

BATTLEZONE

Map Editor Instructions

This document provides some basic instructions for Battlezone's map editor and tools. The editing tools provided with Battlezone are covered by the license agreement at the end of this document, so please read the license agreement before using the map editing tools. These tools are completely unsupported and as such are not guaranteed to work under all conditions. Use at your own risk.

Introduction

The following document is a basic outline for creating your own single and multi-player maps.

Note: These tools were created to build Battlezone, so you'll be using the exact same tools we used to make the game in 1997!

This document will show you how to make 2 kinds of maps, Multiplayer and Strategy (Instant Action) single player maps.

Note: This doc will tell you about the ADDON folder, and ask you to move files into the addon folder for testing. Addon is the folder that the game uses to test maps and mods.

Files in that folder will override the stock files.

Once you create your map and upload it to Steam, it is very important that you clean out your addon folder or MP maps may refuse to run and give you a crc mismatch error.

When in doubt, clear out the addon folder.

Getting Started

So to find and get started with the editor you'll want to go to the following directory

C:\Program Files (x86)\Steam\steamapps\common\Battlezone 98 Redux\Edit

In here you'll see all the relevant files to get started, while in this folder you'll want to Shift + Right click in the folder, select the "Open Command Window Here" option to load the Command window

The command window is how we'll be generating the files needed to get started with map editing.

Create a blank map

In the command window, type in **maketrn** at the command prompt. You should see a list of options scroll by. For now, we just want to create a simple map. So here is an example.

Type **maketrn multdm07 /c /w=2560 /h=2560**. Hit enter

This will create 3 files

multdm07.trn
multdm07.hg2
multdm07.mat

These are all we need to start editing a deathmatch level.

Breaking down the command line:

/c	creates a new map
multdm07	multdm07 is the name of the map - maps must start one of three ways: "multdm" will create a deathmatch map, "multst" will create a strategy map, and "usrmsn" will create a singleplayer or "Instant Action" map. The type must then be followed by a two digit number. Don't use the number for an existing map!
/w and /h	are the height and width of the map in meters - they MUST be either 1280, 2560, 3840 or 5120. Battlezone maps are made of zones and a battlezone zone is 1280 meters by 1280 meters, so your map can be any multiple of 1280 in either direction. The command above is 2x2 zones. The max size of a battlezone map is 5x5 zones.

Note - you must start all maps names with either multst, multdm or usrmsn. Once you create it, it can't be changed from one type to another. So, just because you change the name of the map from multst to multdm after you've created the map, that won't make it a deathmatch level.

Choose your planet type

You can now choose your terrain or planet type from 7 different templates within the Edit folder. Pick a terrain type, let's say Europa. In notepad open the file multdm07.trn we created and delete all the sections of text **except** the [Size] section. The [Size] section should look something like this:

```
[Size]
MinX=0
MinZ=0
Width=2560
Depth=2560
Height=0
```

Now, go to the trn folder in the edit directory and open the file Europa.trn provided, and copy the entire document and paste it into multdm07.trn below the [Size] section. Now you can tweak the settings in your newly created .trn file.

An easy one is MusicTrack, which selects which song is played (numbers can be 1-15). The values you should **NEVER** tweak are the [Size] values at the top (they are set when you created the map), and the file names of the Texture Types at the bottom (**because then the autopaint features will not work**).

Note that in the template .TRN file there is a line that looks like:

```
[Atlases]
MaterialName = eu_detail_atlas
```

This is a very important line as it references the terrain atlas that the game will use to find the new textures for the terrain.

Load up the map for the first time

Copy all the files for your new map into the game's addon folder; those files being

multdm07.trn
multdm07.hg2
multdm07.mat

The addon folder is where the game looks for new maps and other user created content.

Back in the command window, type CD.. And hit enter to back up to the Battlezone 98 Redux directory, from here we can launch the game and our new level in edit mode, type the following

battlezone98redux.exe multdm07 /edit /win

This will now launch the game launcher; launch the game from here as normal and you will be in the new map with the game in windowed mode.

You will need to edit while the game is in windowed mode or you won't be able to save objects.

