Nr2k3 PTF to rFactor track conversion tutorial
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Required Tools:

Sim Garage:

TrkMaker, at least version 1.4 and 3dSimEd at least version 1.12

Nvidia:

DDS Thumbnail Viewer (helpful but not required)
http://developer.nvidia.com/object/dds_thumbnail_viewer.html

Text Editor:

Any text editor will do. Notepad, Textpad etc.

Preparation:

Setting up your workspace:

For this example, we will use the track name "`MyTrack`"
Set up a work space directory; `C:\Locations`
Then create the root directory for your track, `C:\Locations\MyTrack` , this will hold the data from the track we are converting. Within this folder we need two temporary folders:
`C:\Locations\MyTrack\MyTrack_dat` and
`C:\Locations\MyTrack\shared`

Within rFactor we need two folders: one for the geometry and textures

`RFactor\GameData\Locations\MyTrack`

and the second for the configuration files

`RFactor\GameData\Locations\MyTrack\MyTrack`

Open 3dSimEd, and from the Tools menu, select Expand – Papyrus DAT. Navigate to where your original nr2k3 track is located and select your `Mytrack.dat` file.
Next, point 3dSimEd to your `C:\Locations\MyTrack\MyTrack_dat` folder and extract the .dat file to that location.
If your track was not packed into a .DAT file, then just copy the files to your `C:\Locations\MyTrack\MyTrack_dat` workspace.

Now copy the .LP files from the nr2k3 track to your
`C:\Locations\MyTrack\MyTrack_dat` folder.

Most tracks will also contain objects and textures held in the N2K3 shared folder.
Using the Tools->Expand->Papyrus .DAT function select the `SHARED.DAT` within
the n2k3 `Tracks\Shared` folder and extract the files to
`C:\Locations\MyTrack\shared`

We are now going to use 3DSimED to ensure all our textures are in one place. Open
`MyTrack.PTF` from `C:\Locations\MyTrack\MyTrack_dat`. Select the
File->Export Textures function and select
`C:\Locations\MyTrack\MyTrack_dat` as the target folder (you can skip the
option to Rename Textures...).

We should now have all the textures used by the n2k3 track in the folder
`C:\Locations\MyTrack\MyTrack_dat`.

Texture conversion.

Use the Texture Browser in 3dSimEd and navigate to your
`C:\Locations\MyTrack\MyTrack_dat` folder. Click on `Batch Conversion`.
Select all of the .mip files and choose .DDS as the format to convert to. Point 3dSimEd to
your `RFactor\GameData\Locations\MyTrack` and you will now have all
your texture maps as .DDS files.

Converting the track surface and terrain with TrkMaker.

Open TrkMaker and select `Nascar .PTF to XML`
Navigate to `C:\Locations\MyTrack\MyTrack_dat` and select `MyTrack.ptf`
Save as `MyTrack.XML`

Select `XML to rFactor`
Navigate to `RFactor\GameData\Locations\MyTrack` and save.
You will now have all of your track segments as .gmt objects and you will also have a file
named `_trkmaker.scn`

You may, want to check your progress so far by opening `_trkmaker.scn` with
3DSimED. Check that all faces generated by TrkMaker have textures assigned.
The quick way to confirm this is to use Tools->Missing Textures & Objects. If there are
missing textures then you need to look at the Materials table within TrkMaker.

Creating Response Objects.

For the AI, and the correct timing of laps, rFactor needs a number of special response
objects. These objects can be created in TrkMaker using the VerticalObj table. Using the
TrkMaker Open XML command open the `MyTrack.XML` you created from the .PTF.

For each vertical object you need to define the longitude, latitude of the left and right of the object, bottom elevation, height and the material name. You will also need to give the title of the object which should be from the list below.
With the XML open go to the `VerticalObj` table (you may need to scroll down the list of tables on the left)

1) Xfinish. An object which spans the track (including the pit lane) at the start/finish line. Normally this object would have longitude of zero.
2) XSector1 & XSector2. As the names suggest these two objects span the track at the end of sectors 1 and 2 and should have longitudes of approximately 1/3rd and 2/3rd around the track
3) XPitin & XPitout. These objects mark the start and end of the pitlane. You need them to span the pitlane but not overlap any of the racing surface.

