ENGINE EXHAUST SYSTEM*PLUS*

Version 3.2 for you and your AI traffic

By Martyn Becker, January 2006
Operating instructions for Flight Simulator 2004 and 2002.

CONTENTS:

UPDATE

Version 3.2 was initially conceived as a 'bug fix' since Version 3.0 was responsible for a specific crash error in FS9, which has now been corrected. The correction process prompted another couple of improvements which are included here also.

Version 3.2 includes the following:
- Version 3.0 caused a specific crash error involving FS9 module FE.DLL. My thanks go to Jerel Hayes who spotted that it was the bitmap files associated with the actual effects files that were to blame since they were saved as 32-bit textures, rather than simple DXT1 textures like the default effects textures.
- Improved exhaust effects that stream backwards more realistically during flight.
- Inclusion of a 'light' effects density as well as 'medium' and 'heavy'.
- More location parameters in the aeroplanes section.

If you are new to this package, then simply follow the instructions below for a complete install.

If you are upgrading to fix the crash error, then simply replace the two bitmap files in the fs9/effects/texture folder with the updates in the zip. If you want the enhanced effects as well, then overwrite the effects files in the fs9/effects folder with the effects files in the zip. Note that there are two more there now – the 'light' variants.

(If you routinely use the taxi light switch (switch 6) for the taxi lights, then there is a variant of the XML gauge provided in the zip that only uses switches 7, 8 and 9. You would then need to amend the gauge name in the panel.cfg entry from LightsAutosmoke to LightsAutosmoke9789. The control lines in the aircraft.cfg file also need to be amended. Please see the appropriate sections in the manual, in italics, where I give examples. This addition was specifically requested and is included here as an option which will require a little more work from you. Don't do it if you don't need to.)

OVERVIEW – and What's New in version 3:

There are many great freeware aircraft out there for Microsoft Flight Simulator. I am indebted to Rob Barendregt whose original gauges and effects were part of the inspiration for this system. My thanks also go to Nick Needham whose own work on aircraft emissions for AI made me realise that it was possible to do this.

A little history - I originally designed an effects file for FS2002 that added engine smoke to the exhausts of my passenger jets that were activated from the aircraft.cfg file [smokesystem] section by the use of the 'I' key, as this seemed to give an extra dimension to the sim when viewing from outside. Then I wrote a simple XML switch that sat as a gauge in the panel.cfg file that activated the smoke when the engines' N1 was over 59%, so that using the 'I' key wasn't necessary. I didn't think much further about it until I saw a request in the SIMViation forums (www.simviation.com) for an engine effect that reproduced the engine heat 'shimmer' that you see with modern turbofan engines.

I decided that my smoke effect that had served me well for a couple of years was just not realistic enough in FS9, and inspired by Nick Needham's smoke-for-AI aircraft package, I set about putting together a realistic engine exhaust effect set for the pilot's (that is, YOUR)

passenger jet plane in FS. With EES*Plus*, the effects are also usable for your AI (if you use Project AI).

The effects are not 'smoky' as such - they are designed to imitate the heat shimmer and turbulence that modern turbofans put out. I've tried to make them as accurate as possible while also making them visible enough to be worth adding. As such, this package is intended to enhance the external view of the plane that you are flying. Additionally for those like me who like to fly older jetliners as well, effects are included that mimic the smoky exhaust of the older turbojets.

There are a number of improvements in this package over the first two versions:
- There are fewer control XML files (there's only 1 now instead of 2),
- An Auxiliary Power Unit (APU) exhaust plume is now included as an effect which is angled slightly upwards at the aircraft rear as in real life,
- A 'simple' addition process applies the exhaust system to your AI planes also!

I have had requests to make this installation process simpler. I'm sorry, but with my level of expertise, I think this is as simple as it gets! If you can think of an easier way, please let me know! If you do what's detailed in this manual, it will work for you as it does for me. All my installed planes work with it, as do all of my installed Project AI packages. If you have installed EES*Plus* and something doesn't work, then please check the instructions – you've probably missed something out. Or I've made a boo-boo in this documentation (in which case, please tell me). There's a troubleshooting section at the end of the document to help you out.

To get it all to work, this package assumes some familiarity with editing aircraft and panel configuration files. I will try to make it as easy as possible throughout the process. DO NOT FORGET to make back-ups of all original files and store them in a safe place before making any changes, just in case of error. The author accepts no responsibility for changes that you make, that you cannot recover!

SUMMARY OF INSTALLATION PROCESS:
Your plane:
- copy 'autosmoke' folder to FS 'gauges' folder
- copy all .fx effects files to FS 'effects' folder
- copy .all bmp texture files to your FS effects/textures folder
- copy and paste appropriate control lines (see below) to aircraft.cfg and panel.cfg files
Overwrite files or folders if prompted. You will only overwrite anything that you might have installed from previous EES versions.

AI:
- copy supplied panel.cfg to the AI plane 'panel' folder. If it hasn't got one, create one
- copy and paste appropriate control lines (see below) to AI plane's aircraft.cfg

DETAILED DESCRIPTION:

EES*Plus* provides an exhaust control system for your passenger (and Project AI) aeroplanes that is controlled by the [LIGHTS] settings within the aircraft.cfg file. This leaves the

[smokesystem] inputs free for use with wing condensation effects and so on, that might be provided by a plane model designer. The system for your plane is controlled by the throttle position by means of a custom XML gauge, so that the effects all happen automatically with no input from you.

The effects process that works in the system is controlled by the following parameters in the aircraft.cfg and panel.cfg files for the plane you are flying:

AIRCRAFT.CFG:
[LIGHTS]
The engine 'idle' effect is controlled from the lights section. When the engines are off, the effect is not present. However when you start the engines, once the N1 value exceeds 10% then the 'idle' effect starts. This is a lower-level heat shimmer from the exhaust nozzles of the engines which is present at all times when the engines are running. There is a lighter effect for small to medium planes, and a slightly darker one for the 'heavies'. At startup, the engine heat effects start up in time with the engines themselves. So normally, the port engine will fire up first in the sim, followed by the starboard. This is mimicked by EES and can easily be seen from the 'spot' plane view.

