# Create terrain and photo realistic scenery for Condor 2.

Rev 7, 6/5/20 – Nick Bonniere, Joe Somers & John Murtari (john@murtari.org)

A step-by-step tutorial on how to create both 3D terrain and photo-realistic scenery for use in Condor 2.

**CREDITS**: Many thanks to Mr. Luis Briones (a member of a Flying Club in Argentina), and special thanks to Mr. Nick Bonniere, a long-time Condor scenery pro who created a Condor 2 scenery for Lake Placid. Nick developed the Condor_tiles program and a lot of notes/description used in the tutorial.

Updates and revisions to this document are welcome. Just send to the author and you'll be included in the Credits above. 

## Table of Contents

# Goal: Create a scenery for Harris Hill Soaring Corporation.

This tutorial will take you thru all the steps that were used to create a scenery for Harris Hill Soaring in Elmira, NY. The home of Soaring in the United States and the location of Schweizer Aircraft. Large sceneries at high resolution take a lot of processing power and time. In this case we'll be creating a 57x57 mile landscape with the Harris Hill airfield (4NY8) at the center.

At the end of this tutorial we'll have flyable scenery with 3-D terrain which has been overlaid by photo scenery. For those of you who have used Condor, it will NOT have any actual 3-D objects like trees, hangars, runways. We will not do any special thermal modeling. Hopefully, those additions to this tutorial will come later (maybe from you!)…

# Part One: Creation of 3-D terrain

This part will first get your computer setup for landscape creation with the needed landscape creation tools and documentation. We'll then go thru the steps necessary to create a flyable 3-D terrain of the correct size

## Step Zero: Download the tools and guides needed

If you're a Mac/Apple person, sorry, most of these tools only run under Windows. Graphics processing is a difficult task for a PC. You should have a reasonably fast processor and at least 8 Gigabytes of RAM and room on your hard drive. A completed scenery can easily use several Gigabytes of disk space.

1) Download the tool set and documentation for landscapes from the condorsoaring.com site, unpack in a different directory from where Condor2 is installed

1a) Download a Legacy texture tool from Nvida that will be needed. Unpack the zip in the same directory where you installed the landscape editor above. When you are done the LandscapeEditor.exe and nvdxt.exe should be in the same folder.

2) Download and install the QGIS program version2.18.28, x64 from → http://download.osgeo.org/qgis/ . We won't use most of it, but one of the utilities it contains will be used by Condor_tiles later.

3) Download and install Google Earth Pro for the desktop → https://www.google.com/earth/versions/ Scroll down on the versions page and choose the desktop download. This is a great tool for visualizing/measuring your landscape.

4) Download the Condor_tiles program and unpack. It can be found in the downloads section on the SoaringTools web site → http://www.SoaringTools.org/index.php/downloads/

## Step One:  Determine the coordinates for the scenery

Use this to find your Universal Transverse Mercator Zone (UTM) and measure distances → https://mangomap.com/robertyoung/maps/69585/what-utm-zone-am-i-in-

The goal is to determine your UTM zone and then the latitude/longitude of the north west corner and south east corner of your landscape (also know as top left  and bottom right).  **NOTE**:  *It can be OK if your scenery crosses into another UTM zone by a small amount.  Just be sure to use the UTM zone # where the majority of the scenery is located in the steps below.  There may be some minor distortion.*

For Harris Hill we want  at least a 9 tile landscape (3 x 3).  Each Condor landscape tile is 14.2915 miles/23 km square, so we want to have a square app. 42 miles on each side.  Now remember, the Earth is not FLAT, so our square is approximate and the tools will compensate for that. Make sure you have a little extra.  Start from you center point and measure out 23 miles N,S,E,W (46 miles/side)

You can use the UTM lookup site above for that, also Google Earth is very handy.  Here is what we have for Harris Hill and the yellow pins define the two corners.  Take the time to make SURE you get the coordinates right.  In this case we have the below.  BE CAREFUL not to confused Degrees/ Decimal minutes/seconds below with other format which give individual degrees, minutes, seconds. Some tools like a certain format – many are happy to take the wrong format and convert to a bad location….. beware!

This web site is your FRIEND in conversions →  https://www.pgc.umn.edu/apps/convert/

**NW Pt:  42°25'26"N / 77°24'26"W or 42°25.438’N / 77°24.434’W or 42.423968 / -77.407247**

**SE Pt: 41°48'41"N /  76°25'32"W or 41°48.699’N / 76°25.545’W or  41.811661 /  -76.425757**

WARNING: Don’t skimp on this step, some bad numbers here will cost you late

## Step Two: Convert to UTM coordinates, confirm proper size

With those corners defined, we can now start to build the landscape. The Lat/Lon we have are approximate. We not need to get exact numbers by converting to UTM and making sure we are on a boundary.

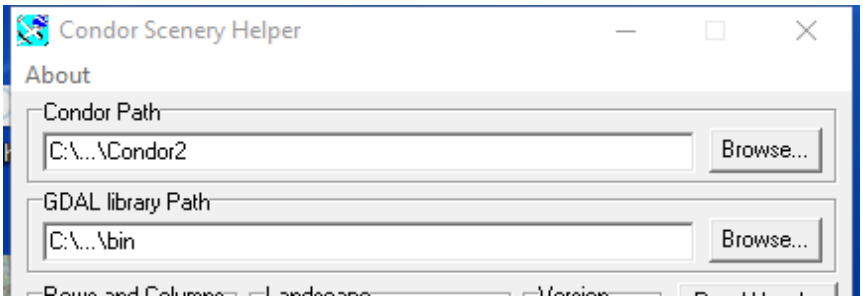
Create a folder in the Condor2\Landscapes directory to hold your scenery. In this case we call it hhsc1

1) Start Condor_Tiles. In the "Landscape" box, choose the folder you just created above. Some settings: Imagery/Tiles, Tile Zoom/16, Tile size/8192, GeoData/OSM. On just the first run you need to define two paths. Using the 'Browse' buttons

Condor_Path → Set it to the location of your Condor2 install, usually C:\Condor2

GDAL library Path → This is a geodata processing package that was installed as part of QGIS. If you've installed QGIS 2.18 you should find this path: C:\Program Files\QGIS 2.18\bin
If you're having a hard time finding it, do a Windows search for gdalwarp.exe

Mine looks like this when done. The displayed paths look incomplete, but it's all there.




2) In Condor_tiles click on the "DEM Helper" button in the lower right. This will bring up a new screen. Make the following entries:

a) In the bottom left "Range Margin" choose "None" (we should have already compensated that the last 5.76Km or 3.6 miles will be unflyable around the border of your landscape).

b) In the upper left "Desired Area Selection" choose "By Coordinates" and enter the values just as we recorded earlier. Use the degree/decimal values, latitude for North/South, longitude for West/East.

c) Then click the box 'To UTM', do not check the box "TL BR" – you will then see values fill in the upper right side in the box "Condor UTM Range". (TL – Top Left, BR – Bottom Right coordinates are used for extents instead of the overall largest extents)

d) Then click "Check/Show" and you will see a grid pattern in the box labeled "Condor Latitude/Longitude". Explanation follows.

