

AptCndr and Condor

The CST (Condor Scenery ToolKit) of Condor Software allows to create/modify scenes;

Nevertheless, if it allows to easily place objects and create generic airports,

- the right location of the objects is difficult because of the degraded visual aspect of the tiles
- there is nothing to create textured surfaces except the tiles themselves
- There is nothing to create ' glider' surfaces except the runways themselves (these surfaces define if there are flat or not, and interact with the glider running)
- Trees are not diversified

AptCndr will try to bring a solution with the purpose of creation of scenes linked to existing defined airports in CST

- runway creation
- glider surfaces creation
- creation of textured surfaces like aprons
- creation of textured lines like central taxiway lines
- creation of forests with various trees
- eventually, creation of a background texture being the support of all these elements.

In Condor, we can add 3D objects in 2 different ways :

- with the CST itself, i.e. objects are created in the ".obj" file of your scene
- or viaO.cx files; these files are linked to airports which are defined in the CST; that's the way AptCndr works

AptCndr will update the files linked to each airport :

- airportG.cx for all textured surfaces on the ground
- airportS.cx for "glider" surfaces
- airportO.cx for 3D objects

Remark: in the CST, when defining a new airport, the « Use generic files » option creates these 3 files but with .x extension.

This tool is the result of hard researches and a lot of trials.

Bugs remain, of course, but also it could be some wrong assertions about Condor.

Remarks, suggestions, are welcome.

Vocabulary

Main runway : runway linked to an airport in Condor.

All elements in the S, G and O.cx files are referenced with regard to the centre of this runway, but considering that the runway is north aligned.

The center of this rectangular runway becomes de facto the centre of the scene associated with the corresponding airport;

Project ; in AptCndr it's the definition of a new scene.

A project is a .CDR file; all the parameters of the scene and what you type in is contained in this file.

Scene : In AptCndr a scene is linked to an airport **and only one**.

The scene is centred at the centre of the corresponding runway, but you are allowed to create some others runways if needed.

In the help documents you can find YS (your scene) ; it's the name of your general scene in Condor (...\\landscapes\\YS)

Note: AptCndr reads the YS.APT file located in...\\landscapes\\YS; this file contains all your YS airports

Remarks

Numbers : AptCndr uses the regional parameters in other words, the decimal point can be a point or a comma depending on your Windows option.

Precision in files .cx (and .x)

The point coordinates are defined with regards to the distance at the main runway centre.

The precision of values is depending on this distance.

For numbers generated by AptCndr, between 1 and 10 km, the precision is 1 cm; and less and less going to small distance.

Airport S, G & O.x files

These files are created when we use the “Use generic files” option in CST.

Read carefully: there are X files (not CX)

When we create the files with CX extension, these file are used by Condor instead of the X files; delete the files that are not needed; it's better for understanding.

Condor allows a mix of X & CX files; ex airportS.x, airpotG.x and airportO.cx

DDS files, DXT3/DXT5 formats

In Condor, all my trials with DXT3 and DXT5 textures with mipmaps <> 1 show blank surfaces? What is the reason why ?

Main Parameters

Contains only the language used by the graphical interface.

V1.0.1: Help is now in English.

Project parameters

In AptCndr a project is a scene linked to an airport.

Important :

The background of this scene is an image and the vertices of the lines or of the centre of the objects are defined with regards to the centre of this image, and this, in pixels.

The vertices are independent of the geographical coordinates of the scene.

The geographical coordinates are used only for information.

What is very important is the resolution meters/pixel.

AptCndr allows that the resolutions on latitude and longitude are different but in this case a rectangle will not be shown as a rectangle on the screen if the rectangle is not oriented South/North.

The image must be geographically oriented South/North and West/East

Numbers : AptCndr uses the regional parameters; in other words, the decimal point can be a point or a comma depending on your Windows option.

Project parameters

Project: J:\Point_Net\VB\AptCndr\AptCndr\bin\Debug\ess12.CDR [Select]

Condor Scene

Directory: K:\Condor\Landscapes\essai\ [Select]

Airports:

ess	Lat.:	Lon.:	Alt.:	Runway	Dir.:
Essai2	46,5802001	5,39219999	0	1000	50

Background

Image: K:\Condor\Landscapes\essai\Beaune.Bmp [Select]

3650x3796

Scene centring

Runway centre in the image

X: 1600 Y: 1600

☒ Centring on runway centre

Centring on runway center

Lat. 46,5802001 M/pixel: 0.5 N46:34:48.7204

Lon. 5,39219999 M/pixel: 0.5 E005:23:31.920

Centring width 2 points

NW SE

Lat. 46,58738662 Y: 0 Lat. 46,57034108 Y: 3795

N46:35:14.5919 N46:34:13.2279

Lon. 5,381744407 X: 0 Lon. 5,405589670 X: 3649

E005:22:54.279 E005:24:20.122

NW/SE image coordinates

NW SE

Lat. 46,5873866252 46,5703410856

Lon. 5,38174440702 5,40558967095

Check

Cancel ? OK

Project : when you create a new project we need to locate the corresponding .CDR file.

This file will contain all the following parameters of the project and the definition of the corresponding elements (3D objects, surfaces, lines ..)

Scene : your « general » scene located in ..\Landscapes\

The corresponding directory contains a YS.APT file (here ESSAI) where are defined all your airports and also:

- The « Airports » directory containing S,O, & G.cx files (and S, G & O.X if you have generated Generic airports)
- The “World” directory with “Objects” and “Textures” directories. The “Textures” directory would contain your textures related to your 3D objects, surfaces and lines, but they can be located in other directories. The “Objects” directory is not used by AptCndr.

Choose your “general scene” and the airport with which you want to work.
Of course it is supposed you have defined it in CST.

BackGround :

It's the image used as background in AptCndr

24 bits format only allowed; can be a Bmp or JPG file. Some other formats are accepted like PNG.