What happens is that there is an invisible XML panel gauge (LightsAutosmoke.xml) that toggles the FS recognition and wing lights. These lights are rarely used by the vast majority of model makers and so the toggle is used to turn the effects on and off. In early discussions with Rob Barendregt, we were wondering how you could use lighting effects to give the same visual effect as those found in the smoke system. I found the answer to this, which forms the basis for how this gauge works.

Because this effect uses the switching effects of the light control section, each engine has its own control line in the lights section. So for a 737 for example, you'd need 2 lines, for a 727 you'd need 3 and for a 747 you'd need 4. This is important to remember, since the [LIGHTS] section has a maximum of 19 control lines (numbered 0-18), beyond which any entries are ignored and therefore the effects numbered beyond this limit will not work.

The second effects set is also controlled by the [LIGHTS] section, called by the same invisible XML gauge as above. EES*Plus* uses this gauge to control a secondary effect that cuts in when the throttle position provides an N1 of greater than 60%. This is an expanded version of the 'idle' shimmer effect that has greater rearward velocity and a wider angle of particle ejection - and just more particles. So when you spool the engines up at takeoff, the idle shimmer grows as the engines move to higher power settings. The system also differentiates between engine types: it includes the kind of exhaust put out by earlier turbojet aircraft, for example the 707 and 727 and modern turbofan-powered planes, such that the 707 or VC10 for example will put out darker smokier trails as well as the heat shimmer. The effects are linked to the taxi and logo lights and are toggled on or off by the control gauge depending on the engine N1.

Again, it is rare that aeroplane designers use these lighting effects, but you can check this in the aircraft.cfg [lights] section where:

Light reference 6 = taxi lights
Light reference 7 = wing lights

Light reference 8 = recognition lights
Light reference 9 = logo lights

Using the system means that while you are taxiing on the ground, you will just see the lighter 'idle'-type heat effect, as in real life. The full exhaust effect will not be evident until the engines are spooled up for takeoff and flight.

There are two bitmap files (fx_heat.bmp and fx_heat_r.bmp) that provide the textures for the effects. These go in the 'texture' sub-folder within the effects folder. If you don't put the files in the right place, you are likely to see strange transparent boxes in SPOT view that block out the plane's textures.

The functions within the PANEL.CFG file are described in the next section

COMPONENTS:

On extraction from the zip file, there is an XML gauge in a folder called 'Autosmoke'. Copy this folder as it is into the FS gauges folder, not just the gauge by itself. The LightsAutosmoke.xml gauge toggles the 'idle' and flight-level heat shimmer effects on at engine startup via the recognition and wing lights, and at spool-up.

Please make sure that no other light control lines in the aircraft.cfg use these light references (recognition is 7, wing is 8: taxi is 6, logo is 9) as there would be interference and the effects would not work. All beacon, strobe and navigations lights are normally types 1 to 5.

It's very difficult to illustrate a dynamic swirling effect with a static screenshot – but then in real life, the 'shimmer' at idle is not all that obvious! Here's the 737 Experience at idle with the almost transparent 'heat shimmer' particles just visible on the black of the 737's livery, and on the runway.

With turbojet engines, the darker smoke trail also is evident from the outside. The following is a screenshot of George Carty's Boeing 707-420 on climb-out.

For planes with APUs, an additional effects file is used to simulate the APU running on the ground. This is activated by the landing light switch, so when your landing lights are on, then your APU effect is operating.

The XML gauge itself is activated by placing control lines in the panel.cfg for the panel you are using. The control lines are placed in the [window00] section of the panel.cfg, normally as the last two numbered lines with sequential gauge numbers. So if the last line of this section in your file is, for example;

gauge33=737-400!Autobrake, 581, 134

then add another line, as follows. Cut and paste these lines into your panel.cfg, incrementing each number after 'gauge' by 1:

gaugeXX+1=Autosmoke!LightsAutosmoke, 0,0

In this example, they would be;

gauge34=Autosmoke!LightsAutosmoke, 0,0

(If you are installing the additional XML gauge that allows the pilot to use the taxi light switch, the entry would be:
gauge34=Autosmoke!LightsAutosmoke9789, 0,0)

Remember to increment each control line.

When you have done this, copy the effects (.fx) files to the FS effects folder. You then need to edit the aircraft.cfg for the plane that will show the effect. I attach lines hereunder to cut-and-paste into the appropriate sections of the aircaft.cfg for most of the common freeware passenger aeroplanes available at the time of posting. I indicate which models the effect

locations were designed for, but the reality is that they are pretty close for most other good models of the same aeroplane type too. Replace 'x' below with the next sequential number in the appropriate aircraft.cfg section. If the effects are not close enough for you, use the method described below to adjust the locations.

As indicated above, make sure that the fx_heat.bmp and fx_heat_r.bmp files are copied into the 'texture' sub-folder within the FS 'effects' folder. This is essential for the effect textures to show up properly.

If you are using a saved flight, you must start it (or at least cycle through the views past the 2-D panel once) before the gauge will work. Otherwise, the effects will not show.

This all sounds complicated but is easy to work through if you are systematic. The final effect is worth it!

PLEASE NOTE:
As in all things there are exceptions, and in this case it is with David Maltby's superb VC10, Trident and BAC 1-11 models. The control lines that follow are designed to be put into the aircraft.cfg as described, and also the XML gauge can be used. However the dedicated panels for these planes already contain XML code to turn on [smokesystem] effects, so that it is necessary to 'REM' out the lines in the [smokesystem] section. You can do this by putting a semicolon (;) at the start of the lines beginning 'smoke.x='. Otherwise you'll get my heat effects PLUS David Maltby's!