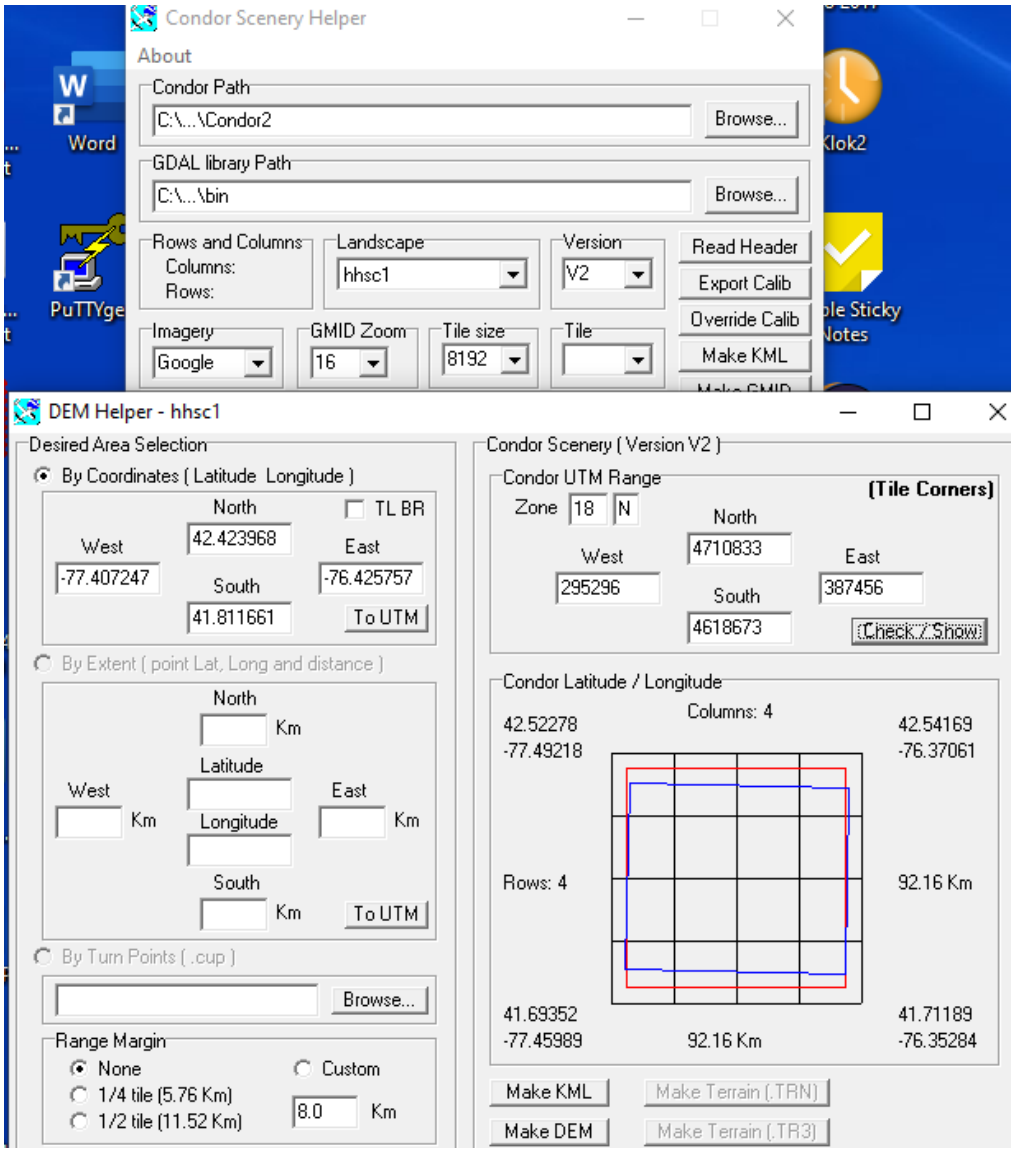
umber in the upper right box are called Easting/Northing values. The earth is divided into 60 UTM

zones, HHSC is in 18N, and your exact location in the zone is defined by the Easting(X Coord) and Northing(Y Coord). So the values above express the exact coordinates of the corners and for our Condor landscape they need to be on whole numbers.

The bottom right box shows the rounding that occurred. Our original values (the Blue Box) put us closer to a 4x4 terrain. The outer black grid shows the landscape has been expanded to 4x4. The red box shows the actual flyable area (remember, you can't reach the edge of a landscape). We could try to shrink it in Latitude and Longitude for a 3x3, but we'll accept the 4x4.

We need to store the Easting/Northing values. GOOD IDEA to take a screen snapshot to you have all the values, including lat/lon of the corners.

NW Corner: 295296 (Easting) <the West value>, 4710833(Northing) < the North value>
SW Corner: 387456 (Easting) <the East value>, 4618673 (Northing) <the South value>

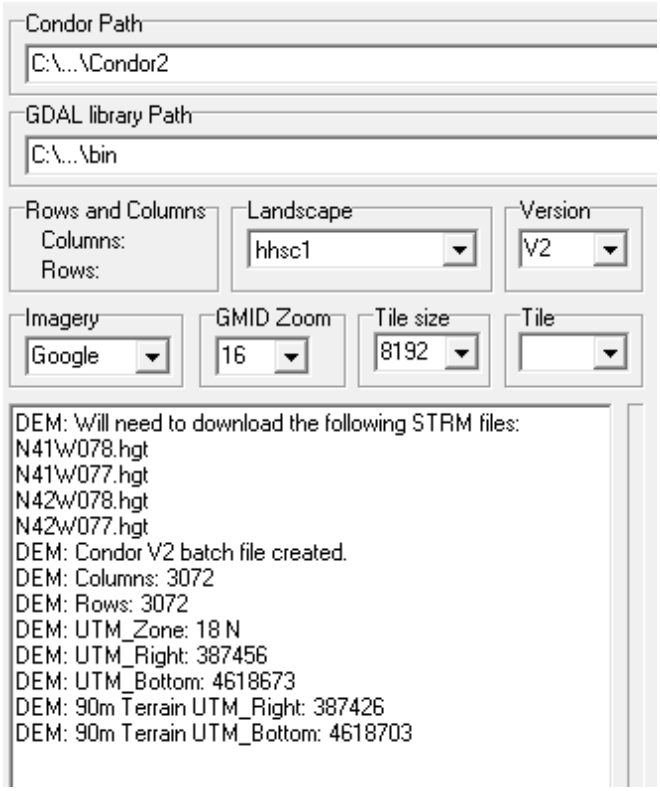


3) In the lower right click on “Make KML” to make a Google-earth map file. It will be stored in Landscapes/hhsc1/working/DEM/OverAllMap/OverAll.kml
You’ll need Google Earth to open and see the file. It should agree with what you expect.

