

SCRUFFYDUCK SCENERY DESIGN ENGINE (SDE)

RELEASE NOTES

VERSION 0.90

Current Version 00.90.2624

INTRODUCTION

The Scenery Design Engine (SDE) can read FS9 and FSX scenery BGL files generated by Bglcomp. This covers:

- Airports (including files generated by AFCAD2)
- Waypoints, boundaries and Geopols
- Navigational aids
- Scenery Objects including library objects, effects, triggers, windsocks and generic buildings (note limitation that current version provides very limited support in relation to model data)
- Extrusion Bridges (FSX)
- Exclusion Rectangles

SDE can also read in XML files created by other tools.

The engine is made available via a simple User interface. Future versions will include graphical interfaces. The resultant information is shown in a tree view of the objects contained in the file. The properties of these objects can be modified using a simple property grid. SDE can display information about the scenery in the following formats:

- XML as used to compile scenery using BglComp
- A special XML format used by SDE to store scenery information
- When displaying information from a Bgl File
 - A raw data view showing the location of each piece of information in the file, it's length and hex bytes
 - A Bgl Format view showing the actual breakdown of data in each object in terms of its description, location, data type and hex bytes.

The program can add, or remove, elements from the scenery tree. It can then compile the resulting scenery into a working FSX bgl file. It does NOT generate FS9 bgl files although the internal capabilities to do this are present in the engine. This version represents the first public release of the program.

ACKNOWLEDGEMENTS

- Winfried Orthman for his work on bgl file formats and other generous assistance in help me to understand how things work
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- Martin Couture for his work on decoding and displaying Airport information and for sharing it with me.
- Javier (from FSDeveloper.com) for his help with Simconnect
- Everyone on FSDeveloper.Com which is the best place on the net for FS Developers to be.
- Chilkat Software Inc for their excellent XML Parser Library.
- Paul Henty for his dotNET FSUIPC Client Library.

REQUIREMENTS

- You need to have the FSX SDK to use SDE if you wish to compile bgl files. You do not need it if you just wish to explore Scenery Bgl files. The SDK is not freely down loadable and is supplied by Microsoft only with the deluxe version of FSX. SDE uses components of the SDK and you must have these for the program to work compile. **IMPORTANT** you must use the SP1 versions of BglComp.exe and BglComp.xsd with SDE. Those shipped with the deluxe version will generate compiler errors.
- Microsoft's dotNET 2.0.
- You may need other software such as MSXML if not already installed.
- You will need to have SimConnect working in your FSX installation if you wish to use the auto placement functionality.

INSTALL/UNINSTALL

To install unzip everything into it's own folder respecting any folders in the application.