PLANES THAT ARE NOT IN THE LIST:

For fine tuning the location of the [LIGHTS] effects during development, it was a simple matter of substituting the engine effect filename with an easily-visible light effect. I used the Microsoft default navwhih.fx and varied the configuration file values until it appeared in the right place. Then, I replaced the original filename and – hey presto.

PREVIOUS INSTALLATIONS OF EES:

If you do not have either of the previous versions of EES installed, then you need to do nothing except install as described in the attached README file, and as described here.

If you have either of the previous versions: version 2 was streamlined and simplified to remove the necessity for using the [smokesystem], and EES*Plus* is the same. So if you have them from version 1, there are a number of files that may be safely removed without affecting EES*Plus* or its operation in any way. During installation, Windows will prompt you for whether you wish to overwrite the existing EES effects and gauge files with the new ones – you should say 'yes' to this. The following list comprises the files that you can safely delete manually if you wish. IT IS ESSENTIAL TO DELETE 'EXTRAAUTOSMOKE.XML' FROM THE 'AUTOSMOKE' FOLDER AS OTHERWISE IT MAY INTERFERE WITH THE OPERATION OF THE REWRITTEN 'LIGHTSAUTOSMOKE.XML' GAUGE.

Gauges/autosmoke:
autosmoke.xml
extraautosmoke.xml

Effects:
Fx_fanengine10a.fx
Fx_fanengine32x.fx
Fx_fanengine310. fx
Fx_fanengine717. fx
Fx_fanengine777. fx
Fx_fanengine_b. fx
Fx_fanengine_c. fx
Fx_fanengineA380a. fx
Fx_fanengineA380b. fx
Fx_fanengineRJ. fx
Fx_jetengine707. fx
Fx_jetengine707b. fx
Fx_jetengine727a. fx
Fx_jetengine727b. fx
Fx_jetengine_111. fx
Fx_jetengine. fx
Fx_jetengine_tria. fx
Fx_jetengine_trib. fx
Fx_jetengineVC10. fx

You MUST over-write the LightsAutosmoke.xml gauge as it has been entirely re-written.
The previous version will NOT WORK!

AIRCRAFT.CFG LOCATION PARAMETERS:

Here are location values for the common **freeware** airliners out there. If you want to fine-tune the API location for your plane, look for the light entry corresponding to the navigation light at the rear of the fuselage (most models generally have one), and modify the values to move the APU plume. So if the light value is for example:

light.4 =5, -53.12, 0.00, 3.30, fx_navwhih (the longitudinal, lateral and vertical coordinates for the high intensity white navigation light)

it might become

light.4 =5, -54.12, 0.00, 3.30, fx_**APU**

as an example.

Please note that many payware aircraft such as the Level D 767 and PMDG 747 series are not currently included. The effects should work but you may need to resolve any conflicts that may arise from the use of the [lights] section by these payware providers. Also, you'd need to figure out the locations yourself using the method I describe above, but they should not be very far away from the locations listed below. I use the PMDG 737-800 and -900, and include the location parameters here.

Please make sure that the numbering of the light section lines is sequential (e.g. light.0, light.1 etc.), as if it is not then the effects will not show.

I have been requested a few times to make the effect more visible – something that's not that easy since in real life the 'shimmer' effect is itself not that visible! So it's something of a challenge not to get it looking too 'smoky'. The default control lines below provide for the most visible effect using the effects files fx_fanengine_heavy_idle.fx and fx_fanengine_heavy.fx. If you prefer an even more subtle effect, then you can use any combination using the 'medium' or 'light' variants of the files supplied in place of them – it's up to you.

(If you are using the alternative XML gauge, then the lines for the Airbus A300 below would look like this:
light.x=7, 15.5, -26.0, -3.7, fx_fanengine_heavy_idle
light.x=8, 15.5, 26.0, -3.7, fx_fanengine_heavy_idle
light.x=9, 15.5, -26.0, -3.7, fx_fanengine_heavy
light.x=9, 15.5, 26.0, -3.7, fx_fanengine_heavy
light.x=5, -90.30,   0.00, 11.33, fx_APU)

AIRBUS
A300 (located using the AeroDesigns A300-600R and the SGA A300B4-200)
LIGHTS section:
light.x=7, 15.5, -26.0, -3.7, fx_fanengine_heavy_idle
light.x=8, 15.5, 26.0, -3.7, fx_fanengine_heavy_idle
light.x=6, 15.5, -26.0, -3.7, fx_fanengine_heavy
light.x=9, 15.5, 26.0, -3.7, fx_fanengine_heavy

light.x=5, -90.30,   0.00, 11.33, fx_APU

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A310 (located using Harald Nehring's A310-300 model)
LIGHTS section:
light.x=7, 1.0, -25.4, -8.0, fx_fanengine_heavy_idle
light.x=8, 1.0, 25.4, -8.0, fx_fanengine_heavy_idle
light.x=6, 1.0, -25.4, -8.0, fx_fanengine_heavy
light.x=9, 1.0, 25.4, -8.0, fx_fanengine_heavy
light.x=5, -85.30,   0.00, 3.33, fx_APU

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A318/19/20/21 (located using the iFDG A320, but work with all models in this mini-family; tested and work well on the AeroDesigns A318 and iFDG A319/21)
LIGHTS section:
light.x=7, -1.5, -18.5, -4.9, fx_fanengine_heavy_idle
light.x=8, -1.5, 18.5, -4.9, fx_fanengine_heavy_idle
light.x=6, -1.5, -18.5, -4.9, fx_fanengine_heavy
light.x=9, -1.5, 18.5, -4.9, fx_fanengine_heavy
light.x=5, -72.52,   0.00, 2.92, fx_APU

NOTE – APU SETTING IS FOR A320.FOR A318/9 CHANGE -72 FIGURE (IN RED) TO -62, FOR A321 CHANGE FIGURE IN RED TO -82.