To get the correct longitudes and latitudes for these objects you can open your original N2K3 .PTF with 3DSimED and move the mouse over the track watching the bottom right of the status bar for the three values labeled LLE which are the longitude, latitude and elevation of the cursor position. Alternatively, by right clicking and selecting Memorize XYZ these values will be copied as text to the clipboard and you can paste them into notepad to read or copy.

For each of the five objects make sure the Material is one already present in the Material table (e.g. road01), set the bottom elevation to -2 and the height to 10 (we are attempting to create objects that cannot be missed so we are drawing it from 2m below the track surface to 8m above the surface). You would normally set the LongEnd to the same as the LongStart ensuring the object is perpendicular to the track. The LatStart is the left latitude and LatEnd the right latitude.

Once all five objects are added to the `VerticalObj` table, use Write to XML, and then use the Write rFactor function to re-create the track surface objects in the `RFactor\GameData\Locations\MyTrack` folder.

Track Texture Tranparency.

TrkMaker is a database application with no knowledge of the transparency of the textures used for the track surface so it sets all the materials to have no transparency when writing the .GMT. It is almost certain that your original N2K3 track used textures that have transparency so this issue has to be resolved.
The quick way to do this: with 3DSimED. Import `_trkmaker.scn` into 3DSimED. You should now see the response objects we created above as well as the track surface. If everything is as you expected use `Edit->Reset Material Transparencies` and you should see a difference wherever there are transparent textures. Now using `File->Save as rFactor GMT->Save Objects`, saving the objects back to `RFactor\GameData\Locations\MyTrack`

A better way to deal with the transparencies is, within TrkMaker, to open the Material Table and to set the values of the Transparency fields. The advantage of this method is that you only have to do it once and you will not have to use 3DSimED to reset the transparencies every time you export .GMTs from TrkMaker. The Transparency field should be zero for no-transparency (e.g. asphalt, grass paint etc), one for simple transparency (e.g. Armco) and two for multiple transparency (e.g. wire fences). If you are

not sure you can always use the `Tools->Texture Browser` of 3DSimED to look at the textures.

Converting the TSO .3do objects with 3dSimEd

From within 3DSimEd and from the File Menu, select `Import Model.`
Open your `MyTrack.ptf` file.

The first thing we need to fix is a material named "*GENERATED BY DEFAULT*
If you don't see this material, don't worry about it. It is not part of our track and is created by 3dSimEd. Click on the material name, and click the Edit button. An * is not allowed by rFactor in a material name so we will change it to `Null.` Also, notice that the texture that is assigned to it has no name. Click the button with the texture name, and assign any texture to it. It does not matter which one you choose.

At this point we should delete the flaggers as these objects have no purpose in rFactor. The quick way to do this is to go to `Display->Object Filter` and select All Off. Now switch back on the display of `flagger*.3do` objects, and exit with OK. With `Edit->Select All Displayed` you should get a sub-menu with Objects, and from the `Objects` menu select `Erase`. With Display->Object Filter All On switch on the display of all your remaining objects.

If there are animated objects from the shared folder such as `flag.3do`, `flag_large.3do`, `flag_xlarge.3do`, `truck_jumbotron.3do`, & `truck_led.3do` you should delete this objects. The same applies to any flying objects such as `blimp.3do`, `Cessna.3do`, and `heli*.3do`.

From the File Menu, select `Save As rFactor GMT->Save as objects`
Point 3dSimEd to your `RFactor\GameData\Locations\MyTrack` folder and save.
Now all of your TSO .3do objects are .gmt objects and you will also have an `_output.scn` file in which they are listed.

At this point, use 3DSimED to Import the _ouput.scn that has just been created to check for missing textures (`Tools->Missing Textures & Objects`).

Setting up the track configuration files.

Info

First, let's take a look at these file extensions and what these files do. All of these files can be viewed and edited with Notepad or other text editors. (You may need to right-click the file and select `Open With` and select Notepad) With the exception of `.tdf` files, each of these files will be located within a "configuration" folder within the main track folder. If your track has multiple configurations, Long, Short, GP, etc, you will have a

folder for each configuration, and new copies of these files will be set up to reflect the needs of that layout.