You will locate your objects on this image.

All the elements are located with pixel coordinates in the image; thus, it is not possible to change the image in the project.

Runway centre in the image :

In the background image, pixel coordinates X/Y of the centre of the main runway with origin (0,0) at the NW corner of the image.

Decimal numbers accepted.

Check box « Centring on runway centre » : we define here what we will do now : give information about the scene with the centre of the main runway or using 2 points NW and SE.

Note: the latitude and longitude coordinates are not useful in AptCndr, there are used only to verify that your object are well located. **What is very important is the resolution Meters/pixel.**

If you choose to centre with 2 points, the resolutions are automatically calculated.

To a visual aspect of the lines, it's better that the resolutions on longitude and latitude are identical.

Check button: click on this button to finish the calculation. Verify and validate with the “OK” button.

Remark:

Once validated, AptCndr copies automatically the Pistes.dds, TreesFs.dds and R_.dds files in
..\Landscapes\YS_World\Textures

V1.0.1: the main runway will be automatically created with the left model of the Piste1.jpg texture and with its characteristics you have declared in CST

The runway will be visible in the AptCndr main window

How to

Menu bar

1. Menu bar :

Files

- New
- Open
- Save
- Save as ...
- Close
- the 5 last projects
- Exit

Parameters

- Project parameters
- Main parameters
- Project initialization

Tools

- Lat/longitude conversion

1.0 Files : your projects

When you open an existing project, AptCndr copies it as a .bak file in the AptCndr root directory.

When you save your project as a new project, AptCndr keeps the name of the current project, it doesn't change it to the new name.

1.1 Main parameters

See the corresponding chapter

1.2 Project parameters

In order to create a new project, use the « New » icon or use the Menu/Files/New option.

Initialize a project : it is possible to create a new project from another; in this case this option erases all you have entered (lines, surfaces, 3D objects)

1.3 Tools

The tool for lat/lon conversion allows a conversion in 3 different formats.

How to

In AptCndr surfaces are depicted by on line defined by vertices.
Vertices are linked visually each others EXCEPT the first and the last.

Vertices of surfaces of type Runway and Background texture cannot be directly modified because there are always square or rectangle.

Icons



From left to right :

New project

Save project

Hide/show the background image

Zoom +

Zoom –

Generate S, O & G.cx files

Help (not functional)

Go to 3D object mode

New 3D object

Select a 3D object

Go to surface/line mode

New surface/line

Select surface/line(s)

Select vertice(s)

Inset a vertex

Extend the line on one of its extremities

Cut a selected line

Duplicate a selected line

Tab button : Go thru lines, 3D objects or vertices

Centre the background image on left mouse click

Trash

Used keys:

Suppress key to delete selected element(s)

To move selected element(s)

Ctrl + direction keys : displacement of one SCREEN pixel

Alt + direction keys : displacement of 5 SCREEN pixels

Shortcut	
F1	Help (not functional)
Tab	Idem "tab" button

How to enter lines/surfaces

In the following text, line = surface = polygon

Creation of a line:

You are in line/surface mode

Click on the « new surface/line » icon

Move the mouse cursor to the location where the first vertex will be created then left click ;

A new window is shown : choose the type of the line/surface.

Click on “OK” button.

A new window is shown, the window is depending on the type of the surface/line.

Enter the value for the corresponding attributes and click ‘OK”

The first vertex is created.

For the other vertices, move the cursor then left click and so on.

To finish : Escape key or an other selection/creation option.

**For a surface, NEVER try to link the first and last entered vertices.
AptCndr does that internally automatically**

Selection of a line :

Click on “Select surface/line” icon

Then left click **on a vertex** of the desired line;

Modification of the attributes of a line :

Select the line and then RIGHT click

Select a vertex :

A line being selected, LEFT click on the vertex to select

Delete line or point :

The element being selected, use the DEL key or click on the “Trash” icon.

Insert a vertex between two vertices :

A line being selected, click on the “Insert vertex” icon and then click at the location where you want to insert and release the mouse;

Then, click left and move the cursor precisely at the wished location then left click again to fix the location.

Escape key to finish (and deselect the vertex)

Extend a line on one of its extremities

The line being selected, click on the “Extend line end” icon;

Click left on the desired end then with successive left clicks create new vertices.

Escape key to finish and unselect the last created vertex.

Cut a line :

Select the 2 vertices on the line where to cut and click on the “cut a line” icon.

To select 2 vertices do as for one vertex **but maintaining pressed the Ctrl Key**

Duplicate a line :

Select the line to be duplicated and then click on the « Duplicate a line” icon;

To see the duplicated line, use the keys allowing a displacement of a line (Ctrl/ Alt + direction keys)

Selection of several lines or vertices

In the corresponding mode (select a line or vertex) press the Ctrl key and select the desired elements

The selected elements can be deleted or moved together.