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A330 (located using the Project OpenSky A330-300 but is fine also for the -200. Also good for the Flightcraft A330)
LIGHTS section:
light.x=7,-7.0,-30.3,-3.4, fx_fanengine_heavy_idle
light.x=8,-7.0,30.3,-3.4, fx_fanengine_heavy_idle
light.x=6,-7.0,-30.3,-3.4, fx_fanengine_heavy
light.x=9,-7.0,30.3,-3.4, fx_fanengine_heavy
light.x=5, -116.000, 0.000, 7.420, fx_APU

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A340 (located using the AeroDesigns A340-300. This is the model I prefer to use, although it should be noted that the AeroDesigns designers request that their FD files not be altered)
LIGHTS section:
light.x=7,-21.0,-65.7,2.0, fx_fanengine_heavy_idle
light.x=7,2.0,-30.5,-2.0, fx_fanengine_heavy_idle
light.x=8,2.0,30.5,-2.0, fx_fanengine_heavy_idle
light.x=8,-21.0,65.7,2.0, fx_fanengine_heavy_idle
light.x=6,-21.0,-65.7,2.0, fx_fanengine_heavy
light.x=6,2.0,-30.5,-2.0, fx_fanengine_heavy
light.x=9,2.0,30.5,-2.0, fx_fanengine_heavy
light.x=9,-21.0,65.7,2.0, fx_fanengine_heavy
light.x=5, -105.8, 0.00, 10.5, fx_APU

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A380 (located using Robert Versluys' A380, but also tested on Camil Valiquette's FS2002 model and Mike Stone's FS2004 model with good results)
LIGHTS section:
light.x=7, -4.0, -85.5, 4.8, fx_fanengine_heavy_idle
light.x=7, 25.0, -50.4, 0.8, fx_fanengine_heavy_idle
light.x=8, 25.0, 50.4, 0.8, fx_fanengine_heavy_idle
light.x=8, -4.0, 85.5, 4.8, fx_fanengine_heavy_idle
light.x=6, -4.0, -85.5, 4.8, fx_fanengine_heavy
light.x=6, 25.0, -50.4, 0.8, fx_fanengine_heavy
light.x=9, 25.0, 50.4, 0.8, fx_fanengine_heavy
light.x=9, -4.0, 85.5, 4.8, fx_fanengine_heavy
light.x=5, -109.7802, 0.00, 12.22375, fx_APU
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BOEING
707 (located using the Historic Jetliner Group's -320 models)
LIGHTS section:
light.x = 7, -18.5,-46.6,1.7, fx_fanengine_heavy_idle
light.x = 7, -2.0,-27.2,-0.4, fx_fanengine_heavy_idle
light.x = 8, -2.0,27.2,-0.4, fx_fanengine_heavy_idle
light.x = 8, -18.5,46.6,1.7, fx_fanengine_heavy_idle
light.x = 6, -18.5,-46.6,1.7, fx_jetengine_heavy
light.x = 6, -2.0,-27.2,-0.4, fx_jetengine_heavy
light.x = 9, -2.0,27.2,-0.4, fx_jetengine_heavy
light.x = 9, -18.5,46.6,1.7, fx_jetengine_heavy

NOTE: 707s do not have APUs!
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717/MDxx series (located using the SGA MD95/717 and the Jet City Aircraft 717; also works with the default Microsoft MD83)
LIGHTS section:
light.x=7,-35.0,-9.0,4.0, fx_fanengine_heavy_idle
light.x=8,-35.0,9.0,4.0, fx_fanengine_heavy_idle
light.x=6,-35.0,-9.0,4.0, fx_fanengine_heavy
light.x=9,-35.0,9.0,4.0, fx_fanengine_heavy
light.x=5, -42.75, 0.00, 0.00, fx_APU

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727 (located using the Vistaliners and FFX -200 models, although the Vans Aircraft Corp. and the model by Mike Stone also work well)
LIGHTS section:
light.x=7, -44.5, -9.0, 5.8, fx_fanengine_heavy_idle
light.x=8, -63.0, 0.0, 5.0, fx_fanengine_heavy_idle
light.x=8, -44.5, 9.0, 5.8, fx_fanengine_heavy_idle
light.x=6, -44.5, -9.0, 5.8, fx_jetengine
light.x=9, -63.0, 0.0, 5.0, fx_jetengine
light.x=9, -44.5, 9.0, 5.8, fx_jetengine
light.x=5, -61.00,   0.00, 5.00, fx_APU

737-100/200 (located using the FFX/Kittyhawk -200 models)
LIGHTS section:
light.x=7, -9.0, -17.0, -3.4, fx_fanengine_heavy_idle
light.x=8, -9.0, 17.0, -3.4, fx_fanengine_heavy_idle
light.x=6, -9.0, -17.0, -3.4, fx_jetengine
light.x=9, -9.0, 17.0, -3.4, fx_jetengine
light.x=5, -51.50,   0.00, 4.70, fx_APU

737-300 to -500 (located using the FFX -300 and tested with other FFX classic series, not to mention the Microsoft default)
LIGHTS section:
light.x=7, 6.0, -16.9, -3.8, fx_fanengine_heavy_idle
light.x=8, 6.0, 16.9, -3.8, fx_fanengine_heavy_idle
light.x=6, 6.0, -16.9, -3.8, fx_fanengine_heavy
light.x=9, 6.0, 16.9, -3.8, fx_fanengine_heavy
light.x=5, -53.10,   0.00, 4.70, fx_APU

NOTE – replace -53 with -58 for the -400.

737-600 to -900 (located using the 737 Experience model, but work for Kittyhawk, AIAardvark and FFG [FS2002] models also)
LIGHTS section:
light.x=7, 5.0, -17.4, -3.2, fx_fanengine_heavy_idle
light.x=8, 5.0, 17.4, -3.2, fx_fanengine_heavy_idle
light.x=6, 5.0, -17.4, -3.2, fx_fanengine_heavy
light.x=9, 5.0, 17.4, -3.2, fx_fanengine_heavy
light.x=5, -53.50,   0.00, 4.70, fx_APU

NOTE – replace -53 with -64 for -800, and -70 for -900.

