedly support your generous praise of the RealAir Lancair Legacy 2 which I have used since it was first on the market. Sadly it is no longer available. Just about the day your edition went to press, RealAir issued the sad notice that they were closing down and that none of their aircraft would now be available to new purchasers.

On another subject, on your last page you refer to JoinFS, the excellent new multiplayer programme. Your readers may like to know that this was developed by a group of very clever members of CixVFR, the FS Flying club which you reviewed in your previous edition, to which I have belonged for many years.

Yours,
John Crockatt

PC Pilot

Hi John,

We heard the sad news about RealAirSims after we had gone to press. We wish them all the best. And thanks for the info on CixVFR

All the best,
Derek

Time to specialise

Dear PC Pilot
During my long interest in flight and specifically flight simulation, I have had a very deep interest in the magnificent 737.

I started simulation in the early '90s and one of my first add-ons was the Wilco Airliner series around the year 2000, which I flew on VATSIM. I then picked up the Dreamfleet 737 and never looked back. I have progressed to the Wilco 737, the original PMDG 737 and now the NGX. Any chance I get, I try to learn more about the aircraft. I have been studying the type for 16 years now and that study has allowed me to become a professional 737 flight simulator instructor. I am glad that I stuck to one type, and to be honest I really don't want to fly anything else unless it has a 737 attached to its name.

Kind regards,
Jason Sokol

PC Pilot
Hi Jason,
Thanks for your email.

It shows what can be achieved through hard work and dedication.

Well done and good luck with the future.

Best wishes,
Derek

How the full-sized 1965 BAC One-Eleven simulator helped identify the stall problem

Dear PC Pilot
I enjoyed the excellent article on the One-Eleven in your previous issue, which was particularly nostalgic for me because I was a member of the electronic design team at Redifon Flight Simulators Ltd which designed and built the full-sized simulator.

When the early prototype crashed, there was an intensive drive to discover the cause. Redifon designers were involved in this as we also manufactured flight data recorders (FDRs). The FDR from a crashed One-Eleven was sent to us at Redifon's Crawley factory and this data enabled us to reproduce the pre-crash conditions on the simulator, which was nearing completion at the time. This immediately confirmed the 'deep stall' theory, as the simulator also went into a non-recoverable stall when subjected to the pre-crash conditions.

What could we do about the problem? The answer was obvious. We could design a system that would detect the beginning of a stall and immediately force the control column forward automatically in order to prevent (or dare I say forestall) the stall developing. That's exactly what we did. We tried it out on the simulator and it worked fine. Thus, the 'stick pusher' was born and became a standard feature on many aircraft thereafter.

Interestingly, until the BAC One-Eleven, analogue computers were used to control flight simulators. These used thermionic valves, shaped potentiometers to produce non-linear functions and were so large, they had corridors that engineers could walk through in order to gain access to the circuitry. The One-Eleven simulator was the first to use a digital computer (the Ferranti Argus, if memory serves) and this was real cutting-edge technology at the time. Also, the control systems used transistor circuitry, which was also fairly new at the time (around 1964). The view through the cockpit windscreen was produced by means of a large scale model of an airfield, with a gimballed video camera mounted on a moving overhead gantry. The camera moved in accordance with the pilot's control column and gave a surprisingly realistic landing and take-off experience for the pilot viewing the video screens through the cockpit windows. During testing, I had a number of white-knuckle experiences while trying to land the aircraft!

I thought that the above might be of interest to your readers.

Congratulations on producing a consistently excellent magazine.

Kind regards,
Arthur Crump

PC Pilot
Hi Arthur,
Thanks for sending in your fascinating story which I'm sure your fellow readers will find of great interest.

Best regards,
Derek

Virtual reality headsets

Dear PC Pilot
I have to write and give my feedback on what has been the most exciting time I've had in flight simulation since I entered this wonderful hobby back in the 1990s. Unable to fly for real and trying to avoid arcade simulations, I was able to get close to reality through flight simulation, which has been my driving force ever since. Now I feel one giant step closer.

So, what has caused this moment? It's the addition of the Oculus Rift headset and Leap Motion (which allows you to manipulate elements within the cockpit), which, when added to a new PC in the summer, meant I could now fly around the world in stunning reality. I recall many years ago reading that it only takes a small movement to 'fool' the brain into believing it is in motion - and trust me, when the head-set is on, you absolutely feel as though you are in motion in the sky.

When used with real photographic scenery and real weather, you can be forgiven for thinking you are a real pilot. Speed feels, well, fast.

Turns in the air feel like you're on a roundabout. Sinking from a height makes your stomach lurch and you feel as though you are in a real three-dimensional world. Move your head and turn in the cockpit and you suddenly see so much more than a 2D screen ever gave you.

Adding Leap Motion creates the illusion of your own hands being within the cockpit. I'm raising the gear following a fast track down the runway. I've set the flaps and as I rotate, I raise the gear manually inside the sim with my 'hands'. Throughout the flight I'm switching knobs and dials, clicking here and there and the sounds are amazing. But it's landing where you really feel the realism hit you. Descending into any airport flying above houses and factories, you see the approach to the runway... touchdown and in an instant you have to apply the speed-brake, add reverse-thrust (all manually) and feel the aircraft come to a halt.

It's difficult to put into words how much these devices can change the whole sensation of the world of flight simulation. Yes, the images need to get even sharper, the addition of better ATC will increase awareness, but for now, I'd say flat screens are a poor representation of the flight experience and the use of virtual reality headsets has to be the way forward - after all, we are 'flying' in a world where three dimensional feelings are necessary to make the brain truly believe it is inside the sim, and not just looking from the outside at a flat screen.

I'll end by saying everyone will have their own way of enjoying flying in the simulator. What suits one doesn't always suit another. However, my experience is one that a huge number of 'average-Joes', who are not anything other than dreamers, can really share and for them, like me, suddenly they will find themselves in a new definition of the phrase 'As real as it gets'.

As ever, keep up the great magazine.

Kind regards,
Phil Coombes

PC Pilot
Hi Phil,
Thanks for sharing your experiences with your VR headset. We agree, these devices potentially provide you with total immersion. However, we have found that currently, given their limitations, such as the still limited resolution, they are more suited to light aircraft rather than more complex examples, such as the Boeing 737. But with another year of development, we hope that VR devices will take flight simulation on to the next level.

Best regards,
Derek

Falcon BMS 4.33

Dear PC Pilot
In your Jan/Feb edition (No.107) there is an article about Falcon BMS 4.33.

Can you tell me where we can find the software to download this simulation update as I now have the original Falcon 4.0 software?

Many thanks.

Lapeijsen Lucien,
Belgium

PC Pilot
Hi Lapeijsen,
Thanks for your email.

You will find Falcon BMS 4.33 at the following website:

https://www.bmsforum.org/forum/showthread.php?26567-Falcon-BMS-4-33-U1-Full-Installer

This particular version is named: 'Falcon BMS 4.33 U1 - Full Installer'. Please note you do not need the previous version (Falcon 4.33) to install this one.

However, once Falcon BMS 4.33 U1 has been installed, you can then also install the 'incremental' update 'U2' - located on the same website.

I hope this helps.

Best regards,
Derek

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DCS: AJS-37 Viggen – 'Early Access' release!

The juggernaut that is DCS continues to roll with yet another addition to its hangar in the form of the DCS: AJS-37 Viggen, developed by Leatherneck Simulations and available as an 'Early Access' product.

This is what the developers have to say about this new addition:

"The AJS-37 Viggen is a Swedish double-delta supersonic attack aircraft from the late Cold War. It was the backbone of the Swedish Air Force during the Cold war, serving as the main attack and anti-ship platform. The AJS is the '90s upgrade of this '70s-era aircraft, adding several advanced weapons and systems functionalities."

Key Features of the DCS: AJS-37 Viggen include:

- Highly detailed and accurate 6-DOF (Degrees of Freedom) cockpit.
- Extensive and highly detailed aircraft modelling systems such as:

CK37 aircraft computer with navigation data, time on target and fuel calculation systems.

Data input / output interface and pre-planned data cartridge functionality.

Automatic dead reckoning navigation and terrain contour matching position update system.

Flight instrument systems.

Electrical and hydraulic systems.

TILS Tactical Instrument Landing System.

- Advanced RM-8A jet engine modelling with thrust reverser, compressor surges and stalls.
- Sophisticated high-resolution air-to-ground radar technology modelling the PS-37/A radar including:
- Highly accurate advanced flight model based on real performance data and documentation.
- Maritime reconnaissance capabilities to determine position, course and speed of vessels.
- Advanced programmable weapons such as the RB-15F anti-ship missile with multiple waypoints and the configurable BK-90 "Mjolnir" Cluster munitions dispenser.
- Detailed modelling of over 14 unique weapons and miscellaneous stores.
- Comprehensive 400+ page flight manual.
- Extensive interactive and voiced training tutorials.
- Several campaigns and missions

Manchester out now

Aerosoft has released this highly detailed expansion for FSX, FSX: Steam Edition and Prepar3D.

The package comes with high resolution satellite imagery and accurate, hand-placed 3D-objects to create a realistic representation of the airport. In addition, AES-Lite is included, simulating airport traffic, along with a configuration tool to enable or disable objects, improve performance or enhance visual detail. You can choose matching seasonal textures to get the best possible experience at any time of the year.

Features:

- All seasons
- Billboard coverage
- 3D grass
- Static cars and people
- Static ground service
- AES-Lite dynamic traffic
- Custom trees
- Static aircraft
- Scenery managers
- Airport charts

For more information visit: www.aerosoft.com.

New Malibu Meridian – ready for take-off

Carenado has released the PA46 500TP Malibu Meridian G1000 HD Series for FSX and Prepar3D.

The package features five HD liveries and a blank paint scheme for creating custom artwork, while the virtual cockpit comes with an improved Carenado G1000 (PFD and MFD) with a GCU 476 Control Unit and a AFCS GMC 710 autopilot.

Special effects include take-off run and landing roll, 32-bit 3D sound set, cockpit night lighting and a cold and dark start option.

A configuration panel can be used for setting various options such as instrument reflections, window transparency/scratches and static objects such as wheel chocks.

Documentation consists of emergency and normal checklists along with performance/quick reference tables and a Carenado G1000 PDF.

Features

- Normal and Emergency Checklist on screen.
- TAWS and TCAS with visual and audible alerts.
- Fully customisable (AUX page included).
- Three different wind options display.
- MFD / Inset map with traffic, topographic and terrain awareness display option.
- Flight plan creation option directly from the MFD.

More information can be found at: www.carenado.com.

A new yoke is coming!

Snakebyte group has announced 'Honeycomb Aeronautical' - a new brand of flight simulation hardware. With the first units expected to ship this summer, the range is designed to offer authentic flight simulation products suitable for both enthusiasts and students training for a pilot license.

Designed and developed by pilots and flight engineers in California, Honeycomb Aeronautical has engineered the range using genuine aerospace components and the same internal mechanics used in certified simulators approved by the FAA for flight training.

Each product in the range is designed to function alone or can be combined with other products in the Honeycomb range to function as a full cockpit simulation. In addition, Honeycomb has designed its range to work alongside components from other flight simulation manufacturers, negating the need to begin building its cockpit anew.

The first product in the Honeycomb Aeronautical range is the: Alpha Flight Control – Yoke & Switch Panel – SRP: $169.99 (£136 approx). Manufactured from aerospace-grade components, the Yoke & Switch Panel is a multi-purpose Yoke & Switch Panel, compatible with all major flight simulation software. An all-steel shaft with metal mechanical movement provides full 180° yoke movement. In addition, it features four buttons, four two-way switches and one, eight-way hat switch, offering an avionics switch panel with master, alternator, avionics and light switches. The Yoke & Switch Panel also includes a mounting bracket for the Honeycomb multi-purpose panels.

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DCS: SPITFIRE LF MK. IX

PLUS: A2A SIMULATIONS' CONSTELLATION

We have three superb videos on this month's cover disc. The first two are for Eagle Dynamics' DCS: Spitfire LF Mk. IX - a review for which starts on page 16 and the third is for A2A's Captain of the Ship L-049 Constellation – a four-page review for which commences on page 20. The first Spitfire video is a tutorial covering start-up, while the second gives instruction on taxi, take-off and landing procedures. The third video, for the Constellation and narrated by A2A's founder Scott Gentile, showcases the main features of this high-class simulation.

GETTING STARTED

To get the CD running, close all programs and applications and place the PC Pilot CD in your CD-ROM drive. If Autorun is enabled, the program will start and you will see the opening screen and menu buttons. If the CD doesn't start automatically, press the 'Start' button on your Windows taskbar, move up to 'Run' and left-click on it. Type in the open window: D:\issue_108 (where 'D' is the drive letter of your CD-ROM drive) then press OK and the menu should appear. If this does not work, go to 'My Computer', right-click on the CD icon and select 'Explore'. You should then be able to open up the folders as required. If the menu buttons won't run, try the CD in another drive or use the 'Explore' method as outlined above.

CD CONTENTS NOW AVAILABLE VIA DOWNLOAD

Due to popular demand, we are pleased to announce that the entire contents of the PC Pilot cover disc is now available to all our print and digital readers. Just go to our website www.pcpilot.net, click on the 'Online content' button on the right-hand side of the page and input the following code: **7240-542852**.

MOVIES – a special note!

Please note that some of the videos on the CD have been saved in MP4 format, which most operating systems (running Windows 7, 8 and 10) should support. However, if you have trouble running these videos, notably on some XP systems, here's a link to a movie player called MPC-HC, which, after installation, will run the videos satisfactorily: http://mpc-hc.org/downloads/. A link is also provided on the CD.

FLIGHT ADVENTURE

NORTHERN GERMANY

To accompany our flight adventure for this issue, which explores northern Germany, Peter Stark has generously provided a number of files designed to enhance your experience. The route takes Jan Visser and Manfred Jahn's Douglas C-47 Skytrain on a VFR flight from Berlin Tegel Airport to the East Frisian island of Norderney via Hamburg Finkenwerder Airport.

This zip file contains:

- 5 charts to assist you during the flight,
- A special PC Pilot livery for the C-47 Skytrain,
- Flight, flightplan and weather files to suit FS2004/FSX/FSX: Steam Edition/Prepar3D simulator platforms.

Enjoy!

PC PILOT INDEX

Looking for a review on a particular product, feature or tutorial? Then look no further. Our regularly updated PC Pilot index includes references (with accompanying issue and page numbers) to all our past reviews of software and hardware as well as features, tutorials and more. Now you can find that elusive article you've been looking for.

UTILITIES

You'll need WinZip and Acrobat Reader for reading PDF documents and opening Zip files. Please note that we have provided internet links to both these essential utilities on the CD.

VIRTUAL AIRLINES

We have some interesting newcomers to our VA and flying club listing for you. Take a look to see if there is one to suit your taste. The experience and fun of being part of a virtual club or airline are second to none.

REVIEWS – SCREENSHOT GALLERIES

To help give our readers a better appreciation of the products reviewed in this issue, we have compiled the screenshots accompanying some of the articles into a series of galleries.

DOWNLOADS

Issue 108 **By Joe Lavery**

Once again we have a collection of high quality freeware files for you to enjoy. These aircraft, scenery and utilities easily compare with many commercial products but don't forget, if you've enjoyed a particular file please let the author know, it's their only payback!

By the same token we're always interested to hear from you if you've downloaded or designed a file that you think is worth sharing.

FEATURED DOWNLOAD:

Honduras Islands v3

The beautiful bay and airport of Roatan

PLATFORM: FSX

AUTHOR: Carlyle Sharpe

In this issue we feature the latest version of the Honduras Islands by Carlyle Sharpe. This version includes all previous updates. It also restructures the file system to be fully compatible with the ORBX 'FTX Global openLC North America' product, as well as adding more functionality for default FSX users. Additionally, water class scenery is updated to appear more realistic, MHRO is updated to reflect the newly expanded apron and a SRTMGL1 (30m) mesh is included. All landclass polygons and coastlines were meticulously hand-drawn directly from satellite imagery to provide the most detailed and accurate scenery available for this region.

Carlyle has also added new and fully functioning AI at Utila (MHUT), Fort Cay (MHFC) and Cochino Pequeño (MHCP) of the Cayos Cochinos chain, and La Ceiba (MHLC) is modified to accommodate more AI traffic.

For those unfamiliar with the area, the Honduras Islands (known locally as the Bay Islands) are a group of islands located in the Western Caribbean just off the coast of Honduras. The group is made up of the three large islands, Utila, Roatan and Guanaja, and the smaller island groups of Barbareta, Morat and, closest to the mainland, the two Hog Islands, Cayos and Cochinos.

This is a wonderful place to fly VFR, island-hopping or flying in one of the many seaplanes available for FSX. Carlyle has done a first class job of updating the scenery, so pack your swimming gear and get some of that Caribbean sunshine.

VFR island-hopping is the only way to go

A seaplane gets you closer to the more remote bays

STAR PERFORMERS FROM THE INTERNET:

Airbus A350-1000 V5

This version 5 of the Airbus A350-1000 features modifications done on both taxi lights and wing lights. As usual, it includes CamSim's own static displays and Animated Ground Servicing (AGS). By Camil Valiquette.

PLATFORM: FSX **AUTHOR:** Camil Valiquette

Bembridge EGHJ Airport

Bembridge is one of only two airports on the Isle of Wight; it's a small but very picturesque area. This scenery is provided with photo real surround to give you a smoother transition from HD to default scenery. Designed by Mark Piccolo and Soarfly Concepts.

PLATFORM: FSX **AUTHOR:** Soarfly Concepts

Comper Kite

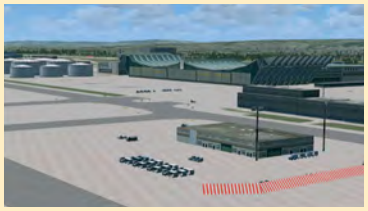
Conceived in 1933, only two dual seat Kite aircraft were ever built, with one modified to compete in the potentially lucrative Deutsch de la Muerth Cup of 1934. The model shown here was designed by Keith Paine.

PLATFORM: FSX/FS2004 **AUTHOR:** Keith Paine

EDDF v2 - Frankfurt/Main

This rendition of Frankfurt Main by Ray Smith is a very accurate model of EDDF as it is today. Provided with optional files to determine which runway pattern will be used, the ILS frequencies and approaches are corrected to match the latest charts.

PLATFORM: FSX **AUTHOR:** Ray Smith



McDonnell F2H Banshee

AF Scrub is a regular contributor to our download section, producing many fine aircraft for the community. This time we have the single-seat carrier-based McDonnell F2H Banshee, the only jet-powered fighter ever deployed by the Royal Canadian Navy.

PLATFORM: FSX/FS2004 **AUTHOR:** A.F Scrub

Mach Loop Project

The Mach Loop Project was designed by Max Beckett. It's an adventure for FSX covering the low flying area in North Wales used by the RAF, which is between Dolgellau in the north and Machynlleth in the south (from which the Mach Loop gets its name).

PLATFORM: FSX **AUTHOR:** Max Beckett

Northrop T-38 Talon

Surprisingly the T-38 Talon has been in service since 1961, that's 55 years! It appears that the US Air Force is planning to upgrade its avionics and engine to extend its operational life until 2020. The fine model here was designed by Ron Norvelle.

PLATFORM: X-Plane **AUTHOR:** Ron Norvelle

Lockheed XF-90

The Lockheed XF-90 and F-90B were early twin engine jet fighters designed for long-range bomber escort, which unfortunately did not move beyond the prototype stage. However, thanks to David Allen we have an opportunity to virtually fly them once more.

PLATFORM: FSX **AUTHOR:** David Allan

PC PILOT PLATINUM AWARD

Spitfire SUPREME!

Eagle Dynamics' DCS: Spitfire LF Mk. IX

In aviation terms, one of the most iconic aircraft to come out of World War Two was the Vickers Supermarine Spitfire. Part of the reason it became an icon was that, along with the Hawker Hurricane, it represented a country's unifying symbol of defiance during the hard-fought Battle of Britain.

So it comes as no surprise that Eagle Dynamics (ED) has finally decided to add the iconic Spitfire to its DCS World. ED has used a real Spitfire owned by its parent company, The Fighter Collection, based at Duxford in the UK, to produce this 'study sim'. In this instance, the company has wisely chosen to model the most produced variant in the Spitfire series: the Spitfire LF Mk. IX. The developers used data from scientific research and documentation, as well as consultation and tests conducted by the real world pilots of the Fighter Collection. At this juncture it is worth pointing out that at the time of writing, this module was available as an 'Early Access' release, meaning that although the majority of the product is complete, the developers are still making ongoing additions and improvements.

The Spitfire LF Mk. IX

Before examining ED's virtual rendition, it is worth explaining how this version of the Spitfire came into service. The Spitfire Mark IX was developed from the Mark V but was initially fitted with the more powerful Merlin 61 engine on the realisation that the Spitfire V was, in most respects, inferior to the new German Focke-Wulf Fw 190 fighter. The Mark IX was a significant improvement over its predecessor both in terms of speed and service ceiling. The Mark IX entered service in June 1942 and was intended to be a stop-gap model while the Mark VIII got into full production. Ultimately,

As with all DCS modules, the damage modelling is both comprehensive and impressive!

This is what happens when you don't look where you're going...

TOP: **Eagle Dynamics has managed to recreate the 'atmosphere' of the Spitfire's cockpit through their attention to detail**

ABOVE: **A photo of the instrument panel of a real Spitfire**

however, the Mark IX remained in production until the end of the war, and was in fact built in greater numbers than any other Spitfire variant.

To meet a variety of operational needs, the Spitfire IX was produced with different versions of the Merlin engine optimised for low-, medium- and high-altitude operations. Depending on the version of the Merlin fitted, the Spitfire IXs were categorised as LF, F or HF (low-, medium-, or high-altitude fighters) but no external changes distinguished these variants. In 1943, a new sub-variant of the Mark IX entered service, powered by the Merlin 66 engine, with its supercharger designed to cut in at slightly lower altitudes than the Merlin 61, providing it with a performance that was designed to combat the Fw 190 at all altitude levels. Spitfires powered by the Merlin 66 were designated LF. Ironically, however, the LF IX developed its maximum speed at 22,000ft, compared with 28,000ft for the F IX. The HF version, powered by the Merlin 70, was optimised for operations at extreme altitudes.

Documentation

The documentation that comes with this module is nothing less than comprehensive and sets the tone for the rest of the simulation. Two PDF manuals are included. The first is called *Quick Start* and caters for those who want to get in, operate and fly in the least amount of time possible. Comprising 34 pages, sections include descriptions of the cockpit, engine start-up, take-off, flight and landing procedures. All chapters are accompanied by clear and annotated diagrams and screenshots.

The main *Flight Manual* is more detailed and involved, which is reflected in its 213 pages. Subjects covered include an overview of the Spitfire's design, its engine, systems, cockpit, operational and flying aspects, armament, radio operation and gunsight use.

Flying modules

ED provides you with a number of options in which to experience the Spitfire LF Mk IX. First up is *Instant Action*, which comprises: Cold Start, Take-off, Free Flight, Landing and Dogfighting. This section is good for getting acquainted with the Spitfire's handling qualities – both on the ground and in the air. Next is the interactive *Training* module which is accompanied by an event-triggered voice-over (which I found a little lack-lustre). The training tutorials focus on four areas: engine start procedure, taxi and take-off, landing and aerial gunnery. As far as single *Missions* are concerned, just two scenarios are supplied: *'Battle over the lake'* and *'Sochi-Adler Defence'*. These are essentially dogfighting set-ups. It should be noted that at the time of writing there was no campaign module but the developers have indicated that this will be available in the final release version.

In addition ED provides its Mark LF IX in eight liveries covering four British and four Russian aircraft.

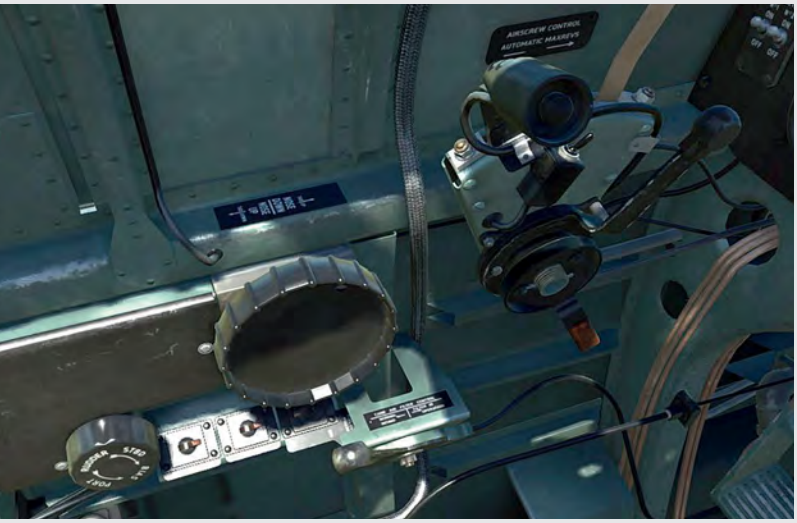
Internal affairs

Okay, let me say right off the bat that, as far as this writer is concerned, the Vickers Supermarine Spitfire is a thing of beauty – both inside and out. So let's see if the design team has done 'her' justice by first taking a tour of the cockpit. The real world Spitfire's office has a certain 'ambience' and compactness which has been faithfully captured by ED in this fully functional rendition. Spitfire pilots have often said that 'you don't get into a Spitfire, you strap it on!' Having recently had the pleasure of 'strapping on' a real Spitfire (a Mark XVI, which you can see from the accompanying images), I can confirm that ED has managed to recreate that 'atmosphere' through their attention to detail.

In front of you sits the two-part instrument panel comprising the 'blind-flying' panel housing the airspeed indicator, altimeter, artificial horizon, heading indicator, vertical speed indicator and the turn and slip indicator. These are flanked by instruments either side, which include the brake pressure gauge, undercarriage indicator on the left, and by the RPM, boost and temperature gauges on the right, to name but a few.

Above the instrument panel is an operable gunsight, with which you can dial in an aircraft's wingspan and distance. On the port side of the cockpit are located the throttle, propeller and trim controls, while on the

Above the instrument panel is an operable gunsight, with which you can dial in an aircraft's wingspan and distance. Again, compare this with the real thing below...



ABOVE: **Real v Sim – two shots comparing the virtual rendition of the port side of the cockpit with the real thing**

BELOW: **Here we see the distinctive and beautifully rendered spade-grip joystick. Compare this with the real thing...**

starboard is the undercarriage selector. In the centre is the distinctive and beautifully rendered spade-grip joystick – the top half of which controls the ailerons. This also includes the rectangular and fully functioning fire button for the guns and cannons, based on a rocker design system. You have the facility to arm or make safe the fire button and choose between firing guns, cannons or both simultaneously. In the middle of the joystick is the silver lever which operates the wheel brakes. Every component has a working function because the developers have modelled all of the Spitfire's systems, which encompasses weapons, engine, radios, fuel and electrical systems. Not only has the cockpit been rendered with great attention to detail, but each component has been executed with a high degree of subtlety and finesse.

External modelling

Moving our attention to the exterior, we find that same level of finesse and attention to detail is in abundance. ED has managed to capture the beautiful lines of this thoroughbred. Any study of the Spitfire's contours will reveal the absence of any straight lines – it is composed of curves and compound curves. This is no more evident than in the shape of its distinctive and iconic elliptical wing, which again has been faithfully reproduced. The high resolution textures give the aircraft a photo-realistic and metallic appearance. Yet again, it's the attention to detail that impresses. For example, a characteristic feature of the real Spitfire is its stressed-skin construction, held together by thousands of rivets. When you have a series of rivets in a line, it causes a subtle rippling effect on the skin of the aircraft – most notably on the wings. That effect has been reproduced and executed on this model with skill and subtlety and is most noticeable when the light hits the aircraft from certain angles. In short, in visual terms, ED has done the Spitfire justice.

The subtle rippling effect on the skin of the Spitfire's wings has been faithfully reproduced and is most noticeable when the light hits the aircraft from certain angles

Start-up, taxi and take-off

The 'study-sim' nature of all DCS products means that you have full control over the engine start-up procedure. This is covered in both of the provided manuals and the interactive training module, the latter of which I would advise you run through at least once.