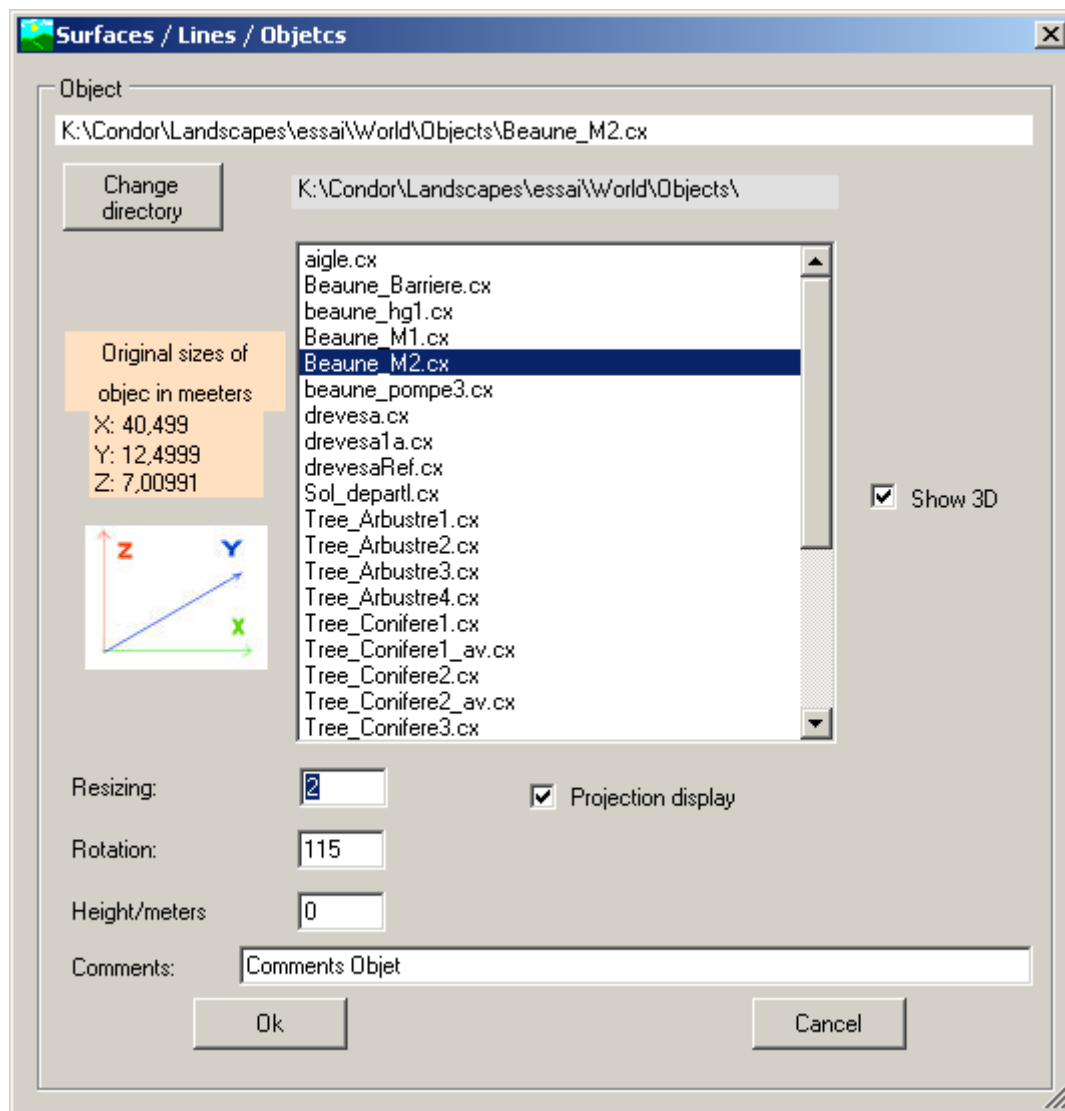
Note : when entering lines and points, you can zoom, use the scrollbars, the “Centre” button and also the mouse wheel; in the case of mouse wheel, you centre and zoom in the same time the background image.

How to enter 3D objects

Go to 3D objects mode (click on the “3D objects key in” icon)

Creating or modifying is similar to surfaces/lines

Keying in a 3D object



The « Change directory » button allows to choose the directory where to locate your 3D objects.

The 3D object can be a .CX or .X object but must be compatible Condor, i.e. usable by CST.
Note: in CST these files are DirectX file types but the internal values are encrypted and there is a particular notation for texture path.

There are errors in some existing .cx/.x available (?) files.
AptCndr follows the directX rules and rejects the bad files.

After selecting an 3D object, AptCndr displays the “external” sizes; there are the maximal found values.
The little schema with the 3 axis shows how to interpret the X,Y & Z notation.

Resizing: we can resize an object entering a transformation coefficient (1 = no resizing)
The transformation is homogeneous (on the 3 axis)

Rotation : it is the rotation with regard to the centre of the object on the horizontal plane.
The rotation is done with regard to the vertical axis and is defined positive clockwise.

The centre of an object is defined very simply: for each axis it's the sum of the vertex values/ number of vertices.

Height/meters : objects are usually on the ground but we can raise them entering the corresponding elevation in meters.

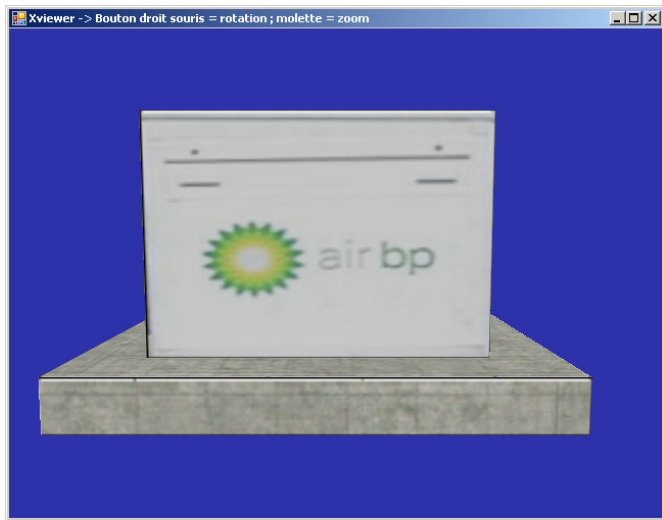
Projection display : here we decide if we want to see on the horizontal plane the projection of the polygons in the main AptCndr windows.

If not, we will see only the circumscribed rectangle.

Comments : not mandatory, but can be useful in case of error during the file generation step.