## Step Three: Download terrain data and create terrain files

1) Click on “Make DEM” (lower right part of the window) while in the “DEM Helper” window to create a batch file to run the GDAL library routines. Check the message box in the main Condor_tiles window for files you need to download.

```
DEM: Will need to download the following
STRM files:
N41W078.hgt
N41W077.hgt
N42W078.hgt
N42W077.hgt
DEM: Condor V2 batch file created.
DEM: Columns: 3072
DEM: Rows: 3072
DEM: UTM_Zone: 18 N
DEM: UTM_Right: 387456
DEM: UTM_Bottom: 4618673
DEM: 90m Terrain UTM_Right: 387426
DEM: 90m Terrain UTM_Bottom: 4618703
```




**DEM → Digital Elevation Model**

At this point some files have been created for your new scenery. Check the ../Working/DEM folders and you see the batch file (DEM.bat). It contains the commands necessary to created the actual 3-D terrain for the area you specified.

2) You next need to download this data from a NASA website. We’ll be use Space Shuttle Radar Topography Mission data (SRTM).

a) First go to → https://dwtkns.com/srtm30m/
You can zoom in to your location and then click to see the tile name, we need four tiles as shown in the message above:
N41W078.hgt, N41W077.hgt, N42W078.hgt, N42W077.hgt

b) When you click to download, you’ll first need to create a login account with NASA. Save the files (.zip) in the DEM directory where the .bat file is located. You should now have this directory

contents:

```
       jmurtari@anvil:/cygdrive/c/condor2/Landscapes/hhsc1/working/DEM>ls -l
total 40214


-rwxrwxr-x+ 1 jmurtari None     2188 May 11 10:58 DEM.bat
drwxrwxr-x+ 1 jmurtari None        0 May 11 10:52 KML
-rwxrwxr-x+ 1 jmurtari None       87 May 11 10:50 LatLong.txt
-rwxrwxr-x+ 1 jmurtari None 10602217 May 11 11:03 N41W077.SRTMGL1.hgt.zip
-rwxrwxr-x+ 1 jmurtari None 11545464 May 11 11:03 N41W078.SRTMGL1.hgt.zip
-rwxrwxr-x+ 1 jmurtari None  9441928 May 11 11:03 N42W077.SRTMGL1.hgt.zip
-rwxrwxr-x+ 1 jmurtari None  9575162 May 11 11:02 N42W078.SRTMGL1.hgt.zip
-rwxrwxr-x+ 1 jmurtari None      264 May 11 10:58 scenery.hdr
```

c) Next unzip the files and you should have four .hgt files. You may need to rename these files to match what is expected, e.g. `N41W078.SRTMGL1.hgt → N41W078.hgt` When done you should have 4 new files in the same directory as above:

```
-rw-r--r--+ 1 jmurtari None 25934402 Oct  8  2012 N41W077.hgt
-rw-r--r--+ 1 jmurtari None 25934402 Oct  8  2012 N41W078.hgt
-rw-r--r--+ 1 jmurtari None 25934402 Oct  8  2012 N42W078.hgt
-rw-r--r--+ 1 jmurtari None 25934402 Oct  8  2012 N42W077.hgt
```

d) Then run the DEM.bat file in a command prompt window – you should see quite a bit of output . Just showing sample output from the start of execution:

```
c: \Condor2\Landscapes\hhsc1\Working\DEM>DEM

C:\Condor2\Landscapes\hhsc1\Working\DEM>setlocal

C:\Condor2\Landscapes\hhsc1\Working\DEM>set PATH=C:\Program Files (x86)\Common Files\
Oracle\Java\javapath;C:\ProgramData\Oracle\Java\javapath;C:\WINDOWS\system32;C:\WINDOWS;C:\
WINDOWS\System32\Wbem;C:\WINDOWS\System32\WindowsPowerShell\v1.0\;C:\Program Files (x86)\
Common Files\Intuit\QBPOSSDKRuntime;C:\WINDOWS\System32\OpenSSH\;C:\Program Files\Git\
cmd;C:\John\emacs\emacs\bin;C:\Program Files (x86)\Intel\Intel(R) Management Engine
Components\DAL;C:\Program Files\Intel\Intel(R) Management Engine Components\DAL;C:\Program
Files\PuTTY\;C:\Users\jmurtari\AppData\Local\Microsoft\WindowsApps;;"C:\Program Files\QGIS
2.18\bin"

C:\Condor2\Landscapes\hhsc1\Working\DEM>set GDAL_DATA=C:\Program Files\QGIS 2.18\bin\..\
share\epsg_csv

C:\Condor2\Landscapes\hhsc1\Working\DEM>rem convert HGT file to GeoTiff

C:\Condor2\Landscapes\hhsc1\Working\DEM>set sourceHGT=N41W078.hgt

C:\Condor2\Landscapes\hhsc1\Working\DEM>set destinationTIFF=T0.tif

C:\Condor2\Landscapes\hhsc1\Working\DEM>gdal_translate -of GTiff N41W078.hgt T0.tif
Input file size is 3601, 3601
0...10...20...30...40...50...60...70...80...90...100 - done.
```

*<<< much more follows, should be no errors>>*

The following new files should be created:

```
-rwxrwxr-x+ 1 jmurtari None  2099695 May 11 11:10 UTM_cropped_90m.tif
-rwxrwxr-x+ 1 jmurtari None      604 May 11 11:10 UTM_cropped.raw.aux.xml
-rwxrwxr-x+ 1 jmurtari None 18874368 May 11 11:10 UTM_cropped.raw
-rwxrwxr-x+ 1 jmurtari None      679 May 11 11:10 UTM_cropped.hdr
-rwxrwxr-x+ 1 jmurtari None  2097152 May 11 11:10 UTM_cropped_90m.raw
-rwxrwxr-x+ 1 jmurtari None      604 May 11 11:10 UTM_cropped_90m.raw.aux.xml
-rwxrwxr-x+ 1 jmurtari None      683 May 11 11:10 UTM_cropped_90m.hdr
```

3)

Now you can use the two other buttons at the bottom of the DEM helper page. Click on Make Terrain (.TRN) to generate a Terrain file. *You will see a blue progress bar in the main Condor_tiles window.*

When that is complete click on Make Terrain (.TR3) to generate the heightmaps files that Condor2 uses for elevation. Depending on the size of the terrain, this may take a few minutes. *Again, the progress bar will appear in the main Condor_tiles window*. The following files and folders were created within c:/Condor2/Landscape/hhsc1

hhsc1.trn
HeightMaps/ – a folder containing series of files starting with h0000.tr3 – h1515.tr3

These contain the terrain data for each tile. You should be asking if our terrain is 4x4, that should only be 16 files, why are there 256!!!? Because…. Condor2 subdivides each of the larger tiles into 4x4 subtiles. So 16 * 16 = 256.