The Spitfire's start-up sequence is relatively straightforward. The most challenging aspects of flying a Spitfire are taxiing, take-off and landing. Nothing new there, you might be thinking. However, the difficulties are exacerbated by the Spitfire's narrow-track undercarriage. So, when taxiing, you have to get used to combining the throttle with the hand-operated wheel brakes. It takes a while to learn how much throttle and brake pressure to apply to change direction. It is all too easy to apply too much brake pressure with the inherent risk of tipping the 'Spit' on to its nose.

Take-off in the Spitfire takes practice. The underlying reasons are two-fold: firstly the Spitfire's narrow-track undercarriage makes it inherently unstable on the ground and secondly the torque created by the propeller pulls the aircraft to the left, which if not countered in time will result in a groundloop or worse...

The key to take-off in a Spitfire is to trim the aircraft correctly, both in pitch and in yaw. In terms of pitch I found that neutral trim

was in fact ideal, although the training lesson recommends one degree nose-down. I discovered that if the nose was trimmed too far forward or in a nose down position, it was more difficult to get the aircraft off the ground.

In terms of the rudder trim, instead of dialling in full right-rudder trim, as recommended by the DCS tutorial, I found a quarter turn of the trim wheel yielded better results.

Once these controls have been set up, initially hold the stick back and slightly to the right, then increase the throttle slowly to +7/8 boost. As speed increases apply small but rapid rudder inputs as necessary to keep the aircraft straight and allow the stick to go to the neutral position. The tail will lift, and at 90-95mph you can allow the aircraft to take-off by gently pulling back on the stick. All of this happens rather quickly and before you know it, you're airborne.

TOP: **Take-off in the Spitfire presents a challenge and takes practice because of its narrow-track undercarriage and the torque created by the propeller pulling the aircraft to the left**

ABOVE: **Airborne! The key to a succesful take-off in a Spitfire is to trim the aircraft correctly, both in pitch and in yaw**

Handling notes

Once airborne and trimmed out, you begin to understand why pilots have such a high regard for the Spitfire and its handling qualities. The aircraft is instantly responsive and as a result requires finesse and coordination. Initially, I found my inputs were a little heavy for the Spitfire. However, after a while you discover how this lady likes to be treated - with a light touch. Like the real thing, the elevator is quite powerful. The ailerons and elevators are well harmonised at intermediate speeds (although the Spitfire is very sensitive in pitch), but at high speeds the ailerons begin to get heavier, while the elevator retains its effectiveness. This accounts for the Spitfire's exceptional turning ability. In fact, I initially found it all too easy to momentarily black out in a turn when dogfighting against opponents - such was the effectiveness of the elevator.

The Spitfire is a delight to fly when it comes to dogfighting; its manoeuvrability fills you with so much confidence! However, when in combat you have to manage your engine and keep an eye on oil and coolant temperatures due to the high fidelity of the systems modelling. Flying your 'Spit' at full power for too long will be met with deadly silence - the result of your engine dying and your propeller coming to a complete stop!

At the bottom end of the flight envelope, again like its real-life counterpart, the DCS Spitfire is very docile unless treated harshly. It gives forewarning of an imminent stall in the form of elevator buffeting. The Spitfire stalls with a gentle drop of the nose and wing but the ailerons are still effective all the way up to the stall. With undercarriage and flaps lowered and throttle fully retarded, the Spitfire stalls at a ridiculously low speed of about 63mph. This is due to the unique design of the Spitfire's elliptical wing.

Cleared to land

Like the take-off, the landing section of the flight can cause frustration - yep, for the same reason - due to the Spitfire's narrow-track undercarriage. Landing a Spitfire has to be done as a curved approach due to its long nose. A curved approach allows you to keep the runway in view all the way up to the point when you have to round out and flare the aircraft. Once the runway threshold has been crossed, at around 85mph, I found it best to keep the rate of descent as low as possible, then before flaring the aircraft, fly a few feet parallel just above the runway; crucially making sure to keep the wings level. Then, allow the speed to bleed off and the aircraft to settle on to the tarmac. Once on terra firma, hold the stick fully back. If you sense the aircraft is beginning to swing, immediately apply a little opposite rudder - all the while holding the stick back. If you don't keep the aircraft straight, a wing will drop and scrape the runway. All being well, the Spitfire will eventually slow and come to a stop.

Conclusion

Well, what can I say? Having flown the DCS: Spitfire LF MK. IX for a while now, all I can say is I'm impressed. As with all DCS modules, attention to detail is the key ingredient, from the rippling effect on the wings, to the way the Spitfire handles on the ground and most notably in the air. In fact, although at time of writing it is still at the 'Early Access' stage of development, the flight model of ED's Spitfire is already very advanced. To be honest, based on my own research, I could not fault it, which, in essence, goes for the whole product. This is a superb tribute to an iconic aircraft.

By Derek Davis

DETAILS

PC PILOT PLATINUM AWARD

Publisher & Developer: Eagle Dynamics
Price: $49.99 (£39 approx)
Website: www.digitalcombatsimulator.com/en/shop/modules/spitfire/
At a glance: A superb tribute to an iconic aircraft.
System Requirements:
Minimum system requirements: OS 64-bit Windows 7/8/10; DirectX11; CPU: Core i3; RAM: 8GB; Free hard disk space: 30GB; Video: 2GB RAM card, DirectX11 - compatible; requires internet activation.
Recommended system requirements: OS 64-bit Windows 7/8/10; DirectX11; CPU: Core i5+; RAM: 16GB; Hard disk space: 30GB; Video: NVIDIA GeForce GTX780 / ATI R9 290 DirectX11 or better; Joystick; requires internet activation.
It also requires DCS World version 1.5.5 or 2.0.5.
Not Steam compatible.

The Spitfire is a delight to fly when it comes to dogfighting; its manoeuvrability fills you with so much confidence!

The Spitfire is instantly responsive and as a result requires finesse and coordination in terms of control inputs

REVIEW

Add-on for Microsoft Flight Simulator X and Prepar3D

A2A SIMS' CAPTAIN OF THE SHIP 049 CONSTELLATION

Reliving the golden age of air travel with a classic Connie!

A2A Simulations has been making high-quality general aviation and historic aircraft that take realism to another level for some years. Its latest release focuses on a different genre, taking us on a journey back in time to the dawn of airline travel with the iconic Lockheed L-049 Constellation.

Brief history

The Constellation, or 'Connie' as it is commonly known, traces its history back to 1939 when Howard Hughes, the owner of Transcontinental & Western Air (which later changed to Trans World Airlines, TWA) made a deal with Lockheed to build a 40-seat airliner capable of flying non-stop coast-to-coast.

Hughes had a very specific design in mind. The aircraft had to be sleek and distinctive while featuring new technologies such as electric de-icing and hydraulically assisted controls. It was equipped with supercharged Pratt & Whitney R-3350 Duplex-Cyclone engines, the most powerful engines at the time, giving it a cruise speed of 340mph, while the pressurised cabin enabled it to fly above the weather in smoother air. However, plans to put the type into civilian service were frustrated when the US entered World War Two and aircraft for the TWA fleet were converted to C-69 military transports for the US Army Air Force.

Betty the stewardess welcomes passengers on board. Keeping them happy is key to a successful career

Departure is a critical time for the powerplants. It is imperative to maintain sufficient airspeed to keep the engines cool during the climb-out

Thanks to its powerful Wright R-3350 Duplex-Cyclone engines, the Lockheed L-049 Constellation had a cruise speed of 340mph and a range of 3,680 miles

TWA finally took delivery of its first L-049 in November 1945, launching its inaugural transatlantic crossing in February the following year when Constellation, NC-86511 (c/n 2035), Star of Paris, departed from New York to Paris, with stops in Gander, Newfoundland and Shannon, Ireland. Internationally the type saw service with national carriers including Delta, Braniff, Air France, Pan American World Airways, KLM Royal Dutch Airlines and British Overseas Airways Corporation (BOAC). Production ceased in 1946 when it was succeeded by the larger L-649 and L-749.

Kicking the tyres

The L-049 Constellation is the second 'Captain of the Ship' product from A2A, succeeding the B377 Stratocruiser, but unlike its predecessor, the Constellation has the Accu-Sim and Captain of the Ship expansion as an integral part of the package.

In true A2A fashion, the build quality of the aircraft is immediately apparent. Externally, the 3D model and textures are stunning. Polished metal gleams in the sunlight and the control surfaces, undercarriage and flaps are all superbly modelled. Even weathering effects and oil and exhaust stains around the engines have been recreated in detail. Included in the package are three liveries: TWA, BOAC and a military C-69 variant, although additional liveries can be downloaded from the A2A website.

Flight deck

Up front, the virtual cockpit is typical of early propliners. The Connie requires a crew of four: captain, co-pilot, a navigator and a very busy flight engineer. The engineer station has a huge array of instruments, levers and switches for monitoring and configuring the engines and various sub-systems. There was very little automation in these early aircraft and flight engineers really earned their keep.

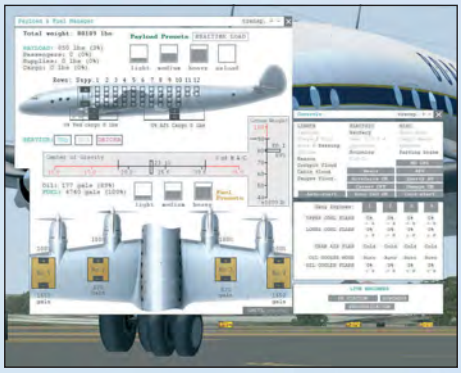
A2A has devoted a lot of effort to recreate the lighting of the real aircraft with options for floodlights or fluorescent lighting. Instruments and gauges are backlit and the windows can even fog up if you don't turn on the window heat; no detail has been spared in recreating an authentic cockpit environment.

Navigation is old school. The Connie is fitted with a couple of VOR/DMEs and two ADF receivers. There is no long range navigation equipment, so crossing remote areas can be a challenge. To help us get from A to B, A2A has included a pop-up navigator map for displaying information such as nearby navaids/airports as well as coastlines etc. For those of us who prefer to rely on modern technology, there is an option to select either the default GPS or the Reality XP GNS 430, Flight 1 GTN650, Midstar GNS430 or the freeware KLN90B. Another system that was very basic in the past was the autoflight system. A2A has included an authentic gyro-driven Sperry autopilot, which provides pitch and roll commands. Although it can take on some of the workload, it is a far cry from modern flight management computers and needs constant tweaking to maintain altitude and heading. If you don't fancy battling the Sperry autopilot, A2A has included an option to use the default FSX/P3D unit.

Accu-Sim

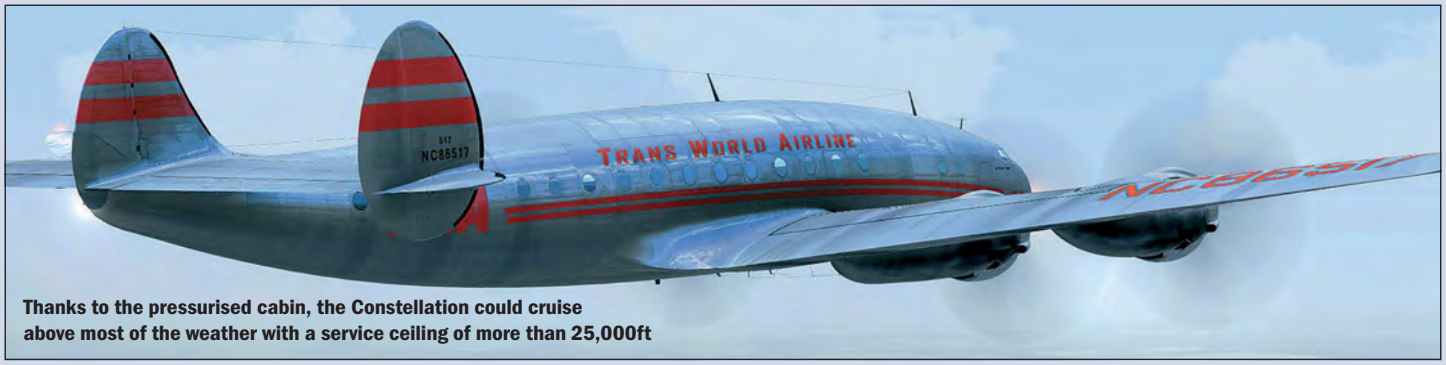
One of the strengths of A2A aircraft is the Accu-Sim module, which accurately models the aircraft's

The virtual cockpit offers incredible detail including custom 3D gauges and florescent lighting



Several pop-up menus are included to monitor the status of the aircraft and configure the systems

Managing the complex engineers panel is daunting, but a virtual flight engineer is on hand to take control, leaving you to fly the aircraft



Thanks to the pressurised cabin, the Constellation could cruise above most of the weather with a service ceiling of more than 25,000ft

Keeping the Pratt & Whitney Cyclone powerplants within temperature limits is essential to prevent failures

Despite the complexity of the aircraft, frame rates are excellent

At the outbreak of World War Two, the L-049 entered service with the US Army Air Force as the C-69 transport

Connie sits high on its long undercarriage to ensure adequate ground clearance for the large propellers and to reduce the possibility of damage caused by debris

systems and flight dynamics. The Connie is no exception – the engines, fuel, hydraulics, electrics and pressurisation systems have been faithfully recreated – even the fire extinguisher system is operational.

The Pratt & Whitney Cyclone powerplants were notoriously unreliable and had a tendency to either fail or catch fire. In fact, it was not uncommon that an engine had to be shut down in flight, either due to mechanical failure or simply because it ran out of oil. A2A has done a superb job in recreating these temperamental engines. For example, damage can occur if they are not up to temperature before take-off, reducing power too much during descent can result in shock cooling, not using the cowl flaps correctly will cause them to overheat or if they idle too low the spark plugs can foul. If an engine starts running rough, it will shake and rattle the airframe. Furthermore, each aircraft has a unique wear and tear model and over time will behave differently; engine instruments will also show different values between aircraft.

If you abuse the powerplants, you might get away with it for the current flight but, Accu-Sim, like an elephant, doesn't forget, so you might be faced with engine problems in the future. As if that wasn't enough, the damage modelling extends to other systems including the pressurisation, flaps and landing gear. However, if managing the engines and systems seems daunting, help is at hand.

Introducing the crew

Operating a complex four crew aircraft single-handed is obviously very workload-intensive. To make life easier, A2A has included by a co-pilot, flight engineer and navigator, giving you the option to fly exclusively from the left seat. Larry, the flight engineer provides welcome relief managing the systems and keeps the engines sweet. He also performs jobs such as balancing the fuel tanks or engaging the blowers (supercharger) when climbing to cruise altitude. You can even hear him muttering to himself as he goes through the checks and configures the aircraft.

The co-pilot makes callouts as you raise or lower the flaps and landing gear or calls out critical information, while the navigator's station comes with a pop-up map with real-time monitoring of wind and atmospheric conditions. A stewardess called Betty takes care of the cabin if you have passengers. According to A2A, the package comes with than 1,000 voices to create an authentic multi-crew cockpit environment. Finally, for setting the aircraft up and interacting with the crew, several pop-up windows are available. The main ones are a load manager for specifying payload and fuel. A maintenance menu provides information on the state of the systems and an interactive menu for configuring the aircraft and ground equipment, such as passenger stairs, cargo hatches or the GPU (Ground Power Unit). Options such as autostart, cold and dark, GPS and autopilot selection are also set here.

Captain of the ship

One of the more innovative features is career mode where you take on the role as captain and fly with passengers. Every trip is logged and evaluated and you are judged on how smoothly you fly the aircraft and how you handle emergencies. If you are heavy-handed or mishandle the aircraft, the crew members are not afraid to let you know. I once forgot to close the cargo hatch before take-off and got a telling off from Betty after we landed.

It is not just your flying skills that are judged. In cold weather you need to warm the cabin up before the passengers embark, while in hot climates the engines need to be started a few minutes before to run the air conditioning to cool the cabin down. As passengers start boarding, you can hear Betty welcoming them on board. During flights she will serve meals and respond to issues that will affect their comfort, so you need to keep an eye on the navigator's pop-up windows to monitor weather conditions and turn the seat-belt sign on if you encounter turbulence. During meal service you need to fly with a light touch and use coordinated turns. Sudden changes in attitude or steep descents are not appreciated by the passengers. You also have to

Failure to monitor the powerplants can lead to dramatic consequences, including a major engine fire

Texturing around the engines is highly detailed with exhaust stains and animated cowl flaps

keep an eye on the cabin pressure, as rapid pressure changes can cause ear pain for passengers; you even get crying babies on occasion. Basically, ensuring the passengers have a peaceful flight will affect your career. Early propliners were not known for their reliability so you can be faced with an engine failure/fire or pressurisation issues. More unexpected problems can also arise, such as a medical emergency, which may force you to divert or you might have VIPs on board, putting your flying skills in the spotlight. Landings in particular are judged – 'greasing' the aircraft on to the runway will be received by a round of applause. Make a bad landing and it will be remembered! Career mode gives you a whole new appreciation of flying and I found it a very refreshing and rewarding experience.

Flight test

A2A has done an excellent job in reproducing the handling characteristics of the Constellation. During normal flight, the aircraft is stable and predictable and the start-up sequence for the Cyclone radial engines feels very realistic. They are much harder to start in cold weather and you may even need to dilute the oil as well as taking the temperature of the engine into account. An auto-start option is available but I find a real satisfaction in getting those big radials going on my own.

The speed and range of the Connie enables you to cross vast distances, while the old school navigation really gives you a sense of going into the unknown. To top that, the Connie also features an excellent sound set. During taxiing, you can hear the brakes squeak and groan, when flying through turbulence the airframes rattles and creaks and the roar of the engine is simply divine.

Perhaps the most challenging part of flying the aircraft is during descent. For its time, the Constellation was quite 'slippery' so planning the descent to maintain cabin pressure and protect the engines from shock cooling is essential. You need to maintain around 15-20 inches of manifold pressure during the descent, which means it can be difficult to slow down to safe flap and gear extension speeds.

Landing the aircraft is straightforward, although achieving a smooth touchdown can be hit and miss. With the flaps and gear down, the aircraft generates a lot of drag and likes to make firm contact with the runway, so you need to be ready to come up on the power. I found a stable approach with a steady 3-degree profile and a constant throttle setting is key to a good landing.

Installation and documentation

Despite its complexity, the Connie is about 270MB in download size and the installer is fully automated, so you will be up and running in no time. Also included in the package is a 148-page manual. It starts off with the history of early propliners and the development of the Constellation, before covering the theory of internal combustion engines. It also has extensive information and diagrams on the systems in the Constellation, normal and emergency procedures and checklists. I highly recommend you read the manual, not only to learn how the Constellation works but it is also a great source on aviation theory and history.

Conclusion

I am struggling to find any faults with this simulation. You could argue there should be more liveries or the passenger cabin should be modelled but you can pick up any number of paint schemes from the A2A website and I never sit in the back... I prefer to see the focus being placed on the flight model and systems. In my opinion, A2A has done a superb job in capturing the sleek lines of the Constellation, while delivering an excellent simulation of a very complex propliner that really feels alive. Combined with the Captain of the Ship expansion it has not only created a study level simulation but a very authentic flying experience with interactive crew members. Visually, the aircraft is superb, the flight model feels right and even the frame rates are excellent. I found the package to be absorbing, challenging and totally rewarding.

By Richard Benedikz

Despite the size of the Constellation and the luxurious cabin, the four-crew cockpit is very cramped

Thanks to the large fowler flaps, the landing speed was relatively low for such a large aircraft

DETAILS

PC PILOT PLATINUM AWARD

Developer: A2A Simulations
Price: $59.99 (£48 approx)
Score: Platinum
Website: www.a2asimulations.com
At a glance: Yet another incredible simulation from A2A that pushes the boundaries of what is possible in FSX and Prepar3D. The combination of realism and enjoyment makes this aircraft an outstanding example of a period propliner.
Requirements:
Microsoft Flight Simulator X Service Pack 2 (SP2) or Prepar3D
OPERATING SYSTEM: Windows XP SP2 or above
PROCESSOR: 2.0 GHz single core processor (3.0GHz and/or multiple core processor or better recommended).
HARD DRIVE: 250MB of hard drive space or better.
Graphics card: DirectX 9 compliant video card with at least 128MB video RAM: (512MB or more recommended).

REVIEW

Add-on for Microsoft Flight Simulator X, FSX: Steam Edition and Prepar3D

Just Flight

HS 748 PROPLINER

Just Flight and Aeroplane Heaven have released another British classic aircraft – the Avro HS 748 short-haul turbo prop airliner. Peter Stark **takes it for a flight.**

Born of a need

In post World War Two commercial aviation, the venerable DC-3 Dakota reigned. There were plenty available, they were initially cheap to buy, run and maintain. However, as time went by, many operators considered the DC-3 no longer economical to fly on many routes and so aircraft manufacturers investigated possible replacement designs. While the four-engined Vickers Viscount and twin-engine Fokker F-27 Friendship had good footholds in the short-haul market, an opening into that sector was identified by Avro. What the others lacked was a short-field capability with a strong landing gear in a low wing configuration, coupled with a large payload, that could operate autonomously from more remote airfields.

The result was the 40-seat 748 which first flew in 1960 and saw immediate sales. Within two years, as Avro became fully absorbed into the parent Hawker Siddeley group, it became known as the HS 748.

A rapid upgrade programme saw more powerful engines and an increase in gross weight with the most popular being the model 2A – on which the Just Flight model is based. It was now fitted with a pair of Rolls Royce Dart Mk532 turbo prop engines with 2280hp each and was capable of carrying up to 58 passengers as far as 1000nm. Production finally ended in 1988 with 380 units being made for military and civilian customers across the world, and many still operate today. A true classic aircraft!

The Just Flight Package

The 464MB package includes the base 2A model with no fewer than 16 liveries from around the world, a 46-page manual and tutorial flight files to help you become acquainted. The manual itself is excellent and includes lots of background on the HS 748 as well as extensive images of the controls and features of the aircraft. The flight notes then allow you to explore the aircraft systems in more detail during the tutorial flight.

The initial walk around reveals quality external textures and features. The 2A was fitted with a large forward hatch to allow easier loading of cargo and is fully animated along with the

All the external liveries are simply outstanding

The Just Flight package comes with no fewer than 16 liveries and a paint kit has been released

Lots of animations and add-ons are available to service your 748

A huge forward hatch and high payload allows operators great versatility

The cockpit is full of custom switches and panels that closely match the real deal and part of the charm is to take the time to manage them well

rear passenger hatch complete with air stairs. On entering the cockpit, you can throw the GRND SERVICE, GROUND SUPPLY and SECURE AIRCRAFT switches to connect the external power cart and place the baggage train next to the front hatch and also put the wheel chocks and pitot covers in place. Continuing the walk around, the 748 textures show the she is a long standing work horse, with oil stains and grime apparent.

Internally, pilots are offered five different cockpit and panel views which can be very handy given the historic layout of the systems. Cockpit ergonomics hadn't been heard of in this period and finding the various controls to manage the aircraft according to the checklists does take a little effort at first and adds to the period feel of the HS 748 in a cockpit which was clearly designed for two pilots to operate.

The panel textures are quite a contrast to the external in that they appear fresh and are perhaps a little simplistic for some tastes. On the plus side, almost all the switches are functional, with the vast majority linked to aircraft equipment such as windscreen wipers, icing gauges, generator warning lamps etc. But users should note that not all systems are replicated past the switches, for example, the fuel trimmers and methanol injectors. Fuel trimmers were a nifty development which allowed the pilots to maintain peak TGT (Turbine Gas Temperature) which effectively meant they could always ensure maximum power was available in any atmospheric conditions without exceeding engine limits. Real-world HS 748 pilots use them constantly and while the Just Flight HS 748 fuel trimmer switches and gauges work, they do not have any impact on engine performance. Likewise for the water methanol injectors, which could be used to deliver increased maximum power for take-offs and go-arounds even when the fuel trimmers were required to wind the fuel flow back.

Night lighting and gauge back-lighting is fine but it is difficult to navigate the panels around dawn or dusk

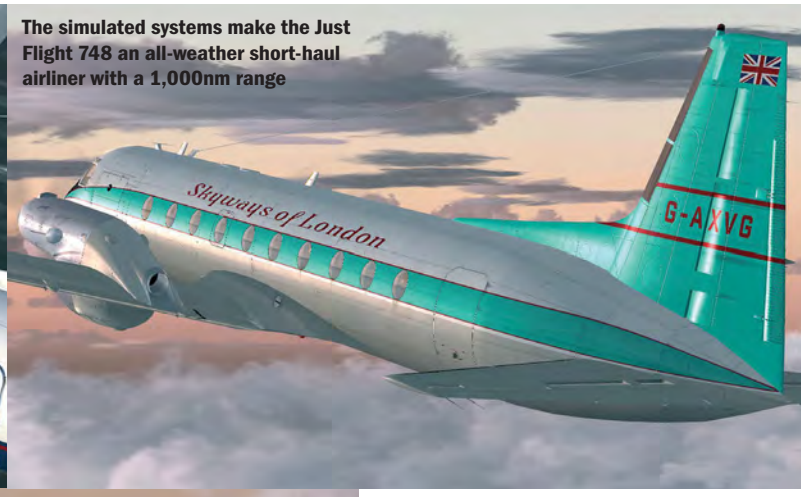
Cockpit and panel textures are simplistic compared to their external counterparts but do the job

What has been done very well is the period autopilot. Forget about having your Flight Director and autopilot functions directly linked – you must operate the autopilot as it was designed to be used in the 1960s, meaning that you have to manually select modes and be aware of how those modes interact if you want them to help you! You can't expect it

Engines can be feathered and restarted in flight

The 748 is quite spritely for a 21-tonne aircraft and is short-field-capable

Engine and fuselage detail reflect the long, hard working life of this classic aircraft



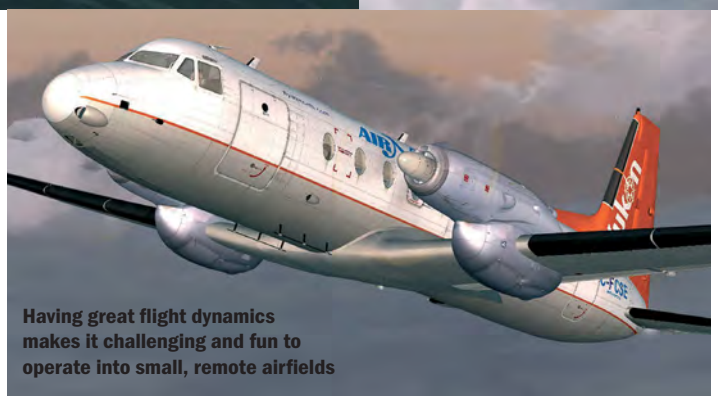
The simulated systems make the Just Flight 748 an all-weather short-haul airliner with a 1,000nm range

to pick up and track a VOR radial if the intercept angle is too steep or your approach to the glideslope too unstable. Pilots of this time could use it as an aid – not a flight management system!

Test Flight

The pre-flight and start-up procedures are very clearly outlined in the checklists and manual and you should have no difficulty in getting the engines to scream into life once you're familiar with the panel layout. The whine of the Rolls Royce Dart is easily recognisable thanks to the sound files by Aaron Swindle's Skysong Soundworks. Likewise, taxiing is a straightforward affair once you get the RPM in the right zone. A correct elevator trim position is a must if you want to get airborne before the end of the runway, with the manuals suggesting at least 3° nose up. However I found 10° nose up was required for a smooth liftoff after a brisk acceleration to around the 110 knots rotation speed. You are kept busy after take-off cleaning up the aircraft, adjusting power settings and flying the correct vertical profile to accelerate to the typical climb speed of around 160 knots.

If you do use the autopilot during climb out, the combination of period style systems means it


Having great flight dynamics makes it challenging and fun to operate into small, remote airfields

really helps to have the correct parameters set before engaging it! It is certainly possible to use the autopilot system all the way from 500ft to late finals, provided you learn about its peculiarities! As an aid, there is a NAV/GPS switch to allow the default GPS to manage your navigation.