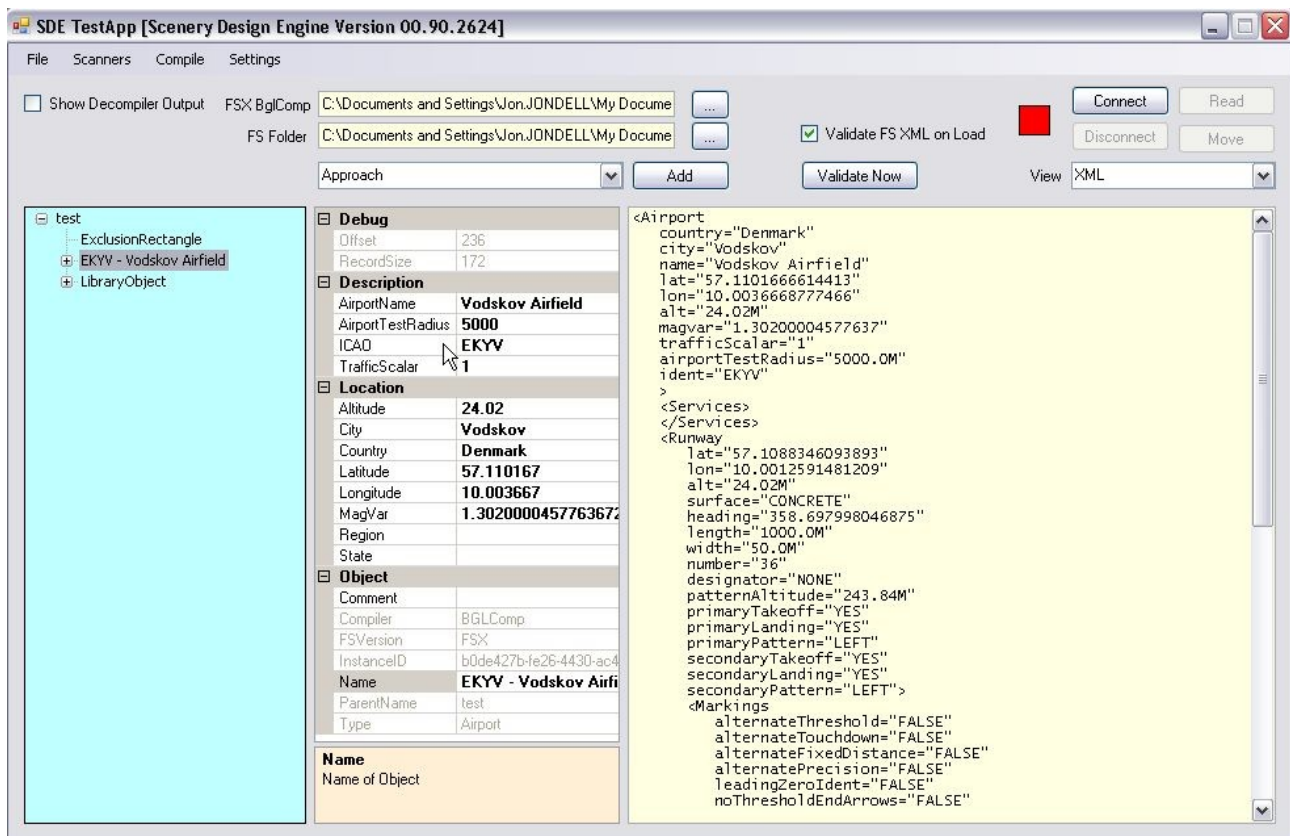
To un-install just delete the application directory. Please do not over write any existing versions of SDE but create a new folder – there are a number of differences in libraries etc.

It is always wise to remove older version or make sure that the new version is in it's own folder as there can be differences in the program and supporting files from version to version as the program is developed.

OPERATIONAL NOTES

These notes do not constitute a full operating manual for the program. They are improved release by release but you should have a good working understanding of how scenery files work and are used in FSX to get the most out of it. If you are new to scenery design then please take some time to learn about it before using this tool. www.fsdeveloper.com is a great source of help for scenery developers both new and experienced.

To get started run the program **TestApp.exe** and after a few moments you should be presented with a program interface like the picture below. If you get error messages and the program does not open then please check first that you have dotNET 2 installed (you only need the run times) and that you have copied everything over from the installation zip respecting folders.



SDE is provided with the simple User interface shown above. Let's start with a quick tour:

Menus

- File** provides access to loading and saving as well as the creation of new files
- Scanners** currently has one option – to Scan you FSX installation for airports
- Compile** When active you can compile you scenery file or part of it to an FSX Bgl File
- Settings** Allows you to set things like your choice of measurement units to use and decompile options

Below the **menu bar** are a number of boxes and buttons which we will look at as we go on.

When checked **Show Decompiler Output** will send intermediate messages to the output window. For large files this can slow things down dramatically so you might want to turn it off. You can turn it off during decompile if you get bored waiting!

If you plan to use the compiler function then you need to tell SDE where your copy of the FSX Bglcomp.exe is. Click on the **small button** to the right of the **yellow text box at top center** of the window and navigate to the location of your FSX BGLComp. The path will be listed in the textbox. Be sure to select the BGLcomp for FSX!!! **NOTE** that unlike earlier builds you need to select the folder and not the executable.