PMDG 737-800 and -900
LIGHTS section:
light.1=7, -63.8, -16.4, -4.4, fx_fanengine_heavy_idle
light.16=8, -63.8, 16.4, -4.4, fx_fanengine_heavy_idle
light.17=6, -63.8, -16.4, -4.4, fx_fanengine_heavy
light.18=9, -63.8, 16.4, -4.4, fx_fanengine_heavy

747 (located using the Project OpenSky 747-400)
LIGHTS section:
light.x =7, -119.9, -70.2, -2.5, fx_fanengine_heavy_idle
light.x =7, -91.9, -40.5, -6.0, fx_fanengine_heavy_idle
light.x =8, -91.9, 40.5, -6.0, fx_fanengine_heavy_idle
light.x =8, -119.9, 70.2, -2.5, fx_fanengine_heavy_idle
light.x =6, -119.9, -70.2, -2.5, fx_fanengine_heavy
light.x =6, -91.9, -40.5, -6.0, fx_fanengine_heavy
light.x =9, -91.9, 40.5, -6.0, fx_fanengine_heavy
light.x =9, -119.9, 70.2, -2.5, fx_fanengine_heavy

light.x = 5, -218.900, 0.000, 12.450, fx_APU

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757 (located using the Project OpenSky -200 model)
LIGHTS section:
light.x=7,4.00, -22.20, -3.00, fx_fanengine_heavy_idle
light.x=8,4.00, 22.20, -3.00, fx_fanengine_heavy_idle
light.x=6,4.00, -22.20, -3.00, fx_fanengine_heavy
light.x=9,4.00, 22.20, -3.00, fx_fanengine_heavy
light.x=5, -77.00,   0.00, 6.50, fx_APU

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767 (located using the Project OpenSky -300 V4 model)
LIGHTS section:
light.x=7, 14.0, -26.7, -8.5, fx_fanengine_heavy_idle
light.x=8, 14.0, 26.7, -8.5, fx_fanengine_heavy_idle
light.x=6, 14.0, -26.7, -8.5, fx_fanengine_heavy
light.x=9, 14.0, 26.7, -8.5, fx_fanengine_heavy
light.x=5, -20.90, 0.00, 6.45, fx_APU

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777 (located using the MelJet -200 model, but compatible with the Microsoft default also)
LIGHTS section:
light.x=7, 14.0, -31.9, -8.5, fx_fanengine_heavy_idle
light.x=8, 14.0, 31.9, -8.5, fx_fanengine_heavy_idle
light.x=6, 14.0, -31.9, -8.5, fx_fanengine_heavy
light.x=9, 14.0, 31.9, -8.5, fx_fanengine_heavy
light.x=5, -102.25, -2.00, 4.75, fx_APU

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787 (located using the 7E7 model by R Versluys)
LIGHTS section:
light.x=7,-9.5,-30.4,0.7, fx_fanengine_heavy_idle
light.x=8,-9.5,30.4,0.7, fx_fanengine_heavy_idle
light.x=6,-9.5,-30.4,0.7, fx_fanengine_heavy
light.x=9,-9.5,30.4,0.7, fx_fanengine_heavy

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Miscellaneous:

MCDONNELL DOUGLAS DC10/MD11 (located using the FFX/SGA DC10-30)
LIGHTS section:
light.x=7, 2.0,-28.7,-2.2, fx_fanengine_heavy_idle
light.x=8, -93.0,0.0,22.3, fx_fanengine_heavy_idle
light.x=8, 2.0,28.7,-2.2, fx_fanengine_heavy_idle
light.x=6, 2.0,-28.7,-2.2, fx_fanengine_heavy
light.x=9, -93.0,0.0,22.3, fx_fanengine_heavy
light.x=9, 2.0,28.7,-2.2, fx_fanengine_heavy

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LOCKHEED L-1011 TRISTAR (located using Erick Cantu's Vista Liners L-1011, beta version)

LIGHTS section:
light.x = 7, -4.5, -35.6, -3.5, fx_fanengine_heavy_idle ,
light.x = 8, -85.0, 0, 10, fx_fanengine_heavy_idle ,
light.x = 8, -4.5, 35.6, -3.5, fx_fanengine_heavy_idle ,
light.x = 6, -4.5, -35.6, -3.5, fx_fanengine_heavy ,
light.x = 9, -85.0, 0, 10, fx_fanengine_heavy ,
light.x = 9, -4.5, 35.6, -3.5, fx_fanengine_heavy,

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VICKERS VC-10 (located using David Maltby's VC-10S model)
LIGHTS section:
light.x = 7, -56.000, -15.400, 2.275, fx_fanengine_heavy_idle
light.x = 7, -56.000, -9.500, 2.275, fx_fanengine_heavy_idle
light.x = 8, -56.000, 9.500, 2.275, fx_fanengine_heavy_idle
light.x = 8, -56.000, 15.400, 2.275, fx_fanengine_heavy_idle
light.x = 6, -56.000, -15.400, 2.275, fx_jetengine
light.x = 6, -56.000, -9.500, 2.275, fx_jetengine
light.x = 9, -56.000, 9.500, 2.275, fx_jetengine
light.x = 9, -56.000, 15.400, 2.275, fx_jetengine

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Hawker Siddeley Trident (located using David Maltby's updated Trident-3 model)
LIGHTS section:
light.x = 7, -41.000, -7.800, -1.5, fx_fanengine_heavy_idle
light.x = 7, -53.000, 0.000, 0.0, fx_fanengine_heavy_idle
light.x = 8, -41.000, 7.800, -1.5, fx_fanengine_heavy_idle
light.x = 6, -41.000, -7.800, -1.5, fx_jetengine
light.x = 6, -53.000, 0.000, 0.0, fx_jetengine
light.x = 9, -41.000, 7.800, -1.5, fx_jetengine