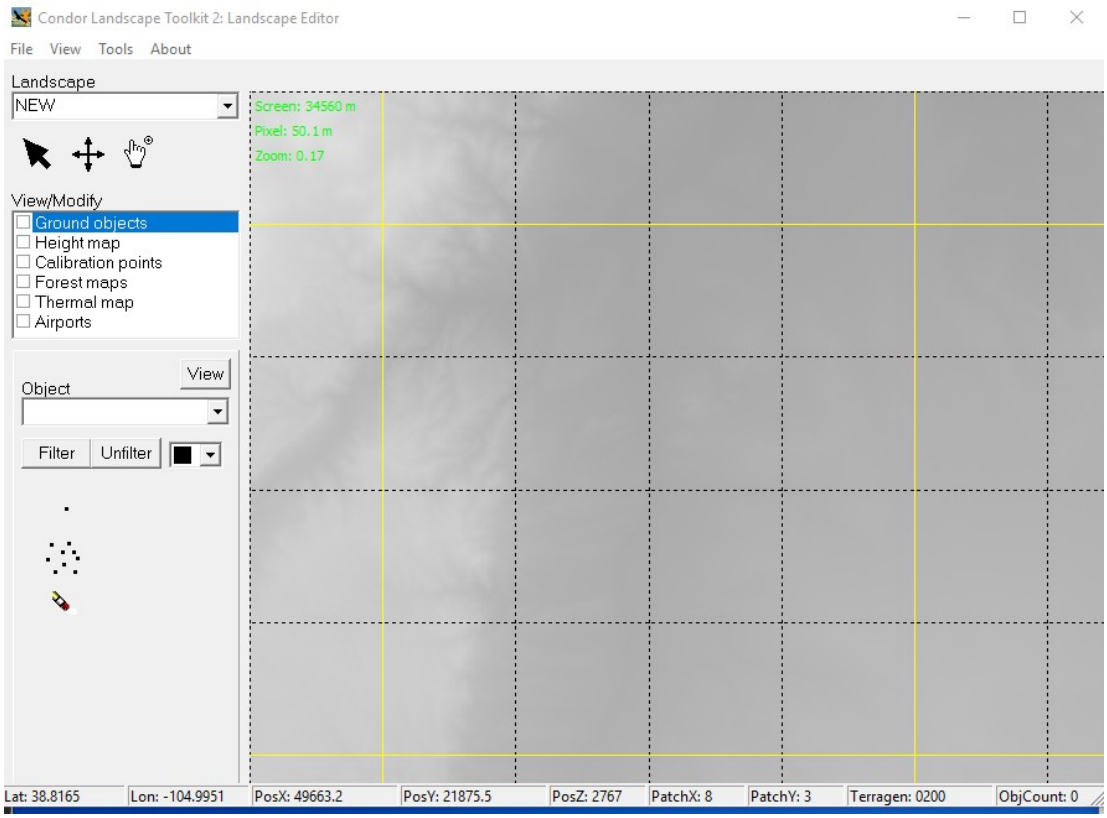
How do you relate the numbers to the actual terrain location, check Appendix ONE for a complete explanation. Real quick → The bottom right tile is “0000”, the first two digits are the row, the second two are the column. The tile to the left of the bottom right tile is “0001” and the tile above the bottom right is “0100”. The tile in the upper right corner is “1515” (remember, total of 16 subtiles numbered 0-15).

**NICE JOB!** – you can close Condor_tiles for now.

## Step Four:  Use the Condor Landscape Scenery Editor

In our last step we'll actually finish creating a flyable terrain.  It won't have any real scenery, but you'll be able to see 3-D terrain and fly it in Condor2.

1)  Start the Landscape Editor, and from the Landscape popdown in the upper right, you should see your new Landscape, hhsc1, as an option. You should see something like below. *It doesn't look like much, but it's actually showing elevation features in the terrain.*




How to maneuver.  As you move the mouse around, you are presented with a lot of useful location information in the bottom bar.  The latitude and longitude values should agree with what you're expecting.  By default, the editor puts you near the middle of the terrain.  To move around select the "FINGER" and you can drag the terrain.  Notice the yellow lines delimit the larger 4x4 tiles, and the dashed lines show the 4x4 subtiles.

Click the left mouse button to zoom in, middle/right to zoom out.

3)  A landscape must have at least one Airport defined to be flyable in Condor 2.  Using another tool like Google Earth you need to find the exact LAT/LON in decimal degrees for the middle of your runway, also the elevation (in meters).  Google Earth does give you the option of seeing decimal degrees and meters.

For hhsc1 I used the name 4NY8:  42.119522 /  -76.900490  (THIS SHOULD BE THE MIDDLE/CENTER of the runway), elevation:  523 meters(1715'),  length: 500 meters (1640'), direction: 331 True (340-9W variation), width: 36 m.

4) In the Landscape Editor, in the "View/Modify" box, check "Airports".  Then put your mouse in the blank area beneath and click right.  A menu should appear, select 'Add'.  Then fill in the values and select OK.  It should appear on the map.

4a) OPTIONAL – you may want to flatten the runway terrain.  Choose "Height Map" and the map will show you elevation, zoom into the runway, it should be outlined.  Then click on the "FLATTEN" icon and set the radius no wider than the runway, and set the altitude to elevation.

Also, you should set the edge slop to smooth any transition 1:4 as a start. Then just click with the mouse on the map, and MAGIC – it's corrected.

5) Now just complete the steps in the "Condor Landscape Guide". Make sure to follow the order below:

a) File → Export flightplanner map
b) File → Export forest map.
c)  File → Export thermal map.
d)  File → Export textures to DDS (As the guide says, you'll need the Nvidia legacy texture tools placed in the same directory with the LandscapeEditor.exe for this to work.  Say 'No' to export only nonexisting, we want everything recreated.
e) File → Export terrain hash
f) File → Export forest hash  (These steps are important as an anti-cheat mechanism. ALSO, if you ever try to fly Condor2 and your elevator doesn't work, make sure you have exported these recently).
g) File → Save Landscape

## Step Five:  Take a test flight in Condor 2

Just a little more to do.

1) You still need two more files in the main landscape directory. Condor_Tiles will automatically create  two dummy files you can edit as needed.  You just need to start Condor_Tiles and then choose the 'Read Header' button on the upper right side.  You should then see some messages and the files will be created if they are absent.

```
      Reading Terrain header...

UTM Zone:   18 N
UTM Bottom: 4618673
UTM Right:  387456
Height:     1024
Width:      1024
Resolution: 90
Delta X:    -90
Delta Y:    90
```

- hhsc1.ini –  Edit the text file and change Version to be something meaningful, e.g. `Version=1.0,3/16/20`
- hhsc1.cup –  This is another text file, which contains waypoint/turnpoint definitions. By default, a dummy waypoint is placed in the center of the scenery.  See the appendix for the format of this file.