This Build includes a function to list all airports in an FS Installation (see below). Use the **small button** to the right of the **FS Folder Box** (below the FSX BglComp Box). You can select either an FS9 or FSX installation. The Folder you need is the main installation folder. Do not select a sub folder otherwise there will be no airports found.

Below this box is the **Add Box** which will contain different object types when you have a file. It is from here, by clicking the **Add button** that you add new object. This is covered in more detail later.

By default SDE will validate incoming XML (i.e. If you open an xml file rather than a Bgl file or SDE file) this is to stop badly formed code from getting in. **The Validate FS XML on Load** check box is checked. Sometimes though you will want to get some code in that you know will not compile properly. Unchecking this box will let SDE try and load it. Be aware that very bad XML problems could result in SDE stopping, or not loading anything useful.

The **Validate Now** button will validate the current scenery file for conformance to the schema. Be aware that this is not a guarantee that the file will compile as not all problems will be found this way. Also once in SDE it should do much to stop badly formed XML (being well formed and being acceptable to the compiler are different things but it needs to be well formed first)

The set of buttons at top rights are to access location information from FSX when running and are discussed later.

The **View** Drop down Box allows you to select what information you want displayed in the yellow display area. This will default to XML, but you can select any of the options described in the introduction to examine the information in different ways. Not that you will not get any Rawdata or Bgl Format information if you have loaded an XML file rather than a Bgl file.

There are three main display elements taking up the body of the display.

To the left with a blue background is the tree view which displays scenery objects as they relate to each other. Here you can browse through and select individual objects to get details on, modify or delete. The tree is the main tool for working with a scenery file

In the center is a property grid which displays the properties of the selected object. You can change the data for each property here if you wish to change the way in which the scenery file works.

To the right is the main text window with a yellow background. This is read only, you can't change anything directly here. This window will display one of the following depending on what you are doing:

- Decompiler logging information
- The information associated with the object that is selected in the tree depending on your view selection

- Error messages and program problem messages
- Compiler output messages

IN MORE DETAIL

Use the **Settings Menu** to set the units you wish to use and the sections you wish to decode. Note that the sections selection applies to Bgl files in the current version and not any xml files loaded. See below for details on how to use the settings dialogs

Use the **File Menu** to open and save the different file types:

- **Open BGL.** To open a bgl file click the **Open Bgl** option and select your file from the file open dialog. Depending on the size of the file it may be some moments before the scenery tree is displayed. If you have the Show Progress box checked then you will see a progress bar. There may be a delay after the progress bar shows complete while the tree is generated. Once the de-compile is complete the text box at top right will show the sections found.
- **Open XML** Use the **Open XML** option to read in an XML Scenery File, This can be one you created yourself, one that comes from BGLAnalyze or BglXML. Again you will see the progress bar (you can't turn it off in the current build) and then a tree is generated showing the contents of the XML file.
- **Open SDE** Use the **Open SDE** option to load any files you may have saved from SDE. SDE provides some extra data including a name and comments for each object in the tree. You can save SDE files (see below) as you work on them without having to compile them.
- **Save XML** This will save the current scenery as an XML file in the standard SDK Format. Note that you can save just part of the scenery Tree. Make sure you have something highlighted in the tree before trying to save
- **Save SDE** This saves the current scenery in SDE format including the extra information. SDE format is XML but the files are zipped and therefore smaller than regular XML. Note that you can save just part of the scenery tree – make sure you have something highlighted in the tree before trying to save
- **NOTE** that all files are saved in the **Work** Sub Folder within the application folder
- To look at the tree click on the small '+' by the file name. You can then navigate through the tree and examine different sections. The property grid will display the properties relevant to the object selected and the display area the information in the format selected in the View List.
- If you change properties in the property list then those changes should be reflected in the XML, although you may need to change object in the tree and go back to the original to see the changes
- To compile the file again you click the **Compile Menu** Item and select **FSX**. If this button is not available then you are probably on an object which cannot be independently compiled into a bgl file. If the button is active then you should be able to compile it (**Note** that this is not foolproof in the current application). You can therefore select a single airport, object, Vor and so on and create a separate file for it. All xml output and bgl files are stored in the work folder inside the application folder. The name of the file is the same as the name of the root object you compiled.