Toggle between views

You start out in a vehicle. Press "Ctrl + E" to switch into edit mode.

You can switch back and forth to view your map in your tank by pressing "Ctrl + E" at any time.

Pressing W toggles between the paint textures, and wireframe modes.

Wireframe Mode is used to change the map elevation, first let's create all the elevation for our map before we start painting textures.

We will do this because the textures are made for specific terrain slopes, and also because maketrn.exe will actually paint the terrain for you.

You can toggle to an overhead view by pressing shift-f9 (this is more for single-player AI path planning)

Or, you can bring up an overhead view while in **Edit Object mode (Ctrl + A)**, by pressing Shift + F10 or Backspace

To zoom in while editing, use the + and - keys

To look around the level while editing, use the mouse to move the camera around, and use the arrow keys to rotate the camera around its current axis

Elevation editing

To edit elevation, we will need to be in wireframe mode. Remember to use the mouse and arrow keys to move the camera around, and to use the + and - keys to zoom in and out.

To change the color of the wireframe from white to green, press tab.

If you change terrain outside the boundaries of the map (outside the overhead mini-map), it will appear now, but when you go to load up the map again, it will not be saved.

To help create all of your hills, valleys, canyons and river beds, there are many tools at our disposal.

First, let's start with the tools that will affect our brush.

Width and Depth

Height

These tools will change the width depth, and height of the brush. By left clicking on these tools you increase the size of the brush's width/depth/height, by right clicking you decrease the size of the brush's width/depth/height.

Raise brush

Left click to raise the elevation with the brush, the height of the elevation will be changed incrementally the longer you hold down the mouse button, and right click to flatten it. You cannot lower the elevation below 0.

Round Raise Brush

This tool works the same as the "raise brush" but has a rounder effect when raising terrain. You cannot hold down the mouse button to increment the elevation in this mode, but each subsequent click of the highlighted area will raise the height.

Increment Amount

The increment amount tool - use this button to increase or decrease the increment amount for the height per mouse click while using the "Raise Brush" tool. This tool does not affect **the Rounded tool**

Eyedropper

If you want to set the brush to a single elevation, use the eyedropper to pick up a height you want.

Leveler

And then use this tool to create a single continuous elevation the size of the brush.

Once you have created the basic outline of the map, but want to fix single points, then there are these tools:

Vertex Lifter

Left click to raise a single point, right click to lower. Remember you can adjust the increment using the increment amount tool.

Smoother

Use this to smooth out sharp edges and large elevation differences. This is an incredibly handy tool when the major features of the map are done and you want to round out the rough edges and fix all the dips and spikes that may get the player stuck.

Save the map

While in the editor window, press "Ctrl+ S" to bring up the save menu.

We want to save the file in the addon folder along with the other files (**multdm07.trn**, **multdm07.hg2** and **multdm07.mat**) as **multdm07.bzn**.

Best practice is to do this often. As mentioned earlier, you must be editing in a window to save objects.

Ctrl-o will also open maps from the editor.

Remember - now that you have saved a .bzn file, now the command line for loading up this map to edit is:

battlezone98redux.exe multdm07.bzn /edit /win

Automatic texture painting

Before you start to edit textures, unless you want to do it all tile by tile, you can use maketrn.exe to paint the entire terrain for you based on elevation.

First we need to go back into the edit folder, in here we will find the "ini" subfolder, as we are using Europa textures, we will want to copy the "Europa.ini" file from this folder, and paste it into the addon folder directory. So to recap, we want the following 4 files in the addon directory

multdm07.trn
multdm07.hg2
multdm07.mat

And

Europa.ini

Now, with the game closed, simply launch the command window while in the (**MakeTrn needs to be copied from edit into the addon folder for this to work**) addon folder and type:

```
maketrn multdm07.trn /p="europa.ini"
```

now when we reload Multdm07.bzn, we will see that the level has been automatically painted based on its elevation

In areas where MakeTRN is unsure what texture belongs on a terrain tile, which often happens when 3 different texture types converge, the terrain square will be painted with the map's default tile. A map maker can go through their map searching for these areas and correcting them as they see fit but it is not necessary in most cases.