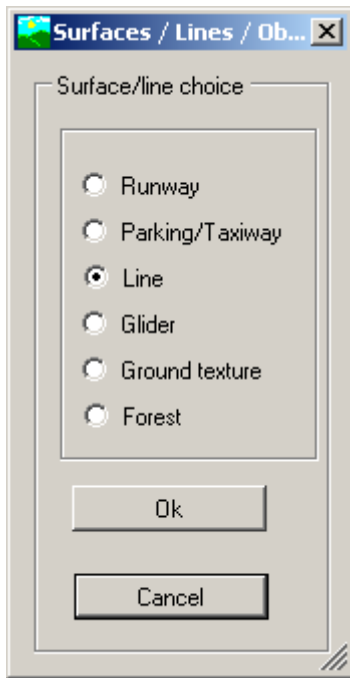
The comments field is sometimes written in the log file.

Visu 3D : not necessary but this option allows to see the 3D object in its position in the final scene if there is no attached rotation. The object is seen South/North, West/East oriented.



Line/surface type choice

When we create a new surface/line we define its type, and it will be impossible to modify it after validation. If you want to modify: delete and create again.



Runway : can be the main runway but can be also an other runway(s).
A glider surface is automatically attached to each defined runway

Parking_taxiway : allows to define a textured surface. Mainly used for apron or taxiway.

Line : allows to draw textured lines on the ground, for example a central line of a taxiway.

Glider : invisible surface to define the roughness of the surface. When running on the ground the glider interacts with the surface.

Ground texture : allows to take in account a part of the background image and create a texture which will be drawn on the existing tiles, but drawn under the runways, textured lines and surfaces.
A transparency can be defined on the periphery of the texture in order to merge it with the surrounding tiles.

Forest : allows to define forest surfaces with personal trees.

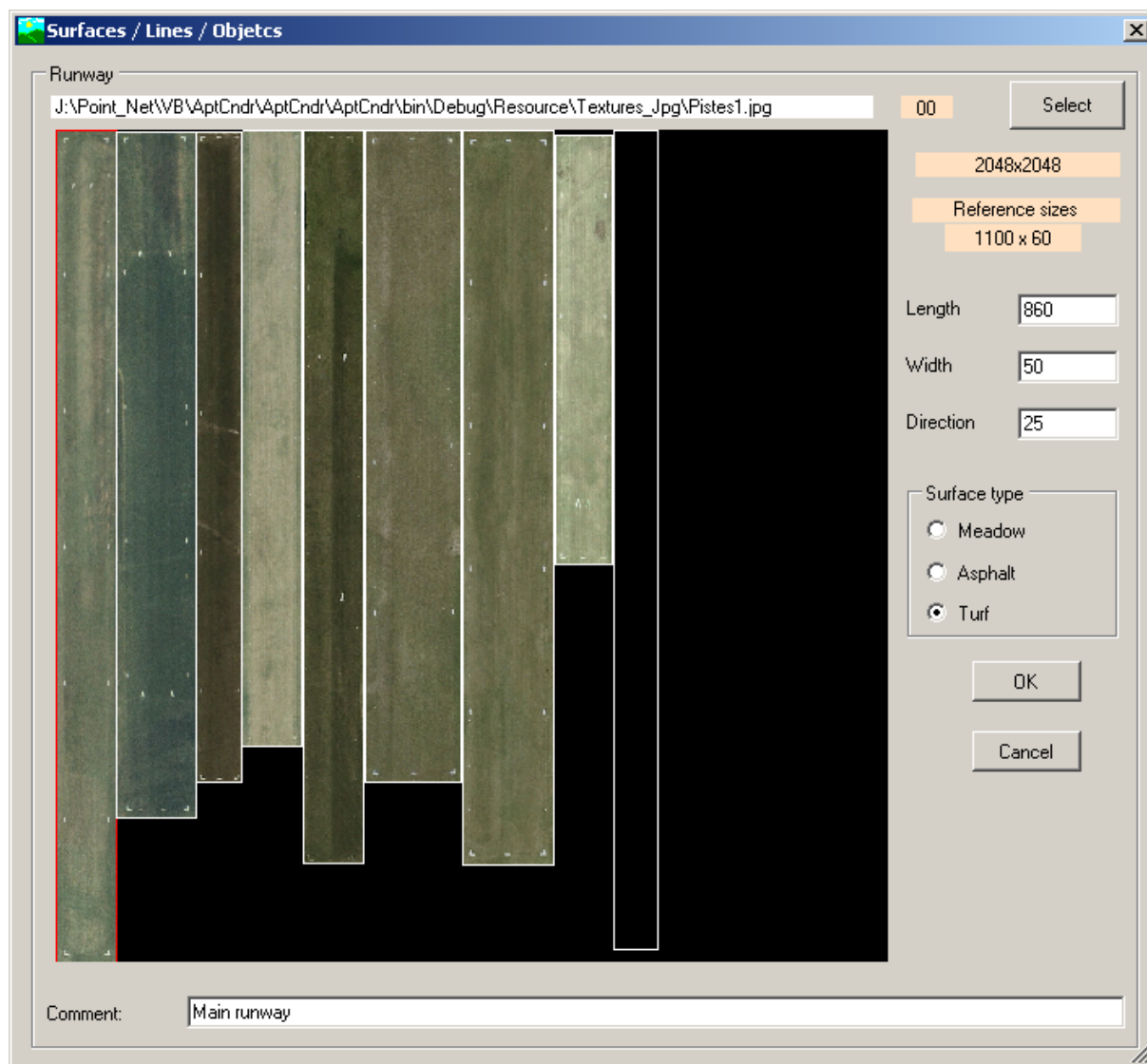
Important :

Forests are made of 3D objects, one per tree.

In other words, there is a lot of polygons that will be treated by the graphical engine.

Textured polygons and lines could be also very expensive in term of polygons volume.
Try to limit the resolution of the textured surfaces.

Runways



AptCndr proposes some runway samples; one of them is transparent.