Note that each tree element is names using the name property of the object. This can be changed in the property grid and will be reflected in the tree. You could thus change the name of an airport and create a bgl for that alone (Note this does not change anything related to the airport in the BGL file). The output from BGLComp is shown in the text window. If you get compile errors then first check that you are compiling something that

can exist alone in the file (e.g and airport, way point, scenery object but not a runway, Glide slope or ILS). If you have selected such an object then please let me know what the errors are.

The compile process may take a few moments after . When complete you will see the compiler message in the text window. If the compile fails then the error messages will be shown in the text window.

Note that changes made to names and comments added are not persisted through the compile process. But they are saved if you save using the SDE format

To delete a scenery element either **Right Click** it in the tree and select **Delete**, or use the delete button at top left side of the tree. **NOTE** – you do not get a second chance in this build – click delete and it will be gone. The element will remove everything below it in the tree. The XML code will be updated to reflect the deletion.

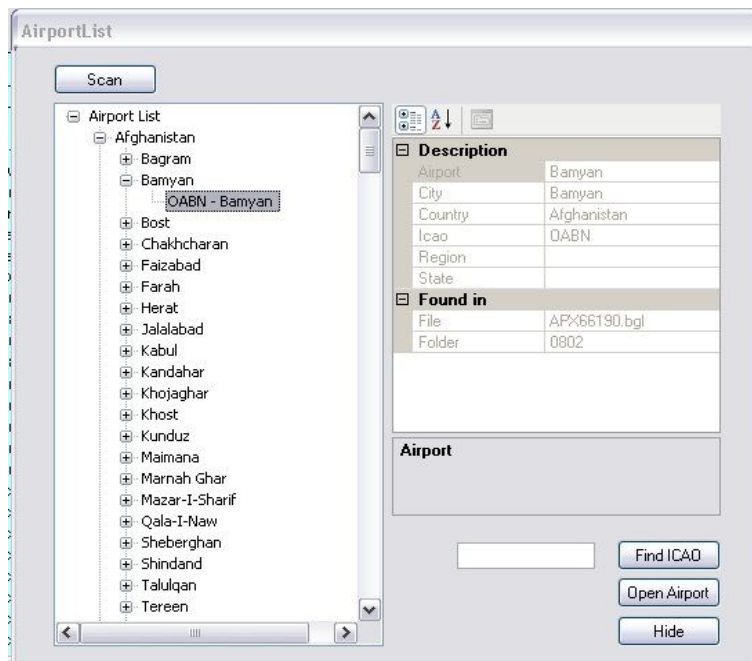
To Add an element use the drop down box above the property grid. First make sure you have something selected in the tree. Now look at the list in the drop list. This should show those elements which can be legally added to the selected element. Choose the one you want to add and click the **ADD** button. The object will be added into the tree. A basic empty object of the type selected is added. **Note** that you may get an error message if the object concerned is not implemented yet. You can then use the property grid to set values for the object and the xml should update. At the moment there is very limited validation of data entered so, to avoid compiler errors make sure that you use valid number. If you don't then the compiler will tell you where you are wrong.

To create an empty scenery file use **File > New** from the menu system. Change the name property from 'Please change me' to whatever you want the file to be called.

AIRPORT SCANNER

SDE has the ability to scan all the airports that exist in a FS Setup and display them in a tree. Properties of the airports are displayed including the folder and file in which they can be found. This function is linked back to the main window so that an airport selected in the scanner will be decompiled and displayed for examination and modification.

To open the airport list click the **Scanner** Menu item and choose **Airports**. The display shown below should open.