If the automatic terrain is not to your liking, you can also try tweaking the europa.ini file. It is separated by texture types, each number referring back to the texture type listed in the multdm07.trn file.

Manual texture editing

Remember to use the mouse and arrow keys to move the camera around, and to use the + and - keys to zoom in and out.

Eyedropper

When in texture mode, use the eyedropper to pick up textures you want to paint with, and then switch to the paintbrush tool to use these textures.



Paintbrush

Solid

Caps

Diagonal

Select the “Solid” tool and click on a tile to cycle through all the solid textures available to you.

The “Caps” tool will cycle through all the caps available to help you blend the tiles together.

The “Diagonal” tool are the diagonal textures available to help you blend the tiles together

Keep in mind you can cycle the textures forward with left click and back with right click in all three of these tools

Variant

Some tiles, especially the first tile and the base tiles of the terrain have variants on the texture. Click on this tool and then the texture to see if it has a variant.

We’ll probably want to try this on all the textures in a map to see which have variants and which don’t.

*You can also rotate textures by holding down the “r” key or selecting any one of **the rotation or flipping tools on the toolbar.***

Finally, you can also autopaint individual tiles to blend together by holding down the control key and clicking on a texture. If that texture has a cap or diagonal that neatly fits in with a different texture next to it, then the tile will change. However, if two tiles can’t be blended together, the default texture for your terrain will be used instead.

Place objects

Once the terrain and textures are placed, **you must place at least 2 spawn-points or the maps won't load.** There are actually 3 different views in which you can place objects.

If you want to do it in real-time while in your tank, Press Ctrl + A. A build menu will replace the unit command menu.

If you want to do it in overhead, Press shift-f9 to get into overhead. Then choose 1 and then 4 to edit objects. Finally, press 5 to get the build menu up.

Also, shift-f10 will bring up overhead with a build menu (you must be in edit object mode, which is ctrl-a, for this to work).

To create spawn points, simple choose **Neutral Buildings**, and then **Spawn Point** from the menu and it will be placed where the cursor is.

For strategy maps you will also want to place Geysers and scrap, which are also found under the neutral map. But we will cover this in greater detail in the single player building guide

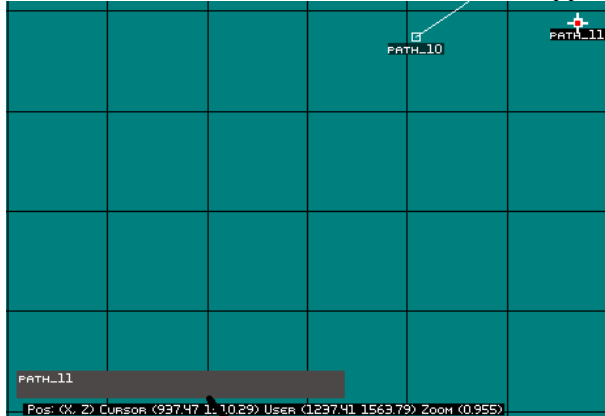
Note: To delete Spawn Points or any other game object, just select the object from the Shift-F9 mode and press the Del key.

Create respawning objects

These can only be created in shift-f9 mode.