Cockpit night lighting is adequate with some minimal panel lighting and backlit gauges. If you do like to get out after dark, you will find the panel and gauges very difficult to read during the transit from dusk to full darkness as the gauge lighting doesn't appear to kick in until it is truly dark. You may need to bring forward or delay your departure/approach to avoid take-offs and landings at these times. The manual also indicates that the engine fire and protection systems are modelled but it appears to be more a case of the switches being functional but again not the underlying systems. Nonetheless, you can shutdown, feather and restart an engine in flight.

General in-flight handling is smooth with the correct feel and momentum for a 21 tonne aircraft and it's hard to come unstuck. The handling becomes interesting at slower speeds when on approach. As you slow to the 110 knot finals speed you can notice the sluggish control response and higher nose attitude. And the combination of the thick chord wing and Fowler flaps means you typically touch down at 90 knots; that's quite low for such a sizeable aircraft and doesn't give you a lot of room to play with should you need to go around on late finals! However, it is always predictable and slowly closing the throttles on touch down eases it on to the tarmac.

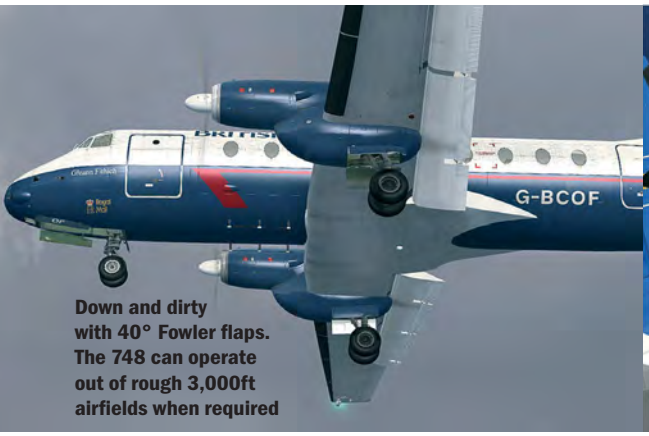
Conclusion

It is important to compare apples with apples. There are developers whose products are squarely aimed at users looking for ultimate realism in the aircraft systems. Others may be aimed at the entry level pilot with only the elementary systems and avionics functional. And of course there are those in between. Part of this equation is also the price of the product. Just Flight and developer Aeroplane Heaven appear to aim their products, including the HS-748, at the mid-market and they have hit this on the mark. While you won't get full systems simulation, you do get a sexy-looking classic aircraft with very good functionality and features at a very fair price that is fun to fly.

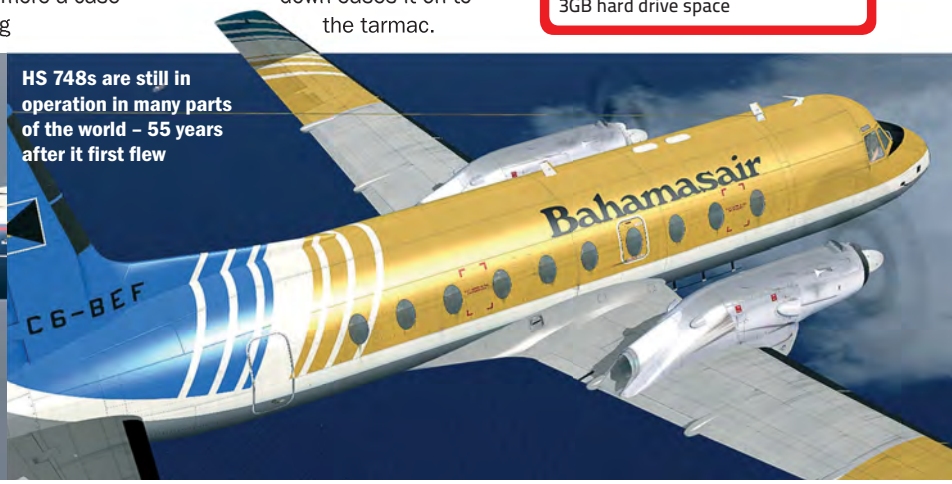
By Peter Stark

DETAILS 80

Developer: Just Flight
Website: www.justflight.com
Price: $37.99 (£31 approx)
At a glance: A classic aircraft with all the elements to satisfy pilots of many different levels without breaking the bank.
Requirements:
Minimum requirements: Flight Simulator X (Acceleration or Gold required), FSX: Steam Edition or Prepar3D v1/v2/v3; 2.0GHz or any Dual Core; 2.0GB RAM; 1GB graphics card; Windows 10 / 8 / 7 / Vista / XP (32-bit or 64-bit); 3GB hard drive space



Down and dirty with 40° Fowler flaps. The 748 can operate out of rough 3,000ft airfields when required



HS 748s are still in operation in many parts of the world – 55 years after it first flew

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REVIEW

Expansion for FSX/P3D

The underside follows the same trend as the rest of the exterior, being very shiny and if you look close enough you will see the ground in the reflections

MPDESIGN STUDIO

Aérospatiale Gazelle SA342

Question: **How good can a £15 add-on really be?** Answer: **Really Good!**

The Aérospatiale Gazelle 342 is a French 5-seat military utility helicopter. First developed in 1973, it has had four primary users: the French and British Army and the Egyptian and Lebanese Air Force. Produced between 1967 and 1996, Aérospatiale managed to sell 1,775 units before it ceased production.

The Gazelle 342 is getting a lot of attention from developers recently. Following the release of Polychop's version for DCS, we now have a version designed for FSX and Prepar3D from MPDesign Studios. It would, of course be unfair to compare the two as one has been designed specifically for DCS and costs four times as much as the other.

Installation

When you purchase the Gazelle you will be presented with a 400MB .exe file. Once downloaded, it's a simple installation process. For some reason the product doesn't feature any license keys, you just simply execute and install. Helpfully,

MPDesign Studios has released a combined installer for both FSX and Prepar3D - you simply have to specify the path to the simulator on installation. The best part of the MPDesign Studios Gazelle has to be the price: it's only €18 (£15 approx)!

Sitting on the ground at Shoreham getting ready for a flight to Southampton, what could possibly go wrong?

First Impressions

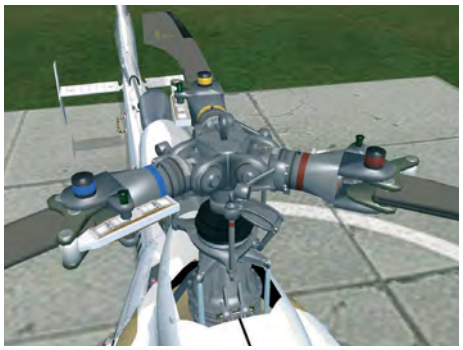
It's been a long time since I last flew a helicopter in FSX, mainly because we all know the default variants aren't really that great. When I first loaded the MPDesign Studios Gazelle 342, I didn't really know what to expect. They're a relatively new company based in Serbia and made up of pilots who have experience flying the Gazelle.

First Impressions of the aircraft were that it was solidly modelled and sounded great. Once I took to the air, I realised that it handled completely different to anything

ABOVE LEFT: **The modelling inside the cockpit is very good. Texturing also is good apart from the seats which for some reason fall below the standard of the rest of the cockpit, which is very high**

ABOVE: **Just milliseconds before I touch down following a PFL (Practise Forced Landing) in the Gazelle, it flies just fine even when you pull the collective out**

ABOVE RIGHT: **Yellow appears to be the colour theme when it comes to the gauges, with great quality textures being used here**



I'm not entirely sure what those keys are for, but they just add realism to the simulation

The helicopter rotor assembly is fully modelled, but for some reason doesn't match the texture quality of the rest of the aircraft

I'd ever flown before. I'd forgotten that Active Sky was launched - therefore providing me with a 20kt crosswind which, without hesitation grabbed the proverbial carpet from under my feet and left me spinning in all directions having completely lost control of the aircraft. Not an amazing way to start my first flight, but I quickly regained control of the aircraft and landed shortly after.

Exterior

The package comes with three high definition liveries, two of which are civil and one military. The first thing that sticks out on this model is the beautiful reflective curved canopy - it's reflective both inside and out, they're dynamic reflections as well and react to the aircraft's surroundings. Moving to the skin of the helicopter, it also has been textured to have a shiny metal feel to it; the darker coloured aircraft show this to best effect and just like the canopy they are dynamic and are affected by the surroundings, especially when you take-off.

The rest of the aircraft is covered with high definition textures which are good; there's nothing ground-breaking about them, but the addition of three liveries is a nice touch. All the features are there and are modelled in 3D. Turning our attention to the rotor assembly, it's 3D modelled and when you move the cyclic controls the yokes that control the angle of the rotors move in the correct direction.

The animation of the rotor does, however, leave something to be desired. It looks like it's going along at about 5 frames per second while the rest of the simulation continues at the normal rate. It's something that most helicopter developers struggle with and MPDesign are no exception to this. It's not terrible, but just could be a little smoother.

Interior

Climb into the cockpit and the first thing you'll be met with is that reflective canopy. It is seriously reflective and for some, this may be a problem, but I found it to be a great addition. Looking around the cockpit it appears to have been modelled to perfection - everything in the real aircraft is present in the sim and most of it is clickable. Depending on the variant chosen, you get slightly different modules. The Swiss version comes with controls used for the operation of the winch, which you'll be glad to learn is simulated and does work.

Sounds and Animations

The sounds in the Gazelle I think are one of its strongest features. MPDesign Studios has recorded them from the real thing and you can certainly tell. The sound changes in response to your inputs. It even features something called 'blade vortex' interaction or more affectionately known as 'blade slap'. It's that slapping sound that a helicopter makes when it goes into high G turns, or when you put an increased load on the rotors. This feature is a very welcome addition to the Gazelle and makes for a very realistic-sounding aircraft.

When starting up, you get a real sense that the aircraft is alive; the whole thing shakes as the blades start turning, while the needles in the gauges also start to vibrate at this point.

Flight Test

I took off from Shoreham Airport - just south of London Gatwick Airport in Southern England and

ABOVE: **Excellent modelling of the Gazelle, it's the little things like the droop of the blades when they're not moving**

RIGHT: **Just pulling a few Gs in the military version of the Gazelle**

I just can't get enough of these reflections, flying high above the Austrian Alps in the Gazelle

Again those reflections translate into the interior as well, with them manifesting themselves on the canopy. Some may find them distracting but I think they're great

decided to go for a little pleasure flight along the southern coast towards Southampton. The Gazelle doesn't appear fast when you see it, but it certainly is fairly quick. I managed speeds nearing 135kts which, with the wind behind you, can produce very quick ground speeds for a helicopter.

I found myself having to input a small amount of right rudder to correct for the torque of the rotor. I thought this would only be the case during take-off and hover, but for some reason an amount of right rudder was required throughout the whole flight to keep the aircraft flying in balance - most likely caused by the wind.

10 minutes into the flight to Southampton I came across multiple large green fields. You may wonder why this was of significance. It's because I wanted to have a go at something I've always wanted to do in a helicopter inside flight sim: auto-rotation.

First thing you need to do when you want to practice a forced landing in a helicopter, is to build up forward speed, because without that, the helicopter literally falls out the sky. I built the speed up to about 140kts and then pushed the collective to idle, the aircraft did of course start going down, but to my surprise was still controllable. Continuing to aim for the green field I'd located, the airspeed slowed slightly and my decent rate increased. At 50ft I started to flare while increasing the collective and the airspeed decreased rapidly, while the descent rate also started to reduce. It's comparable to the flare of an aircraft. If you flare too early, the helicopter will drop to the ground like a stone as it succumbs to the force of gravity, Flare too late, and you'll crash into the ground. I landed in the field and tipped forward. For a split second I thought we were going to tip over, but to my relief the helicopter settled back onto the skids.

Conclusion

As I mentioned previously, the MPDesign Studios Gazelle 342 is €18 (£15 approx). If you choose to purchase it, just know that you are getting unmatched value for money. It's a solid helicopter add-on that simulates the majority of what an avid helicopter simmer would want. However, if you're a hard-core simmer and you are looking for a seriously deep simulation, then you should think about looking elsewhere. For everyone else I'd say it's perfect; you can even follow the actual flight manual of the aircraft for a more realistic operation.

By Thomas Haynes

DETAILS 80

Developer and Publisher:
MPDesign Studios
Price: €15 (15 approx)
At a glance: The MPDesign Studios Aérospatiale Gazelle SA342 Helicopter is a solid simulation - perfect for the casual helicopter simmer. It makes full use of what is possible within FSX and Prepar3D, but because it is limited in scope, it therefore cannot be compared to the DCS model. However, it looks and sounds great, with the audio aspect definitely being the best part of this product.
Requirements:
Minimum requirements: FSX SP2, Prepar3D V3+, FSX: Steam Edition. Hardware: Dual Core, 2.0 GHz or faster, 4GB of RAM. Windows 7 (32-bit).
Recommended Requirements: FSX SP2, Prepar3D V3+, FSX: Steam Edition. Hardware: Quad Core, 3.0 GHz or faster, 4GB of RAM, video card 2GB of VRAM, Windows 7 (64-bit). Hardware: Dual Core, 3.0 GHz or faster, 4GB of RAM, video card 2GB of VRAM, Windows 7 64-bit.

Flying high above the famous Austrian airport known as Innsbruck, the weather is closing in but the Gazelle is fighting through it just fine

REVIEW

Add-on for Microsoft Flight Simulator X and Prepar3D

ALABEO

C441 Conquest II

Chris Frishmuth **takes a trip down memory lane...**

At the risk of starting off another article with 'earlier in my career', there are a few pages in my logbook dedicated to flying twin Cessnas. In the purest sense, if you include the Citations I've been flying for the past two decades, I have many thousands of hours flying 'twin Cessnas'. Most would agree though that the term more correctly refers to twin piston Cessnas and somewhere in the grey area between pistons and jets exists the turboprop Cessnas, to include the Conquest I and Conquest II. The C441 Conquest II, produced from the mid-1970s to the mid 80s, actually preceded the Conquest I but Cessna decided to confuse everyone by giving the Roman numeral 'I' to the second aircraft developed. The freight company I started with all those years ago flew Cessna 402Bs and I had the occasion to fly as a copilot in a Cessna 441 to Oshkosh one year. Anyone who has spent time in any of the '4XX' series of Cessna aircraft can easily appreciate the cockpit layout and configuration that Cessna stuck with through most of the models. Indeed, even the more modern Citation Ultras that I currently fly have design choices that trace their lineage back to those early 'twin Cessnas'. When I heard that Alabeo had released its C441 Conquest II, I was definitely ready for a trip down memory lane.

The package

The Conquest II is a product of Alabeo, the sister brand of the famed developer Carenado. With its own team and support, Alabeo offers slightly lower priced add-ons while retaining the high quality expected from a Carenado partnership. At $34.95 (£28 approx), the Conquest fits squarely in the middle of flight simulator add-on pricing, so expectations should be commensurate with the price point. Available for FSX: Steam Edition and Prepar3D v2.5/3, the package contains five gorgeous HD liveries and a blank texture. Borrowing a page from their big brother, Carenado, the documentation is frustratingly spread across nine separate PDF files

ABOVE: **With a service ceiling of FL330 (FL350 with modifications), the Conquest II can get above quite a bit of weather and take advantage of jetstream tailwinds while sipping tiny amounts of fuel**

FAR LEFT: **The aircraft configuration menu has nice options for ground service items, doors and cockpit graphics settings**

BELOW LEFT: **You can tell this is a simulation since the people in the background don't have their fingers in their ears due to the shriek of the Garrett engines**

that collectively barely scratch the surface of what should be included in an add-on product. The insistence on separating the one-page Stormscope instructions PDF and a two-page GNS530 User Guide PDF is baffling and inconvenient. There is no assistance at all in helping a new pilot learn about a Conquest, no description of aircraft systems, or any kind of Aircraft Flight Manual. You are provided with a normal and emergency checklist, a single sheet of airspeed limitations and three pages of performance tables (which only include stalls speeds and cruise power settings) and sent on your way. Nowhere can you find how to test the negative torque system, a description of the autopilot or the electrical system. Take-off and landing data? Nope. Do you wonder how much fuel your new Conquest can carry? Or what type of engines are on it? The documentation won't let you in on any of those secrets either. The poor documentation is not a new story – and should be much better for something that should be part of mid-tier priced add-ons and when budget titles are doing it far better.

Graphics

As is typical with Carenado/Alabeo products, once you close the thin binder that is the lack of documentation, the rest of the experience is fantastic. The 3D model is gorgeous and the pop-up configuration menu has all of the standard options. I would like to see an option to remove the pilots from the cockpit in the cold and dark state but all of the small details from cones to pitot covers are nicely modelled. Moving into the cockpit it would be very difficult to find a qualitative difference between Alabeo and Carenado modelling as both studios provide exceptional detailing. Cockpit view presets are nicely arranged and I particularly liked the up-close view of the cockpit lighting panel - all developers should include this viewpoint.
The cabin viewpoint shows us a really nicely modelled seating area with near photographic quality textures. External viewpoints are perfect and showcase the drama of flight with great perspectives and angles. Zooming in close on the liveries shows nice weather effects and overall fine attention to details.

BELOW LEFT: **Ground handling in the Alabeo Conquest is a bit temperamental, with the aircraft having a bit of excess thrust at the low idle setting requiring frequent blips into beta to keep taxi speed reasonable**

BELOW RIGHT: **Alabeo did a nice job replicating the wail and high energy state of the Garrett TPE331 turboprops**

Cockpit

Breaking out the checklist to initiate a cold start brought back fond memories of the Cessna 402B. Again, lack of systems descriptions will leave a lot of people scratching their heads. How do you perform the High Power Monitor Check? What are Monopole Monitor Lights? These are questions without answers but fortunately it is easy to stumble through the start procedure due to the limited number of items on it. The engines come to life with a satisfying shriek of those Garrett TPE331 geared turboprops. Alabeo did a good job of muffling the sound in the cockpit while retaining the painful wail in external views. To fully appreciate the noise, I encourage you to turn your speakers up until the neighbours call the police. The cockpit graphics themselves are stunning - crisp and clear through all zoom levels and the 3D modelling is fantastic. Night lighting is very well done with the soft glow from instrument post lights providing a cozy home.

The panel is a beautiful old school layout with steam gauges providing primary flight and engine indications, an old ARC 1000 Integrated Flight Control System (autopilot) coupled to a flight director and Collins NAV/COM radios. In a retrofit that you would

Alabeo captures the drama of flight with nicely placed external viewpoints

The Conquest is a perfect IFR platform with an old school autopilot that requires a bit more participation from the pilot than more advanced avionics suites

ABOVE LEFT: **Though the panel has excellent readability, the 2D pop-up autopilot controller is a useful feature that allows for heads-up manipulation**

ABOVE RIGHT: **The panel lighting is exceptionally well done with post lighting providing moody illumination to individual instruments**

likely see in the real world, the panel is modernised with a lightly modelled GNS530 and a nicely featured Avidyne Multi-Function Display. Owners of the Flight1 GTN750 can take advantage of the ability to install that unit into the panel and FSX users can also choose to install their separately purchased Reality XP GNS530. As it stands, the Alabeo GNS530 is adequate but can be limiting with regards to building or modifying flight plans on the fly. The Avidyne MFD is very nice with many options for customising the display to suit your needs. I'm particularly fond of the TAWS display since I spend so much of my time flying in the murk below the tops of the hills.

Engines

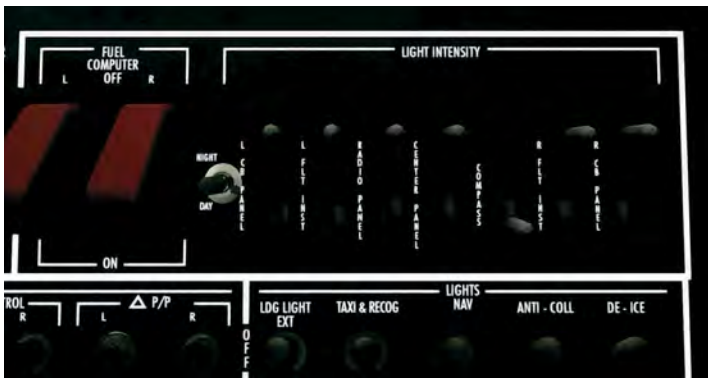
It appears that Alabeo has at least partially modelled the start lock mechanism which keeps the propeller blades flat to produce less resistance while the engine is starting up. It is possible to shut the engines down and have them not return to the locks and the procedure to correct that pilot error works fine (placing the power lever in full reverse and clicking the unfeather switch). It was a nice attention to detail that I did not expect. Modelling the TPE331 engine is a tricky affair, and owing to limitations within the simulation itself, there is a bit of lag between power application and engine spool up. Normally the power response on a geared engine is very rapid, but I think Alabeo has found a good compromise that gives accurate performance throughout the largest range of engine power settings. This concession manifests itself a bit at the START/TAXI condition lever setting coupled with the GROUND IDLE power setting where I feel that the thrust generated is a bit excessive. Normally, taxi speed can be moderated quite well in the GROUND IDLE portion of the throttle quadrant but in the sim you will need to go in and out of reverse to keep your taxi speed low. Beta range is something that FSX was never good at modelling. It is worth noting that the sound of entering reverse is very nice, with a distinct whoosh that makes it readily apparent where your power levers are. A counter-intuitive workaround for the ground power handling is to simply run the condition levers full forward in the TAKE-OFF/LANDING position to give better power control for taxi.

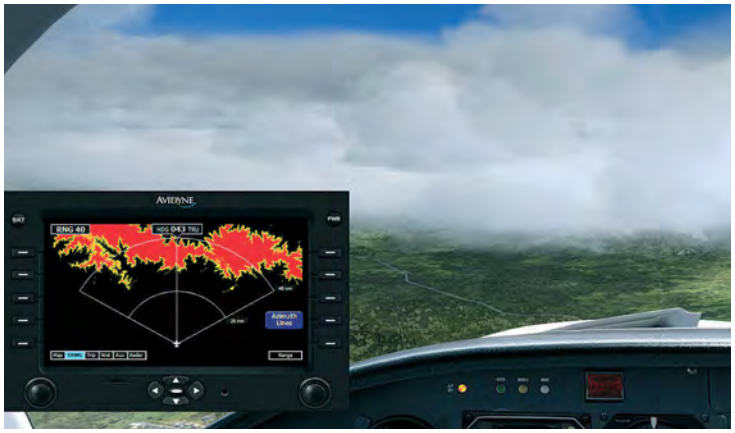
Flight

Flight in the aircraft from take-off to landing is splendid. Alabeo did an excellent job of capturing the jaw dropping performance of the

BELOW LEFT: **One of the preset interior views is a very useful up-close perspective on the lighting panel**

BELOW RIGHT: **The virtual cabin is quite good - almost photorealistic**





ABOVE LEFT: **Both the GNS530 and Avidyne Multi-Function Display are available as pop-up 2D panels, a nice feature when working with them**

ABOVE RIGHT: **The Avidyne TAWS display is a great tool when flying IMC in mountainous terrain. What lurks behind those clouds ahead?**

The cockpit graphics are crisp and clear through all zoom levels

Conquest II. The aircraft leaps from the ground at around 100 knots and can maintain greater than 2,000ft per minute of climb all the way to FL250. I'm not sure how many Conquests are RVSM (Reduced Vertical Separation Minimum) certified but they are capable of climbing to FL330 (and some are certified to FL350). At a more modest FL260 the cruise power setting netted 300 knots at 150 lb/hr per side - an incredibly efficient show. The Alabeo Conquest can carry two pilots, four passengers, a 95% fuel load, and, given the right conditions can fly from Los Angeles to New York!

The autopilot and flight director work like a charm and the Conquest is a pleasure to fly in IFR conditions. My only small gripe is that the positioning of the altitude pre-select is buried under the yoke. The yoke has a click spot to hide it but if it were my aircraft, I'd move that altitude pre-select further up on the panel into the line of eyesight. The ARC 1000 autopilot tracks headings, captures localisers and VORs, and flies a nice ILS. It does not feature altitude capture modes though, so you will have to stay on your toes when climbing and descending. The autopilot can also be slaved to the GNS530, which gives the additional flexibility of performing GPS approaches. Throughout the range of autopilot and hand-flown flight, the Alabeo flight modelling feels fantastic.

ABOVE: **The Conquest is one of the few aircraft I've used that has a perfect default viewpoint from the cockpit, allowing great visibility over the nose but including a large enough portion of the instrument panel for IFR approaches**

Shutting down an engine shows that even near max gross weight, the Conquest will climb at 900ft per minute when held on the blue line (Vyse) of 120 knots. Pitch to 100 knots and you'll see your climb efficiency drop to 700ft per minute and pitch past the red line Vmca of 91 knots and you'd better hang on for a violent roll. The edge of the envelope flight modelling is very, very good.

Conclusion

The Alabeo Conquest II does an excellent job of replicating the feel of an early model 'Cessna twin' and both the flight dynamics and systems operation are up for the job. It is this reviewer's opinion that you can probably throw away the included documentation, seek out an actual Conquest II flight manual from the internet, and live happily ever after.

By Chris Frishmuth

DETAILS 85

Developer and Publisher: Alabeo
Price: $34.95 (£28 approx)
Website: www.alabeo.com
At a glance: A beautiful 3D model, cockpit, and authentic flight model. Lightly modelled advanced avionics. Exceedingly poor documentation. Overall a great reproduction of the Conquest II.
System requirements:
Windows Vista/7/8 (32- or 64-bit)
*Reviewer used Windows 10
Microsoft Flight Simulator FSX with SP1 and SP2 (or Acceleration Pack)
Lockheed Martin - Prepar3D Flight Simulator v2.5 or v3.4 (or higher)
FSX: Steam Edition.
Pentium V/2GHz or similar – 2GB RAM – 512MB graphics card.
990MB available hard disk space.
INTERNET CONNECTION is required for installing this product.

With power to spare, the C441 has enough thrust to get you out of trouble if an engine fails but be respectful of the Vmca or all that power will bite you

The aircraft is very responsive to inputs and was tested by the real aerobatic pilots

VERTIGO Extra 300 SC

Vertigo Designs Take on the Extra 300SC in X-Plane

In the words of the manufacturer the Extra 330SC is a "single seat, low-wing aerobatic monoplane with conventional (taildragger) landing gear, offering incredible aerobatic performance for the unlimited competitor or free-style pilot". It's seen as being the default aerobatics aircraft of choice and I can see why. Since its first flight in 1988, it's had more than 11 different variants made, this one being the 300 SC.

The Extra 300 SC is a single seat variant that features a Lycoming AEIO-580 as its engine. Its flagship features include an increased roll rate, and easier roll stops, which places it in the Unlimited Category for competition aerobatics.

I asked the developer, Vertigo Designs, why it started developing the Extra 300SC. In response the company said it had been contacted by someone who loved one of the freeware aircraft it had made and asked whether it could develop the Extra 300SC. That person turned out to be a professional aerobatics pilot who was racing in the Redbull Air Race (Challengers Cup). He tried the new model and was completely satisfied. He now uses it to prepare for his races and also for aerobatic training. That definitely says something about the flight model.

Installation

Installation is similar to that of many other add-ons within X-Plane. Once you've purchased it from the X-Plane store, you will be presented with a 133MB zip file. A simple drag and drop into the X-Plane Aircraft folder on your desktop is all that is required. Once it's installed, you're ready to launch X-Plane. For this review I chose to test the aircraft in a beta version of X-Plane 11 just to see what it was like.

First impressions

I loaded the aircraft and sat on the ground at Seattle Tacoma International Airport in Washington USA. I decided to do what everyone always does with a brand new aircraft - to put full power on and just go fly, but there was just one problem. I couldn't find where to close the canopy, it was just stuck open and I just couldn't find where to close it. I thought it would be a question of just assigning but that didn't solve the problem. I then spent the next hour fumbling around in the cockpit trying to find a click-spot for the canopy. I eventually found it located on the red handle in a very obscure place. So, if you purchase this add-on, take note.

Once I'd managed to close the canopy, I climbed into the air and started flying around like a maniac (also known as 'testing' the flight characteristics). Landing is most definitely the hardest part when you're flying a twitchy tailwheel Extra 300 SC. Overall, it was a very interesting and slightly frustrating first impression.

There are four high definition liveries to choose from

Exterior

The exterior modelling of the Extra 300 SC is stunning. Everything you'd expect to be there is present, it's the attention to detail that sets this aircraft apart from others. These include small things like when you move the controls, the pilot looks in the direction of the turn and looks up and down when the aircraft is pitched.