To load the airports that exist in the FS Setup (set using the FS Folder Selector discussed above). Click the **Scan** Button. The small loading circle to the right of the button will commence to spin and you will see some status info. **Note** that in this version the loading of the tree display is slow and will lock the display. I hope to fix this in later builds). Eventually the tree will be displayed in the Tree View. From there you can navigate to any airport that you are interested in. Select the airport in the tree and click the **Open Airport Button**. Your selection should load in the main window and the Airport List Window will close.

Important. Due to the way the program currently works please either compile the airport and reload it, or save it to XML and load it again before working on it.

To select an airport by ICAO enter the four letter code in the Box and Click **Find ICAO**

IMPORTANT Though the window closes it still contains the list and you can open it at any time while the main program is running. You can then choose another airport. You only need to call Scan once per session unless you want to change to a different FS installation (FS9 to FSX for example).

PREFERRED UNITS

To change your preferred units click the **Set Units** button and make your choices in the drop downs. Distance refers to things over a long way – mostly ranges, where you would want the measure in NM or perhaps meters. Dimension refers to things like runways dimensions, radius of parking and so on.

PARTIAL DECOMPILE

Click on the **Set Sections** Button. Tick the check boxes for those sections you wish decompiled. Note that if you select Airports then all the ancillary sections needed (Vors, Namelists, Ndb's, Markers, Waypoints and Services) will also be decompiled. Click **Save** to confirm the changes and then open a Bgl File.

SDE ATTRIBUTES

The engine stores additional attributes for name, comments and InstanceID in the XML along with the scenery elements. Most elements have these attributes which are placed at the top of the elements attributes. These are stripped by the engine before compilation. In the Test app you can hide or show these attributes with the Show **SDE Attributes** check box. This attribute list may be extended in future builds. Only Scenery Elements without attributes do not have this facility.

CONNECTING WITH FSX

To use the direct link with FSX you need first to ensure that you have SimConnect properly set up for you FSX. The interface using FSUIPC3 is no longer active. All scenery objects have a locationType property. Depending on the setting of this you can transfer location information direct to the object, To do this with the test app, make sure that FSX is running as well as SDE and that you have a registered copy of FSUIPC4 installed.

- Click the **Connect** button on the top right side of the test app. If all goes well you will get the red box turn green, plus the other buttons will become active.
- To use data from FSX position your aircraft where you want it, including heading if that is relevant. Then in SDE click the **Read** button. The properties grid will not seem to update but if you change object and go back then it will update with the aircraft location. The **Move** button is intended to demonstrate moving the aircraft to the location of the selected object in the tree but this is not yet implemented.

TO DO [WHAT THE PROGRAM CANNOT DO IN THE CURRENT VERSION]

The following Functions are planned:

- Ability to generate IVAC code for objects
- Have the engine generate errors if the user tries to add the wrong type of child element or the wrong number of child elements to an object. I.e make sure that the engine respects the schema rather than passing the responsibility for error checking on to BglComp
- Parameter validation
- Make available material and extrusion Guides from extrusion.xml and material.xml (FSX)
- Sorting of taxiway elements

Beyond the Core Engine I plan to add:

- Additional functions to provide scanning of multiple scenery files
- Further Object Factories (see above in the developers notes) to handle compound object generation

KNOWN PROBLEMS

The list below includes bugs or issues known about but not fixed in this build:

- A number of Approach Leg types decompile from the default bgl and will not then re-compile. This would seem to indicate that MS did not use BGLComp to compile some or all of the scenery files. There are also still inconsistencies between the SDK, default files and standard documentation (ARINC) for Legs. These problems will hopefully be addressed in future builds of SDE. In the meantime you may need to manually update approach legs to get the airport to de-compile. **NOTE that you should not modify approach data unless you know what you are doing!**
 - Boundary elements do not compile correctly.
 - Geopol type is not correctly identified
 - Boundary names may not always show up.
 - Decoding of Taxiway Signs is not always correct. Errors have been found in decoding justification, co-ordinate values and labels.

LEGAL BITS

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