The corresponding texture is `\Resource\Textures_DDS\Piste1.dds` for display in Condor, and `AptCndr\Resource\Textures_JPG\Piste1.jpg` for immediate display in AptCndr.

The associated parameters are located in `AptCndr\Resource\Param.ini`, [Pistes] chapter.

You can create your own runway textures (see appendix)

When you choose a model via a left click on the image, AptCndr displays the associated characteristics of the runway. These characteristics are only information.

Length and Width : new sizes of the runway. The corresponding image will be stretched according to these new sizes.

Direction : direction of the runway. For the main runway this field should be equal to the value you enter in CST (0 degree if North oriented)

Surface type

Meadow : ground not flat

Asphalt : flat ground

Turf : flat ground

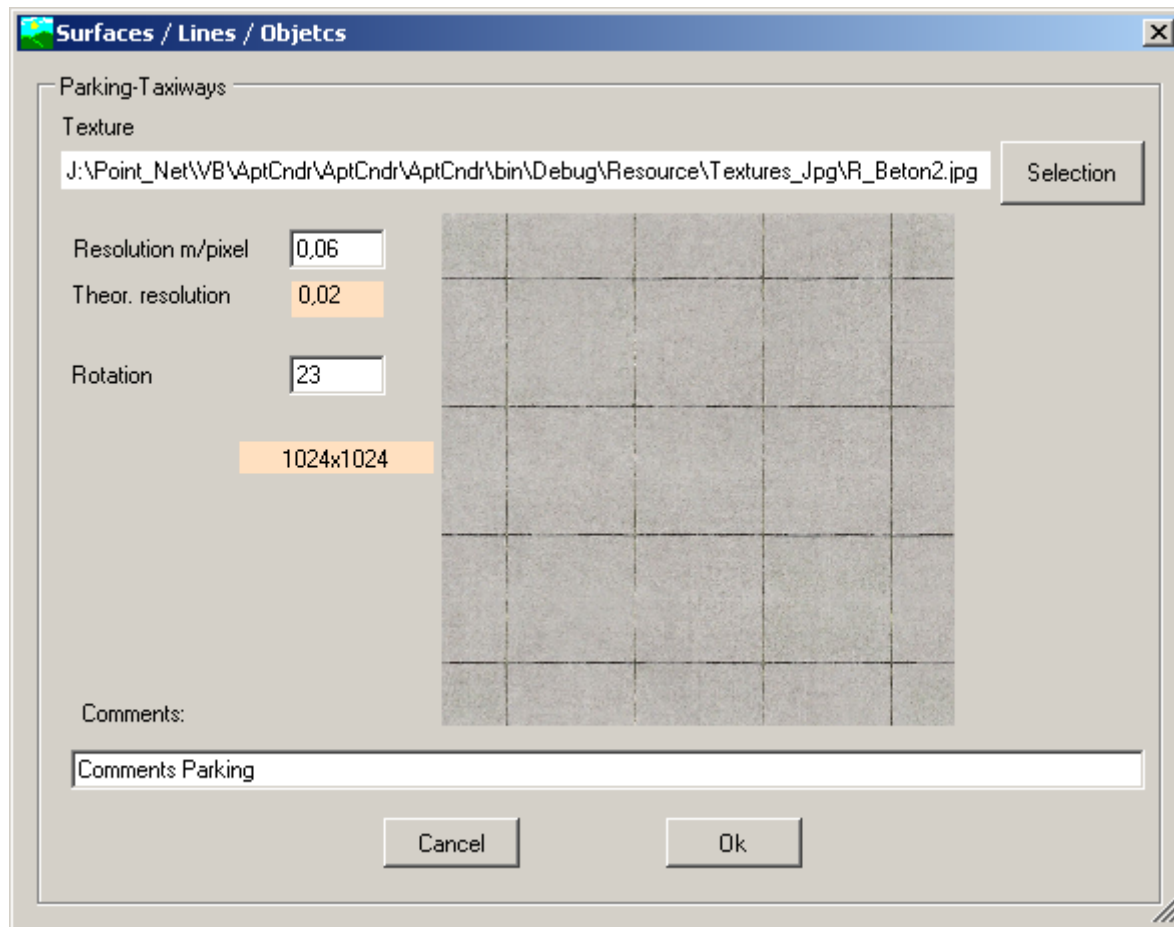
I cannot see difference between Asphalt and Turf; Inform me if you know !

Comments : not mandatory, but can be useful in case of error during the file generation step.
The comments field is sometimes written in the log file

Parking Taxiway

AptCndr proposes texture samples which are located in AptCndr\resource\Textures_DDS for display in Condor and AptCndr\resource\Textures_JPG for immediate display in AptCndr.

The name of these textures begins with R_



Resolution m/pixel : resolution of the texture in meters/pixel

Note : the less is the resolution, the more is the polygon generated volume.

Rotation : allows to orientate the texture in order to align it with a building for example.

Rotation is positive clockwise.

Comments : not mandatory, but can be useful in case of error during the file generation step.