When you move into the exterior view you will also notice that the whole aircraft is shiny and that the texture quality is second-to-none. X-Plane comes in to help make this aircraft look as real as it gets.

You can turn the pilot on and off from within the cockpit but he still remains viewable from the exterior

TOP LEFT: **The Extra 300SC has a very aerodynamic profile which helps it gain speed but makes it very hard to lose that speed**
ABOVE: **When you take a look inside the cockpit, you'll find a very basic set of instruments, this is of course to be expected in this type of aircraft**

Interior

The interior of the aircraft is also of a high quality, with all the gauges being very easy to read because of the texture quality. The actual instruments included are fairly basic which aligns with the real aircraft. The only problem I had with the interior was that some of the click-spots are a little tricky and it takes a few attempts on some of the switches to get them to function. This is probably one of the reasons I had such a problem with the canopy.

There is an actual pilot modelled in the aircraft, who is viewable from the interior as well as the exterior, and his presence just adds that extra bit of realism to the model. When you move the aircraft's controls he follows the movements, which makes for a highly realistic cockpit experience.

Sounds

The sound reproduction is the weakest point of an overall very strong model. It leaves something to be desired when the rest of the aircraft is stunning.

I decided to see how high it could climb going straight up... about 3,000ft before it started to struggle

The aircraft comes with a smoke system that can be turned on and off in the cockpit

BELOW: **The cockpit instruments are fully viewable even from exterior views**

The Extra looks gorgeous especially in low light with the reflections on the exterior

DETAILS 80

Developer and Publisher:
Vertigo Designs
Price: $29.90 (£24 approx)
At a glance: The Vertigo Designs Extra 300 SC has been tried and tested by a real-world professional aerobatics pilot and has received his approval. Excellently modelled, both inside and out, this is a very good simulation of a world famous aerobatics aircraft.
Requirements:
Minimum Requirements: X-Plane 10 or newer. Operating system: Windows, Mac or Linux. Hardware: Dual Core, 2.0 GHz or faster, 4GB of RAM Video Card: 2GB+ VRAM. Recommended Requirements: X-Plane 10 or Newer, Windows Mac or Linux Hardware: Quad Core, 3.0 GHz or faster, 4GB of RAM, Video Card 2GB of VRAM.

The sound of the engine when you are in the cockpit is actually difficult to listen to for long periods of time. It's a low quality recording and there isn't a lot of difference in sound when you increase or decrease the throttle setting. When you move to the outside view the engine noise is fairly generic but the developer assured me that the sounds are something which is going to be tackled in an update.

Flight test

The fact that a Red Bull Air Race pilot has tested this aircraft and now uses it to prepare for races speaks volumes about the realism of the flight model. Add to this X-Plane's unique aerodynamic model which incorporates Blade Element Theory and you have a highly sophisticated flight model.

I decided to just take the aircraft for a little flight to test some of its features and to find out what it was really like to fly. I started on the ground at Seattle Tacoma Airport with the engine off. I then followed a generic start procedure by turning the battery on, followed by the magnetos. The engine came alive and the gauges reflected this with the needles bouncing up and down in time with the engine.

I then rediscovered the category wide problem that tailwheel aircraft have - taxiing. In the Extra you can't see anything out the front, so looking out the side worked in my case. Once I'd managed to taxi to the runway, I applied full power and the aircraft propelled itself down the runway gaining speed rapidly. I'm sure all pilots who fly tailwheel aircraft rejoice the moment the tail lifts and you can finally see out the front because I certainly did. The aircraft climbed into the air and I tried to maintain a steady heading on my climb to 5,000ft, ready to do some basic aerobatic manoeuvres.

On the menu were a few basic aerobatic manoeuvres, which include: loop, aileron roll, barrel roll, wing-over and stall turns. All of these I've conveniently done in real life, sadly not in an Extra 300SC. The aircraft responded well to all the manoeuvres, but what I found most impressive was its response to the stall turn. Very few flight add-ons can accurately replicate stall turns because of the complex simulations that go along with it. The Extra 300SC did very well. After completing all the manoeuvres, I headed back to the airport. Landing the aircraft is almost as hard as taxiing it, mainly because it has no drag devices such as flaps or airbrakes, so slowing the aircraft down is rather difficult. I landed too fast on to the main gear and bounced back into the air, only to return to terra firma again seconds later. I then taxied the aircraft back to the GA parking and shut down.

The Extra seems equally happy to be inverted as the right way up

The climb rate in an Extra 300SC is phenomenal - it will climb at this attitude for what seems like ages

Conclusion

In conclusion, the Vertigo Designs Extra 300SC is a fantastic aircraft. The developer has done a really good job of modelling the aircraft to make it look and feel as real as possible. As mentioned, the sounds are something that let the aircraft down a little bit but you can easily disregard that when you get it in the air. Once airborne, it's a dream to fly!

By Thomas Haynes

REVIEW

Add-on for Microsoft Flight Simulator X, FSX: Steam Edition and Prepar3D

AEROSOFT GENOA X

A visit to 'The Proud One'

La Superba

The local nickname for Genoa is 'la superb', or 'the proud one' for non-Italian speakers, a name based on its impressive architecture, landmarks and long cultural heritage. In fact part of the old town was added to the list of UNESCO World Heritage sites in 2006. The city is the capital of Liguria, a coastal region of north-western Italy, which sits within the gulf of Genoa and faces the Ligurian Sea. It's also one of the biggest cities on the Mediterranean, with the largest seaport in the whole of Italy.

Genoa Airport

The airport serving the city is known locally as Sestri or Cristoforo Colombo Airport, named after the city's most famous son Christopher Columbus, who was born there in 1451 (that's in the city not the airport). Like many similar airports around the world, the current Genoa airport is just off the coast on a man-made peninsular, roughly 7km to the west of the city. Yet the first airport was in fact a seaplane landing built in 1930 just in front of the famous Genoa lighthouse.

It was 25 years later when the current airport was constructed on land reclaimed from the sea. Then in 1986 the new terminal was opened as part of an intermodal transport hub, encompassing the harbour, motorway and rail infrastructures, which together form a link between central Europe and the Mediterranean basin. The runway was extended to its present length of 3,066m in 2002, and in 2014 the terminal had a major

ABOVE: **There's a massive marina just behind the airport**

RIGHT: **This shows the rail and road complex that serves the airport**

ABOVE RIGHT: **Animated buses drop off and pick up passengers at the terminal**

RIGHT: **This is the bridge carrying the A10 motorway from Genoa to Cornigliano**

LEFT: **I was getting over 40 frames a second on approach**

CENTRE LEFT: **Taking off from Nice on 04L in my current favourite aircraft, the Carenado A36 Bonanza, I climbed to 3,000ft to clear the headland of Mont Boron**

BELOW LEFT: **Taxiing to the terminal**

overhaul, enabling it to accommodate increasing passenger numbers, which reached more than 1.4 million in 2015.

A trip to Genoa

Because Genoa is situated in a part of Italy I'm unfamiliar with, I decided to chart a course from Nice in the South of France to the Cristoforo Colombo Airport. But rather than take the more direct route across the Ligurian Sea, I took a more leisurely route and followed the beautiful coastline, essentially tracking the E80 motorway as it winds its way up and across the coast.

I already had the superb Nice Airport installed, (also from Aerosoft) which allowed me to have a more realistic experience, starting with a proper start-up on departure, finally arriving at the airport as many other pilots would have done before. My idea was to get a better appreciation of how the city and airport have been integrated into the surrounding areas - in my opinion an important consideration if you want the simulation to be convincing. It also means that the arrival would be my first look at the GayaSim product.

As the trip is just under 100 miles, I decided to fly my current favourite aircraft, the Carenado A36 Bonanza. It's a well-equipped aircraft that has a fair turn of speed and should get me there in about an hour. Most of the trip is going to be VFR, in order to give me a better appreciation of the scenery, although I did use the autopilot to hold the altitude for me.

Taking off from Nice on 04L, I climbed to 3,000ft to clear the headland of Mont Boron, before passing over one of the most beautiful little towns in France, Villefranche-sur-Mer. It's a popular stop-off for visiting cruise ships, although you wouldn't realise it from the lack lustre depiction of it in the FSX scenery. Just a few miles up the coast we come to Monte Carlo, the capital of Monaco. At this point I wished I'd invested in some more realistic scenery for my trip. Passing Monte Carlo is the town of Menton and the Italian border. And it has to be said the coast is fairly mundane from this point on. As I passed Savona I set NAV 1 to 108.60, the frequency for the SESTRI VOR and NAV2 to the ILS frequency of 109.3, then I headed across the bay for an approach to Runway 28.

Making the approach in this way means you get to experience the airport more realistically than if you simply place your aircraft on the runway for take-off. The only down side is that you don't have a lot of time for sightseeing when you're on finals. So, after landing, I took the usual tour, wandering around the terminal, checking out the detail and comparing it with the real airport. I must say the GayaSim designers have not disappointed. They've created a perfect three-dimensional replica of the buildings, right down to the air conditioning units and antennae on the roof. The control tower is a work of art, with its weathered precast concrete staircase, aerial arrays and perimeter chain-link fencing. Then you have the massive TNT warehouse alongside the Poste Italiane building, both with a fleet of accompanying sign written vehicles. Other notable structures include the massive Sheraton Hotel that dwarfs the terminal itself, then to the east is what appears to be a large manufacturing complex. All of these are faithfully represented in the scenery.

Outside the airport

Genoa airport is just a stone's throw from the city, which means you're likely to pass over it either on arrival or departure.

Although the city is not as detailed as some of Aerosoft's other products, the overall impression is extremely realistic. The vast majority of the buildings are generic in design but there's plenty of diversity and the sheer number of buildings depicted is staggering. If you get too close you'll notice that many of them (particularly on the hillsides) are precariously positioned with one end hanging in space - not really an issue but something worth mentioning.

In fairness, the designers have included some of the more prominent landmarks too, including the round Fiera di Genova exhibition centre and its blue pavilion companion, You'll also see the Stadio Comunale Luigi Ferraris, a multi-use stadium and the suspension bridge carrying the A10 motorway from ▶▶▶

The Runway 10 approach to the airport

LEFT: **Plenty to see around the airport - here we have the imposing Sheraton Hotel**

BELOW LEFT: **The round Fiera di Genova exhibition centre and its blue pavilion companion**

As you pass over the port, you'll see cruise and container ships with attendant cranes waiting to load/unload them and containers lining the docksides in all directions. There's also a large marina full of boats and yachts directly behind the airport.

Documentation

As usual, Aerosoft has included a detailed manual that explains the relevant points on the installation and optimisation of the product. It also mentions its compatibility with other scenery products and the new 1.4 SODE (SimObject Display Engine) that handles the automated docking gates system. As long as the aircraft designer has set the door positions correctly the jetways will now operate correctly, automatically lining up with your aircraft's doors.

LEFT: **Like most airports Genoa is the hub for many other companies, TNT for example**

BELOW LEFT: **Accurate 3D modelling can be seen all around the airport**

In addition 16 pages of recent charts are included, covering all the approaches and departures to the single runway at Genoa. These include the airport layout and stand coordinates, SIDs, STARs, ILS, VOR and NDB approaches.

Incidentally, if you're running Prepar3D v3 or later, you will be able to use 'Frank' - the Aerosoft pilot avatar to explore the airport. He can be controlled like any other vehicle using the default P3D commands. All this is explained in the manual.

Performance

As I mentioned, I used Carenado's rather nice Bonanza for the review, so I wasn't exactly taxing the system. I imagine some of the more complex aircraft might have more impact on your frame rates. Having said that, I believe the designers are getting better at optimising the scenery to suit our current hardware because my system has coped very well with all the scenery I've thrown at it recently. This is particularly true of the Aerosoft scenery I've reviewed. In this case I was getting over 40 frames a second on approach and up to 55fps while taxiing to the terminal.

Conclusion

I think it's fair to say that the Gayasim designers have faithfully reproduced Genoa airport, filling in some of the surrounding areas with more generic structures. Having said that, with satellite imagery covering the area it sits on, you still get the impression of a large metropolis, unless you fly down to street level when the imagery becomes more pixelated. Don't forget, as I mentioned earlier, this is sold as a product covering Genoa airport - anything outside that is a bonus.

By Joe Lavery

DETAILS 90

Publisher: Aerosoft
Price: Download €25.78 (£22 approx)
Website: www.aerosoft.com
Developer: Gaya Simulations
At a glance: A well produced depiction of the airport that serves Genoa.
Requirements:
Microsoft Flight Simulator (Service Pack 2 or Acceleration), FSX Steam Edition, Prepar3D V3.
Microsoft Windows 7, 8, 10 (64-bit Recommended).
Processor: Dual Core 3.0 Ghz (core i5 Recommended).
4GB RAM (8GB recommended).
1.5 GB Hard drive space
Video Card: 2GB or more.

Genoa to Cornigliano. Closer to the coast is one of the tallest and oldest lighthouses in the world, Genoa lighthouse, known locally as Lanterna. Not far behind is the Matitone, a hexagonal-shaped skyscraper that looks like a large pencil. These unique landmarks help to identify Genoa, so you can see there is plenty to explore but it must be remembered that this is a product depicting the airport, and not the city itself; anything you find outside the airport is a bonus.

Known locally as Lanterna, the Genoa lighthouse is one of the oldest in the world

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REVIEW

Add-on for Microsoft Flight Simulator X, FSX: Steam Edition and Prepar3D

PC PILOT CLASSIC PRODUCT

AEROSOFT MENORCA X EVOLUTION

The island looks beautiful from altitude

A return to picturesque Menorca

The Balearics

It's been quite a while since I reviewed Aerosoft's Balearics Islands X package for FSX, which at the time included all four of the most popular tourist destinations in the archipelago. As an all-encompassing product it did not have the finer detail that's a feature of the 'Evolution' packages. You may recall we reviewed Majorca Evolution back in Issue 98, which was in June/July 2015, so Menorca X Evolution is the next step in the revamping of all the Balearic Islands by Sim-Wings.

The real Menorca

Menorca is not the most popular island in the Balearic chain and contrary to popular belief it's not the smallest of the islands either. Mallorca (or Majorca if you prefer) is the most popular in terms of tourist numbers, yet there are three smaller islands that you've probably never heard of. They are Cabrera, Dragonera and S'Espalmador. These are uninhabited, but are the destination for regular day trippers from the larger islands. Other well known islands in the archipelago that do get their fair share of tourism are Ibiza and Formentera.

I imagine the reason Menorca is not the most popular island is because it doesn't have as much to offer as the other two. For example, Majorca has more places to visit and has a greater density of populated areas. When it comes to Ibiza it's no secret that it's best known for its party atmosphere, whereas Menorca has its seclusion and quiet beauty, which I guess is what most of its regular visitors are attracted to in the first place. It's also where you'll find more of the real Spanish culture and a lot fewer package hotels that are sprinkled all along the coastline of the other two.

The glass and steel façade at the back of the terminal

Sim-Wings Menorca

This latest depiction of the island combines updated aerial textures at a resolution of 50cm per pixel, with a lot more hand-placed scenery objects. The designers have reworked all the coastlines which now match the Google Earth images, which means you can use real maps to explore and you don't get any strange looking artefacts where the sea meets the beaches.

Because the island is less populated, there's much more open space between the towns and villages, so you're more likely to find your own secluded beach here than on the other islands. With the exception of the capital Mahon and the original capital Ciutadella, the towns have very few high-rise buildings and this is evident in the Sim-Wings version.

Because it's a small island there are naturally fewer landmarks to see, however it was disappointing that the only one I could find depicted was the Monte Toro sanctuary with its church and statue of Christ. This is situated in the centre of Menorca on top of the tallest hill on the island. Others you might expect to see include the Fort Marlborough at Mahon, the Castell de Sant Nicolau, the large monument in the Placa des Born at Ciutadella and the Menorca Cathedral. While

ABOVE AND ABOVE-LEFT: **The GA field that houses the Aeroclub Mahon**

Looking towards the fire station, with the control tower on the left

The front of the terminal is nicely done

these are shown as flat images in the aerial photographic textures, it would have been nice if they'd been modelled in 3D as well.

The airport

Although there are some places of interest missing, this is certainly not the case in and around Menorca Airport, which has been modelled in great detail. Like the island itself, the airport is small by international standards, with one main terminal and 16 boarding gates. The terminal is mostly made from glass and steel frames, designed in the sectional shape of a wing. It's faithfully depicted in the scenery, complete with reflective glass and five animated air bridges, operated using the usual Ctrl-J keyboard command. The modelling is of a very high standard, covering even the smallest detail. There's plenty to see and the amount of extra content strewn around the aprons helps to make it more realistic. The ground textures within the airport are pin-sharp, with painted lines that de-mark the stands and taxiways, as are the lines in front of the terminal building indicating the roadways for the service vehicles. You'll also see plenty of animated vehicles (of all types) following their predefined paths, which helps to bring the airport to life.

Conclusion

The Sim-Wings designers have done a fine job of updating Menorca, which looks spectacular, particularly on approach or when cruising overhead. The new textures more faithfully represent the island and at the higher resolution don't pixelate unless you're crop dusting. I didn't notice any appreciable drop in frame rates at these higher resolutions either.

If only they'd modelled a few more points of interest it would have been perfect. However that doesn't stop me from recommending it!

By Joe Lavery

DETAILS **85**

Publisher: Aerosoft
Price: Download €20.12 (£17 approx)
Website: www.aerosoft.com
Developers: SimWings
At a glance: Sim-Wings gives the island of Menorca a makeover, with new textures and lots more detail.
Requirements:
Microsoft Flight Simulator (Service Pack 2 or Acceleration), FSX: Steam Edition, Prepar3D V3
Microsoft Windows Vista or Windows 7, 8, 10
Processor: Dual Core 3GHz (or higher)
4GB RAM: (8GB recommended)
2.8GB Hard drive space
Video Card: 1GB (2GB or more recommended)

Ciutadella, the original capital, is at the other end of the island

REVIEW

Add-on for Microsoft Flight Simulator X, FSX: Steam Edition and Prepar3D

PC PILOT CLASSIC PRODUCT

Orbx VALDEZ PIONEER FIELD

An introduction to Southern Alaska

All four seasons are depicted in the package

Occasionally we all get preconceived ideas about something, which for me was the case with this latest product from Orbx. I imagined that a remote airfield in Alaska would hold very little interest for me, particularly after reviewing some of the largest airports in the world... How wrong I was!

The product in question is the latest release, depicting Valdez Pioneer Field. It's a small provincial airport in Southern Alaska, just 6km east of the city of Valdez. Although small by global standards, it's quite an important place. With one of the few ice-free ports in the area, it was cited as an ideal location for the termination of the Trans-Alaska pipeline, which carries oil from the Prudhoe Bay oil fields in northern Alaska.

Valdez Pioneer Field

This Orbx scenery was designed by Marcus Nyberg and Philip Schall, using hand painted, high-resolution ground textures (in the vicinity of the airport), and photoscenery at a resolution of 7/30/60cm and 1m ground imagery. In addition they used some advanced rendering techniques featuring atmospheric night lighting effects and ambient occlusion, which greatly improves the realism and ultimately your immersion.

The airport

Pioneer Field is typical of other small airports around the world produced by the Orbx team. They tend to be unremarkable, with at first glance very little to identify them from similar airports. However the fantastic modelling and microscopic attention to detail that the Orbx developers lavish on them, makes them quite unique and for anyone who is familiar with the location, instantly recognisable as well.

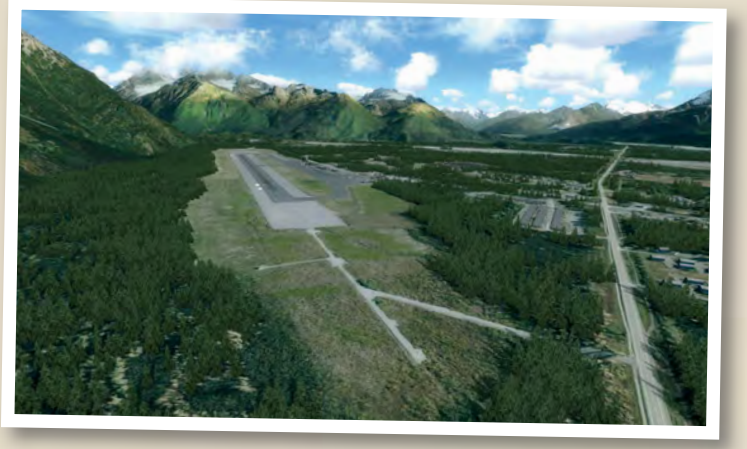
Pioneer Field fits nicely into this category because of its location and the architectural style of its terminal. The road that runs from the town to the airport, imaginatively called 'Airport Road' has a number of other buildings housing mostly aviation-related companies. These are mainly constructed from corrugated steel panels, which once again are meticulously modelled on the real buildings. How do I know this? 'Google Street View' of course.

As you wander around you'll see flocks of birds flying overhead, animated people and ground crew stood talking; there's also an engineer working on an aircraft engine, shaking his head, obviously having trouble identifying the fault. I also noticed a rather distinguished-looking gentleman in a dinner suit, pacing up and down outside the fire station, waiting for his private jet I imagine!

In common with all Orbx airports, the amount of unique structures and complementary objects copiously sprinkled around is brilliant. Let's be honest, only Orbx would model a pile of broken pallets and abandoned tires?

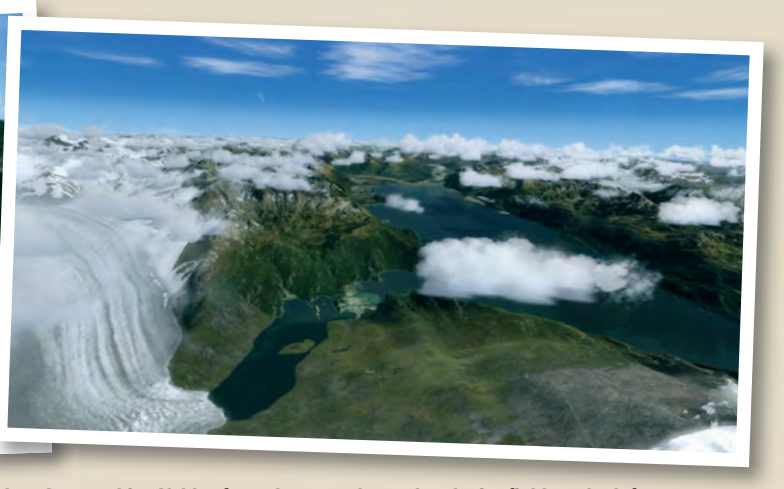
The scenery

Although some distance from the airport, the city of Valdez has been recreated with most of its prominent buildings in place. The street layout is accurate and there are plenty of animated vehicles to



See how well the airport sits within the scenery - this image shows Runway 6

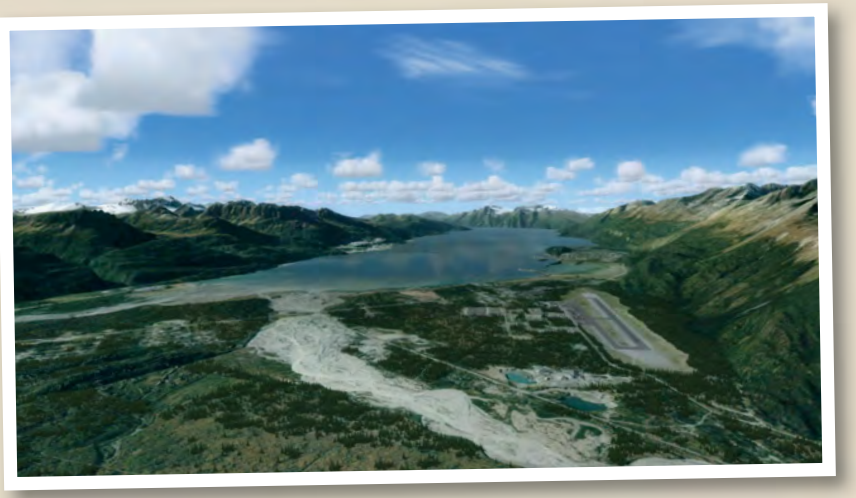
Across the bay you'll find the oil pipeline terminal



Approaching Valdez from the west shows the glacier field on the left

provide an impression of habitation. The city rests on quite high resolution photographic textures, so flying over on approach to Runway 6 fools you into thinking there's more detail than is really there.

Just to the east of the city is Ammunition Island, a large flat area used these days as a container port for cargo shipping. Then almost straight across the port is the oil pipeline terminal run by the Alyeska Pipeline Service Company, with lots of tanks, pipes and pumping stations.



An overview of Valdez from 5,000ft

ORBX 'Southern Alaska'

If you decide to buy Valdez Pioneer Field, you'll need to invest in Orbx Southern Alaska first, or I imagine the scenery will be missing some of the features you're expecting to see. While this entails an extra cost, if you have an interest in the area I'm sure you'll feel it a worthwhile investment. It covers a mind-numbing 200,000 square miles, from Anchorage to Watson Lake (Yukon Territory) and Kenai to Juneau, with Valdez, Skagway and Whitehorse. Of course the add-on airports like this one considerably enhance those depicted in the regional products. Yet in a similar way the regional scenery offers so much more than the bland generic scenery you get with the native FSX or P3D.

The mountains are spectacular with a variety and resolution that gives them a more realistic appearance. The same goes for the seasonal changes that are more subtle than the default ones.

Conclusion

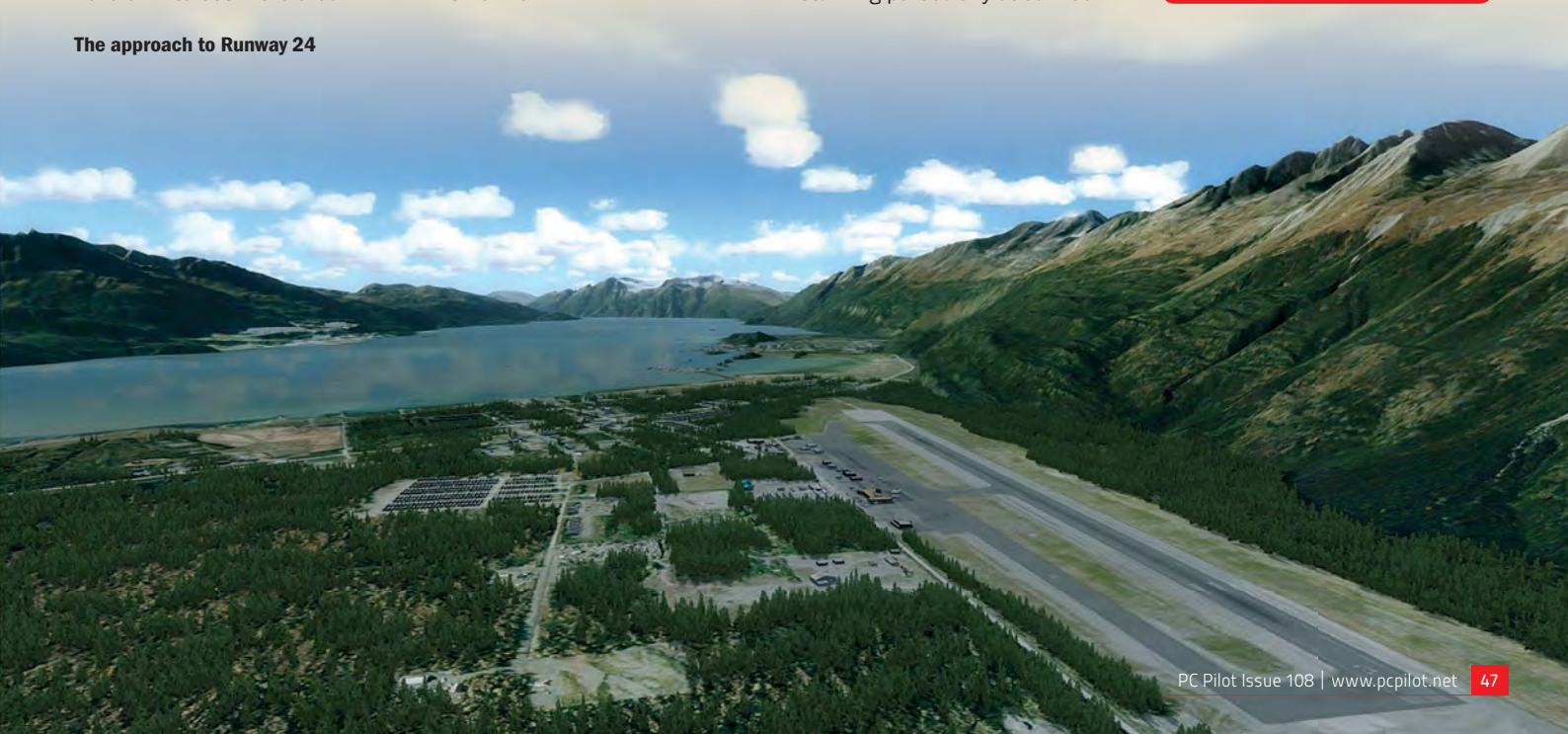
Valdez is another fine product from Orbx and another destination to visit. It's also a place I found more interesting than I'd imagined. The landscape is simply stunning particularly at sunrise and sunset. It's also very easy on the frame rates, in fact not much different from what you'd get from the default scenery. So if you like the smaller more remote airfields, you'll love Valdez.