2)  Start Condor2 and select "FREE FLIGHT".  In the upper right "Landscape" box you should now be able to select your scenery.

3)  TASK tab: You must define a simple task.  Click on "New" and then Click on your airport, move the mouse and it will create a line, Click again to create a turnpoint.  Just make a box, but end it by going to your airport and clicking again – you should get "Finish"

4)  NOTAM tab:  You can try an "Aerotow", recommend change rope length to 200'.  We have not yet created a real airport, so the terrain and tow planes may not line up.  If it doesn't work, choose Airborne.

5) "SAVE" the flightplan and then click "Start flight"

**NOTE:** *When the flight starts, check your flight controls.  If you cannot move the stick forward/aft please re-export all the items shown earlier in the landscape editor.  The lack of stick control is a security feature against 'tampered' sceneries….*

# Part Two: Photo Scenery creation

## Step Zero: Download extra needed tool.

There is probably a way to do this for FREE and I'm happy to update the tutorial. For now you'll need to spend a little money for a tools that makes downloading satellite imagery easier.

Go to http://AllMapSoft.com/ and download the "Google Satellite Maps Downloader." To create HI-RES scenery as we will in this case, you'll need the paid version. Your version should be at least 8.346

Let it install to the default location, usually: C:\allmapsoft\gsmd

After it installs you'll need to create a symbolic link to make it usable by other tools. To do that you need to run a Command Prompt window as the Administrator. Then give these commands:

```
C:\WINDOWS\system32>cd \allmapsoft

C:\allmapsoft> dir

 Directory of C:\allmapsoft

05/11/2020  01:31 PM    <DIR>          .
05/11/2020  01:31 PM    <DIR>          ..
05/11/2020  01:22 PM    <DIR>          gsmd


C:\allmapsoft> mklink /D gmid gsmd
symbolic link created for gmid <<===>> gsmd


C:\allmapsoft> dir

05/11/2020  01:32 PM    <DIR>          .
05/11/2020  01:32 PM    <DIR>          ..
05/11/2020  01:32 PM    <SYMLINKD>     gmid [gsmd]
05/11/2020  01:22 PM    <DIR>          gsmd
```

For Condor scenery generation, the concept is to get a set of these imagery tiles at a desired resolution for a given area to fit into Condor tiles of a desired resolution. Review Appendix ONE for more info and a table of zoom/resolution in meters.

## Step One: Create the commands necessary to download images

1) Start Condor_Tiles ***(IMPORTANT: click right and choose "Run as Administrator")*** *To minimize the download data size, Condor_Tiles creates 'symbolic-links' for the imagery folders and needs administrator level for this step.*

Pick the landscape name and Version should stay at V2.
Pick the type of data imagery (we'll be using Tiles).
Pick the desired Tile zoom level (we'll use 16 for high resolution)

Pick the desired tile size for Condor, which should match closely to the zoom level (8192)

NOTE: High resolution uses of lot of disk space. Use zoom level 15 for large Landscapes, with a tile size of 4096.

2) Click on Read the Header button to load the UTM data of the scenery extents

You should see something like this in the message area:

```
Reading Terrain header...
UTM Zone:   18 N
UTM Bottom: 4618673
UTM Right:  387456
Height:     1024
Width:      1024
Resolution: 90
Delta X:    -90
Delta Y:    90
16 dummy centre tile airports \dhhsc1.apt created

The file mention above is here -> /Condor2/Landscapes/hhsc1/Working/dhhsc1.apt
```

3) Click on the 'Make GMID' button to generate initial coordinate extent files for each tile. These files will be used by the Maps Downloader. Again, you can see the numbering coordinate system used for the files. These are text files. You will find them in the ./Working/SourceTiles

IMPORTANT NOTE:

CONFIRMATION CHECK: Look at the contents of a file, the Lat/Lon coordinates should be as you expected.

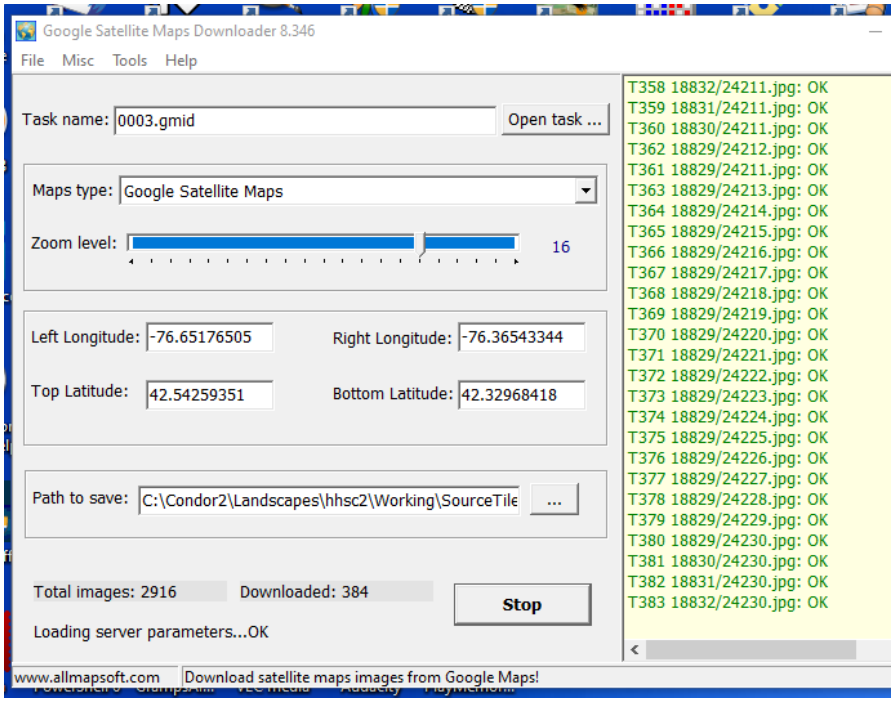
## Step Two: Download the image data.

NOTE: The latest version of GoogleSatelliteMapsDownloader and Condor_Tiles allows us to automate much of this process. To see details on the manual method, reference Appendix Two.

1) Condor_tiles has created a couple of batch files to automate the process in the `./Working/SourceTiles` folder:

```
-rwxrwxr-x jmurtari    None  1250 May 11 11:56 ./Working/SourceTiles/GMID_ALL.bat
-rwxrwxr-x jmurtari    None  690 May 11 11:56  ./Working/SourceTiles/GMID_ALL_Combine.bat
```

Again, in a Command Prompt window, change to the tiles directory, "`cd \Condor2\Landscapes\hhsc1\Working\SourceTiles`", then run `GMID_ALL.bat` This may take a few hours depending on the size of the scenery. You will see new windows open and close for downloading and combining files as it works it's way thru the process, e.g.