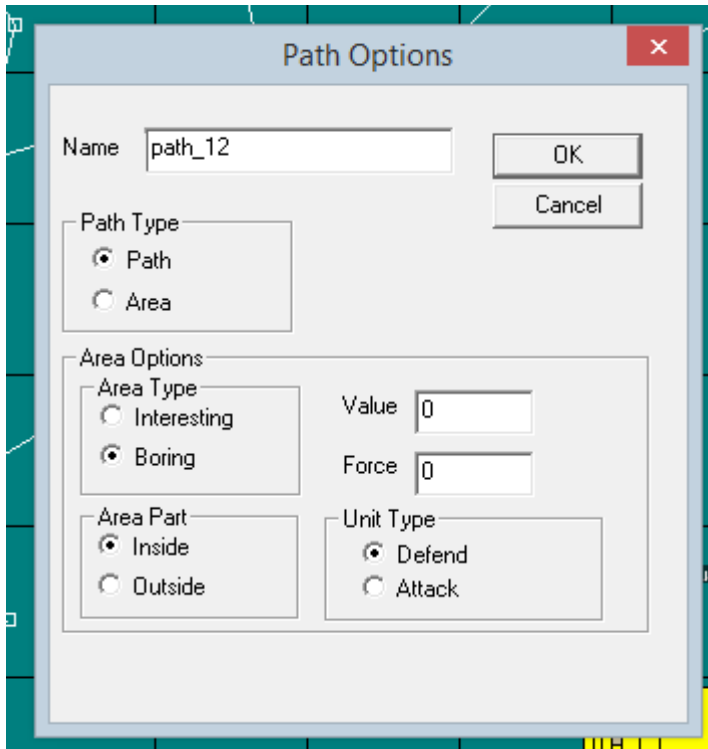
Choose 1 and then 2 to get "Edit Path" selected in the top menu. Click where you want the respawned item to go.

Now a box on the bottom left of the screen will appear that says "Path_1". **SEE IMAGE BELOW**



CLICK ON THIS

Click on the box, the map will go black, and a window will appear on the screen.



The first number, 30, is the time between respawning, and the second number is sequential. So, left click somewhere else on the map, and if you want to place another ammo, type `apammo_30_2`.

If you place a path where you don't want or you start to string paths together, simply press the delete key to get rid of unwanted squares.

Spawnable units:

Any powerup or pilotable unit in the game can be spawned, including custom ones, with units spawning empty so that players can hop into them.

Here is a list of the game's powerups:

Apammo	Ammo Pod
aprepa	Repair Pod
apmini	Minigun
spmini	Chaingun
apstab	AT-Stabber
apsstb	SP-Stabber
apmagg	MAG Cannon
apflsh	Flash Cannon
apblst	Blast Cannon
apbolt	Bolt Buddy
apshdw	Shadower
aphorn	Hornet
apcmet	Comet
aptagg	TAG Cannon
apsand	Sandbag
aprktb	Rocket Bomb
apmort	Mortar

apmdmg	MDM Mortar
appopg	Pop Gun
apspln	Splinter
apflar	Solar Flare
apmcur	M-Curtain
apmits	MITS Mine
approx	Prox Mine
apbltm	Arc Mine
apthmp	Thumper
apredf	RED Field
apphan	Phantom VIR
apsite	SITE Camera
apmasg	MAS Grenade

Here is a list of the game's pilotable units, replace "*" with A for American, B for Black Dog, or S for Soviet:

*vscav	Scavenger
*vhaul	Tug
*vturr	Turret
*vartl	Howitzer
*vmine	Minelayer
*vfigh	Scout/Fighter (NOTE: the BDog scout is bvraz not bvfigh)
*vtank	Tank
*vltnk	Light Tank
*vrckt	Rocket Tank
*vhraz	Bomber
*vapc	APC
*vwalk	Walker

Upload your map to the steam workshop.

Now, if you want to put the map into the game so that you and everyone else can play it, you have to upload it to steam workshop. So let's prepare all of the files for your map

List of files to upload to steam

Here is a checklist of the files you must upload to steam for your map to work.

addon\multdm07.bzn
addon\multdm07.trn
addon\multdm07.mat
addon\multdm07.hg2
addon\multdm07.lgt
addon\multdm07.des
addon\multdm07.jpeg
addon\multdm07.bmp
addon\multdm07.ini

Note: The uploader app will check all of the above files and will refuse to upload if any of the files are missing.