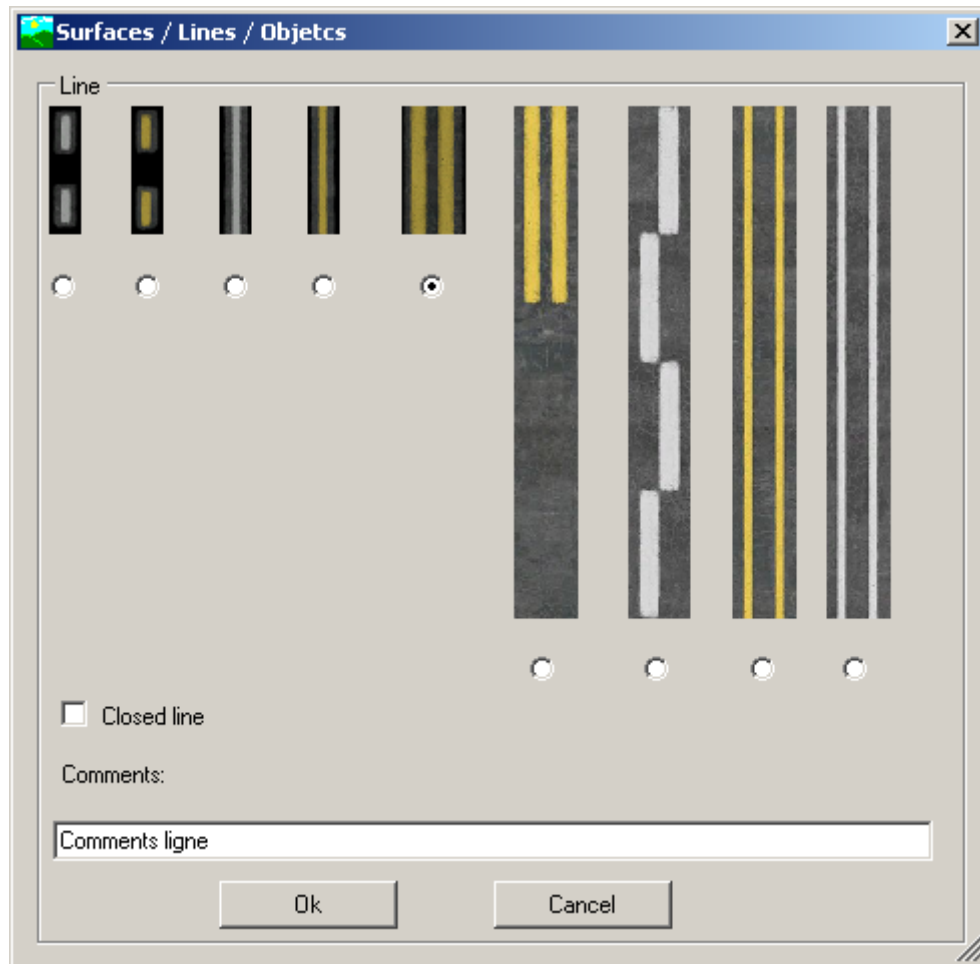
The comments field is sometimes written in the log file.

Lines

Allows to draw textured lines.

AptCndr proposes samples of textured lines; the corresponding texture is Lignes1 and is located in AptCndr\Resource\Textures_DDS for display in Condor and AptCndr\Resource\Textures_JPG for immediate display in AptCndr.

In AptCndr\Resource\Param.ini, [Lignes] chapter, you will find the associated parameters, one of them is the width. You can modify this value. See Appendix.



Select the wished line model.

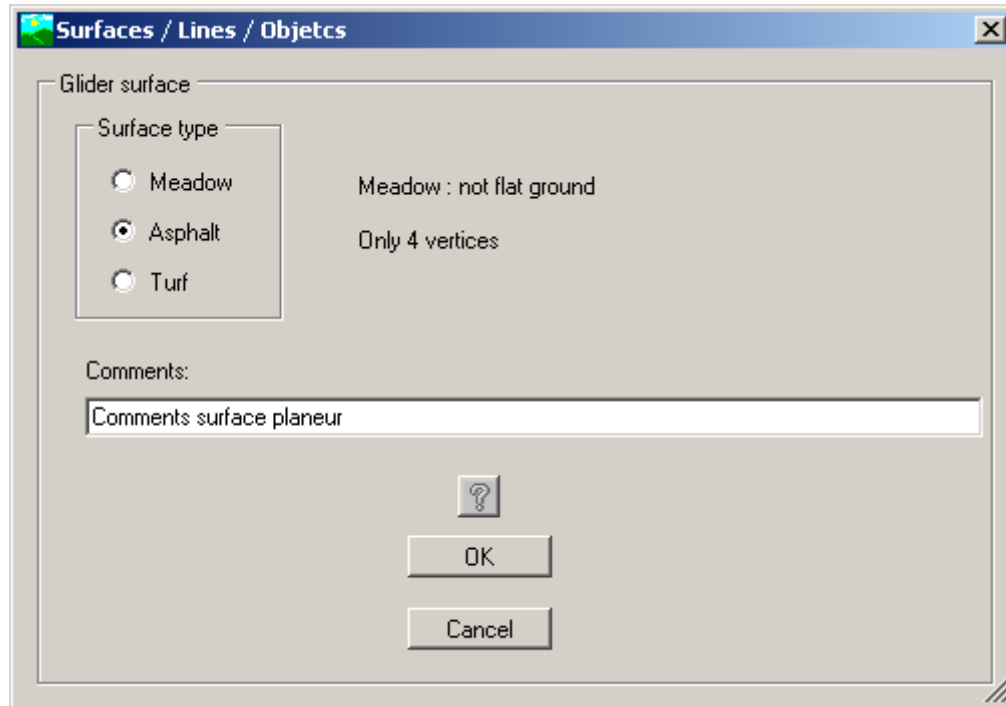
Closed line: A textured line can be closed (note : when entering vertices of the line, AptCndr never links visually the first and last vertices)

Comments: not mandatory, but can be useful in case of error during the file generation step. The comments field is sometimes written in the log file.

Glider surface

These surfaces are invisible. They define the roughness of the ground.
For runways, AptCndr creates automatically the corresponding Glider surfaces.

It seems that only 4 vertices are allowed; the surface is not strictly a rectangle.
AptCndr verifies the number of vertices.