NOTE: If the scenergy has more than 30 tiles, it is possible the process will be interrupted as Google sets limits for downloads. In that case you will have to wait 24 hours to resume. You can just give the GMID_ALL command again, the tools will skip images that have already been downloaded.

2) At the end of the automatic process, you've created 16 .bmp files, one for each tile:

```
/cygdrive/c/Condor2/Landscapes/hhsc1>find ./Working/SourceTiles -name "*.bmp" -print

./Working/SourceTiles/0000/0000_combined/0000.bmp
./Working/SourceTiles/0001/0001_combined/0001.bmp
./Working/SourceTiles/0002/0002_combined/0002.bmp
./Working/SourceTiles/0003/0003_combined/0003.bmp
./Working/SourceTiles/0100/0100_combined/0100.bmp
./Working/SourceTiles/0101/0101_combined/0101.bmp
```

```
./Working/SourceTiles/0102/0102_combined/0102.bmp
./Working/SourceTiles/0103/0103_combined/0103.bmp
./Working/SourceTiles/0200/0200_combined/0200.bmp
./Working/SourceTiles/0201/0201_combined/0201.bmp
./Working/SourceTiles/0202/0202_combined/0202.bmp
./Working/SourceTiles/0203/0203_combined/0203.bmp
./Working/SourceTiles/0300/0300_combined/0300.bmp
./Working/SourceTiles/0301/0301_combined/0301.bmp
./Working/SourceTiles/0302/0302_combined/0302.bmp
./Working/SourceTiles/0303/0303_combined/0303.bmp
```

## Step Three:  convert images to Condor tiles

Now, this each image can be converted into a Condor tile, by 'warping' to UTM and 'cropping' to the desired size.

NOTE:  This process is automated below, for information on the manual process see Appendix Two.

With Condor_Tiles, click on Make GDAL but do not select a tile, i.e. leave the tile selector blank. Condor_tiles creates a batch file 'GDAL_xxxx_TIF.bat' in each tile folder `..\Working\SourceTiles\xxxx` and an overall batch file '`GDAL_ALL.bat`' in the `..\Working\SourceTiles` folder.

Again, in a Command Prompt window, run `GDAL_ALL` to start the process. This may take a few hours depending on the size of the scenery.

When you're done, again 16 files created in a new directory, these will be large files, >200 Meg each.

```
jmurtari@anvil:/cygdrive/c/condor2/Landscapes/hhsc1>find ./Working/Terragen/ -name "*.bmp"
-print
./Working/Terragen/Textures/0000.bmp
./Working/Terragen/Textures/0001.bmp
./Working/Terragen/Textures/0002.bmp
./Working/Terragen/Textures/0003.bmp
./Working/Terragen/Textures/0100.bmp
./Working/Terragen/Textures/0101.bmp
./Working/Terragen/Textures/0102.bmp
./Working/Terragen/Textures/0103.bmp
./Working/Terragen/Textures/0200.bmp
./Working/Terragen/Textures/0201.bmp
./Working/Terragen/Textures/0202.bmp
./Working/Terragen/Textures/0203.bmp
./Working/Terragen/Textures/0300.bmp
./Working/Terragen/Textures/0301.bmp
./Working/Terragen/Textures/0302.bmp
./Working/Terragen/Textures/0303.bmp
```

## Step Four: create the final scenery

1) Run the Landscape editor, and pick the landscape, and then in Tools, 'Import tile sized textures'
- the images in `Working/Terragen/Textures` will be loaded as the imagery.
- this will replace the initial black-and-white terrain based imagery.

2) You can check your airport placement with the imagery, and carefully adjust the lat/lon for the proper position.

3) In the Landscape editor the run the same export commands as before.

a) File → Export flightplanner map

b) File → Export forest map

c) File → Export thermal map

d) File → Export textures to DDS (As the guide says, you'll need the Nvidia legacy texture tools placed in the same directory with the LandscapeEditor.exe for this to work. Say 'No' to export only nonexisting, we want everything recreated. This will take some time: 15-30 minutes

*NOTE: When this is done you can also use Condor_tiles to tune the runway position. Start the program, pick the landscape, click on 'Read Header' and then 'Airport Place'. A separate window will appear that allows you to make fine position adjustment using the arrow keys. You will see a blue line also, that is the tow plane track. Make sure to save your changes!*

e) File → Export terrain hash

f) File → Export forest hash (These steps are important as an anti-cheat mechanism. ALSO, if you ever try to fly Condor2 and your elevator doesn't work, make sure you have exported these recently).

g) File → Save Landscape

## Step Five: Splash Screen and Imagery Credits

When Condor loads you see some large images displayed as the scenery is being loaded, in the default Slovenia 2 landscape, 'Two burly guys in a glider!'

It's easy to create your own. We'd recommend at least 1920x1080 in size (HDTV/16:9 ratio) and JPG format. Your landscape has an Images subfolder. It will be empty, but you can copy the files and they are used in random order. As you see below, just use a number as the name, starting at 0 (zero).

```
 Directory of C:\Condor2\Landscapes\hhsc1\Images

05/12/2020  08:12 AM         1,714,475 0.jpg
05/12/2020  08:12 AM         1,528,563 1.jpg
05/12/2020  08:12 AM         2,053,719 2.jpg
```

**See APPENDIX THREE about imagery usage.** Not real practical to put tags in the landscape that will never be seen. We'd suggest adding some text somewhere on your Splash Screens to credit Google. ALSO, don't forget to give us a LITTLE LOVE! We'd be happy if you'd share the source of help, e.g.

satellite images: Google Maps
help from: SoaringTools.Org

***CONGRATULATIONS – you should have a flyable landscape! If you'd like to share it, let us know and we'd be happy to offer a download from our site.***

***Now you just need to create a nice airport/runways. You can find some excellent tutorials on using the different Landscape utilities and how to create a detailed airport in their "Downloads" area -> https://www.condorsoaring.com/downloads-2/***

*Be prepared for some reading, the English version of the Airport Creation tutorial has over 130 pages!*

# OPTIONAL EXTRA PROCESSING

None of these items are required, but they can enhance your scenery:

## Correcting artifacts in the imagery

NOTE: The Landscape Editor uses the nVidia nvdxt program to export DDS tiles. nvdxt has two bugs which can result in 'water puddles' on the landscape in dark spots, with 3 color compression instead of 4. A workaround is to use nvdxt with a different output (dxt5 instead of dxt1a ).

Condor_Tiles generates a batch file '`DDS_xxxx.bat`' in each tile folder `..\Working\SourceTiles\xxxx` and an overall batch file '`DDS_ALL.bat`' in the `..\Working\SourceTiles` folder. You can click on `DDS_ALL` as a work-around.

NOTE: dxt5 DDS files are twice as large as dxt1 DDS files. Condor_Tiles provides a Utility to convert dxt5 DDS tiles to dxt1 DDS tiles which effectively reduces the file size by 50% and still maintain 4 color compression.