By Joe Lavery

DETAILS 90

Publisher: Orbx
Price: Download £23.32
Website: http://fullterrain.com
Developers: Orbx Simulations
At a glance: Another superb product from Orbx for FSX and P3D, providing a real insight to the remote beauty and magnificent scenery to be found in Alaska.
Requirements:
Microsoft Windows, Vista or Windows 7, 8, 10
Processor: 2.4Ghz (or higher)
RAM: 2GB (4GB recommended)
Video Card: 1 GB DirectX 9 compatible (2GB or more recommended)
Microsoft .Net Framework 4.0 or higher
PC System used for review
Intel i7 4790K 4.20 GHz Processor
16GB DDR3 1600 MHz RAM
EVGA GTX 960, 2GB GDDR5 Video card
2 x 240GB Kingston SSD
2 x 1.5 Terrabyte Samsung Hard Drives

The approach to Runway 24



FERNANDO DE NORONHA (SBFN)

One of the things I enjoy most about writing the Challenging Airports articles for PC Pilot (the series is five years old!) is hearing suggestions from subscribers and fans on airports that I would have otherwise never discovered. We've featured some of those airports in past issues. Occasionally I'll stumble across a suitable airport while doing research for another project, which was the case for this issue's spotlight on Brazil's oceanic island of Fernando de Noronha. While planning a virtual flight from North America to Antarctica, I spotted the tiny airport 200 nautical miles off the coast of Brazil, while looking over high altitude airways. It turns out that Fernando de Noronha, consisting of a tight group of around two dozen islands and islets, is a UNESCO World Heritage Site, and an increasingly popular tourist destination for its pristine beaches and excellent recreational diving. The impact of tourism has been tempered by strict regulations and daily limits on visitors. While perhaps not as 'challenging' as some of the other white-knuckle destinations we've featured in the past, the airport on Fernando de Noronha has its own unique considerations that make a visit worthwhile.

ABOVE: **The terrain around the airfield can funnel and increase the velocity of the prevailing winds, giving a boost to take-off and landing performance but also bringing the possibility of low-level turbulence**

Brief history

Fernando de Noronha (SBFN) is the easternmost airport in Brazil and is located centrally on the largest island of the small cluster that comprise the archipelago. The runway was constructed in 1934 and was further expanded by the United States in 1942 to serve the Natal-Dakar transoceanic link to French West Africa during World War Two. Immediately after the war, control of the airport was returned to Brazil and it was further expanded in 1975 to accommodate aircraft as large as the Boeing 737. The present day 6,053ft long single runway (12/30) straddles the middle of the main island and is aligned to take advantage of the prevailing winds from the east. A look at the meteorological data shows that the winds blow greater than 90% of the time out of the east, making Runway 12 the preferred take-off and landing direction. Temperatures are comfortably constrained in a narrow range throughout the year with average highs of 84°F (29°C) and lows of 77°F (25°C). A rainy season runs from February to July, with very little moisture in the dry season.

Getting there

A scheduled air carrier service shuttles residents and tourists principally from the mainland airports of Recife (SBRF) and Natal (SBNT). From Natal, airway W40 can be flown off the Natal VOR 076° radial until intercepting the Fernando VOR 254° radial - a straight shot of 208nm. From Recife, airway W41 or UB623 can be flown off the Recife VOR 053° radial until receiving the Fernando

Four aircraft stands can accommodate several arrivals and departures at a time, but ramp space is tight

The VOR approach to Runway 12 is offset, requiring a jog to the right then a turn to the left to line up on final. (X-Crafts E-175)

VOR 231° - a span of 296nm. The relatively short distances mean that larger aircraft such as the Boeing 737-700 can tanker fuel out to the island with enough fuel remaining to fly the segment back to the mainland without having to upload much, if any, fuel. Of course, you would want to carry enough fuel to meet ICAO alternate airport requirements in case something precluded a landing at Fernando de Noronha. Assuming an alternate is required, in simplified terms, required fuel includes: fuel to Fernando de Noronha, a return to Natal, plus 30 additional minutes of reserve fuel.

Multiple airlines provide flights to and from the islands with the most popular fleet aircraft being the Boeing 737-700, ATR-72 and Embraer 190/195. With the larger aircraft such as the 737-700, fuel, passengers, baggage and weather conditions play an important part of safely operating to the 6,053ft strip, particularly when it is wet. Some 'back of the napkin' rough calculations show that to squeeze a 737-700 into 6,000ft of dry runway, a maximum gross weight limit of around 165,000lb must be observed, while a wet runway will require a reduction to just a bit over 141,000lb. The prevailing headwind of 10 to 15 knots, which is a nearly daily occurrence at Fernando de Noronha, will shave about 850ft off your runway requirement, giving a bit better margin.

Geography

The runway sits at an elevation of 190ft and is hemmed in on the southeast by a large hill that tops out at 755ft while a more distant large spire of rock guards the northern edge of the island up to 1,067ft. While the terrain isn't as daunting as some of the locations we've visited in this series, it is significant and very close to the runway. Adhering to the extended runway centreline on departure from Runway 12 is a wise practice. With an area of only 10 square miles, the island itself is quite small.

Approaches

The airport has three published instrument approach

HOW TO FLY TO FERNANDO DE NORONHA

Flights to Fernando de Noronha can be replicated using any X-Plane or FSX aircraft that is suitably equipped to fly either RNAV or VOR/DME approaches to a 6,053ft runway length. The largest aircraft that typically land at SBFN are Boeing 737-700s and Embraer 195s. The default FSX and X-Plane 11 737s can be good choices for the flight, although there are many fine free and payware 737s available.

While stock X-Plane and FSX/P3D airports can be used, I'd recommend enhancing the experience with custom scenery packages. LatinVFR has a very nice SBFN scenery for FSX/P3D (available at SimMarket.com). For X-Plane 10/11, a very nice free scenery package by 'axmiha' can be found at X-Plane.org's download section.

Instrument approach plates to SBFN can be obtained from the Brazilian Aeronautical Information Service: http://www.aisweb.aer.mil.br/

In the search box on the right side of the screen, type in SBFN to pull up charts and information.

The airport is centrally located on the widest portion of the island and is aligned to take maximum advantage of the prevailing winds out of the east. (LatinVFR SBFN scenery for FSX/P3D)

On final to Runway 12, the spire to the north of the field and the hill guarding the south explain the high minimums required on the approach. (POSKY 737-800)

The hill on the southeast corner of the airfield rises to 755ft, an obstacle to both landings and take-offs

Flying the VASI and staying near Vref are critical to reducing landing rollout

Though the airfield has lighting, familiarity with the obstacles around the airport is recommended - the terrain can hide in the darkness

procedures: two RNAV approaches (one to each end of the runway) and an old school VOR approach to Runway 12. Interestingly, the VOR approach provides for the lowest minimum descent altitude (MDA) of 820ft as well as the closest in missed approach point (MAP) of 1.9 DME versus the 2.2 NM MAP on the RNAV 12. While the VOR is not located directly at the runway end, it is quite close. The RNAV approaches provide for straight-in approaches while the VOR approach inbound course is slightly offset, requiring a small course adjustment to line up with the runway. The main advantage of the RNAV approaches is their 'T' configuration that allows for a more efficiently flown procedure that does not require a procedure turn, course reversal, or turn in the hold to establish on the approach like the VOR approach requires. As well, the RNAV approaches both have circle-to-land minimums published which could be useful if you found yourself below the ceiling, yet not in a great position to land.

The relatively high MDAs for all of the approaches are due to the high terrain close to the airport. Be aware that the 820ft MDA on the VOR approach puts your aircraft 250ft below the rock spire north of the airfield, so you absolutely must execute the missed approach at 1.9 DME to provide for time to climb above that obstacle.

Hazards

Probably the greatest hazard to operating to Fernando de Noronha is the very real risk of spatial disorientation while manoeuvring for the landing or immediately after take-off. With the island only a speck of land among the vast ocean, an obscured horizon or darkness can meld the sky with the ocean and make the onset of vertigo rapid and disastrous. The warning "attention for possible spatial disorientation" is printed on the departure charts (I'm surprised the notation is not included on the approach charts). The preventative measure is to supplement any visual manoeuvring with

The ATR-72 is heavily used for scheduled air carrier service and requires significantly less runway than its jet competitors. (Aerosoft ATR 72-500)

Manoeuvring in the vicinity of the island requires care, situational awareness and a good cross-check of the flight instruments to avoid spatial disorientation

a frequent crosscheck of the flight instruments. In most of our simulations we don't have the advantage of having a First Officer to call out airspeeds, bank angles and sink rates, so we have to perform double-duty in our virtual cockpits. A good working knowledge and use of the autopilot in the single pilot cockpit is invaluable. At some airlines, it is policy to fly the instrument approach at night, particularly to airfields that have terrain or obstacle considerations. A by-the-book instrument approach will usually set you up for a more stabilised approach from which a more predictable outcome can be expected.

The other major consideration to operating to Fernando de Noronha is the limited runway length. While 6,000ft of runway isn't short, neither is it long. In past articles we've taken the Boeing 737 into Unalaska, Vagar/Faroe Islands, and Port Stanley/Falklands - all with 4,100ft of runway at their respective times in history. Brazil's GOL airlines has the added advantage of fielding 737s with enhanced short runway packages that modify several flight control components to decrease landing distance requirements. That said, 6,000ft is not a lot of room on a wet runway when you consider the scenario of the high speed abort just prior to the V1 take-off decision speed. I ran the scenario in both X-Plane and FSX/P3D out of Fernando de Noronha with a 737-800 loaded with full passengers and enough fuel to return to the mainland plus reserves and an abort at V1 on a wet runway will leave you with around 600ft of runway. For landings, the numbers definitely work when operating at reduced fuel loads that are still adequate for the flight to and from the island, but care has to be taken to fly the VASI to touchdown, maintain Vref until 50ft, apply reverse thrust, assure the spoilers deploy and maintain moderate braking. My wet runway landings typically used up about 4,900ft, so margins are seriously compromised if airspeed is held too high, touchdown is delayed or if any of the other contributing factors to runway overruns are ignored. Both the ATR-72 and the Embraer 190/195 had better landing distance performance, with the ATR-72 requiring only half of the runway length.

Enjoy the out-of-the-way jewel that is Fernando de Noronha and just know that the adventure starts the minute you board the aircraft in Natal or Recife. I'm adding this island to my personal bucket list, regardless of how I get there.

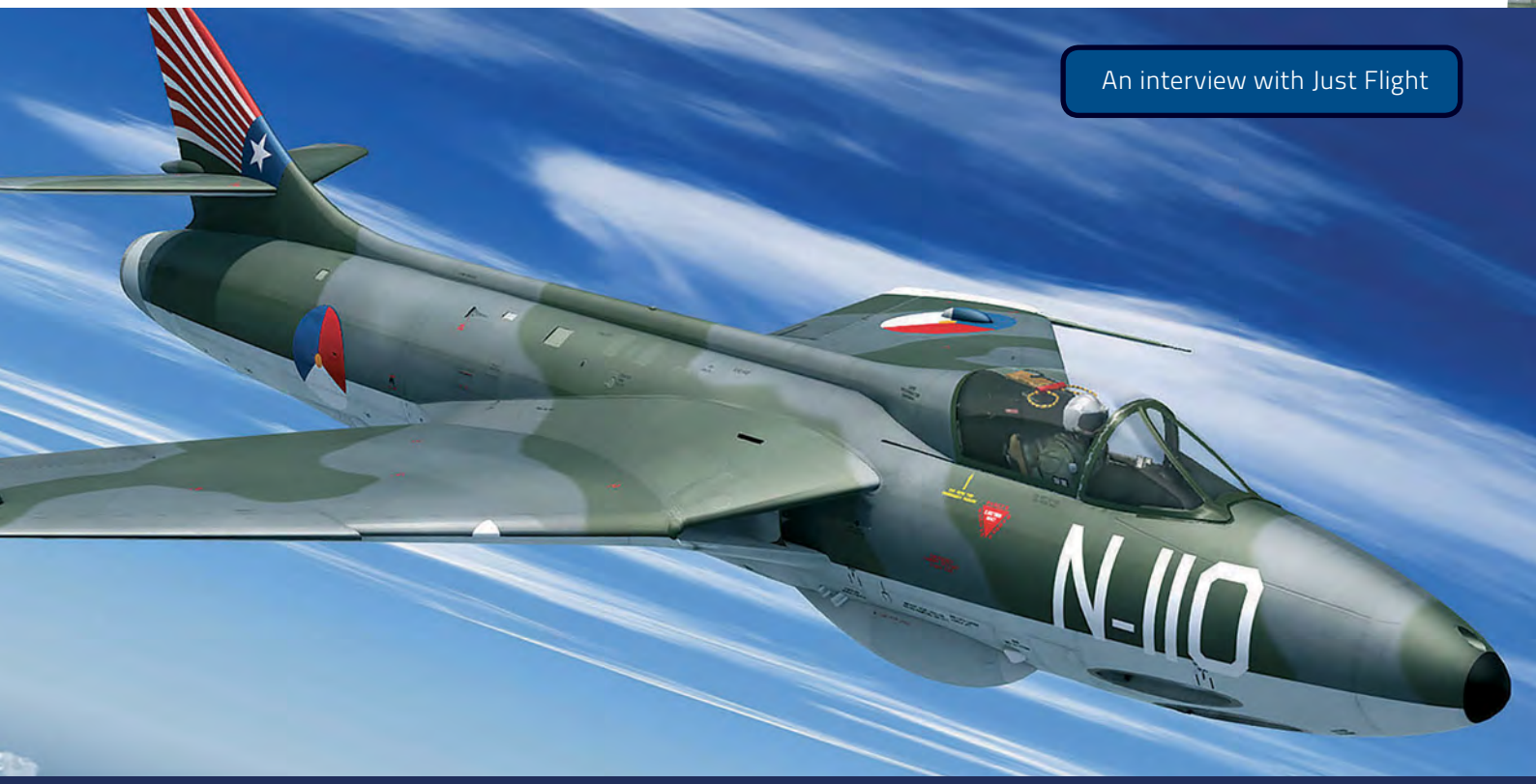
By Chris Frishmuth

At the missed approach point on the VOR approach (1.9 DME), the aircraft is in position for a visual approach - any closer would necessitate an excessive rate of descent

With no parallel taxiway available, aircraft can utilise the turning bays at the ends of the runway to reverse course or position for take-off

As with any short runway, the spoilers, reversers and brakes (auto or otherwise) should be used immediately upon touchdown

With a wet runway, a fully laden 737-800 with just enough fuel plus reserve to fly to Recife or Natal has about 600ft of runway remaining in the event of an aborted take-off at V1



Just Flight 20

Just Flight celebrates 20 years in the flight sim industry

Just Flight has recently celebrated its 20th anniversary of being in the flight sim industry. So we thought it would be a good opportunity to invite members of the Just Flight team to take part in a Q&A which will look back over the last two decades of a company that has been synonymous with the word flight simulation. The respondents in this interview are: Andy Payne – Founder, Dermot Stapleton – Operations Director, Martyn Northall – Development Manager and Richard Slater – Development Manager. Richard and Martyn were also integral members of the programming team for recent Just Flight titles such as Tornado GR1, Canberra, Hawk, Tristar Professional and the TB 10/20.

Origins and company ethos

PC Pilot: So to begin, can I ask how Just Flight came about?

Andy Payne: Just Flight was originally called The Associates which myself, Mungo Amyatt-Leir [sadly no longer with us - Ed] and Roger Large founded back in 1997. We started off publishing add-on content, now known in some circles as DLC, for games such as Microprose Grand Prix, called GP Track Pack. We also published a flight sim called Back to Baghdad at the same time. We got some critical and commercial success and then decided to focus on some more add-ons, this time Microsoft Flight Simulator-based. Initially we worked with Wilco (Airport 2000) and Aerosoft (Airline Flights 2) to make English language versions of add-ons that they planned in French and German-speaking territories. Soon after that, we decided to change the company name to Just Flight as that really reflected exactly what we did. And here we are, 20 years on and with close to 300 titles under our belts. It's been an exhilarating ride, eventful at times, ups and downs along the way but certainly rewarding and we've enjoyed almost every minute!

PC Pilot: What do you think is Just Flight's main ethos?

Martyn Northall: We have always focused heavily on providing excellent customer service and offered excellent value for money and that is at the core of everything that we do.

Dermot Stapleton: No snappy strapline – I think we are in a team that brings together enthusiasts with an interest in aeroplanes, trains and computing. We run a business, but it's the content that is key.

Choosing products

PC Pilot: How does Just Flight decide on the products it sells?

Dermot Stapleton: This varies but many titles come to us directly from developers who want us to publish their product. We don't take everything we get offered, we'll evaluate the offering and decide if it's something we want to run with and add to our portfolio of titles.

BELOW: **This Canberra PR9 is another hi-fidelity Just Flight in-house production**

LEFT: **Just Flight's Tornado GR1 (an in-house production), is a superb 'study sim' of this iconic aircraft**

ABOVE: **Every system of the Tornado GR1 has been modelled**

Martyn Northall: We also spend a lot of time speaking directly to simmers across a variety of social media platforms from Facebook and Twitter to forums. Engaging with them directly allows us to get a much clearer understanding of what they are looking for in a product.

PC Pilot: How would you divide the products, in terms of categories, that Just Flight markets?

Dermot Stapleton: Good question. We spend a lot of time discussing website design and one of the biggest issues is how to categorise products. Should it be by host sim (eg, FS2004, FSX, X-Plane, Aerofly), by type (airliner, military, airport scenery, utility) or by appeal (best seller, on promotion, bargain etc). There is no definitive answer – you just try to anticipate how a customer might browse.

Martyn Northall: We've used labels/sub-brands over the years in an attempt to better communicate to our customers what level of complexity and functionality they can expect from a product, from F-Lite (easy-to-fly, simplified systems etc) through to Professional (study-sim, fully simulated) and Jetliner/Propliner sitting somewhere in between.

Although it's often the fans of Professional, study-sim, aircraft that appear most prevalent on social media, there is a wide variety of simmers and many prefer an F-Lite level aircraft, so we try to accommodate customers at all levels.

ABOVE: **JF's A319 Jetliner – part of their F-Lite range of aircraft - high in detail, but less demanding to fly than the more complex procedural simulators**

RIGHT: **Another in-house simulation - this time the Hawk T1/A Advanced Trainer which was awarded our PC Pilot 'Platinum Award'**

Industry changes

PC Pilot: In the 20 years that Just Flight has been trading, in what ways has the industry changed in terms of the products and the user base?

Dermot Stapleton: In terms of product we have seen demand for ever more complexity and realism followed by demand for aircraft that are easier to fly. However, developers will always push for greater realism and, to an extent, the public wants what the public gets. We try to keep our options as open as possible by offering F-Lite and Professional ranges.

Martyn Northall: There are also a far greater number of products available to simmers. For many years, there would only be a handful of study-sim products released each year, whereas in the past few years there could be a handful released each month. Expectations from users have risen sharply and developers have responded to those demands, the result being continuous innovation from the industry.

Flight simmers and flight simulation

PC Pilot: How would you define flight simulation to someone who is new to the hobby?

Martyn Northall: Flight Simulation allows you to fly almost anything that can be (or has been!) flown in real-world aviation. One of the most appealing aspects of flight simulation is that there are absolutely no limits on what you can fly or where you can fly it.

You can hop a memorable 100 yards in the Wright Flyer, flash across the Atlantic in Concorde or perhaps you'd prefer a sortie in a classic Spitfire or a mission in a modern RAF Tornado or Hawk.

The entire world is available for you to fly in, from Antarctica to Zanzibar and all points in between. It's up to you whether you take-off from your local grass airstrip or one of the busiest international airports around the world.

PC Pilot: What do you think are the main essential ingredients that a flight simmer looks for in a good flight sim?

Dermot Stapleton: Not in any particular order – ease of entry (ie a GUI that works for the user, not the developer), immersion and the ability to customise it. Then, depending on the user, accuracy of systems and flight dynamics of course.

PC Pilot: How would you describe a 'typical' flight simmer in terms of their likes and dislikes?

Dermot Stapleton: The term 'armchair aviator' was coined many years ago and it still works to a degree. It gives you the chance to get airborne on your computer.

Martyn Northall: As discussed earlier, flight simmers are varied in their tastes and expectations, however in general they like to receive excellent customer service, to be listened to and communicated with by developers and to feel like they are part of a community. They (and we) dislike anything that limits the immersion and realism of the simulation experience, whether that relates to bugs, a lack of functionality or difficulty in operating the product.

PC Pilot: What impact has Microsoft's absence from the industry had on Just Flight and the flight simulation industry as a whole?

Martyn Northall: It has been over a decade since the last ('proper') iteration of Microsoft Flight Simulator, and had it not been for the demise of Aces Studios, we could have probably expected one or two versions since then. The impact of that has been both positive and negative.

Producing content for a decade-old simulator can certainly be frustrating. Developers are constantly hitting limitations of the simulator rather than hardware, which has advanced significantly since the release of FSX in 2006. Limitations such as the dreaded out-of-memory (OOM) error force us to make compromises, which is not something that we like to do!

The need to work around these limitations, as well as the stability offered by a lack of a new simulator, has resulted in a great deal of innovation though, and developers are doing amazing things with such an old product.

It is also worth noting that despite Microsoft's absence, we have seen releases from Laminar Research (X-Plane), IPACS (Aerofly) and Eagle Dynamics (DCS). They are offering exciting new platforms which we are currently exploring.

ABOVE: **Majestic's Dash 8 series has been a popular product for Just Flight**

Brands and in-house products

PC Pilot: As well as retailing and publishing other third-party products, Just Flight has also developed its own in-house flight sims. Can you tell us a little about your F-Lite brand and your more recently developed 'study sim' titles. What were the motivations behind each of these product lines?

Martyn Northall: It was clear to see an ever-increasing demand for study-sim aircraft in the market, so in response we formed a new in-house development team and tasked them with creating products which could compete with the best-of-the-best in the industry. We are operating in a saturated market at the moment, so the team had to identify a neglected genre. Iconic British military jets seemed like the ideal choice - often neglected, interesting subject matter and research trips could be easily arranged. We're really encouraged by how these initial products have been received and reviewed. They are not without teething problems but that was to be expected. However, some of the praise these products are now receiving has knocked us off our feet; we're extremely grateful for the positive feedback and we're glad we've been able to reach the needs of many simmers out there.

The F-Lite range fits in at the other end of the spectrum but this range remains equally important to us and to simmers. The range is designed to provide top quality aircraft that are extremely high in detail but less demanding to fly than today's most complex procedural simulators. The range helps newcomers to the hobby to dip their toe in the water and not be strangled and put off by not being able to take-off without spending hours on complex and ultra-realistic systems. They are the perfect introduction to the hobby and you'd be surprised how many simmers continue to use this range long after they've got up to speed with other more complex aircraft. Although we're aware the aircraft in this range aren't for everyone, we do believe that sometimes keeping it simple really does pay off.

PC Pilot: Of the third-party products you retail, which ones have proved to be the more popular?

Dermot Stapleton: Air Hauler and Air Hauler 2 have both outsold most other airliners and scenery – although special mention must go to Majestic's Dash 8-300, and others to mention are Traffic (now Traffic 360), VFR Real Scenery and 747-200/300 - all ever-popular and still selling nicely.

PC Pilot: In terms of the in-house products, how do you decide on which aircraft to produce?

Richard Slater: There is a myriad of different factors that come into play when deciding on the next project – everything from how likely we are to be able to obtain all the required research materials, to whether there is already a version available and whether people would be interested in a fresh higher quality version of it, even down to things like whether one of the team used to have a poster of it on his wall as a child and it absolutely has to be the next project!

PC Pilot: Of the in-house products you have released, which ones have been the most successful for you?

Richard Slater: I always point to the Canberra as our most successful in-house release. Not because of anything to do with the number of copies it sold but because it signalled our intent to evolve from being primarily a publisher to developing our own range of high-end aircraft add-ons. We assembled a new team and I'm very happy to say that they hit the ground running with an award-winning "study level" aircraft, that has been followed up by further acclaimed releases.

Dermot Stapleton: The Traffic series has probably been our most consistent best-seller over the years. Our F-Lite range of airliners has been very popular and we also saw a lot of success with our UK VFR scenery.

The future

PC Pilot: Having been in the industry for 20 years, how do you view

LEFT: **The 747-200/300 has also been a top seller for Just Flight**

ABOVE: **A close-up detail shot of the throttle quadrant from JF's 747-200/300**

LEFT: **The high quality and detailing is apparent in this cockpit shot of Just Flight's Duchess for AeroflyFS**

BELOW: **AeroFlyFS is also supported by Just Flight who released their Duchess for this platform**

the future of desktop flight simulation, both in terms of direction and complexity?

Andy Payne: In terms of desktop flight simulation and where it is going, that assumes desktops are here to stay! I think at the top end there will always be serious flight sim enthusiasts who will demand processing power and top-end graphics and as long as there are really talented developers such as Laminar Research making X-Plane and IPACS making Aerofly, then simmers will be happy. Most people have great expectations for the new version of Flight Simulator now development has passed from the Microsoft team to the Dovetail team, so that will provide some competition and choice for all of us. As tablets and smart phones continue to get faster processors, there will be more possibilities for flight simulation away from the desktop. Add in Virtual Reality (VR) and we could well see some really interesting and exciting innovations in the world of Flight Simulation and we could even see innovations in Alternate Reality (AR) too. The device itself will dictate the experience you get, and much like the real world that a pilot experiences, flying by wire, sight or by App or a combination of all three will keep what we do real.

ABOVE: **Still work-in-progress at time of writing, this is a shot of Just Flight's upcoming Hunter F.6/FGA.9**

PC Pilot: Can you tell us of any future plans or projects you have in the pipeline for the coming year?

Richard Slater: We're looking forward to rebooting one of our best-loved and longest running product series this year, which will be exciting.