Surface type

Meadow : ground not flat

Asphalt : flat ground

Turf : flat ground

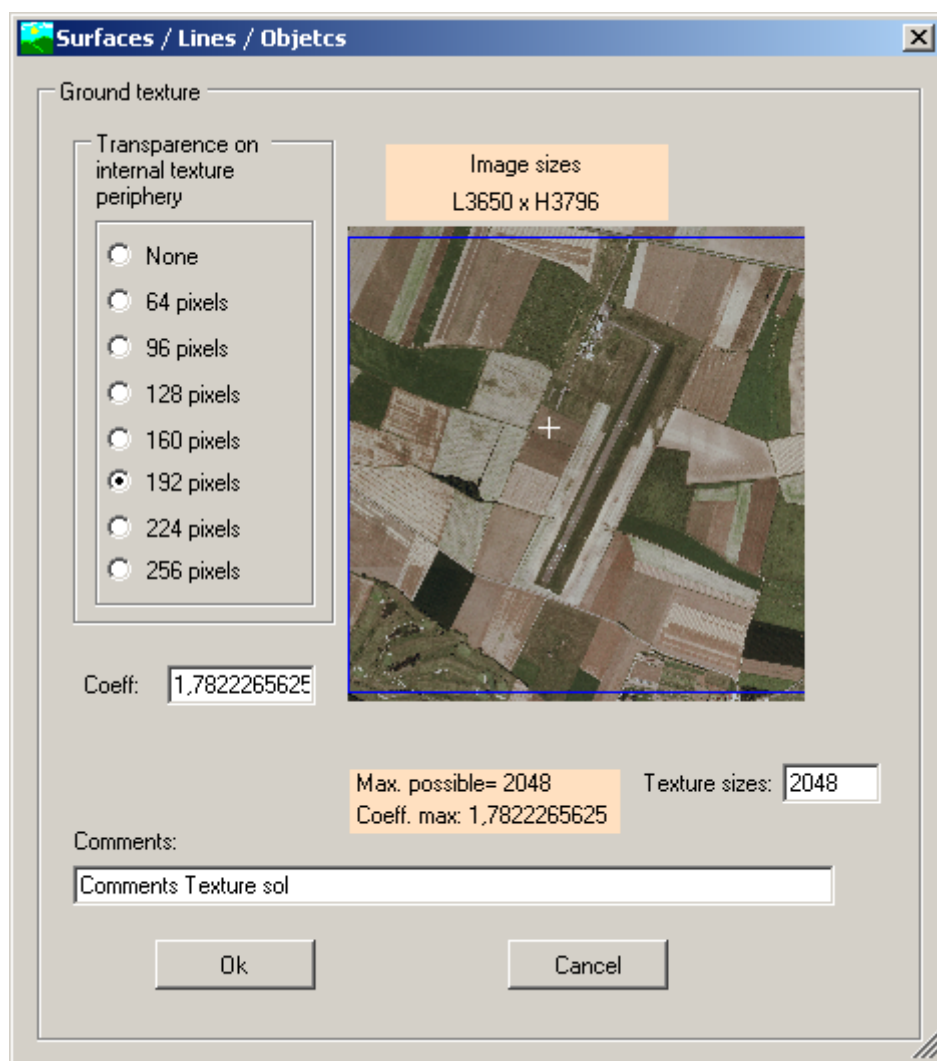
I cannot see difference between Asphalt and Turf; Inform me if you know!

Comments : not mandatory, but can be useful in case of error during the file generation step.
The comments field is sometimes written in the log file.

Note : for example, an apron can be a textured surface and also a glider surface. Create the two surfaces.

Ground texture

AptCndr gives the possibility to take in account part of the background image and transform it into a texture for display in Condor.



Texture sizes : At the moment of the creation of the texture, AptCndr proposes pixel sizes for the texture. The texture must be a square and the size a power of 2.

You can modify but the texture must be contained in the background image. See the “Coeff.” Field

Coeff. : theoretically, one image pixel is one texture pixel. This coefficient allows to extend the taken square, the sizes for the texture being not modified.

We cannot here move the texture square in order to fit your needs, but it is possible in the main AptCndr window with Ctrl/Alt + direction keys.

Transparency on internal texture periphery : this progressive transparency allows to merge nicely the texture with the surrounding tiles.

Comments : not mandatory, but can be useful in case of error during the file generation step. The comments field is sometimes written in the log file.

Note: the texture will be named automatically TextureSol.dds and will be located in ...Condor \Landscapes\YS\World\Textures

Forests

The forest surfaces are made of 3D objects.
These objects as .cx files are located in AptCndr\Resource\Arbres.
You can use them as individual objects.

The description of the trees is located in \Resource\Param.ini, [Feuillus] and [Coniferes] chapters.
You can add your own trees; there is only two categories of trees : deciduous and conifereous.
TrresFs.dds is partially used.

The screenshot shows a dialog box titled 'Surfaces / Lines / Objects' with a 'Forest' tab selected. Inside the dialog, there is a 'Density' section with three radio buttons: 'Dense' (selected), 'Medium', and 'Low'. To the right, there is a table for tree distribution parameters:

	Percentage	Medium height
<input type="checkbox"/> Decideous	60	20
<input checked="" type="checkbox"/> Conifereous	100	25

Below the table, it states: 'Decideous standard height= 25 m' and 'Conifereous standard height = 20 m'. At the bottom, there is a 'Comments:' label and a text field containing 'Comments Foret'. 'Cancel' and 'Ok' buttons are at the bottom right.

Density : Dense, Medium or Low

The average distance between trees is calculated with the density parameters located in Param.ini in the [Arbres] chapter.

Decideous/Conifereous : choice of the category ; there are several different models per category, the choice is random.

Percentage : percentage of conifereous/decideous distribution.

Medium height. : the variation is calculated only for height, not for width.

N Param.ini, [Arbres] chapter, the min/max parameters are used to calculate the delta min/max for height.
The calculated height for each tree is random.

Comments : not mandatory, but can be useful in case of error during the file generation step.
The comments field is sometimes written in the log file.

Note : trees are individual 3D objects and depending on the density and the surface, the volume of generated polygons can be very important.