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BAC 1-11 (located using David Maltby's updated 1-11 model)
LIGHTS section:
light.x = 7, -42.000, -7.100, 2.00, fx_fanengine_heavy_idle
light.x = 8, -42.000, 7.100, 2.00, fx_fanengine_heavy_idle
light.x = 6, -42.000, -7.100, 2.00, fx_jetengine
light.x = 9, -42.000, 7.100, 2.00, fx_jetengine

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AVRO RJ85-100 (located using Jon Murchison's -85 model but works with his -100 model and Mike Stone's Avroliner pack)
LIGHTS section:
light.x=7,9.00, -21.75, -0.67, fx_fanengine_heavy_idle
light.x=7,11.50, -13.50, -0.07, fx_fanengine_heavy_idle
light.x=8,11.50, 13.50, -0.07, fx_fanengine_heavy_idle

light.x=8,9.00, 21.75, -0.67, fx_fanengine_heavy_idle
light.x=6,9.00, -21.75, -0.67, fx_fanengine_heavy
light.x=6,11.50, -13.50, -0.07, fx_fanengine_heavy
light.x=9,11.50, 13.50, -0.07, fx_fanengine_heavy
light.x=9,9.00, 21.75, -0.67, fx_fanengine_heavy
light.x=5, -56.50, 0.00, 1.80, fx_APU

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CRJ (located using the Project SkyWorks -700, but works with the Project OpenSky models also)
LIGHTS section:
light.x=7, -33.5, -7.5, 4.2, fx_fanengine_heavy_idle
light.x=8, -33.5,   7.5, 4.2, fx_fanengine_heavy_idle
light.x=6, -33.5, -7.5, 4.2, fx_fanengine_heavy
light.x=9, -33.5,   7.5, 4.2, fx_fanengine_heavy
light.x=5, -50.72, 0.00, 1.24, fx_APU

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Ilyushin IL-96 (located using P Samborski's model)
LIGHTS section:
light.x = 7, -16.0, -53.0, -5.9, fx_fanengine_heavy_idle
light.x = 7, 1.5, -33.0, -7.5, fx_fanengine_heavy_idle
light.x = 8, 1.5, 33.0, -7.5, fx_fanengine_heavy_idle
light.x = 8, -16.0, 53.0, -5.9, fx_fanengine_heavy_idle
light.x = 6, -16.0, -53.0, -5.9, fx_fanengine_heavy
light.x = 6, 1.5, -33.0, -7.5, fx_fanengine_heavy
light.x = 9, 1.5, 33.0, -7.5, fx_fanengine_heavy
light.x = 9, -16.0, 53.0, -5.9, fx_fanengine_heavy
light.x = 5, -87.0,   0.00, 8.0, fx_APU

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Concorde (located using the Project Mach 2 model)
LIGHTS section:
light.x = 7,   -58.00, -19.85, -5.70, fx_fanengine_heavy_idle
light.x = 7,   -58.00, -15.45, -5.70, fx_fanengine_heavy_idle
light.x = 8,   -58.00, 15.45, -5.70, fx_fanengine_heavy_idle
light.x = 8,   -58.00, 19.85, -5.70, fx_fanengine_heavy_idle
light.x = 6,   -58.00, -19.85, -5.70, fx_fanengine_heavy
light.x = 6,   -58.00, -15.45, -5.70, fx_fanengine_heavy
light.x = 9,   -58.00, 15.45, -5.70, fx_fanengine_heavy
light.x = 9,   -58.00, 19.85, -5.70, fx_fanengine_heavy

AI AIRCRAFT (PROJECT AI)
Having done all this, it's a relatively simple process to apply the effects to the AI aircraft that you have installed into FS – but some words of caution to avoid frustration! I use many Project AI packages to enhance my FS world and what I will describe here works perfectly well WITH THAT SYSTEM. I can't guarantee that it'll work for any other, including the use of the default planes, as Project AI is the system I use – it's as simple as that. It should be usable with the default planes however – see below.

If you use Project AI, I would advise installing all of the AI packages that you want first, because installing new ones after you've set the AI exhaust effect up will cause the AI models' aircraft.cfg files to be re-written, and the extra lines that you put in may be lost – as will the visual effects. What I have done is to make a back up of the 'last good' aircraft.cfg for each AI plane that includes all of the lights settings, so that if I install more airlines that use those models, then at least the settings are recoverable.

The process can be used with all AI types including the default FS ones – the principles are the same. The controlling XML gauge (LightsAutosmoke.xml) is also used to control the AI traffic effects. What you need to do is:
- Copy the enclosed panel.cfg into the AI plane's panel folder (if there isn't one, then create one). Project AI planes have an empty panel folder, as panels are not needed for AI. The panel.cfg file is simply a modification of the MS default 737 panel with a section added to activate the effects with AI traffic.

- Add a copy of the panel.cfg to each AI plane that you want to show the effect.

- Add the control lines for the relevant plane type to the [lights] section of the cfg file from the list below. As with your plane, it is very important that the numbering of the lines remains sequential because if it is not, then the effects will not show up. APU control lines are included for most types of AI.

The 'heavy' effects are used universally to make the effects maximally visible at distance.

AI using the default Boeings
- Add the control lines to the aircraft.cfg as described above.
- Open the provided panel.cfg and copy/paste the [vcockpit03] section to the end of the default planes' panel cfg files. This will have no effect on the planes' use for flying, but will activate the use of EES*Plus* when they are used as AI.