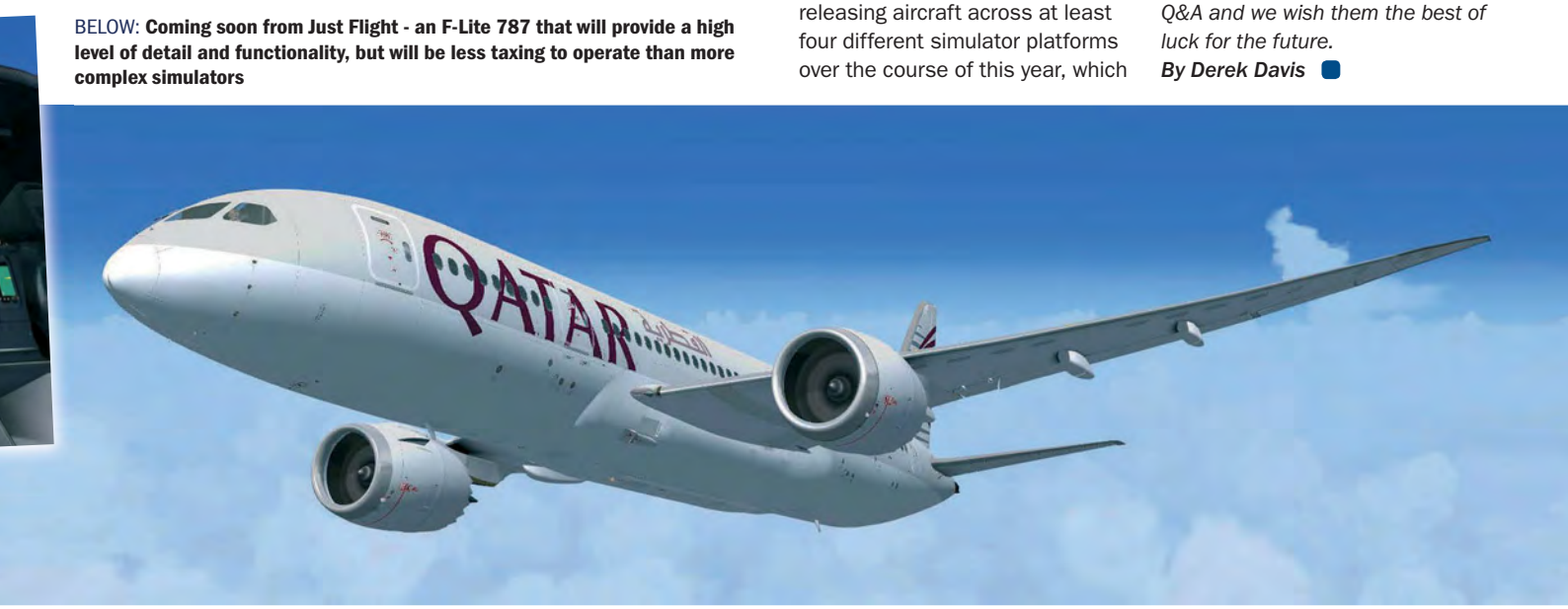
I think we can look forward to releasing aircraft across at least four different simulator platforms over the course of this year, which is probably a record for us!

Martyn Northall: We are also working towards commissioning a couple of longer-running, Professional-range airliners, which will be another significant and exciting step for our development team.

ABOVE: **Another work-in-progress project – this time what promises to be a highly detailed PA28R Arrow III for FSX, FSX: Steam Edition and Prepar3D**

PC Pilot: We would like to thank Just Flight for taking part in this Q&A and we wish them the best of luck for the future.

By Derek Davis



BELOW: **Coming soon from Just Flight - an F-Lite 787 that will provide a high level of detail and functionality, but will be less taxing to operate than more complex simulators**

GA Back To Basics

Stage 1 – Lesson 3: **Preflight and groundhandling procedures**

This issue we start with preflight procedures and how to handle our bird on the ground as we continue to learn how to fly your sim like a pro by simulating private pilot training.

Welcome back!

I hope you have been practising your basic manoeuvres and memorising those reference points since the previous issue. When we started this series, we knew you would be bursting to get airborne and so we bypassed the ground manoeuvres and made life easy. Now it's time to start flying like real grown-ups and introduce some basic flight preparation procedures.

An old saying says that the job's not done until the paper work is finished. Well, in aviation the job doesn't even start until the paperwork is finished. While procedures vary around the world, all countries do insist on stringent maintenance standards and these standards are monitored by everyone involved, from engineer to pilot, by keeping accurate records on each aircraft. In most places, this is called the Maintenance Release and contains not only records of the scheduled maintenance but also of any problems reported by pilots such as broken lights, spongy brakes etc. In flight simulation, we often don't include this step as the default software doesn't include these features, but you should still practice the correct procedure in flight simming by making sure that you have all the correct checklists, charts etc that you may require for your intended flight.

One of the reasons we use A2A aircraft in this series is the workshop view. This allows us to inspect aircraft systems, examine engine wear, identify failures that currently exist - and importantly – to correct them before we fly (Figure 1). This also serves to simulate our preflight maintenance check.

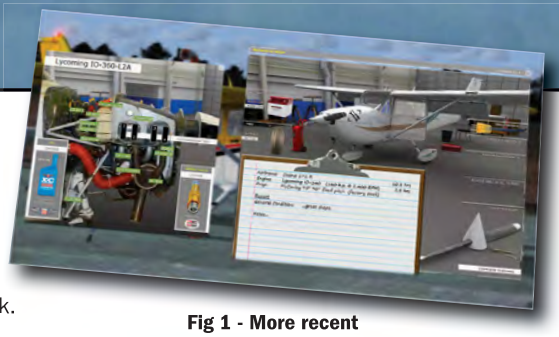


Fig 1 - More recent general aviation aircraft from A2A Simulations feature a workshop simulation to help ensure you are keeping your aircraft well maintained

Taking a stroll

Another aspect of real world aviation that isn't often well covered in Flight Simulator is the 'walk around'. If you examine a real aircraft manual, you will see that all pilots, whether flying a C152 or a 747, are required to walk around the aircraft to inspect it for any obvious damage or something that appears out of place, engine oil levels etc - even if the Maintenance Release suggests all is well. Most light aircraft pilots would also use this opportunity to remove any pitot covers, wheel chocks, control locks and pet dogs from under the propeller.

Despite the limited walk around functionality in simulators, we can still include it by using a utility such as Orbx Simulations BOB First Person Mode (available from the Freeware section at https://orbxdirect.com) which will even simulate your head bobbing up and down as you walk. A far more realistic option comes from A2A Simulations again. It introduced a clever walk around utility for its general aviation aircraft some years ago and it continues to evolve to the point

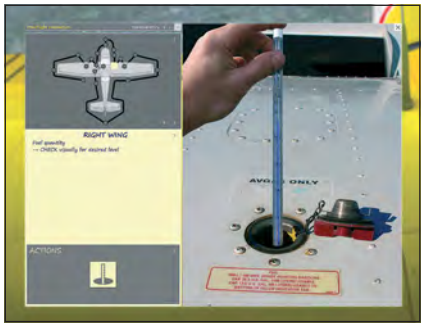


Fig 2 - The walk around simulation also features actual fuel and oil levels, plus visual images of any damaged or faulty parts

That preflight walk around is essential and can reveal damage and excessive wear and tear...

Before applying full power for take-off, check your oil temperature and pressure gauges to be sure all is well

Hand swinging a prop is a heart-stopping experience but was the norm on older piston engine aircraft and is replicated on our Piper Cub

Changing your aspect view gives you a better perspective when taxiing taildraggers

you must do a walk around or pay the price. Depending on your technique and skills, the Accu-Sim module may generate unusual failures and damage that, if not corrected before you start up, will not end well. So for this component of Back to Basics, we will demonstrate the walk around using the A2A Cessna C172 Skyhawk. Figure 2 shows that by clicking different positions around the aircraft, our view changes and gives us the opportunity to check the aircraft quite comprehensively by also presenting views of areas that may become damaged or worn, as well as testing the integrity of trim tabs and flaps.

Checklists

Let's return to the Piper Cub for the next stage. Once we are happy the bird will fly, we can enter the aircraft, stow our equipment and adjust our seats. Another difference that pops up with simulated vs real world students is the use of checklists. Real world students will of course, do exactly what is preferred by their instructor. This may vary a little with some insisting on written checklists, others prefer committing them to memory (with a written checklist as backup if required) and some aircraft even have crucial checks printed onto the instrument panel. Many flight sim aircraft also have interactive checklists or are printed on to the electronic kneeboard.

I personally prefer the memory method and achieve this by using a set of mnemonics which I learnt some time ago. I have found they adapt extremely well from one light aircraft type to another, and with some modification, will even cope well with flying simpler jets in flight simulators. The first checks I do, once seated and comfortable with harnesses on, is to scan the cockpit looking for any damaged instruments, knobs etc. Once satisfied, I then start my formal checklists. Table 1 shows my mnemonics for pre-start, after-start and pre-take-off checks that you can use for this series if you wish and we'll add some more as we progress. I must emphasise that while these will work well with most general aviation simulator aircraft, you must discuss these with your real world instructor before applying them to real aircraft!

Orbx Simulations Shoreham/EGKA Airfield makes for a perfect base for flying training

Getting under way

Through this series we have been introducing some so-called 'tips' which are really just good 'airmanship'. This term refers to actions taken by the aircrew to ensure a safe flight for everyone in the sky and on the ground. They are always common sense. For example, when we are about to turn to the left, we should first scan the skies to make certain there will be no conflict with other aircraft. But when things start to get busy, good airmanship can deteriorate. For example, we may be in the circuit and trying to simultaneously complete checklists, fly the aircraft, lower flaps and be turning towards to the runway. In our rush to complete all the tasks, it may be possible to start your turn

You'll soon have all the skills you need to be flying thrilled passengers across the countryside

GENERIC CHECKLISTS

Pre-start

B Brakes on
M Master switch on
F Fuel on fullest tank, Qty OK
M Mixture full rich
P Pitch full fine
T Throttle, cracked open
C Clear prop
S Start engine

After Start

S Set engine 1000rpm
O Oil temps and pressures rising
G Generator on
R Radios on
R Rotating beacon on
V Vacuum
I Instruments set

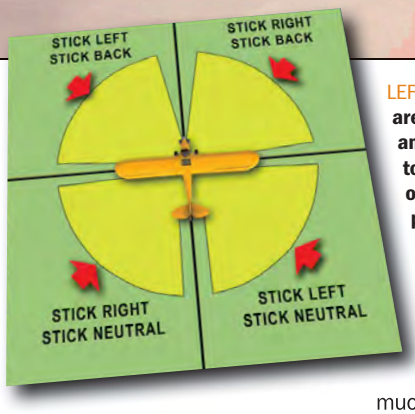
Pre-Take-off

S Set engine 1000rpm
T Trim set for take-off
T Throttle friction set
M Magnetos set both
M Mixture full rich
P Pitch full fine
F Fuel fullest tank
F Flaps as required
I Instruments (gyro) stable and set
S Set engine 1500rpm (aircraft-dependant and Cub is 2100rpm)
Check magnetos, pitch, carburettor heat, idle etc.
C Controls full and correct
H Hatches and harnesses

without a proper scan and in the congested circuit area this could be catastrophic.

I mention this now because we are about to start the big fan thingy up the front. It will be a mass of whirling wood or metal that will not hesitate to attempt to destroy anything it comes into contact with! Even when we use checklists and are an absolute ace at flying technique, you will never get your licence if you don't consider good airmanship before you act. So take a good look around your aircraft before you commence your pre-start checklists. Run through your checklists, prime as required to the conditions and then when you get to 'C - clear prop', call "CLEAR PROP" in a booming authoritative voice and look around the aircraft again before swinging the prop.

Once you have the engine fired up, return to the cabin and your checklists to ensure the engine is performing correctly and that the extensive range of avionics and instruments are correctly set (that bit shouldn't take long in the Cub). For the moment we won't be using radio procedures as it very much depends on the size of the airport you are flying from. Feel free to use the default ATC or mimic your local procedures!



LEFT: **Fig 5 - Light aircraft are easily influenced by the ambient winds and learning to manoeuvre correctly on the ground will help prevent accidents**

RIGHT: **Fig 7 - The torque effect of the rotating prop also adds more complexity to handling prop-driven aircraft**

Just before we move off, check your surrounds again to ensure everyone's safety. Smoothly and slowly apply just enough power to get the aircraft rolling. Immediately close the throttle and gently apply the brakes to ensure they are working. Once we know they are, start moving forward again slowly and reduce the throttle to maintain no more than a brisk walking pace. In the A2A Piper Cub, that will be around 1200rpm.

You want to impress your instructor by taxiing slowly and keeping a good lookout. This won't be difficult in normal conditions, but taxiing a tail-dragger has a few extra considerations over a regular nose-wheel fitted aircraft. You have no doubt already noticed the visibility over the nose is somewhat restricted by the engine cowling (Figure 3). To get around the possibility of us taxying straight into another aircraft, tail-draggers are more typically taxied in a slow weaving pattern (Figure 4), which allows us to monitor what is up ahead.

Taxiing in strong winds will require some further thought again. Figure 5 summarises how to taxi safely in an aircraft with a tail wheel. Study the diagram and you will see that as you taxi around the airport, your orientation to the prevailing winds will change. So you must anticipate this and alter your control positions as you change heading. But do note that the technique varies a little for tricycle aircraft with nose gear – we will look at that later in the series when we look more closely at cross-wind take-offs and landings.

Fig 3 - Forward visibility in taildraggers is reduced and requires some alternative taxi techniques

Fig 4 - With limited visibility over the nose, taildraggers usually taxi in a snaking pattern down the taxiways to check ahead

Fig 6 - The prop wash and rearward centre of gravity all conspire to make controlling a taildragger challenging

The A2A Cessna C172 is used worldwide as a trainer and will be featured later in this series

Next issue we'll cover balanced turns and flight at different airspeeds

Ready for take-off

When at the runway holding point, or close to it if you are in a queue, complete the very critical pre-take-off checks. Again, you can either use your real world, default or mnemonic checklists. The use of flaps for take-off is another issue best discussed with your real world instructor. I was trained to not use them for normal take-offs when plenty of runway was available but there are others who use them regardless. In our illustrious Piper Cub, the choice is made for you as there are none fitted! After visually checking for other aircraft or obstacles, taxi on to the runway and line up.

As this is in an ideal virtual world, we won't introduce crosswind take-offs just yet but we must consider what forces will be acting on our aircraft during take-off as we can only maintain control of the aircraft by understanding them and manipulating our controls to counter those forces. To demonstrate this, we need to open the Aircraft > Realism Settings box and make sure the Autorudder is unchecked.

As the propeller turns clockwise, it creates a slipstream of air that looks somewhat like a corkscrew pattern. Figure 6 demonstrates this and you can see how the slipstream impacts on the left side of the vertical stabiliser. This pushes the nose of our Cub to the left around our centre of gravity as we increase power and the propeller spins faster. As if that isn't enough, we also feel the torque effects of the spinning propeller. Figure 7 shows a view we might expect to see from the cockpit point of view. The propeller is spinning clockwise which produces an equal and opposite force in the counter clockwise direction. The wheels of the aircraft prevent us from flipping over but the extra force and friction placed on the left mainwheel also translate into the nose swinging left. So as pilots of most piston engine propeller-driven aircraft, we have to counter these effects as we apply power by applying right rudder. It can get more complicated in taildragger aircraft as we also have to deal with the large surface area behind the centre of gravity which may be more prone to gusts of crosswind. One of the reasons the Piper Cub has been such a venerable training aircraft over the decades is that it is quite a manageable taildragger on the ground in all but the more severe crosswind conditions.

Some aircraft allow you to use the electronic kneeboard to store your checklists

To take-off safely and smoothly, we simply open the throttle to around 1500rpm and steal a glance at the oil temperature and pressure gauges to make sure the engine is behaving. If we are satisfied, we slowly open up the throttle while keeping the nose pointed down the runway by anticipating the nose swing from forces above. The tail will rise on its own and the Cub will simply fly itself off the ground with the gentlest of back pressure on the stick. Now is the time to recall your climb attitude from our previous issue and continue to climb out on the runway heading at 55 knots.

Next issue

While it seems we have barely got off the ground this issue, it does set us up for next time when we will spend the entire tutorial learning some more key aspects of basic flight that you will be able to carry through the entire series.

By Peter Stark

All these basic skills will soon come together when we look at the most critical of aircraft manoeuvres – landing

NORTHERN GERMANY

In this issue we explore northern Germany before tracking along the northern coastline to the East Frisian island village of Norderney...

The plan

This flight can be flown using almost any aircraft that can land on the 3,200ft runway at Nordernay. I flew the freeware Douglas C-47 v3.12 Beta by Jan Visser and support team, which is available on the cover CD of PC Pilot issue 106, or from major file libraries. The unique PC Pilot livery for this aircraft, along with some Flight Simulator flight and weather files and charts, are available on the cover CD of this issue (108).

Your VFR route is EDDT-BKD-EDHI-EDWG-EDWY, and with each leg being VFR, we have provided lots of useful flight notes to help you enjoy the route. After visiting the cities of Berlin and Hamburg, we will be tracking westwards along Germany's northern coastline. The accompanying screenshots were taken using Orbx Simulation's Germany North and Aerosoft's German Airfields Inselhuepfen, which gives scenery coverage and VFR objects for the entire route. See the Scenery Options box for alternatives.

Load your aircraft with enough fuel for the 240nm flight to Norderney. You will have an opportunity to refuel at Finkenwerder so there is no need to fill your tanks and if you are using the C-47, you will find your landing at the end of the trip less stressful if you depart with just 1500lb of fuel in the main tanks!

Being a VFR flight, it is a good opportunity to introduce a very useful freeware tool - Plan G. This mapping and flight planning utility by Tim Arnot of TA Software (www.tasoftware.co.uk) is simple to use, offers a large variety of data that can be displayed and allows you to fly while connected to it so you get a real time moving map display. This can be used to identify specific landmarks and

TOP RIGHT: **Preparing to depart Berlin's Tegel airport in our special PC Pilot C-47**

ABOVE RIGHT: **Depart Tegel airport and briefly fly south over Berlin to take in the scenery**

RIGHT: **Berlin's woodlands as seen to the north of Tegel as we start to track towards Brunkendorf VOR**

BELOW RIGHT: **Spring is great time to fly this route as the plains of northern Germany are alive with crops and pastures**

to fix your position should you become, ahem, geographically embarrassed.

Departure

After taking off and cleaning up the aircraft, turn southward to overfly the closed Tempelhof/EDDI Airfield and take in some of the sights of Berlin and River Spree while climbing to 2,500ft. Berlin is the largest city in Germany with 3.6 million inhabitants, as well as being the capital. Over the centuries it has seen good times and bad but the result is a fascinating mix of cultures, food and people that intrigues visitors from across the globe and should definitely be on your 'bucket list'! With a third of the city area being parks and forests, it is certainly possible to forget you are in such a metropolis and this becomes especially apparent from the air. Built on low lying plains, it is dotted with lakes and woodlands. Once you are ready to head towards Hamburg, overfly Tegel/EDDT and track 293° outbound where you will quickly leave the city for farmland.

Our first leg takes us westward towards the Brunkendorf/BKD VOR, so tune your VOR to 117.70MHz with the OBS set to track inbound on the 293° radial when you come into range which will be almost immediately. As you approach 25DME from BKD, you should see the Elbe River flowing from the south before taking a sharp turn to the north west. Our track takes us just a couple of nautical miles from this sudden bend and is an excellent visual fix. You can continue to track directly towards the VOR or simply fly along the banks of the Elbe. If you're on track, you will meet the Elbe at Wittenberge and it is easy to identify by the large number of bridges that cross the Elbe and by the rail line from the east that turns sharply to the north through a rail yard.

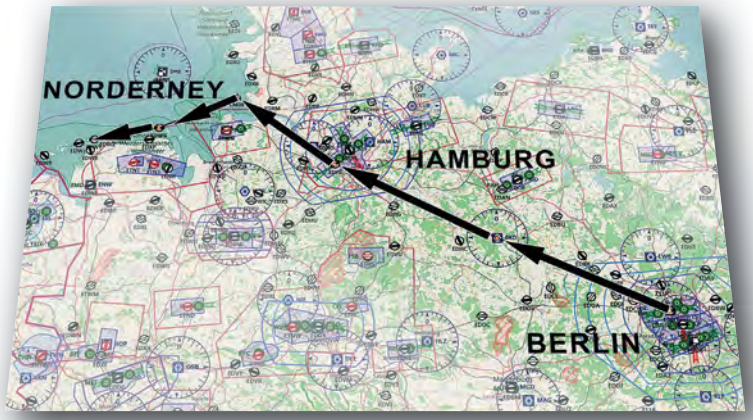
As you overfly the Brunkendorf VOR, continue to fly along the river on a broad track of 297° for the 69nm run into Finkenwerder/EDHI and take the time to enjoy the villages and countryside as the navigation couldn't be simpler!

Due to the close proximity of Hamburg Intl., our approach into Finkenwalder must be at 1,000ft AGL – another excuse to enjoy the scenery of northern Germany up close! If using Orbx's Germany North, you must be at 1,000ft AGL by the time you pass the Kruemmel power station on the northern shore of the Elbe in order to keep under the controlled airspace above you. But at the same time, ensure you don't

overfly the power station as there is a restricted area from the surface to 2,200ft within a nautical mile. You can make a small detour to the south west side of the river at 1,000ft AGL to keep ATC happy.

By now you will see Hamburg on the horizon and it is important to continue to fly over the river to avoid running into traffic making for Hamburg/EDDH Airport to the north of the city. The river splits close to the city and if you take the northern branch, you will get better views of Hamburg. This city has a very long history with the initial permanent structure built in 834, but just 11 years on it was attacked by no fewer than 600 Viking ships and was virtually destroyed. During the Middle Ages the inhabitants also regularly experienced plagues and fires which tested their resolve. Even in more recent times, residents had to deal with devastating floods in 1962 that saw hundreds perish. However, the city is prospering again and is a major transport hub with the extensive port and canals network feeding a rail network that branches out across Germany and beyond.

Finkenwilder/EDHI is an airfield known to many as one of the manufacturing facilities for Airbus Industrie and will be our first port of call. It is located on the south side of the Elbe river and can be easily spotted, as a major network of dockyards lies next door. This airfield is ideally located for Airbus production and is the home of the A320 series programme as well as a major component assembly facility for the A380. These components can be flown or shipped in and



Our route takes us across northern Germany and introduces the geology and history of the major centres – and a few aviation facts

the completed sections are placed directly onto ships for transport to Toulouse for final assembly, but Finkenwerder isn't quite finished with the A380 yet. The unpainted A380s are then flown back to Finkenwerder for interior fit-out and painting before delivery.

As you make visual contact with the airfield, turn left onto downwind for Runway 05 and prepare to land. After touchdown, make your way to the main apron on the north western side of the runway to take a break. At this point you could consider a side trip to Copenhagen's Roskilde/EKRK Airport as shown in the Optional Flights panel or prepare to continue to Norderney.

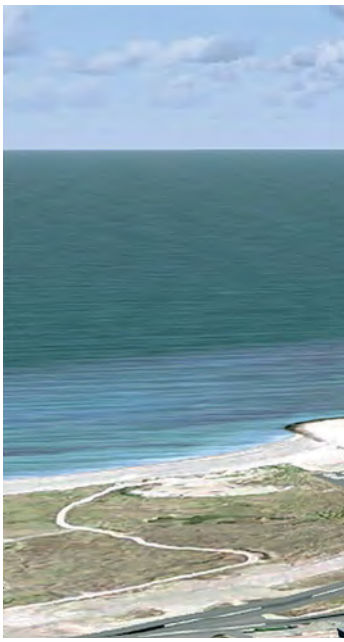
You can get a good visual fix at Wittenburge and simply track the Elbe from there

Our next leg will continue north west along the Elbe out into the North Sea. As you take-off on Runway 05, immediately turn left to track westwards over the river and again ensure you stay at 1,000ft AGL to clear the controlled airspace above you.

If you are using Germany North, take care for the high tension power lines that stretch across the river at 1,000ft AGL in the vicinity of Sietwende! You clear the Hamburg control area once you have passed this point, and you can climb to 2,500ft for the remainder of the flight.

Stadersand Power Station is also a restricted area from the surface to 2,200ft – so be sure to skirt to the north. As you continue to the North Sea, you will enter the world's largest tidal flats of the Schleswig-Holsteinisches Wattenmeer National Park. This 4,400 sq km UNESCO World Heritage site boasts significant populations of birds, seals and porpoises and is one of the last places in Europe where nature can develop without human interference, drawing many visitors.

As you leave the Elbe estuary, you will pass the town and small port of Cuxhaven on your left which marks the point where we are leaving the river. Turn left on to an approximate heading of 250° towards the islands of East Friesland. Each of these low-lying islands on Germany's north coast is the result of the same tidal flats. The eastern most is Wangerooge and is very popular in summer with day visitors outnumbering the resident population 7:1. This island was also the site of an extraordinary aviation story when the ball turrets and fuselages of a pair of B-17 Flying Fortresses became entangled in flight. Most of the crew parachuted to safety, while two crew remained on board the



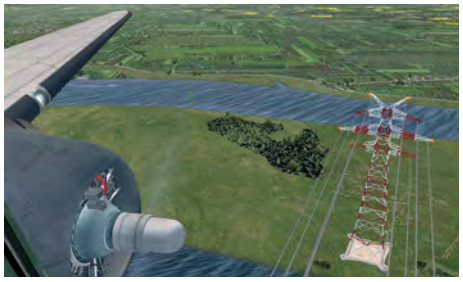
ABOVE LEFT: **Berlin is full of objects such as the Berliner Dom Cathedral**

ABOVE: **Taking the northern branch of the Elbe will give better views of the city**

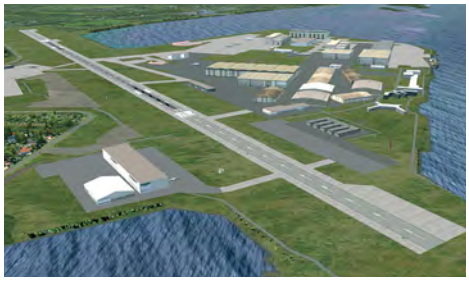
RIGHT: **While in northern Germany, take the opportunity to fly to other scenic airfields in this region**

SCENERY OPTIONS

In addition to the add-ons used in the screenshots in this article, links for a wide range of FS2004/FSX/P3D scenery options for this flight are available from www.freewarescenery.com including those for Berlin, Hamburg, Helgoland, Roskilde and openVFR for The Netherlands.



Beware of high tension power lines as you continue up the Elbe!



The dockyards are your cue to watch for the Finkenwerder Airport on the south side of the river

Much of the island's sandy wetlands are protected and are a very popular summer holiday destination

Start your descent overhead Baltrum and make a left downwind approach for Norderney's Runway 09

The UNESCO-listed tidal flats are clearly visible as you enter the North Sea

Unload at Norderney and enjoy the relaxing atmosphere of the island

entwined aircraft and successfully crash landed them on Wangerooge. The next island along is Spiekeroog and during its early history was a base for pirates, but since 1820 it has been a resort island. Other than emergency vehicles, you won't find any cars here or on most of these islands. The vast majority of visitors stay for several days taking in the sea air and visiting a number of historical and environmental tourism sites. There is no airfield here so we will overfly and continue westwards.

Our destination of Norderney/EDWY can be found on the fifth island along the chain. Start your descent to 1,000ft as you pass over Baltrum and enter left downwind for Norderney's Runway 09.

Watch for several restricted areas along the Elbe and skirt them by at least a mile

Significant parts of the island include a national park for wildlife and it is usually serviced by ferry from nearby Norden. It was in fact a part of a much larger island that existed until floods in the 14th century, which with some permanent shifts in the tidal flats, resulted in several smaller, now permanent islands.

Take care landing as the narrow runway can be deceiving and you may have to focus on nailing the centre of the runway if you are in a larger aircraft such as the C-47. Taxi to the eastern grassed area which should be large enough to accommodate you.

Auf wiedersehen

The areas along this route are very well represented in a large range of commercial and freeware add-ons and so Norderney makes an excellent base from which to fly a large number of optional VFR routes as described in the Optional Flights box.

By Peter Stark

OPTIONAL FLIGHTS FROM NORDERNEY

- Fly the daily mail run between Borkum/EDWR to Wangerooge/EDWG in a small Cessna.
- Take tourists to the island of Helgoland/EDXH in a Britten Norman Islander or single engine prop aircraft.
- Continue along the Frisian island chain to the Dutch airport of Midden-Zeeland-Middelburg/EDMZ, using the openVFR Netherlands scenery (FSX) to enhance the flight, or
- From Finkenwerder/EDHI to Copenhagen's Roskilde/EKRK Airport.

ADRIA AIRWAYS VIRTUAL

Jessica takes a look at a lesser-known Virtual Airline

This issue, I thought it would be nice to find a 'lesser-known' real-world airline that has a virtual presence. It sounds easy but is surprisingly difficult. By definition, lesser-known can mean 'overlooked'. As I sat scratching my head, a message popped up from a nice chap called Jure Griljc. He happens to be the CEO of Adria Airways Virtual. There's a phrase about 'looking a gift horse in a mouth'... Curious to know more, I thought it was worth a look.

Who's Adria?

Founded in 1961, Adria Airways is the national airline of Slovenia, based in Ljubljana. To say they have a small fleet would be an understatement, with just 12 aircraft active, plus three in storage. They're frequent visitors to Vienna, with their Bombardier CRJs making daily visits. The fleet consists mostly of CRJs and a small number of Airbus A319s, so it's a small airline, with a tiny fleet. There's something a bit 'cool' about that. I like Adria already. However, with such a small real world airline, how on earth can a VA cope?