`.scn` (scene) this file lists all of the objects the game will load when loading your track. It also contains the file paths to search for them, and information about lighting and fog values. Special properties for objects such as `movable` and `vis groups` (controls whether the object is hidden at low graphic detail settings) are also controlled by this file. You will also notice, that unlike Papy .3do, where you only have one object of each type, such as cone.3do, and the .ptf file keeps track of multiple instances and their locations, you will have a unique `.gmt` file for each instance: cone.gmt, cone001.gmt, cone002.gmt, etc. and the XYZ coordinates are stored in the `.gmt` file itself.

`.gdb` contains the information about your event; Name, description, session details, pit speed, etc.

`.cam` This is the camera file, but editing it is beyond the current scope of this tutorial.

`.aiw` This is the AI file and includes the equivalent information as the nr2k3 .lp files and portions of the track.ini. It contains the pit, garage, pace/safety car and start grid locations.

`.tdf` This file is found in the Locations folder and is named `terrain.tdf`. It defines the types of track surfaces, responses such as dust, grip settings, and bumpiness. If you need to define custom track surfaces or customize existing surfaces, you can make a copy of it and place it in the the root of your `MyTrack` folder, and rename it to `MyTrack.tdf`.

Borrowing files

Now that we know a little bit about the files we will be working with, we will need to borrow some existing ones to get us started. I chose Toban for my source. We will also need to borrow a `sky.gmt`, a `skyboxi.gmt` (horizon) and the `bka.dds` file for the skyboxi.gmt.

Later there are other files we will need from Toban so we are going to extract all of the geometry and texture files. Create a folder `C:\locations\toban` and using the 3DSimED function Tools->Expand->rFactor .mas open first `Toban.mas` and then `Tobanmap.mas` (in `rFactor\Gamedata\Locations\Toban`) giving `C:\locations\toban` as the destination folder.

Copy `sky.gmt, skyboxi.gmt, and bka.dss` from `C:\Locations\Toban` to `RFactor\GameData\Locations\MyTrack`

Go to your `rfactor\GameData\Locations\Toban\Toban_Long` folder and copy all of the files to `RFactor\GameData\Locations\MyTrack\MyTrack cd`
Rename each one to `MyTrack.AIW, MyTrack.cam` etc.

The three image files are the loading screen, and the preview images.
Rename these, and keep the naming scheme intact. Example: `MyTrackThmb.tga`
We can create custom image files for our track later.

Editing the files

Open `MyTrack.gdb` with Notepad.
Replace references to `Toban` (and `Toban_Long`) with `MyTrack.`

```
MyTrack
{
 Filter Properties = RoadCourse 2005 SRGrandPrix OWChallenge
 Attrition = 30
 TrackName = MyTrack
 EventName = MyTrack
 GrandPrixName = MyTrack          //this must be the same as event
      name in order to sort circuit info correctly.
 VenueName = MyTrack
```

Scroll down the bottom and do the same with the folder to save car setups to.

```
  SettingsFolder = MyTrack
```

Save and close the `MyTrack.gdb` file.

Open `Mytrack.scn` with Notepad.
The first section of the `.scn` file determines the search paths for your track files:
Replace references to `Toban` with `MyTrack.`

```
CUBEASF

//------------------------------------------------------

SearchPath=.
SearchPath= MyTrack
SearchPath= MyTrack \ MyTrack

//------------------------------------------------------

MASFile=COMMONMAPS.MAS

//------------------------------------------------------
```

The next sections of the `.scn` file determines fog values and lighting. We will keep the View and Fog settings and just keep a minimal set of lights, so delete `NightLight04` through to `NightLight69`. Find the Skyboxi instance further down the .scn file and cut & paste above the outhouse04 Instance.

```
//-------------------------------------------------------

Light=FDirect01
{
 Type=Directional Dir=(0.338743,-0.883505,-0.323532)
Color=(255, 255, 255)
}
Light=NightLight00
{
 Type=Omni Pos=(-223.159912, 11.439373, 12.055908)
Range=(0.000000, 43.000000) Active=True Intensity=(1.000000)
Color=(255, 255, 255)
}
//-------------------------------------------------------

Instance=skyboxi
{
  Moveable=True
  MeshFile=skyboxi.gmt CollTarget=False HATTarget=False
  Instance=Sky
  {
    Moveable=True
    MeshFile=Sky.gmt CollTarget=False HATTarget=False
  }
}
//-------------------------------------------------------

Instance=outhouse04
{
…
```

Note the // indicate "comments". The game will ignore any text on a line that follows a //. These can be used to separate your `Instances` into categories so that things are easier to find when you need to edit properties for an object

Now delete all Instances from outhouse04 to the end of the .scn file and Save `MyTrack.scn`.