AIRBUS
A300
LIGHTS section:
light.x=7, 15.5, -26.0, -3.7, fx_fanengine_heavy_idle
light.x=7, 15.5, 26.0, -3.7, fx_fanengine_heavy_idle
light.x=6, 15.5, -26.0, -3.7, fx_fanengine_heavy
light.x=6, 15.5, 26.0, -3.7, fx_fanengine_heavy
light.x=7, -90.30,   0.00, 11.33, fx_APU

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A310
LIGHTS section:
light.x=7, 1.0, -25.4, -8.0, fx_fanengine_heavy_idle

light.x=7, 1.0, 25.4, -8.0, fx_fanengine_heavy_idle
light.x=6, 1.0, -25.4, -8.0, fx_fanengine_heavy
light.x=6, 1.0, 25.4, -8.0, fx_fanengine_heavy
light.x =7, -85.30,   0.00, 3.33, fx_APU

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A318/19/20/21
LIGHTS section:
light.x=7, -1.5, -18.5, -4.9, fx_fanengine_heavy_idle
light.x=7, -1.5, 18.5, -4.9, fx_fanengine_heavy_idle
light.x=6, -1.5, -18.5, -4.9, fx_fanengine_heavy
light.x=6, -1.5, 18.5, -4.9, fx_fanengine_heavy
light.x=7, -72.52,   0.00, 2.92, fx_APU

NOTE – APU SETTING IS FOR A320.FOR A318/9 CHANGE -72 FIGURE (IN RED) TO -62, FOR A321 CHANGE FIGURE IN RED TO -82.

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A330
LIGHTS section:
light.x=7,-7.0,-30.3,-3.4, fx_fanengine_heavy_idle
light.x=7,-7.0,30.3,-3.4, fx_fanengine_heavy_idle
light.x=6,-7.0,-30.3,-3.4, fx_fanengine_heavy
light.x=6,-7.0,30.3,-3.4, fx_fanengine_heavy
light.x=7, -116.000, 0.000, 7.420, fx_APU

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A340
LIGHTS section:
light.x=7,-21.0,-65.7,2.0, fx_fanengine_heavy_idle
light.x=7,2.0,-30.5,-2.0, fx_fanengine_heavy_idle
light.x=7,2.0,30.5,-2.0, fx_fanengine_heavy_idle
light.x=7,-21.0,65.7,2.0, fx_fanengine_heavy_idle
light.x=6,-21.0,-65.7,2.0, fx_fanengine_heavy
light.x=6,2.0,-30.5,-2.0, fx_fanengine_heavy
light.x=6,2.0,30.5,-2.0, fx_fanengine_heavy
light.x=6,-21.0,65.7,2.0, fx_fanengine_heavy
light.x=7, -105.8, 0.00, 10.5, fx_APU

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A380 (Not available yet, but here they are anyway!)
LIGHTS section:
light.x=7, -4.0, -85.5, 4.8, fx_fanengine_heavy_idle
light.x=7, 25.0, -50.4, 0.8, fx_fanengine_heavy_idle
light.x=7, 25.0, 50.4, 0.8, fx_fanengine_heavy_idle
light.x=7, -4.0, 85.5, 4.8, fx_fanengine_heavy_idle
light.x=6, -4.0, -85.5, 4.8, fx_fanengine_heavy
light.x=6, 25.0, -50.4, 0.8, fx_fanengine_heavy
light.x=6, 25.0, 50.4, 0.8, fx_fanengine_heavy
light.x=6, -4.0, 85.5, 4.8, fx_fanengine_heavy
light.x=7, -109.7802, 0.00, 12.22375, fx_APU

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BOEING
707
LIGHTS section:
light.x = 7, -18.5,-46.6,1.7, fx_fanengine_heavy_idle
light.x = 7, -2.0,-27.2,-0.4, fx_fanengine_heavy_idle
light.x = 7, -2.0,27.2,-0.4, fx_fanengine_heavy_idle
light.x = 7, -18.5,46.6,1.7, fx_fanengine_heavy_idle
light.x = 6, -18.5,-46.6,1.7, fx_jetengine_heavy
light.x = 6, -2.0,-27.2,-0.4, fx_jetengine_heavy
light.x = 6, -2.0,27.2,-0.4, fx_jetengine_heavy
light.x = 6, -18.5,46.6,1.7, fx_jetengine_heavy

NOTE: 707s do not have APUs! You won't find many 707s as AI either.
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717/MDxx series
LIGHTS section:
light.x=7,-35.0,-9.0,4.0, fx_fanengine_heavy_idle
light.x=7,-35.0,9.0,4.0, fx_fanengine_heavy_idle
light.x=6,-35.0,-9.0,4.0, fx_fanengine_heavy
light.x=6,-35.0,9.0,4.0, fx_fanengine_heavy
light.x=7, -42.75, 0.00, 0.00, fx_APU

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727
LIGHTS section:
light.x=7, -44.5, -9.0, 5.8, fx_fanengine_heavy_idle
light.x=7, -63.0, 0.0, 5.0, fx_fanengine_heavy_idle
light.x=7, -44.5, 9.0, 5.8, fx_fanengine_heavy_idle
light.x=6, -44.5, -9.0, 5.8, fx_jetengine
light.x=6, -63.0, 0.0, 5.0, fx_jetengine
light.x=6, -44.5, 9.0, 5.8, fx_jetengine
light.x=7, -61.00,   0.00, 5.00, fx_APU

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737-200
LIGHTS section:
light.x=7, -9.0, -17.0, -3.4, fx_fanengine_heavy_idle
light.x=7, -9.0, 17.0, -3.4, fx_fanengine_heavy_idle
light.x=6, -9.0, -17.0, -3.4, fx_jetengine
light.x=6, -9.0, 17.0, -3.4, fx_jetengine
light.x=7, -51.50,   0.00, 4.70, fx_APU

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737-300 to -500
LIGHTS section:
light.x=7, 6.0, -16.9, -3.8, fx_fanengine_heavy_idle
light.x=7, 6.0, 16.9, -3.8, fx_fanengine_heavy_idle

light.x=6, 6.0, -16.9, -3.8, fx_fanengine_heavy
light.x=6, 6.0, 16.9, -3.8, fx_fanengine_heavy
light.15=7, -53.10,   0.00,   4.70, fx_APU

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737-600 to -900
LIGHTS section:
light.x=7, 5.0, -17.4, -3.2, fx_fanengine_heavy_idle
light.x=7, 5.0, 17.4, -3.2, fx_fanengine_heavy_idle
light.x=6, 5.0, -17.4, -3.2, fx_fanengine_heavy
light.x=6, 5.0, 17.4, -3.2, fx_fanengine_heavy
light.x=7, -53.50,   0.00,   4.70, fx_APU

NOTE – replace -53 with -64 for -800, and -70 for -900.