Now we've not mentioned 4 of these files yet, the .bmp.jpeg .des and .ini files, but you will need them to upload your map to steam. Let's go over them now

To make a preview.bmp image that the game will use to show a thumbnail in multiplayer, type **Into the command prompt**

```
Battlezone98redux.exe /win /nointro /shellmap:216,178 multdm07.bzn
```

This will run the game and output a top down image of the map at a size of 216x178

This will put multdm07.bmp into the /battlezone98redux folder, find it and place it in your /addon folder

The .jpeg will be what is displayed on the workshop, so make an image that you think best reflects the content of your content and name it multdm07.jpeg

Note if you want to make a much bigger image for your Workshop preview image, you can use /largemap instead of shell map and leave out the ":216x178"

The .des is what description will be displayed in game in the Multiplayer or Instant action map screens

A blank .des file can be found in the /edit folder (Sample.Des)

To keep it relevant to the map type you can copy what's already written in the game's existing MP maps
so something like

World:
Size:
Powerups
Geysers:
Scrap:

this will appear at the following (on multiplayer)



Or you could type out a little narrative brief such as
"You must infiltrate the enemy base and blow up the cafeteria"
if you were making an Instant action map

Fill out a sample ini file based on the template below. You can also find this sample .ini in the edit folder so you can make a copy and edit it. Workshop has 3 kinds of content, Instant action, Multiplayer and Mod. For your map to appear in the right place, you need to add one of those lines to your .ini file. In the example below, Instant action and Mod are commented out with a ";" character leaving the map type "multiplayer".

Sample INI

[DESCRIPTION]

missionName = "3rd Force"

[WORKSHOP]

;mapType = "instant_action"

mapType = "multiplayer"

;mapType = "mod"

[MULTIPLAYER]

minPlayers = "2"

maxPlayers = "8"

gameType = "D"

Now launch the BZ uploader via the steam overlay.

The uploader will ask you to find the folder your game is in, for neatness let's move all of the files mentioned below into a new folder (so /multdm for example). When that's all sorted, Press the Create Item button to create a new item. Select your folder, the uploader will ask for the .jpeg & .ini and then it will upload the contents of that folder to the workshop as a single workshop item.

To update an existing item select it from the list and press the Update Item button.

Instant action

When making a Singleplayer or "Instant Action" map you will follow a process fairly similar to how a Strategy map is made, with a few key differences. The first is that spawn points are unimportant as the player will always start at the position where you saved the map.

You will want to place, at bare minimum, a Recycler for the player and some starting forces for the enemy, usually a constructor or armory. You'll want to avoid placing a recycler or factory, as they will start building units even as you're still working on the map, so save them for last. Be careful to stay in edit mode while arranging the enemy's forces, as they'll start acting on their own as soon as you return to normal gameplay mode.

When you make an IA map the most important file will be the AIP, which defines what the AI player will do. You can copy this from another IA map, as it's really just a list of what the AI should spend resources on and how much it should attack the player. Other important files are the OTF, which sets the text in the objective box, and the ODF, which sets the starting resources for you and the enemy team as well as the win and loss conditions.

Appendix A.

1 Mission_Name.TRN

2 [NormalView]

Time

Time of day in military time (e.g. 9:30pm would be 2130)

Range: 0000-2400 hours

Default: 1200 (high noon)

FogStart

Where the fog begins (in meters)

Range: 0-1000m

Default: 100

FogEnd

Where the fog ends (in meters). Normally this would be same as VisibilityRange

Range: 0-1000m

Default: 250

FogBreak

Fog will have visibility down to n%, at n% between FogStart and End. For example FogBreak=20, FogStart=0, FogEnd=100 will drop visibility to 20% at 20m: fog will be thick very early. FogBreak=80 will drop visibility to 80% at 80m: fog will be very light until the very end, and then it will increase very quickly.

Range: 0-100%

Default: 50% (linear fog)

VisibilityRange

No polygons will be drawn beyond this distance (in meteres)

Range: 0-1000m

Default: 250

FlatRange

Texturing will be disabled beyond this range (in meters)

Range: 0-1000m

Default: 250m

Intensity

Percentage of light (0-100%) used to illuminate polygons. This value normally matches the LUMA table l parameter. In daytime missions it is around 30, in night missions it is around 80. This indicates that "normal" colors are at about 30% in the luma table (and 80% in night missions). This value is not the maximum intensity, it specifies where the maximum intensity is in the Luma Table!