Completing the SCN.

Leave your `MyTrack.scn` file open and open your `_trkmaker.scn` (in `C:\Locations\MyTrack)` file with Notepad.
Select all of the text in `TrkMaker.scn` and copy it to the clipboard.
Paste these into the `Instances` section of `MyTrack.scn`
Close `TrkMaker.scn`

Open `_ouput.scn` with Notepad.
Select all of the text in `_ouput.scn` and copy it to the clipboard.
Paste these into the `Instances` section of `MyTrack.scn`
Close `_ouput.scn`

Save and close `MyTrack.scn`

<u>Creating the AI.</u>

The file `MyTrack.AIW` needs AI information for MyTrack. `TrkMaker` can help make a very basic, limited, AIW file which will get us started.

In `TrkMaker` open your MyTrack.XML. We need to complete the `AIInfo` table before creating the AIW (you may need to scroll down the list of tables to get to AIInfo).

All the values must be present. MergePitIn and MergePitOut are the longitudes at which the AI cars will merge to and from the pit line. StallsLongStart, and StallsLatStart give the longitude and latitude of the pit stall at the start of the pit lane while StallsLongEnd and StallsLatEnd are for the end of the pit lane. Don't forget you can use 3DSimED to help get these positions for you moving the mouse over the track watching the bottom right of the status bar for the three values labeled LLE which are the longitude, latitude and elevation of the cursor position. Alternatively, by right clicking and selecting Memorize XYZ these values will be copied as text to the clipboard and you can paste them into notepad to read or copy.

Once you have completed the `AIInfo` table hit the `Write AIW` button. You will be prompted for .LP files so navigate to your `C:\Locations\MyTrack\MyTrack_dat` folder and select one of the .LP files. Next you will be prompted for the AIW filename, browse to the your `RFactor\GameData\Locations\MyTrack\MyTrack` folder and overwrite `MyTrack.AIW`

Testing and Troubleshooting.

Start rFactor and select MyTrack for a testing session.

If all went well, have fun turning a few laps and you should be also able to sit back and with CTRL-I let the AI take over the driving while you enjoy the scenery.

If your track does not show up in the track list then you have probably made a mistake in the top line of `MyTrack.GDB`.

If rFactor failed to load the track because of a problem with missing textures, you will get a message which should help you to find which texture is missing. If you are getting no error message try running rFactor with the argument `trace3` and then open trace.txt from the `UserData\LOG` folder and read the trace particularly at the end of the file.

If the trace.txt does not help, and you are crashing about 75% through loading then it may well be that there is a problem with the .AIW file.

Another way to create the AIW.

Look for the rFactor track this seems closest in length (but longer). Copy this AIW over `MyTrack.AIW` in the `rFactor\GameData\Locations\MyTrack\MyTrack` folder.

We now need to determine our garage location for where the car will appear when we first enter the track.

Import the either the original N2K3 .PTF *or* the `rFactor\GameData\Locations\MyTrack\MyTrack\MyTrack.scn` to `3dSimEd` and rotate so you are looking down at the track and place your cursor over a spot on your pitlane. Write down the XYZ coordinates that are displayed in the lower right side of the `3dSimEd` window.
Close `3dSimEd`

Open `MyTrack.AIW` with notepad. Scroll down through the starting grid entries and look for this section:

```
[PITS]
TeamIndex=0
PitPos=(53.345,-2.370,-385.856)
PitOri=(-0.001,-1.526,0.000)
GarPos=(0,52.901,-2.370,-382.767)
GarOri=(0,-0.002,0.003,0.001)
GarPos=(1,50.156,-2.370,-382.759)
GarOri=(1,-0.002,0.003,0.001)
GarPos=(2,46.933,-2.370,-382.749)
GarOri=(2,-0.002,0.003,-0.001)
```

`GarPos` (Garage Position) is the location where your car appears when you first enter the track. Depending on the track, the garage and pit locations may or may not be the same, but for the purpose of this tutorial, we will assume that they are.
There are 3 possible garage locations for each pit stall and each is indicated by the index numbers 0, 1, 2. Be careful not to remove these index numbers when entering your coordinates.