Click on the Utilities button and click the dxt Convert button and select all (ctrl-A) the tiles in the Textures folder.

## Creating custom thermal maps & forest maps

You can create custom thermal/forest maps for Condor. It can be a lot of work. Condor_Tiles has some support for using publicly available data to automate the process. Below are some notes. As of this tutorial version, we have not tried it!

*Helper_OSM_GEO.txt By Nick Bonniere*

```
For thermal and tree maps, it can be done by hand, basically 'painting' forests,
roads, fields, etc.. onto a background of each tile. This takes way too long, but
will match the textures very closely.


For a landscape in Canada, the Geogratis website can be used, but it only covers
the Canadian landmass.

An alternate way is to use the database from Open-Street-Maps which has shape files
for roads, lakes, rivers, forests, etc...  The database is not complete, but for
some areas it is quite good. Whatever is missing can then be filled in manually.

In Condor-V1 the various maps had this resolution:

Terrain-map – 90m
Thermal-map – 90 m
Combined forest map with
- Deciduous Forest-map – 45m
- Coniferous Forest-map – 45m
```

Textures maps – variable resolution in Textures folder

In Condor-V2 the various maps have this resolution:

Terrain-map – 90m and .tr3 maps at 30m in HeightMaps folder
Thermal-map – 90 m
Combined forest maps in .for ForestMaps folder with
- Deciduous Forest-map – 11.25m
- Coniferous Forest-map – 11.25m
Textures maps – variable resolution in Textures folder

OSM ESRI shape files are available in a reasonable format from GeoFabrick. You can use OpenOffice database to look into the .dbf files to look for items of interest such as roads and rivers.The OSM shape files can be downloaded from GeoFabrik:

https://download.geofabrik.de/index.html

For the Pennsylvania Landscape Ridge-North-2 recently created, a downloaded of the .shp.zip is needed for the Pennsylvania state from North-America. Because the scenery extends around and south of Pennsylvania, the states of Maryland, Virginia and West-Virginia are also needed. Use Google-Earth for example to find all the states/regions that is needed.

It is possible to download a whole region or by state. It depends on what you want and how big it is.
The .shp.zip file type is what is needed.

https://download.geofabrik.de/north-america.html

pennsylvania-latest-free.shp.zip
maryland-latest-free.shp.zip
virginia-latest-free.shp.zip
west-virginia-latest-free.shp.zip

There is a button on Condor-Tiles ‘Make-Geo’, that creates a GeoDatabase folder and creates batch files for each condor tile. You then unzip the shape files into the geodatabase folder and for each, change the name, if desired, such as Pennsylvania.shp for example. It is actually a folder that contains all the shape files.

In each sourceTile, there will be 3 batch files. One for thermal, GEO_t_0000.bat, one for deciduous forest GEO_V2_b_0000.bat, and one for coniferous forest GEO_V2_s_0000.bat. You can run these batch files individually or use the 3 batch files, GO_b.bat, GO_s.bat, GO_t.bat, in the GeoDatabase folder that call all the individual batch files, one at a time.  It is best to start by doing one tile individually, and if it looks good, then run the overall batch file and go away for a few hours, as all the tiles get generated.

Note that OSM has only a ‘forest’ definition, not a deciduous nor a coniferous distinction. A blank coniferous map will be generated as it is needed for the Landscape Editor.

You can view and modify the resulting tiles with Condor_Tiles with the ‘Edit Forest’ and ‘Edit thermal’. The background textures tile is shown and is overlaid with the thermal or forest. Press the ‘v’ key to toggle the overlay.

Because the shape lines are narrow, it is best to usually 'shrink' the forest which

provides more margin around lakes, rivers, roads, so that no tree ends up on roads or lakes, etc...

Forest maps end up in Working/Terragen/Forest folder, and with the landscape editor, you can import them, and then export the forests and export the forest-hash.

Thermal maps stay in each SourceTile folder. There is a button on Condor_Tiles ‘Make thermal’ that will generate the thermal map.  Each type of geographic structure is assigned a thermal value 0 to 255, basically a heat index for thermal generation. You can edit the default values if you want.

---

Details about OSM data:

Open Office can be used to open the database file to have a look at details.

```
gis_osm_buildings_a_free_1 - (big file - OpenOffice  may crash)
gis_osm_landuse_a_free_1   - forest, orchard,
                           - allotments, cemetery, commercial, farm, grass,
industrial, meadow,
                           - nature_reserve, park, quarry,
                           - recreation_Ground, residential, retail, scrub,
vineyard
gis_osm_natural_a_free_1   - beach, clifs, etc. Nothing useful
gis_osm_natural_free_1     - peaks, springs, trees, etc. Nothing useful
gis_osm_places_a_free_1    - village, town, locality, island, etc
gis_osm_places_free_1      - village, town, locality, hamlet, etc
gis_osm_pofw_a_free_1      - churches
gis_osm_pofw_free_1        - churches
gis_osm_pois_a_free_1      - park, golf course, graveyard, etc
gis_osm_pois_free_1        - restaurant, pub, hotel, university, etc
gis_osm_railways_free_1    - rail lines
gis_osm_roads_free_1       - (big file - OpenOffice crashes)
gis_osm_traffic_a_free_1   - parking
gis_osm_traffic_free_1     - crossings, junctions, turning circles, etc
gis_osm_transport_a_free_1 - railway stations, bus stations, etc
gis_osm_transport_free_1   - bus stop, railway stations
gis_osm_water_a_free_1     - river, lake, reservoir, bog, etc
gis_osm_waterways_free_1   - canal, river, stream, etc
```

# APPENDIX ONE – General notes on Scenery Creation

by Nick Bonniere

1) A scenery is a made up of a group of tiles

2) Each tile is 23 km x 23 km (14.29 mi x 14.29 mi), which is actually a resolution of 90 meters times 256 = 23.040 km

If you pick 4 tiles, I would suggest you offset the airport from the center a bit so it falls fully into one of the 4 tiles, otherwise it will be cut-up into 4 pieces. Not absolutely necessary, just a suggestion so you can view the airport in one tile only.

3) The original resolution of 90 m is based on Space Shuttle elevation data (STRM)

4) Condor 2 uses a resolution of 30 meters, which is 3 times the resolution of Condor 1, and 30m STRM data is available

5) The last 1/4 tile edge of a scenery is not flyable. So if you have one tile, only the centre 1/2 or 11.5 km x 11.5 km is flyable, If you use 2 x 2 tiles, i.e 4 tiles, 46 km x 46 km, only the centre 34 km x 34 km is flyable, etc...

6) The projection used is UTM, (Universal Transverse Mercator), This means that all elevation data and photographic data needs to be converted to UTM coordinates.

7) Tiles are in a grid of rows and columns starting at the bottom right corner (South East), which is tile 0000. The first two digits are the column number and the second two digits are the row number. Above tile 0000.bmp is tile 0001.bmp. The tile to the left is tile 0100.bmp

8) You can use multiple resolutions. For LakePlacid, the centre tile is hi-res 8192x8192, while all the other tiles are 4096x4096.  The file size increases by a factor of 4, 48MB file (at 4096) instead of 192MB (at 8192).