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747
LIGHTS section:
light.x =7, -19.9, -70.2, -2.5, fx_fanengine_heavy_idle
light.x =7, 8.9, -40.5, -6.0, fx_fanengine_heavy_idle
light.x =7, 8.9, 40.5, -6.0, fx_fanengine_heavy_idle
light.x =7, -19.9, 70.2, -2.5, fx_fanengine_heavy_idle
light.x =6, -19.9, -70.2, -2.5, fx_fanengine_heavy
light.x =6, 8.9, -40.5, -6.0, fx_fanengine_heavy
light.x =6, 8.9, 40.5, -6.0, fx_fanengine_heavy
light.x =6, -19.9, 70.2, -2.5, fx_fanengine_heavy
light.x = 7, -118.900, 0.00, 12.450, fx_APU

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757
LIGHTS section:
light.x=7,4.00, -22.20, -3.00, fx_fanengine_heavy_idle
light.x=7,4.00, 22.20, -3.00, fx_fanengine_heavy_idle
light.x=6,4.00, -22.20, -3.00, fx_fanengine_heavy
light.x=6,4.00, 22.20, -3.00, fx_fanengine_heavy
light.14=7, -77.00,   0.00,   6.50, fx_APU

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767
LIGHTS section:
light.x=7, 14.0, -26.7, -8.5, fx_fanengine_heavy_idle
light.x=7, 14.0, 26.7, -8.5, fx_fanengine_heavy_idle
light.x=6, 14.0, -26.7, -8.5, fx_fanengine_heavy
light.x=6, 14.0, 26.7, -8.5, fx_fanengine_heavy
light.x=7, -20.90, 0.00, 6.45, fx_APU

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777
LIGHTS section:
light.x=7, 14.0, -31.9, -8.5, fx_fanengine_heavy_idle

light.x=7, 14.0, 31.9, -8.5, fx_fanengine_heavy_idle
light.x=6, 14.0, -31.9, -8.5, fx_fanengine_heavy
light.x=6, 14.0, 31.9, -8.5, fx_fanengine_heavy
light.x=7, -102.25, -2.00, 4.75, fx_APU

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Miscellaneous:

MCDONNELL DOUGLAS DC10/MD11
LIGHTS section:
light.x=7, 2.0,-28.7,-2.2, fx_fanengine_heavy_idle
light.x=7, -93.0,0.0,22.3, fx_fanengine_heavy_idle
light.x=7, 2.0,28.7,-2.2, fx_fanengine_heavy_idle
light.x=6, 2.0,-28.7,-2.2, fx_fanengine_heavy
light.x=6, -93.0,0.0,22.3, fx_fanengine_heavy
light.x=6, 2.0,28.7,-2.2, fx_fanengine_heavy

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AVRO RJ85-100
LIGHTS section:
light.x=7,9.00, -21.75, -0.67, fx_fanengine_heavy_idle
light.x=7,11.50, -13.50, -0.07, fx_fanengine_heavy_idle
light.x=7,11.50, 13.50, -0.07, fx_fanengine_heavy_idle
light.x=7,9.00, 21.75, -0.67, fx_fanengine_heavy_idle
light.x=6,9.00, -21.75, -0.67, fx_fanengine_heavy
light.x=6,11.50, -13.50, -0.07, fx_fanengine_heavy
light.x=6,11.50, 13.50, -0.07, fx_fanengine_heavy
light.x=6,9.00, 21.75, -0.67, fx_fanengine_heavy
light.x=7, -56.50, 0.00, 1.80, fx_APU

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CRJ
LIGHTS section:
light.x=7, -33.5, -7.5, 4.2, fx_fanengine_heavy_idle
light.x=7, -33.5,   7.5, 4.2, fx_fanengine_heavy_idle
light.x=6, -33.5, -7.5, 4.2, fx_fanengine_heavy
light.x=6, -33.5,   7.5, 4.2, fx_fanengine_heavy
light.x=7, -50.72, 0.00, 1.24, fx_APU

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TROUBLESHOOTING:

Problem	Solution
- Transparent blocks at engines	- fx_heat.bmp file not in the effects/textures folder
- Effect doesn't show	- misnumbered light entry lines
	- Lines beyond light.18 entered
	- Typos
	- 'autosmoke' folder not in gauges folder
	- control lines not added as described
	- other light effects use light switches 6-9
	- saved flight not restarted in panel view
- Spoolup effect doesn't show	- old file 'extraautosmoke.xml' not deleted
- Effects show in the wrong place	- adjust location as described
- AI effects don't show	- panel.cfg not copied into AI plane panel folder
- Not enough spare lines in 'lights' section	- REM out (using ';') duplicate or unwanted lines and re-use those lines
- No APU smoke from 707s	- 707s don't have APUs!

IN CONCLUSION:

The system should work equally well in FS8 and FS9. I spent a lot of time with FS2002 (FS8) and the bulk of the early development of this package was done with it.

The system seems to have no effect on the frame rates on my system (2.0gHz P4, WinXP, 1.0gB RAM, Radeon 9200SE video card) running the system in both FS2002 (FS8) and FS2004 (FS9); hopefully yours should be OK too. So, enjoy! As I said before, if EES*Plus* is not working for you then it's likely that there is something that you have not done correctly as specified in this manual, so re-trace your steps and look at the troubleshooting guide above. I won't be able to assist in fixing problems with your particular installation unless it's something I haven't documented correctly here!

As always, please contact me if you have suggestions for further improvement.

ACKNOWLEDGEMENTS:

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Jerel Hayes with his insights for fixing the program crash issue.

Thanks all.

Martyn Becker
SIMviation's 'microlight'
thebecken@hotmail.com
29th January 2006

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