History

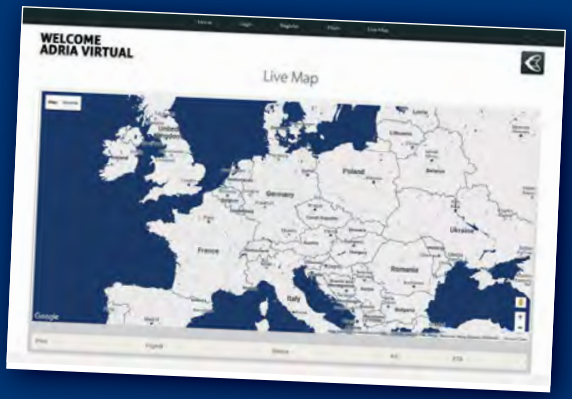
Like so many of the VAs I've looked at in this series, Adria Airways Virtual grew out of frustration. The original Adria Airway Virtual wasn't the most welcoming of places. The airline only operated on the IVAO network and was difficult to join. With just 10 members, it was an airline in trouble and going nowhere. As lead web designer and developer Miha Gračner explained: "We looked at the old Adria Airways Virtual and asked ourselves, what are we missing?" The first thing they did was open up the airline to both IVAO and VATSIM. Then they added in support for pilots who only flew offline. Then the hard work on getting the website set up and ready for the 21st century, with mobile and regular versions, along with lots of new web tech that Miha and others slaved over. While the tech stuff was going on, the board wanted to be so much more than the previous airline. They set about building a VA not just for Adria Airways enthusiasts but for all aviation enthusiasts. They wanted to become Slovenia's biggest VA. It's a difficult task but the team set to it with gusto.

Welcome to Adria Airways Virtual

With any virtual airline, following the real thing is important. Since AAV is representing Adria Airways in the virtual world, they made it a priority to match the real thing as closely as possible. Real world schedules are analysed and updated to stay as current as possible. Real world routes are correlated from various sources, then made available to members to fly. Every current destination that Adria flies to is covered. That is the least any VA should cover but AAV isn't the kind of VA that relies on a 'that'll do' attitude. As mentioned earlier, the Adria fleet is small and the route network isn't as extensive as some. That's where 'Charter flights' come in. The charter flights add an extra dimension to operations, allowing members to not only enjoy flying to destinations not covered by the mainstream aircraft but they also get access to Adria's historic fleet. With 50 years of flying behind them, the Adria fleet is varied to say the least. Along with the expected Boeing 737s both classic and NG variants, the fleet includes some of the McDonnell Douglas DC-9/MD-80 family, the Bombardier Dash-8 and even a single Saab 340 for cargo ops. Its eclectic and I love it. All pilots have access to downloadable Adria

ABOVE: **Adria Airways is the national airline of Slovenia, based in Ljubljana**

BELOW: **The online flight tracker lets pilots see who's online in real time**



A rare shot of the only Saab in the Adria Fleet


There are many custom liveries available


Respect is given to the classics with the DC-9/MD-80 family

liveries, so your 737 can wear the correct colours.

Tying the aircraft together are the four hubs: Ljubljana for home base along with Pristina in Kosovo, Tirana in Albania and Lodz in Poland. This is Eastern European pride in action and a great way to visit airports that the average European VA doesn't visit that often.

Pilot's briefing

Joining AAV is simple. As long as you have flight sim experience, you're in. You're free to fly by yourself or online and as long as you take a flight once a month, you're okay. If you don't fly for three months, you'll time-out of the VA but you're free to join again with no issues. For pilots coming from other airlines, the team will transfer your hours to Adria, to a maximum of 100 hours, which is nice.

As promised, AAV is doing its best to attract as many people to the VA as possible. The best way any airline can achieve this is by offering as many different flight sim platforms as possible. AAV comes through here with flying colours, offering support for FS9, FSX and derivatives, as well as X-Plane. It's always good to see a VA offer X-Plane support. In fact, X-Plane 11's new default aircraft fit perfectly with the AAV fleet.

New members start as new pilots in the rank structure. As hours are gained through experience, you can climb the ranks, topping out at captain. A captain's rank will cost you 500 hours. Those hours are all currently recorded with the free kACARS system, though the board has plans to move to a professional version that will allow the adding of more features for members to enjoy, though the thought of transferring the 649 routes in the current database is a daunting task in itself. Sadly, kACARS doesn't support MAC and OSX users, but AAV has gone that step further in allowing PIREPS to be manually submitted for Mac users. Now that's awesome and incredibly inclusive. The newer ACARS system will support OSX natively.

It's not just flight time that pilots can earn. Pilots also earn virtual pay. It may sound a little gimmicky, but it works by adding that tiny bit of real world fun, encouraging pilots to fly that little bit extra. The pay rates start at $168 an hour for new pilots and rise to $233 for a captain, so things just got competitive.

All pilots, new or veterans, have to book a flight. This is where a VA can fall down. AAV has a great 'Pilot's Centre' though that provides pilots with everything they need, from weather information, briefings, a download area for liveries and a live map to see who's online. Thanks to Miha, its all very slick and modern.

Recently, the airline introduced a new feature to the 'Pilot's Centre' that allows pilots to interact and even compete with each other. Competitive pilot bidding and the ability to brag about the amount of hours you've got, or the amount of money you've earned, sounds very 'real world' to me. The ability to interact with fellow pilots is essential in building any online community.

Finally, AAV is developing a flight school. This will allow new pilots to master ATC communication while online or simply get the hang of a new add-on aircraft. It's hoped that

RIGHT: **The main website is incredibly slick and modern**

BELOW: **The Airbus A320 Family is only a small part of the airline**

Even the old CRJ-200 makes an appearance and is a great aircraft for X-Plane users

If you love rear-engined, high tailed aircraft, the AAV could be for you

One of just three A319s in the current Adria Airways fleet

Ljubljana Airport is a beautiful location to fly to and it's also AAV's home hub

it will allow all AAV pilots to be as professional as possible, with exams available to secure even bigger bragging rights.

Fleeting fancy

The Adria Airways Virtual fleet is fascinating to say the least. What's really nice to see is that it doesn't rely solely on payware. The A319 and A320 fleet offer the ability to fly the freeware project Airbus and IFDG versions as well as the Wilco and Airbus payware versions.

Here's a full list of the fleet and it really does have something for everyone:

Airbus A319 and A320
Boeing 737-300, -500, -800
Fokker 100
Bombardier CRJ-200, 700, 900
Saab 340
Douglas DC-9,
McDonnell Douglas MD-80/81
Bombardier Dash 8-Q400

With the exception of the Fokker 100, there are some great payware aircraft out there to suit this fleet. X-Plane users are especially well catered for. Almost all the aircraft are available as X-Plane payware or just default aircraft in X-Plane 11. Either way, it's great to see plenty of options for all.

AAV's home base

Conclusion

'From little acorns, great oak trees grow', so the saying goes. For the staff and pilots of Adria Airways Virtual, that little acorn is well on its way to becoming Slovenia's very own mighty oak tree. In fact, in just a year from its relaunch, AAV has grown from those 10 pilots to over 50 and it shows no signs of slowing down. A great deal of love, sweat and hard work has gone in to producing something wonderful. That hard work is paying off. The website is slick and the fleet is varied. The routes are numerous, the flying is fun and the ability to chat to other pilots in flight is great. If you're looking for something a little different, based in the heart of Europe, then Adria Airways Virtual is a great place to hang your hat. After all, some of the most beautiful places in Europe are just a stone's throw from Slovenia, and Eastern Europe has much to offer for pilots jaded by the London-Frankfurt milk run.

My thanks go to Jure Griljc and Miha Gračner of Adria Airways Virtual for taking the time to chat with me.

By Jessica Bannister-Pearce

It's not all Alpine mountains. AAV offers a comprehensive charter service

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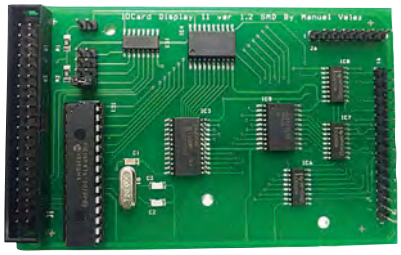
COCKPIT BUILDING

In this issue, Jessica tackles the Flight Control Unit

Following on from our previous issue, the cockpit is more or less starting to reach the homeward stretch now. She's more than flyable, even with a few bits and pieces missing. However, there's an elephant in the room, which, like all elephants, I've spent time ignoring. I can ignore it no more. It's time to tackle the FCU unit.

The FCU or Flight Control Unit is the Airbus equivalent of Boeing's MCP or Mode Control Panel. Don't let the fancy titles get to you though. Whatever the title, it all boils down to one common description: the autopilot. The autopilot is the heart of any modern airliner. The FCU unit is split into three parts. Parts 1 and 3 are the captain's and co-pilot's EFIS (Electronic Flight Instrument System) panel. (I love acronyms or ILA for short!) The EFIS panels control the navigation display elements, such as range, barometric pressure, airport, waypoint and constraints etc...

The second part is where the autopilot sits. It controls the speed, altitude and course settings. It also controls whether the Airbus works in 'Managed' mode or 'Selected' mode. It's really a system of two halves. Given that it sits at the heart of the Airbus, it's amazing I've made it this far without it. In typical cockpit builder's fashion though, things are never easy.



The Opencockpits display can run up to 16 individual digits

Recycled tech

As the FCU unit is such an important part, it doesn't come cheap. Prices start at just under £1000 and rise from there. However, I'm always looking for a bargain and a few years ago, I grabbed an old FCU unit along with a bunch of other panels for just £800. The FCU was an old Skalarki unit dating from 2012. It had seen better days, with part of the plastic frames around the EFIS units broken. It was functional though (more or less). Plugging it in via USB, I struggled to get the unit working. Then while attaching the external power supply, an incorrect voltage wiped the EEPROM, leaving the unit dead. Now in theory it was possible to re-flash the EEPROM's bios but finding a copy of the 2012 firmware was impossible. Even the unit's maker, Marcin at Skalarki couldn't get the unit to function again. So with the unit dead, and Marcin unable to revive it, I placed the unit into position in the glareshield, and there it stayed. Now the move is over, it's time to crack on and recycle the old tech and get it working once again.

Stripdown

Unlike working with the real parts I've had, the FCU is way more complicated. Originally, the whole unit was designed to 'plug and play' with a USB connector. Every button, switch and dial is soldered into a PCB, and then cables connect the various PCBs to the main board and out to the PC via the EEPOM that makes sense of the commands for the sim software to read. In total, there are 13 cables connecting the main board. To get the unit working again I need to figure out the function of each of these cables, then convert it for

ABOVE: **Finally sorted, and alive. Note the damage displays in the V/S section**

The FCU with its front panel removed. Note the altimeter 100/1000 switch placed on the right

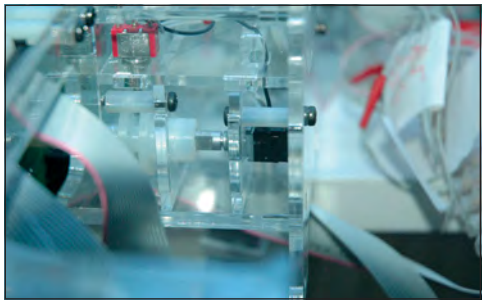
The EFIS section. For a small panel, there's a lot going on

connection to my open cockpits hardware, so it's not easy. Now add in the damage suffered while the unit was with the previous owner, and I've one hell of a mess to sort out. Faced with such a difficult task, it's best to split the work into sections. Thankfully the whole unit is already split into the EFIS and FCU sections. That really helps. Suddenly that mess of 13 cables becomes a set of three per EFIS section and four for the FCU.

The first step is to remove the old main board. It's not needed so it's best to get it out of the way. Next is to split the cables into their sections. The last job I need to do is repair the plastic frame parts. I'll use the CNC machine to make a replacement panel. For now though, once the FCU is in place, the broken pieces won't move.

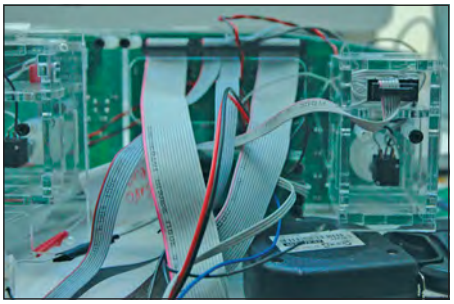
EFIS and FCU rewire

The EFIS panels are a great place to start. Marcin designed the FCU to be sold separately from the EFIS panels if someone only wanted a single piece. Not only does it keep costs down for prospective buyers, it makes my job a lot easier. The EFIS panel is made up of two rotary switches, a single rotary encoder with a three-way toggle switch, two three-way toggle switches for the VOR/ADF selectors and finally seven switches for various navigation settings, along with their individual LEDs. Add to that an LED display for barometric settings. Totalling up the amount of switches, you get 27 functioning switches to deal with, along with seven separate LEDs to light, the LED display and an encoder to wire up.

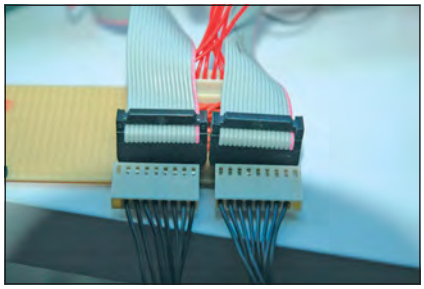


Each encoder is buried. It all works, though the newer models from Skalarki are much thinner in design

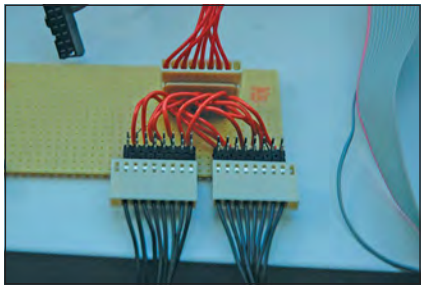
Here are just three of the many, many cables that need to be sorted out



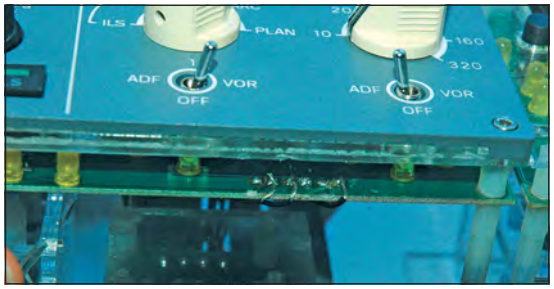
Showing the encoder wiring



When two become one. A simple bridging board for the LED displays



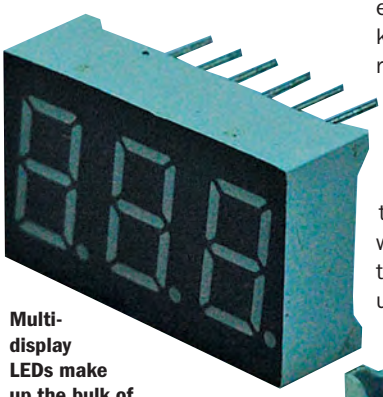
Wiring it all up can be tricky



Hidden at the bottom of the EFIS panel are the earth connections I needed to break

The easiest place to start is with the encoder. It has a separate six-pin plug that contains the wiring for the encoder and the toggle switch used to operate the Push/Pull function of the barometer knob. Using a multimeter, I first have to find the earth. There's a single common earth here, and that makes wiring up easier. Remember, open cockpits hardware relies on grouping switches into groups of 10: nine switches and a common earth. With the earth found, it's time to find the rest of the switch inputs. With help to operate the encoder and switches, I track down the functions and wire them ready for connection. When trying to find any function, you'll need to be patient. Next I tackle the first of three large plugs that come from the back of the EFIS PCB. Luckily for me, Marcin is a very methodical man, and the plugs all relate to individual sections. One plug deals with the LED display, one deals with the rotary switches and the final plug deals with the push buttons and LEDs. Like the encoder, it's important to find that common earth. Here's where I hit the first problem. Running through the board is a single common earth. As above, Opencockpits require you to use four separate earths per 40-pin section. I need to find a way to separate the earths. It turns out luck is on my side. Right at the bottom of the EFIS board are six soldered links. They're earths, and removing the soldered links splits them back up.

The LED display represents a challenge as well. The four digit display is a single unit, with a combined earth. Each segment of a digit is a separate LED and there are seven different segments plus an extra one for the decimal point if needed.



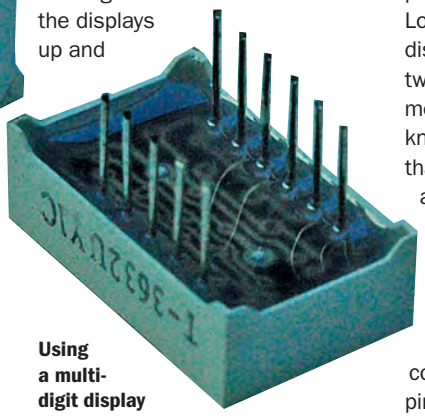
Multi-display LEDs make up the bulk of the displays

Each requires its own pin along with a single earth. With four digits next to each other, you have to find a way to address each segment, and each digit at the same time. I dismantled the front of the panel to see if I could find the type of LED display I was dealing with. Model number found, I was able to track down the data sheet and it told me what pins dealt with what. With the pin info, I was able to test all the displays using my multimeter. Sadly, I discovered one display that had several segments out. I'll need to replace it but a quick web search showed only a single shop that sold the matching type, and I'll need to buy 10 just to replace one. So for now I transferred the damaged display to the least used function, the V/S display.

With the EFIS rewired, the FCU is fairly easy to crack. The encoders are wired as before, and the displays, switches and LEDs are easily sorted via the four plugs attached. Again sorting earths is tricky but again, it kind of works out, with minimal rewiring.

Interfacing

With the wiring sorted and ready for connection, the next task is to get the LEDs lit, the switches working and the displays up and running. Wiring the switches is easy and involves nothing I haven't tackled before. The displays however require a little bit of extra thought. To get the displays working correctly, I'll need to add an Opencockpits Displays II card. These cards plug into a mastercard and can power up to 16 individual digits. Up to four display cards can run from a single master card. The whole FCU Unit features 24 digits and I have but one card. So I prioritise the FCU panel, leaving the barometer displays for another day.



Using a multi-digit display can cut down on the number of pins needed. The three digits need just 11 pins to work as opposed to the 24 required for individual sections

The tricky part comes with connecting the displays to the card. Essentially, I need to combine four separate LED display modules into one set of connectors. On the display card, there are seven pins to control the individual segments, then 16 pins for the earths of each digit. Lots of fun. From the FCU the displays ended up being split into two cables and the best way for me to interface them all was to knock up a quick bridging panel that took the two separate cables and outputted them to a single cable for the display card. It was a little tricky but not too difficult. The fun begins once the card is up and running.

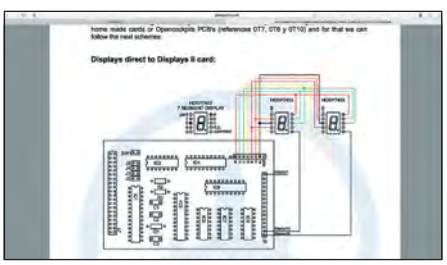
To programme the displays correctly, you need to ensure the pins are in the right order. Power on and it was clear that my wiring was incorrect. Opencockpits labels the displays from 0 to 16. My wiring had them jumbled along the lines of 10 to 16 then 0 to 9. I needed to reorder my connections.

There's still a lot to do, including sorting the rest of the LEDs via the standard Opencockpits master card. Until then, I have a working FCU, and finally getting to use it is great.

By Jessica Bannister-Pearce

LEFT: **It's alive, but the cables are on backwards. Who said it was easy, eh?**

BELOW: **Opencockpits wiring diagram explaining what is connecting individual LED displays together**



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PC PILOT CLASSIC PRODUCT

Wired2Fire Sim X-15

The Need for speed

Last year was an interesting time in hardware development. The highlight was arguably the release of NVIDIA's latest flagship, the GTX 1080 (reviewed in Issue 105). There have also been advances in other areas, in particular drive technology with improved support for an emerging standard called M.2. Although it was initially announced in 2013, it was not until recently that it started to become more commonplace. This year promises to be equally exciting and started with a bang when Intel unleashed its latest processor codenamed 'Kaby Lake'.

Wired2Fire which has been building PCs aimed at flight simulation for several years was quick off the mark to release a new machine, called the Sim X-15, which uses this new processor. Equipped with the latest and fastest hardware currently available, the machine is made with one job in mind, to run flight simulators at maximum frame rates. So without further ado, we are going to see how it measures up against four of the most popular flight simulators on the market: FSX, Prepar3D, X-Plane and DCS World.

Introducing the Sim X-15

The Sim X-15 is powered by Intel's latest high-end central processing unit (CPU), the Core i7-7700K. Based on the Kaby Lake micro architecture, it runs at a base speed of 4.2GHz and a turbo boost of 4.5GHz, although Wired2Fire offers a software tuning and optimisation service as well as an option to overclock the CPU to 4.9GHz!

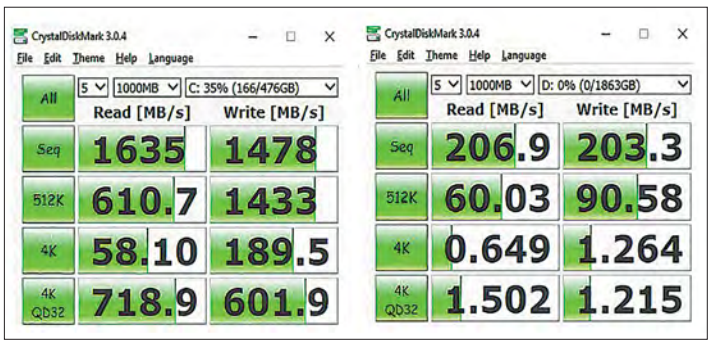
To keep the temperature down, it is fitted with a Fractal Design Kelvin S24 water cooler and mounted on an Asus ROG Strix Z270F gaming motherboard, with on-board Gigabit Ethernet and high-definition audio.

While most systems we have come across are equipped with conventional hard drives or solid state units, the X-15 comes with a 512GB Samsung PCIe 3.0 X4 solid state M.2 drive. This relatively new drive technology boasts a massive throughput of up to 4GB/s (compared with 600Mb/s for SATA III). To take full advantage of the 16GB of fast Corsair 2666MHz C16 dual channel DDR4 memory, the X-15 is loaded with a 64-Bit version of Windows 10 Home Premium. A second 2TB Barracuda 7200RPM SATA III drive is also fitted, which can be used for installing larger programs.

The graphics are handled by an NVIDIA GeForce GTX 1080 with 8GB of GDDR5X VRAM, which is fitted with one DVI output, two HDMI ports and two display ports. Finally, the system is built around a Phanteks Enthoo Evolv case in a black finish, with a large case fans for ventilation and cooling, while power is provided by a FSP 750W Silver 80 Plus Certified PSU. Other features include front- and rear-mounted audio outputs and a total of six USB ports (rear: 4 x USB 3.0; 1x 3.1 and front: 2 x USB 3.0).

ABOVE LEFT: **Wired2Fire has built the Sim X-15 to a high specification using the fastest components currently available**

ABOVE RIGHT: **NVIDIA GTX 1080 comes with two HDMI ports, one DVI output and two display ports**



LEFT: **The motherboard comes with on-board Gigabit Ethernet, audio outputs and several USB ports** ABOVE: **M.2 drives may be tiny but they pack a serious punch. The figures above show the difference between SATA III (left) and M.2 (right)**

Size MATTERS

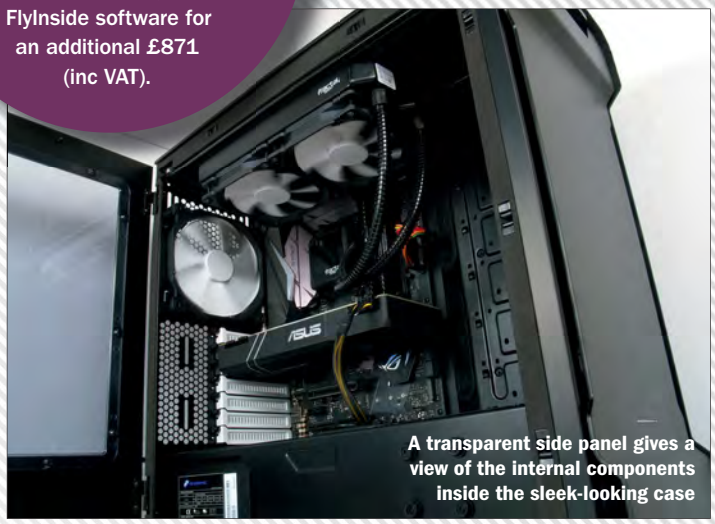
While processors and graphics card have evolved at a rapid pace, it could be argued that drive technology has not advanced at the same speed. Solid state drives (SSD) traditionally use the SATA III bus, which has a maximum transfer rate of 600MB/s. This specification was developed when conventional hard drives were common and SSDs were relatively rare. However, as memory speeds increased, the SATA III interface began to restrict the bandwidth of SSD drives and the M.2 interface was developed to overcome this limitation. By using the greater bandwidth of the PCIe bus, M.2 drives can run at speeds up to 4GB/s on newer motherboards, providing a significantly faster transfer rate than was possible using SATA III.

CPU temperatures are kept under control by the Kelvin S24 water cooler

Virtual reality expansion

The X-15 can be purchased with the HTC Vive VR Head-Mounted Display and FlyInside software for an additional £871 (inc VAT).

Front-mounted connectors include two USB 3 ports and audio jacks for headphones and a mic



A transparent side panel gives a view of the internal components inside the sleek-looking case

Introducing Kaby Lake

The i7-7700K Kaby Lake is the seventh-generation processor from Intel and the successor to the Skylake 6700K. While it uses the same 14nm manufacturing process, it runs at a faster speed, although power consumption remains the same thanks to its more efficient micro architecture. The 7700K runs at a base speed of 4.2GHz and with a turbo boost of 4.5GHz (up from 4GHz and 4.2GHz respectively from the 6700K). As its predecessor, the 7700K is primarily designed high performance computers and takes advantage of Intel's new Z270 chipset, which features several improvements such as 24 PCI-E lanes compared with 20 for the previous Z170 chipset, meaning you can connect more high-speed devices such as M.2 drives and graphics cards at the same time without running into bottlenecks. In terms of performance, the 7700K is around 8 to 10% faster compared with the 6700K. But compared with the fourth-generation Haswell i7-4790K, improvements in performance is estimated to be around 23%.

Performance tests

While third-party software for FSX continues to push the boundaries of the 32-bit memory, it is still primarily limited by the speed of the processor. We ran a number of scenarios using popular add-ons including Active Sky and various Orbx sceneries. We also loaded complex airliners such as the PMDG 737NGX along with high-fidelity packages, including the Airbus A320/A321 from Aerosoft and a variety of general aviation aircraft. To record the average number of frame rates we used FRAPS (www.fraps.com).

With the sliders set to maximum (apart from Autogen which was set to normal), water effects were set to 'Low 2.x' and scenery complexity was set to 'Dense'. We also disabled shadows and light bloom as these are known to have a significant impact on frame rates. With default aircraft and scenery, we achieved an average of around 100FPS in rural areas, while around densely populated airports, such as New York, they were between 35 and 50. With more complex and detailed scenery, such as Orbx England and Aerosoft Mega Airport London Heathrow Xtended, frame rates were between 28 and 40 when flying complex airliners; overall, an impressive result. General aviation aircraft such as the Comanche from A2A with

Complex airliners run at high frame rates, even over detailed scenery such as London Heathrow

DETAILS 90

Manufacturer: Wired2Fire
Price: £2080.99 including VAT
Website: www.wired2fire.co.uk
At a glance: The Sim X-15 from Wired2Fire, loaded with the latest hardware technology, will take your flight simulator experience to new heights.