The series of numbers are: (<index>,<X coordinate>,<Z coordinate>, <Y coordinate>)
*** `Important`*** notice that the coordinates are in XZY order, not XYZ. Pay attention to this when you enter the coordinates that you obtrained from `3dSimEd`.

Enter the same coordinates for `PitPos` and `GarPos`.

The `PitOri` and `GarOri ( orientation )` entries control the Pitch, Yaw and Roll of the position.

Save and close `MyTrack.AIW`

Now try opening the track with this new MyTrack.AIW

```
***IMPORTANT*** Turn OFF flag rules or you will get fined
and DQ for driving the wrong way. Until we create a new AIW
file specifically for our track, we will get Wrong Way
warnings as we drive.
```

I have also noticed that some conversions will not load with certain car or upgrades selected until a proper AIW is made. The basic ZRa and rTrainer seem to consistently work well.

Before testing this new .AIW make sure you delete
`RFactor\UserData\LOG\HAT\MYTRACK.HAT`

<u>IF you have no luck you could try an .AIW </u>from another track, repeating the process above.

<u>Track Surface Materials</u>

If you are having problems driving some of the surfaces or you think the surface should have different grip levels then you will need to edit the material names (Not the texture names, they can be named anything), but the materials must be named by surface types defined in `rfactor\gamedata\locations\terrain.tdf`.

These rules apply to driving surfaces, and walls, there is no need to change the material names of the track details used for the start line etc.

By default, the materials defined in the `.tdf` are:

Legal Material Names
Roads: road,rdax,rdta,rdcp
Dirt/Grass: rged,gras,grxs,grvl,dstg
Rumblestrips: rmbl

Walls: twal, cem, wal, cmwl, grdr, safer

"The material name has to match something in the terrain.tdf file. More correctly, the material name has to *start* with something in one of the lines like "Materials=road". Any material called "roadhouse", "roadblock", or "roadmonkey" will match that terrain and act like it." ISI_T Bone

If a drivable surface is not named correctly, your car will get stuck and sink into it. Grass, paint lines, asphalt, cement, dirt/gravel and rumble strips *must* be named correctly. We should also ensure we have correct material names for our walls at this time.

In TrkMaker open your TractionTex table and look at the Tex field.

For each TractionTex surface check the prefix of the material name and make sure it matches one of the prefixes defined in `rfactor\gamedata\locations\terrain.tdf.`

If you need to change a material name you are going to also have to reflect that change in the Material table.

The materials for the walls are defined in the WallTex table and again you should check for matches to walls in `rfactor\gamedata\locations\terrain.tdf`
Again, if you change a material name the material table will also need editing.

If you have had to make any changes use `File->Save as rFactor GMT->Save Objects`, saving the objects back to `RFactor\GameData\Locations\MyTrack`.

Note a quick way of changing the material names is to do the renaming in 3DSimED. Import _TrkMaker.scn and use the Edit->Material Editing to check/edit the material names. However, changing the material names in TrkMaker ensures you can keep your changes for every time you need to write the track.

Creating .MAS files

If you are going to release your track then at some point you should pack the .GMT and .DDS files to .MAS files.

You can do this using 3DSimED `Tools->Pack Files->rFactor .MAS`

Select all of the `.gmt` files from `rFactor\GameData\Locations\MyTrack` and Save As `rFactor\GameData\Locations\MyTrack\MyTrack.MAS`

Next, select all of the `.dds` files from `rFactor\GameData\Locations\MyTrack` and Save As `rFactor\GameData\Locations\MyTrack\MyTrackmap.MAS`

Once you have done this you should delete the .GMT and .DDS files.

You will also need to modify the MyTrack.Scn file in `rFactor\GameData\Locations\MyTrack\MyTrack` so that the header has all these entries:-

```
CUBEASF

//----------------------------------------------------

SearchPath=.
SearchPath= MyTrack
SearchPath= MyTrack\MyTrack

//----------------------------------------------------

MASFile= MyTrack.MAS
MASFile= MyTrackmap.MAS
MASFile=COMMONMAPS.MAS

//---------------------------------------------------
```

Double-check everything has worked by driving the track in rFactor.