Range: 0-100%

Default: 30%

Ambient

Percentage of additional light. Will soften shadows if set to non-zero value.

Range: 0-100%

Default: 0%

ShadowLuma

Percentage of light to be used for vehicles in shadow. This value is used as the intensity scaler, for vehicles which land on "black" terrain tile. For example value 30, will make vehicles 30% of maximum intensity (pretty dark); value 80 will make vehicles 80% of maximum (pretty light, but still darker than 100). (Zero is not a valid value, if this value is set to 0, then 75% will be used).

Range: 1-100%

Default: 75%

TerrainShadowLuma

Percentage of light to be used for terrain in a shadow cast by buildings. This value is used as the intensity scaler, for terrain grid points which are in a shadow cast by a structure. For example value 30, will make terrain grid point 30% of normal intensity (pretty dark); value 80 will make terrain grid point 80% of maximum (pretty close to normal, but still darker than 100).

Range: 0-100%

Default: 50%

CarAmbient

Percentage of "ambient" light to be added to vehicles and structures. Used only when lighting of vehicles and structures is enabled (to learn how to control lighting, see **lightRadius**, **lightRange** and **lightCount** parameters in the [LOD] section of RENDER.CFG file). Normally all vehicles are rendered at full intensity. All vehicles and structures with lighting enabled will be rendered so that polygons not facing the sun are darker than maximum intensity. Parameter CarAmbient determines how dark the darkest polygon will be. For example **CarAmbient=0**, will make the darkest polygon black; and **CarAmbient = 50** will make the darkest polygon at 50% of maximum Intensity.

Range: 0-100%

Default: 50%

FogDirection

Direction in the luma table to move towards the fog. Shadows always are towards dark colors, which are towards luma 0, and lights are always towards luma 1.0. This value should be set to 1 for day missions (light fog at luma 1), and 0 for night missions (black fog at luma 0)

Range: 0 - 1

Default: 1 (day mission)

Lava

Material index used for lava.

I did not put this in so I do not know what it does. But it is probably related to path finding to find a path around lava materials, and it is also used in vehicle damage.

Range: 0-7

Default: -1 (invalid material)

3 [Color]

Palette

File name for the mission specific palette file mission.act

Range: ASCII string

Default: none

Luma

File name for mission specific luma table mission.lum

Range: ASCII string

Default: none

Translucency

File name for mission specific alpha blending/translucency table mission.tbl

Range: ASCII string

Default: none

4 [Sky]

Parameters in this section control the appearance of the textured sky (sky texture is enabled and disabled from the game menu).

SkyTexture

Map file name for the texture to be used for sky.

Range: Any valid MAP file name

Default: none

SkyType

Determines if the sky is a moving TILED polygon (blowing clouds), or a single stationary polygon (planet or a star-field)

Range: 0 or 1

Default: 0 (moving TILED poly)

SkyHeight

Determines how high, above the camera center, will the sky polygon be placed. There are two types of sky polygons, MOVING-TILED and STATIONARY-NONTILED.

Range: -1000m to 1000m

Default: 110m

SunTexture

Sprite name for the texture to be used for sky. Since we only have one sun texture right now; and because in software it is quite a bit faster to draw a SPRITE then it is to draw a textured polygon, the sun texture polygon has been made into a SPRITE. It must be defined in the SPRITES.TXT file!

Range: Any valid SPRITE name

Default: none

Backdrop polygon is polygon perpendicular to the line-of-sight, which is normally placed outside the "visibility range" to simulate a distant terrain features. Texture for this polygon is "wrapped" around the camera to give an appearance of textured cylinder wrapped around the camera. Because of the limitations of some hardware, the texture must be composed from four consecutive strips which are placed on top of each other in the map file. For example 1024x64 texture could be placed as four 256x64 strips, one on top of the other, inside 256x256 file.

BackdropTexture = Backdrop.map

Map file name for the texture to be used for backdrop polygon

Range: Any valid MAP file name

Default: none

BackdropDistance

Range: 0-1000m

Default: 400m

BackdropWidth

Range: 1-10000m

Default: 800m

BackdropHeight

Range: 1-10000m

Default: 100

5 [Clouds]

Flat horizontal clouds (parallel to the ground). Each type is at the same height, and is using the same texture (although different types can be at different heights and with different textures). There is a maximum of 8 different cloud types. Clouds are randomly distributed at the mission start.