SPECIFICATION

Case: Phanteks Enthoo Evolv Black Case (No DVD Drive Bay)
CPU: Intel Core i7 7700K Quad Core Socket 1151 overclocked to 4.9GHz
CPU Cooler: Fractal Design Kelvin S24 CPU Water Cooler
Graphics Card: NVIDIA GeForce GTX 1080 8GB GDDR5X
RAM: 16GB Corsair DDR4 2666MHz C16 Dual Channel Memory Kit (2 x 8GB)
Motherboard: Asus ROG Strix Z270F
System Drive: Samsung 512GB SM961 PCI-E 3.0 X4 NVMe Solid-State Drive
Storage Drive: Seagate 2TB Barracuda 7200 64MB SATA III
Power Supply: FSP Non-Modular 750W Power Supply (Silver 80 Plus Certified)
Cable Management: Wired2Fire Cable Management
Sound Card: Onboard HD 7.1 Audio
Operating System: Microsoft Windows 10 Home (64-Bit)
Warranty: Three-Year Return to Base Warranty (two years parts and three years labour)

Orbx scenery resulted in superb performance. When flying around detailed scenery, we achieved between the high-40s to mid-50s, which made low-level flying a superb experience. Prepar3D is now up to version 3.4 and has seen various performance and stability improvements, including DirectX 11 support. This allows much of the graphics processing to be handled by the GPU rather than the CPU. We saw similar results with frame rates in the high-to-mid 30s at populated airports and around 50 in rural locations, although on occasion we achieved close to 100FPS.

DCS 1.5 had no issues, even at maximum levels of detail, frame rates were between 40 and 50 using the default aircraft. Similarly, DCS 2.0 ran with a frame rate in the high 40s when the level of detail was set to high, which is ample for a smooth flying experience.

Finally, we ran X-Plane 11 to really put the system to test. While the new version of X-Plane is flexible and can be tweaked to enable most computers with a 3D graphics card to run, it can also tax the most powerful machine. With the graphics set to HDR and antialiasing to 2x, frame rates were between between 40 and 50FPS, while increasing the level of detail to 4x SSAA and FXAA produced around 30FPS.

One area that really impressed me was the speed of the M.2 drive. Boot times were lightning fast, with Windows up and running in around 10 seconds. Both FSX and Prepar3D fired up in around 15 seconds. X-Plane and DCS were slightly slower but still loading in well under a minute. Compared with conventional SATA III drives the difference was simply phenomenal and bodes very well for the future as drives have been the major bottleneck in computer systems.

Conclusion

Wired2Fire has produced a well-rounded system that is built to a high standard. While the price of £2,080.99 represents a significant investment, it is equipped with the best hardware available to date.
The combination of the latest Core i7 processor with the GTX 1080 and a fast M.2 drive promises to deliver a silky smooth flying experience for years to come.

By Richard Benedikz

Even at maximum detail settings DCS ran at 50FPS

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PC MAINTENANCE

MAIN PHOTO: **Case fans are fairly cheap, and can add extra airflow to a case to help keep temperatures under control**

Jessica Bannister-Pearce offers some important hints and tips on keeping your PC in tip-top condition

Spring cleaning

We all get old. This year I've found more than a few grey hairs among my raven locks. However, our PCs age much more quickly and with greater effect. The average life of a PC is 18 months before the components inside are considered outdated. The thing is though, if the machine is working well, there may be no reason to change it. Properly cared for, your PC can soldier on for many years. Even if you do upgrade, that old PC can still function just fine for lots of sim-related activities. Here are a few things you can do to help keep your best friend in tip-top condition.

Turning down the heat

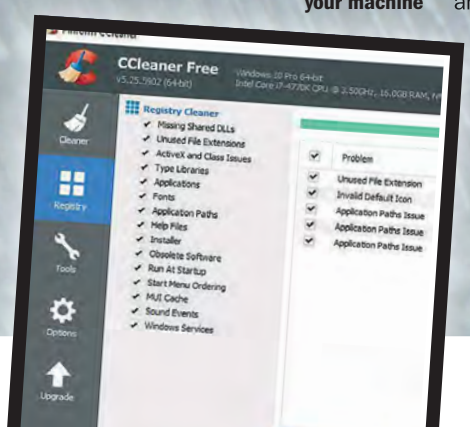
Overheating is the natural enemy of the PC. If the processor gets too hot, the whole system will shut down to protect itself, or worst of all, suffer damage that renders the old girl useless. There are several things you can do to help keep your cool, the easiest of which is to get the vacuum cleaner out.

Dust is the single biggest cause of PCs overheating. Let's be honest, we get our shiny new PCs and plonk them down, plug them in and that's it until something breaks. It's best practice however to get in there and clean the dust out of the PC once in a while. The dust gets everywhere and it's quite adept at clogging the cooling fins of your PC's heatsink or radiator. It also clings to fan blades with ease, disrupting airflow. It's a huge problem. During the summer, when temperatures hit the high 20s here in Vienna, my PC simply couldn't be used. A quick inspection showed my radiator to be clogged with dust. The vacuum and a can of compressed air blown through the radiator itself cured the problem.

To help stop dust getting into the case, you can buy mesh sheets to cut and cover various holes and fans found in your PC case. It's pretty cheap stuff, coming in at under £10 but so worth it. It won't stop all the dust getting in, but it will reduce the amount of cleaning you'll need to do.

Sometimes though, dust isn't the issue, as our editor recently discovered with one of his older machines. The standard heatsink compound found on the PC cooler units can, over time, 'go off'. Heatsink compound is that grey gooey

BELOW: **It's not just your hardware you have to look after. Over the years Windows can 'clog up', slowing down your machine**



Dust can get everywhere, including your GPU, which is not that easy to clean. Adding mesh to your case can reduce the amount of dust entering

Now fully cleaned, the CPU is ready for re-compounding

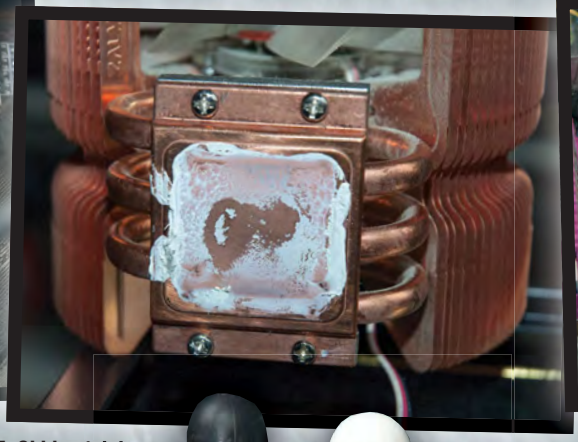
UHD MESH

UHD or ultra HD mesh is a freeware mesh made exclusively for X-plane. Not only does it replace the current elevation mesh in X-Plane, it also includes updated autogen, tree placement and road placements using real world data from the open street maps project (OSM). The mesh is so accurate that even with a machine fitted with 16GB of memory, it's possible to 'run out' of actual memory. Areas such as the Alps can certainly tax any system. Check out www.alpilotx.net/ for more details on this great freeware program.

stuff that sits between the CPU and heatsink block. Its job is to form a nice conductive bond between the two, transferring the heat efficiently from the CPU. Over time though, it can start to harden, eventually stop conducting that heat and start to hang on to it, causing the CPU to overheat. Replacing the compound is the only thing to do. Changing the compound isn't that difficult and you can do it for less than £12. I use Arctic Silver 5 in all of my builds which is great at keeping the CPU cooler than a Nat King Cole Christmas song. You can buy a kit that includes the paste as well as a set of cleaning fluids to ensure the CPU is in tip-top condition for the new compound. Remove the old heatsink and use the cleaning fluid to remove the old stuff from both the CPU and heatsink face. Then lay a single line along the centre of the CPU (this will vary depending on the type of CPU you have). Arctic Silver provides an information sheet on its website on where to put the compound for many different types of CPUs. Then carefully reseat the heatsink on top of the CPU. Don't use too much of the compound as too much is as bad as too little. Arctic Silver 5 will cure over the next 300 hours of use, and temperatures can end up being six to seven degrees cooler than the standard thermal compound.

If you still have issues with keeping the PC cool, consider adding a new case fan or two. Case fans are a great way to either force cool air in or get warm air out. The higher the RPM, the greater the cooling efficiency, though that doesn't always mean increased fan noise. It's a fairly simple job to fit a case fan, though some thought must be given to the airflow within the case. For example, my main work PC has lots of fans. Air is sucked in from the front and underneath, then expelled through the radiator on the top of the case so the airflow runs from bottom to top. Introducing a fan that took air towards the bottom of the case would ruin that airflow and possibly cause unwanted heat to build up. So it's best to think about what your case fans are doing already and augment that, rather than going against the grain.

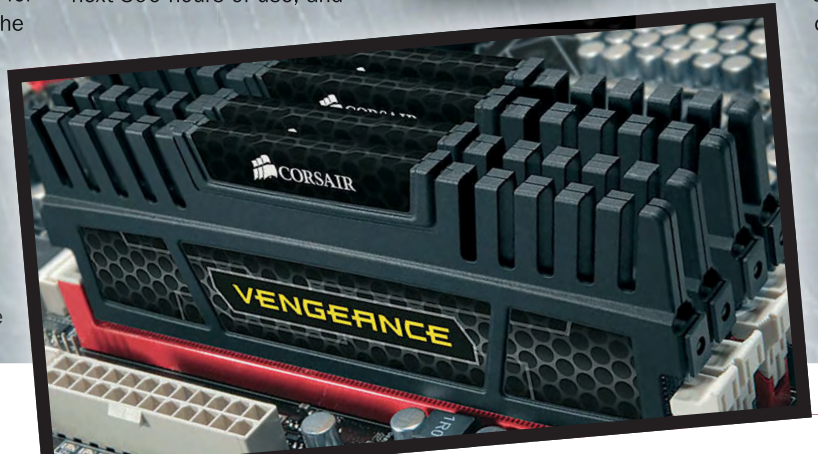
A final quick tip to aid cooling is to tidy up the cables in the case itself. Having cables everywhere can seriously mess with the airflow, disrupting the cooling of the machine. A pack of small cable ties will cost less than £1 and can spruce up an interior with ease. The idea is to create as much open space inside the case as possible. Open space means free flowing air, resulting in cooler temperatures.



Keep it simple when adding heatsink compound. Too much is as bad as none at all

ABOVE: **Old heatsink compound can go 'off' or hard. This then leads to overheating**

RIGHT: **Heatsink compounds come in lots of flavours. I've used both but I prefer Arctic Silver**



It's hard and sticky and needs changing

LEFT: **Extra memory can increase headroom for Windows and gain you a few extra frame rates if you're lucky**

Quick upgrades

If a lack of speed is an issue, there are a few things you can change or add to that can help a slow PC seem like new again.

Changing an old HDD for a new and speedy SSD is a great way to get a performance boost. Instead of long boot-up times, an SSD (or Solid State Drive) can reduce Windows start-up times to just a few seconds. Massive 1TB drives can cost a lot of money (around £200 at the time of writing). A single 120GB drive for just Windows comes in at around £45. There are plenty of programs out there to help you transfer Windows to the new drive without the need to reinstall. It's a cheap and effective way to get a great speed increase.

Another place to add a little headroom to an old PC is to increase the amount of memory. Most older machines make do with 8GB of RAM. Increasing this to 16GB is a fairly simple job and it can add a nice little speed boost if your PC can handle a faster speed of memory. Going from 8GB of DDR3 RAM that runs at 1600MHz to say 16GB of DDR3 running at 2133MHz can offer a nice boost of a few frames a second for flight simming. For X-Plane users, that 16GB will also open up the world of UHD mesh (see box-out for explanation) which needs 16GB of memory as a minimum. It will cost just under £100 but it's worth it.

Software tune-up

The last place to clean out is your software. Over the years of use, Windows will become bloated, flies become lost and the Taskbar becomes a resting place for background programs you've long since forgotten about. Even on my PC right now, there are 14 different programs sitting in my tray next to the clock. I'm sure I need them all, but they do have a habit of slowing things down.

And that's just the stuff I can see. Add to that broken registry links from things long since uninstalled, bloated recycle bins and the mysteriously hidden 'temporary internet files' folder and you have a recipe for a bloated system.

HDD space can be eaten into without you realising it and as they get fuller, so performance drops off. Once you start to see an HDD show its space in red on the 'My computer' screen, its time for a bigger drive or a clean out of the existing one. To help out, I use a cracking little free program called CCleaner from Piriform. The free version allows you to clean out useless old files to free up HDD space. It's fully customisable, so you don't have to delete your 'most recent files' list if you don't want to.

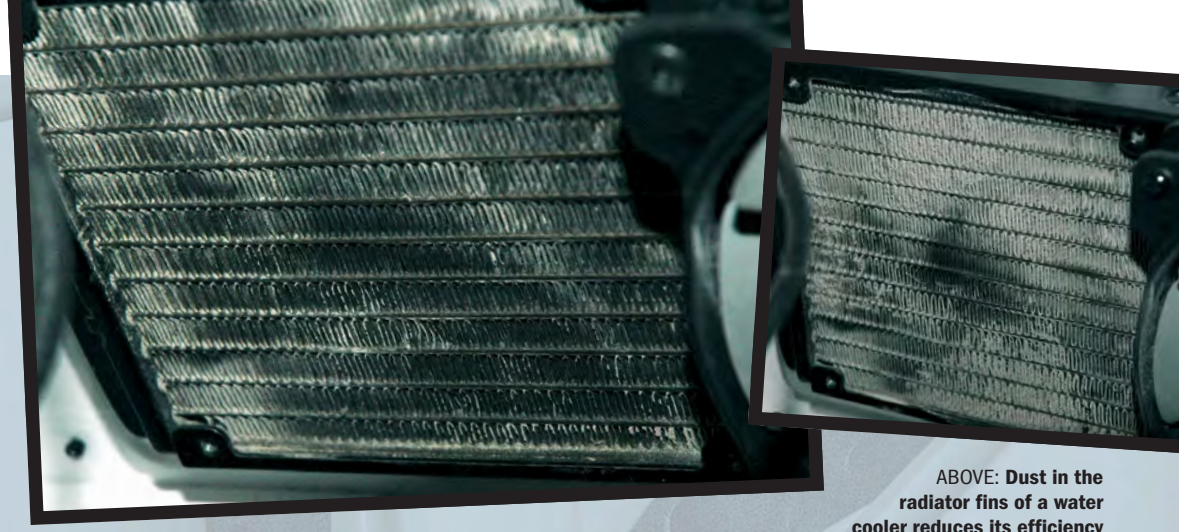
And that's just the start of this program's powerful features.

CCleaner also has the ability to scan your registry to find errors and broken links and then repair them. It allows you to backup your old registry first though, making it a risk-free option. Add to that the ability to uninstall programs you're not using, sort through those pesky start-up programs to decide what actually runs when you start Windows and you can see it's a powerful yet friendly interface to help you optimise your system. It even monitors your system files and tells you how much space is being taken up by useless files.

Conclusion

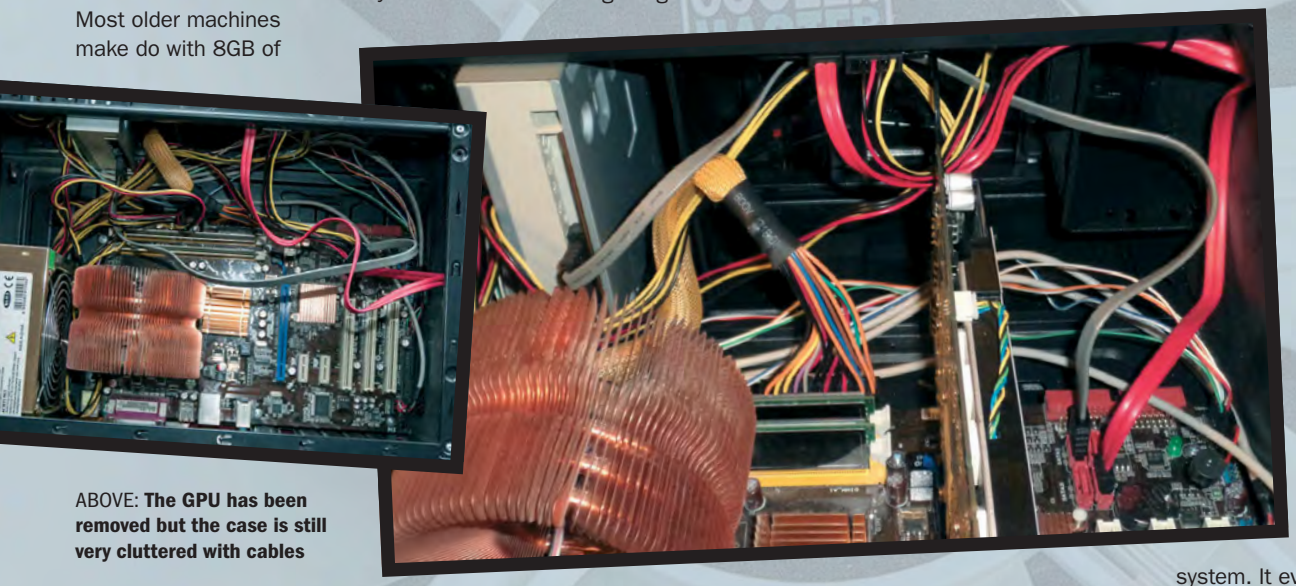
Just because something is old doesn't mean it is worthless. With proper care and love, an old PC can live on for years. Trust me. I still have an old Dell machine that's 10 years old and still running just fine. A little hoovering now and again can help keep the machine cool and a cleanup of your OS can add years on to an old machine. Given the cost of PCs, getting your money's worth is really important.

By Jessica Bannister-Pearce



ABOVE: **Dust in the radiator fins of a water cooler reduces its efficiency dramatically**

ABOVE LEFT: **A bit of 'compressed air' and a vacuum later and things look a lot better**



ABOVE: **The GPU has been removed but the case is still very cluttered with cables**

ABOVE RIGHT: **Tidy cables allow more air to circulate freely around the case**

LEFT: **Upgrading to a cheap SSD for Windows can speed up boot times dramatically**

Flight Sim Q&A

You've got the questions? We've got the answers!

By Richard Benedikz

Entering the Rift

Dear PC Pilot

I recently acquired the Oculus Rift and have been using it with great success. Having seen the potential of this device, I would like to extend this to flight simulation, in particular to fly complex aircraft such as the PMDG 737NGX. Are you aware of a way to get FSX to work with the Oculus and if it is possible to interact with the controls?

Best regards,
Simon

Dear PC Pilot

Hi Simon,

There are various VR options when it comes to virtual flying. Several simulators, including DCS, support the Rift natively. However, if you want to connect FSX or Prepar3D you need to use a third-party add-on programme. A company called FlyInside has developed an excellent VR interface, which works with both simulators. A demo is also available so you can check it out for free before buying by visiting www.flyinside-fsx.com.

For controlling aircraft, the popular option is to use a device called Leap Motion. Basically, this is a hardware sensor that detects your hand and finger motions as an input in virtual reality. It is a slightly surreal experience as you can see blue ghost-like hands moving around mirroring your own hand movements while you operate various buttons and switches. Both the Oculus and HTC Vive can be modified to use Leap Motion, see the following link: www.flyinside-fsx.com/Features/LeapMotion. In use, general aviation aircraft are more straightforward than complex types such as the PMDG 747/737, so you might find it trickier to manipulate controls in the cockpit on these. One thing to bear in mind is some add-on aircraft can exhibit odd behaviour when operating certain levers or knobs. Integrating virtual reality with flight simulation is very much in early development but it is progressing at a fast pace, so there are exciting times ahead.

Cheers,
Richard

A Leap Motion sensor can be used to track the movement of your hands, enabling you to manipulate controls in the cockpit

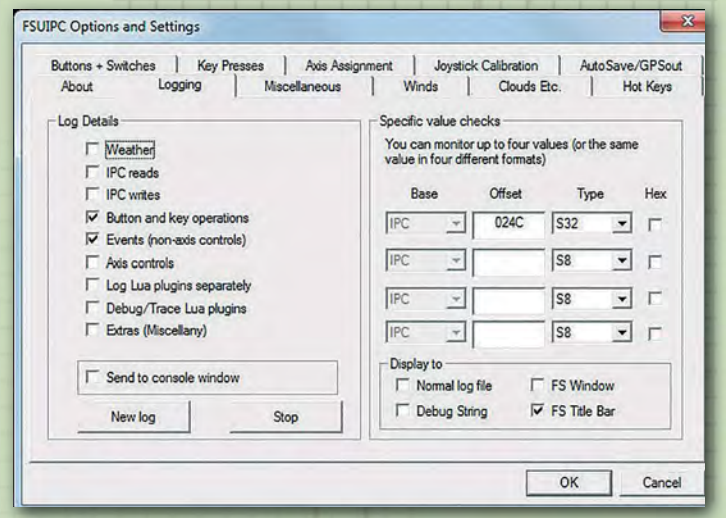
Memory question for FSX

Dear PC Pilot

I have a fairly powerful computer with an Intel i7 processor, 32GB of RAM, 1TB hard drive, an NVIDIA GTX 960 graphics card with 4GB of memory running on Windows 7 64-bit. I also use two Matrox TripleHead2Go video to drive six monitors and I have the video defaults all set to high. About 30 minutes into the flight, FSX crashes and says it has run out of memory, and advises me to reduce the visual graphics setting. Can you please explain why this is happening and what I need to do to prevent it? I would have thought this shouldn't happen with my hardware.

Thanks,

Eddie



FSUIP can be configured to continuously monitor VAS usage

PC Pilot

Hi Eddie,

FSX is a 32-bit application and even when running on a 64-Bit operating system, it can only access 4GB of memory. This also includes graphics memory, so if you are running at a very high resolution, video memory is going to take a fairly big chunk out of that 4GB pool. Essentially this is a 'hard' limit that all 32-bit applications suffer from and is called 'virtual address space' (VAS). When FSX crashes with an error message saying that your computer has run out of available memory, it's actually talking about VAS, not the total physical memory on your system, so to clarify, you are actually running out of the 4GB pool not physical memory.

I am afraid there is no fix for this except turning down the level of detail to reduce memory usage. The best way to start is to reduce AI traffic and turn autogen down and see if that helps. Then start turning down the scenery settings. Add-on scenery is a major cause of VAS usage as there is a bug in FSX that doesn't unload scenery from memory after you are out of range. For example, if you are flying between two detailed airports, scenery will gradually fill up the 4GB memory space causing VAS to gradually increase, until you may ultimately run out of memory. It might also be worth going through your scenery library to see if there are any redundant entries there.

I have found one of the biggest culprits for VAS usage is the LOD_RADIUS setting in the FSX.CFG file. It is often recommended to increase this value from the default 4.5 to 6.5 to reduce blurriness. However, I have found that setting LOD=RADIUS to 6.5 tends to result in out of memory errors more frequently, so I would recommend leaving this at 4.5.

Although it is not possible to monitor memory usage in FSX via the Task Manager in Windows, there are several ways to check how much memory FSX is using, giving you some warning when you are going to run out. A popular solution is to use an application called Process Explorer (http://technet.microsoft.com/en-us/sysinternals/bb896653.aspx).

Alternatively, if you have a registered version of FSUIPC, there is something you can do to display available memory.

Go to the FSX menu > Add-ons > FSUIPC.

Click on the Logging tab.

Enter an Offset of 024C (that's a zero).

Enter a Type of S32 from the drop-down box.

DO NOT check the Hex checkbox.

Press OK.

If you are running FSX in window mode, you will have a continuous readout of available memory in the top left corner of the title bar.

Cheers,

Richard

Flying long distance over detailed scenery areas will eat into available memory

AI Traffic

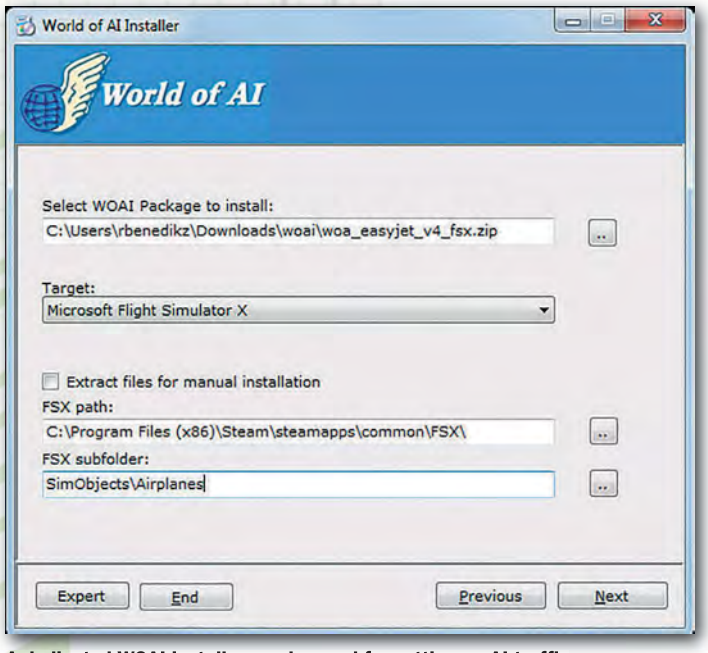
World of AI is run by an independent group that provides high-quality AI traffic for FS2004 or FSX

Dear PC Pilot
I hope I am writing to the correct person. I have been using FSX for some years now and just changed over to FSX: Steam Edition. I can't seem to get any of my World of AI (WOAI) aircraft installed into it. All of my main airports in FSX are populated with all the major airlines and I would like to see that in FSX Steam as well. Hope you can write back to me and give me some ideas.
Thanks
Jim

PC Pilot
Hi Jim,
It should be possible to install the WOAI package in FSX: Steam Edition. Firstly, you need to download the installer and the AI packages you intend to use from the WOAI website: http://www.world-of-ai.com/allpackages.php

Place the AI packages in a custom folder. When you run the WOAI installer, you should see an option to specify the path to the folder; you should then select FSX from the 'Target' dropdown box. If the path to FSX isn't entered, you may need to browse to it manually. Then hit next and the aircraft should be extracted to the Simobject/Airplane folder. I have tested this on a couple of machines and it worked pretty seamlessly. The accompanying image shows the settings I used.

Cheers,
Richard



A dedicated WOAI installer can be used for setting up AI traffic

ATC Audio

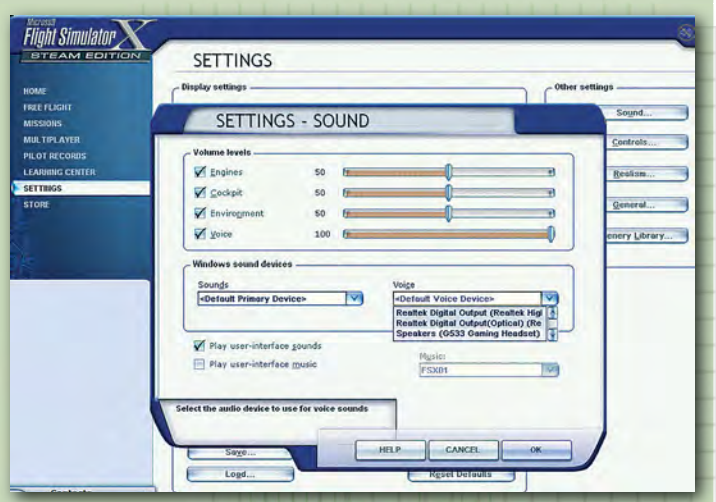
Dear PC Pilot
Greetings to you all at PC Pilot. I have been flying with a virtual DC-3 group for seven years and I am happy with FSX ATC. I read somewhere that it is possible to switch the audio ATC so you can listen to it using a headset. Can you confirm this?

Kind regards,
John

PC Pilot
Hi John,
You can indeed set this up in flight simulator fairly easily. Start FSX and go to the menu, then Settings > Sound. In the 'Voice' dropdown box, select the headset while leaving the other sounds on the speaker settings (see accompanying screenshot).

Incidentally, if you want to fly online using IVAO or VATSIM for added authenticity, it is important to set your headset up so you get audio ATC via the earphones rather than through the desktop speakers. For example, if you use vPilot when connecting to VATSIM, you need to set your headset up so the ATC audio and microphone are directed from here. Also ensure you set the transmit key from here, for example using the trigger button on the joystick.

Cheers,
Richard



Using a headset when communicating with ATC adds that extra bit of authenticity and immersion

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