See Appendix for tree parameters.

File generation



Important : the G, S and O.cx files are deleted and then created again; there is no replacement of elements.

Runway, parking_taxiways, lines and ground texture are created in airportG.cx file.

Glider surfaces ; created in airportS.cx file.

The runway surfaces are automatically included.

3D objects are generated in the airportO.cx file.

Errors : when detecting errors during the generation step, AptCndr displays a Log file.

Error handling is a complicated process and it is possible that AptCndr stops very quickly the generation process; correct and launch again the generation process.

Important, before generation step running, click on the « save » icon, it's so easy and sometimes so helpful !.

Annexe

Param.ini : runway parameters

Pistes1-00= 0; 0; 148; 2047; 20; 20; 129; 2028; 1100; 60; 0;
Pistes1-01= 150; 3; 344; 1692; 167; 17; 324; 1672; 900; 80; 0;
Pistes1-02= 346; 5; 455; 1604; 356; 15; 447; 1596; 860; 50; 0;
Pistes1-03= 457; 1; 605; 1518; 475; 16; 589; 1496; 800; 50; 0;
Pistes1-04= 607; 0; 758; 1805; 619; 16; 729; 1795; 970; 60; 0;
Pistes1-05= 760; 0; 998; 1605; 780; 21; 979; 1583; 850; 100; 0;
Pistes1-06= 1000; 0; 1225; 1807; 1020; 24; 1203; 1782; 965; 100; 0;
Pistes1-07= 1227; 13; 1369; 1070; 1242; 25; 1351; 1052; 675; 60; 0;
Pistes1-08= 1371; 0; 1480; 2018; 1371; 0; 1480; 2018; 1100; 60; 1;

The origin of the pixel coordinates is 0,0 on the NW corner of the texture.

A runway is made of

- an internal rectangle which is really the used runway usually defined by white marks
- an external rectangle which is the limit of the global image including for example a runway on one side.

For each line :

- Texture name without extension, followed by “ - “ and an order number in the texture which begins with “00” on the left of the texture.
- X and Y coordinates of the NW corner of the external limit of the runway
- X and Y coordinates of the SE corner of the external limit of the runway
- X and Y coordinates of the NW corner of the internal limit of the runway
- X and Y coordinates of the NSE corner of the internal limit of the runway
- theoretic length of the runway
- theoretic width of the runway
- flag for transparency (not used today)

You can add runways in the Pistes1 texture or create an other texture. Add the corresponding lines in Param.ini following the same structure as above.

Appendix

Param.ini : Line parameters

[Lignes]

Ligne_0=Lignes1; 0; 376; 511; 407; 0.75; Dot_White

Ligne_1=Lignes1; 0; 72; 511; 103; 0.75; Dot_Yellow

Ligne_2=Lignes1; 0; 439; 511; 470; 0.75; Plain_White

Ligne_3=Lignes1; 0; 8; 511; 39; 0.75; Plain_Yellow

Ligne_4=Lignes1; 318; 135; 511; 198; 1.50; Plain Large_Yellow_double

Ligne_5=Lignes1; 0; 135; 511; 198; 1.50; dot PlainLarge_Yellow_double

Ligne_6=Lignes1; 0; 314; 511; 377; 1.50; dot decalé white

Ligne_7=Lignes1; 0; 9; 511; 72; 1.50; double yellow

Ligne_8=Lignes1; 0; 440; 511; 503; 1.50; double blanc

You can here modify the width of the line. See 0.75 and 1.50 (in meters)

Appendix

Param.ini : forests

[Arbres]

Densite_Dense_Min= 0.6
Densite_Dense_Max= 1.0
Densite_Moy_Min= 1.4
Densite_Moy_Max= 2.2
Densite_Faible_Min= 4.0
Densite_Faible_Max= 6.0
MinHauteur_Feuillus=0.75
MaxHauteur_Feuillus=1.25
MinHauteur_Coniferes=0.75
MaxHauteur_Coniferes=1.25

[Feuillus]

1=Tree_Feuillus1.cx
2=Tree_Feuillus2.cx
3=Tree_Feuillus3.cx
4=Tree_Feuillus4.cx

[Coniferes]

1=Tree_Conifere1.cx
2=Tree_Conifere2.cx
3=Tree_Conifere3.cx

[Arbres] chapter :

- Min/max density parameters : coefficients applied to the average width of the trees in order to calculate the min/max distance between the trees.
- Min/max height parameters : coefficients applied to the average height of the category of the trees in order to calculate the min/max height of the trees

[Feuillus] and [Coniferes] chapter :

Corresponds to the existing .cx files in AptCndr\Resource\Arbres

These objects are linked to TreesFs.dds

You can add new trees ; you must respect the structure of the existing .cx files.

AptCndr allows 20 different trees in each category..

Appendix

Param.ini : texture parameters for Parking Taxiway

Parking_Taxiway]
R_Asphalt1=0.02
R_Asphalt2=0.02
R_Asphalt2=0.02
R_Beton1=0.02
R_Beton2=0.02
R_Beton3=0.15
R_Brick=0.03
R_Grass2=0.1
R_Gravel=0.02
R_Shale=0.02
R_Steel=0.02

Name of the used textures without extension, with their theoretic attached resolution, resolution in meters/pixel

The codification of the name begins with R_; it's not mandatory.

You can add your own textures (.dds and .jpg in the corresponding directories) and add their description in Param.ini.

You must copy manually these .dds textures in the World\Textures directory of your scene (or elsewhere).

Known bugs

Shift+ direction keys produces an horizontal displacement of the screen image. Why ?

The « minimize box » button of the main window is not active; program crash elsewhere.

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Historic

V.1.0.0 January 2010 dated 12

V.1.0.1 : February 2010 dated 5

- add the automatic creation of the main runway
- help in English
- some modifications in language.ini
- some modifications in the French help