Count

Total number of clouds in each tile. There is a 3x3 grid of 9 tiles. Each tile has the same pattern of clouds.

Range: 0 - 32
Default: 32
TileSize
Range 1 -3000m
Default: 100m
Texture[]
Name of the MAP file.
Size[]
Cloud polygon size (width and height)
Range: 1 - 3000m
Default: 100m
Height[]
Cloud polygon height above the camera point
Range: 1 - 3000m
Default: 100m

6 [Stars]

Flat star clusters distributed on a dome of a given radius. Each cluster can have polygon size (width same as height), and polygon position on the dome (elevation and azimuth). There is a maximum of 32 total star clusters.

Radius
Dome radius
Range: 1 - 3000m
Default: 500m
Count
Cloud polygon size (width and height)
Range: 0 - 32
Default: 0
Texture[NN]
Name of the MAP file
Alpha[NN]
Enable/Disable translucency. Earth is transparent only (Alpha=0), all other star maps are alpha blended (translucent).
Range: 0-1
Default: 1 (enabled)
Size[NN]
Star polygon size (width and height)
Range: 1 - 3000m
Default: 100m
Azimuth[NN]
Star polygon position on the dome
Range: 0 - 360degrees
Default: 0deg
Elevation[NN]
Star polygon position on the dome
Range: 0 - 90degrees
Default: 0deg

7 [AnimatedScrounge]

This will be moved into mission specific file.

Load animated scrounge bitmap names (assumes 8,3 DOS format, with last two digits before the dot containing last one in a sequence 00 to nn).

Type0
Type1
Type2
Type3

Rate
Size
Count
Diameter

8 [AnimatedSky]

This will be moved into mission specific file.

Count - max number of active animation's
Diameter - how far from camera do they pop
minDelay - how long till next
maxDelay - how long till next
Anim[J] where J is a digit 0-7
Rate[J]
Size[J]

9 [Size]

Parameters in this section describe the area used in this mission. All terrain's are described in terms of 128x128 uniformly spaced grids, called ZONES. Each grid covers 10m. Thus each zone covers 1280m x 1280m area.

Note this is a legacy item (leftover from the days when I76EDIT.EXE was used to place vehicles within the fixed terrain grid, with upper left at x,y=(30720,133120) which was zone 0,79).

Height

Default height for "EMPTY" zones
Range: 0-511m
Default: 0m

Width

Width of the bounding rectangle of all non-empty ZONES
Range: 0 - 102400m (10m x 128 x 80)
Default: none

Depth

Depth of the bounding rectangle of all non-empty ZONES

MinX

Starting corner of the bounding rectangle of all non-empty ZONES
Range: 0 - 102400m (10m x 128 x 80)
Default: none

MinZ

Starting corner of the bounding rectangle of all non-empty ZONES
Range: 0 - 102400m (10m x 128 x 80)
Default: none

10 [World]

MusicTrack
IntroMovie
OutroMovie

11 [LightningBolt]

minDelay", 5000
maxDelay", 10000
Bolts", 0
Duration", 200
Color", 1
Distance", 100
Sound", ""

12 [TextureType]

Each type J of material has it's own section [TextureTypeJ]. There can be upto 10 different materials; thus there can be upto 10 sections [TextureType0] through [TextureType9]. Each material can have a solid tile (SOLID), and two border tiles with another material. First border tile, CAP, looks like a cap shape along one edge. The second type of border tile, DIAGONAL, looks like two caps along two adjacent edges filling area below diagonal.

For each of the three tile types (SOLID, CAP, DIAGONAL) there must be definition for 4 MIP levels (although these could specify the same file for one or more MIP levels). Same material type can have several variants, upto 4.

SolidA0

SOLID tiles are specified using the following format:

Solid[V][M]=Tile_File_Name.MAP

Where V is one of four tile variants (letter A-D), and M is one of the four MIP levels (digits 0-3).

CapTo1_A0

CAP tiles are specified using the following format:

CapTo[I]_[V][M]

Where I is one of the nine "adjacent" tile materials (digit 0-9), and must be larger than J! V is one of four tile variants (letter A-D), and M is one of the four MIP levels (digits 0-3).

DiagonalTo1_A0

DIAGONAL tiles specified using the following format:

DiagonalTo_[I][V][M]

Where I is one of the nine "adjacent" tile materials (digit 0-9), and must be larger than J! V is one of four tile variants (letter A-D), and M is one of the four MIP levels (digits 0-3).

Note that texture type 3 with border to 2 must be specified in [TextureType2] as either CapTo_3xx or DiagonalTo_3xx; so that material J is always smaller than material I.

FlatColor

Controls color of non-textured terrain. There can be different colors for different terrain materials. If this value is omitted, then the value from RENDER.CFG file is used.

Range: 0 - 255

Default: 239

For example mars tiles are currently using the following settings:

```
[TextureType0]
FlatColor = 223
SolidA0 = ma00sA0.map SOLID texture tile, first variant, MIP level 0
SolidA1 = ma00sA1.map SOLID texture tile, first variant, MIP level 1
SolidA2 = ma00sA2.map SOLID texture tile, first variant, MIP level 2
SolidA3 = ma00sA3.map SOLID texture tile, first variant, MIP level 3
SolidB0 = ma00sA0.map SOLID texture tile, second variant, MIP level 0
SolidB1 = ma00sA1.map ...note that here the second variant is same as first
SolidB2 = ma00sA2.map
SolidB3 = ma00sA3.map
SolidC0 = ma00sA0.map
SolidC1 = ma00sA1.map
SolidC2 = ma00sA2.map
SolidC3 = ma00sA3.map
SolidD0 = ma00sA0.map
SolidD1 = ma00sA1.map
SolidD2 = ma00sA2.map
SolidD3 = ma00sA3.map

CapTo1_A0 = ma01cA0.map CAP from 0 to 1, first variant, MIP level 0
CapTo1_A1 = ma01cA1.map
CapTo1_A2 = ma01cA2.map
CapTo1_A3 = ma01cA3.map

DiagonalTo1_A0 = ma01dA0.map DIAGONAL from 0 to 1, first variant
DiagonalTo1_A1 = ma01dA1.map
DiagonalTo1_A2 = ma01dA2.map
DiagonalTo1_A3 = ma01dA3.map

CapTo3_A0 = ma03cA0.map CAP from 0 to 2, first variant, MIP level 0
CapTo3_A1 = ma03cA1.map
CapTo3_A2 = ma03cA2.map
CapTo3_A3 = ma03cA3.map

DiagonalTo3_A0 = ma03dA0.map
DiagonalTo3_A1 = ma03dA1.map
DiagonalTo3_A2 = ma03dA2.map
DiagonalTo3_A3 = ma03dA3.map
```


Appendix B.

1. MAKETRN.INI

The program MAKETRN.EXE is a utility to automatically assign materials to terrain tiles, using the elevation file Mission.HGT.

The parameter file MAKETRN.INI determines how the terrain elevation file (Mission.HGT) is used to construct "layers" where each layer will have the same material. Layers are described by elevation range, and slope range.

For example all steep hills over 500m high can be made with snow tiles. In this example we define the layer to be in the range of 500-1000m, and have slope 30-90 degrees. All such terrain tile will be assigned material 5. Note that all other tiles will have material 0 (and will be in layer 1 or layer 2).

```
[Layer0]
ElevationStart = 500
ElevationEnd   = 1000
SlopeStart    = 30
SlopeEnd      = 90
Material      = 5
```

```
[Layer1]
ElevationStart = 0
ElevationEnd   = 500
SlopeStart    = 0
SlopeEnd      = 90
Material      = 0
```

```
[Layer2]
ElevationStart = 500
ElevationEnd   = 1000
SlopeStart    = 0
SlopeEnd      = 30
Material      = 0
```

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