9) Notes on Tile system zoom level and Condor resolution

- Tile system zoom level  (approximately)
- zoom level 1 - each pixel is 78184 m (equator), 55284 m (45 deg latitude)
- zoom level 2 - each pixel is 39092 m (equator), 27642 m (45 deg latitude)
.....
- zoom level 10 - each pixel is 152.7 m (equator), 108.0 m (45 deg latitude)
- zoom level 11 - each pixel is  76.3 m (equator),  54.0 m (45 deg latitude)
- zoom level 12 - each pixel is  38.1 m (equator),  27.0 m (45 deg latitude)
- zoom level 13 - each pixel is  19.1 m (equator),  13.5 m (45 deg latitude)
- zoom level 14 - each pixel is   9.5 m (equator),   6.7 m (45 deg latitude)
- zoom level 15 - each pixel is   4.8 m (equator),   3.4 m (45 deg latitude)
- zoom level 16 - each pixel is   2.4 m (equator),   1.7 m (45 deg latitude)

- Condor resolution
- tile size  256 - 23040 m, each pixel is 23040/256  = 90 m
- tile size  512 - 23040 m, each pixel is 23040/512  = 45 m
- tile size 1024 - 23040 m, each pixel is 23040/1024 = 22.5 m
- tile size 2048 - 23040 m, each pixel is 23040/2048 = 11.25 m
- tile size 4096 - 23040 m, each pixel is 23040/4966 = 5.625 m
- tile size 8192 - 23040 m, each pixel is 23040/8192 = 2.8125 m

# APPENDIX TWO – manual run of downloader/combiner

In Part Two of this document (Photo Scenery Creation), Steps Two and Three cover the downloading of image data and how it is combined into tiles usable for Condor. This is now an automated process, but below is more detail to cover the old manual method.

## Downloading images manually

1) Run the GoogleSatelliteMapsDownloader downloader.exe.

a) Click on "Open Task" and select the Initial_0000.gmid file. Make sure "Zoom level" is set to 16 (or whatever was selected earlier) and "Maps type" is Tiles.

b) After it opens change the "Task name;" box to keep the original since the file will be overwritten:
Initial_0000.gmid to 0000.gmid *(YOU ARE NOT changing the actual file name, just the Task name.)*

c) You should see LAT/LON values fill in (taken from the file), and they should make sense with your scenery location.

d) Click on "Start" to begin the download process.
You should see a "Downloaded" count in the lower left, it should eventually reach the "Total images" number. If it seems to get stuck, or no progress, make sure you can reach the google site.

e) What's actually happening:

- a folder 0000 will be created and a set files will be downloaded into that folde
- these files are 256x256 images that cover the desired area, but actually cover more area than needed
- at the end, the file 0000.gmid will contain the actual coordinate extent of the downloaded tiles

f) REPEAT the above steps for all 16 tiles – don't make any typos! *Yes, this is a bit time consuming. We're trying to convince them to create a command line version of the tool that could be used as part of a larger script.*

2) Still in the downloader. Select "Tools -> Map Combiner", that will take care of merging all the individual 256x256 files.

a) Select the "0000.gmid" file (NOT the one prefixed with "Initial_") and untick all image types except bitmap. For Automatic generation of Condor Tiles, also select TIFF image type.

b) REPEAT for all 16 tiles.

## Combining images

1) Start Condor_tiles. To create the batch file that will do this, on Condor_tiles, pick the desired tile in the "Tile" section, 0000 in this case, and click Make GDAL

- a batch file ./Working/SourceTiles/000/GDAL_0000.bat will be created.
- double-click on the batch file and it will process the data
- a new image 0000.bmp will be placed into the Working/Terragen/Textures folder

REPEAT for each tile, 0001, 0002, etc...
You can do these simultaneously if your PC has the memory. Each is independent.

ALTERNATE: If you have a unix shell available, a command similar to the below will process all.

```
jmurtari@anvil:/cygdrive/c/condor2/Landscapes/hhsc1/Working/SourceTiles> for dir in `ls -d
0*`; do echo "#### Processing $dir"; cd
/cygdrive/c/condor2/Landscapes/hhsc1/Working/SourceTiles/$dir; ./GDAL_$dir.bat; done

#### Processing 0000
…..
```

# APPENDIX THREE – Licensing, Google and Satellite Imagery

This tutorial uses imagery data collected by various satellite sources and compiled by Google and made available for download. We're happy to acknowledge the great help that is. Licensing can always be an issue (see link below for more info and references).

We certainly feel we are making 'FAIR USE' of their imagery and transforming it into a new product. That all being said we strongly advise NO COMMERCIAL use, e.g. You shouldn't setup a website where people give you coordinates and you spit out a scenery they can download for a fee. It might be OK, but it might not under FAIR USE.

More on FAIR USE → https://FreeGeographyTools.com/2007/fair-use-and-google-earth-imagery

You can certainly acknowledge Google. We'd suggest adding some text somewhere on your Splash Screens, some have used: "Satellite Imagery – Google Maps"

# APPENDIX FOUR – Distortion: Flat map over round earth

Some of you interested in enigmas and brain-teasers may be asking, “How can satellite photos of a ROUND Earth be flattened?” Well just think back to older flat maps you’ve seen… mercator projections, etc….

by Nick Bonniere

When you fly in real-life, you are flying over a sphere. When you fly in Condor, you are flying over flat terrain which is a projection of a sphere onto a flat surface. For Condor this projection is UTM (Universal Transverse Mercator). Just like for any flat map such as a paper map, the projection results in distortion. The further away from the centre point of the projection, the more the distortion and that is why you need to pick the closest UTM zone.

When images are downloaded, they have already been flattened based on a tile projection system. For use with Condor, they have to be re-projected to UTM. This is where epsg:3857 and espg:4326 come in. They refer to the projections and coordinates. If you use the right one, you minimize distortions, but if you use the wrong one, you introduce more distortion. Over small distances, the distortion is small and in a Condor tile (23040 metres wide), the difference between epsg:3857 and espg:4326 is about 10 to 15 metres.

For your 5x5 scenery, you can determine the overall effect of the UTM projection. You take the lat-long coordinates of opposite corners and do a great-circle calculation, and for condor you do an arithmetic distance calculation.

For 5x5, Condor opposite corner distance is (2*(5x23040)^2)^0.5 = 162.92 Km

Great-circle calculations for one diagonal is: 162.85 km, the other diagonal is: 162.84 km

As you fly in Condor, you are totally un-aware of any distortion. Reaching a turn-point is simply a few more metres away than in real-life, and for a 5x5 about 250 feet over 100 mi.

NEXT REV NOTES:

he Landscape Editor draws the airport G file with asphalt and grass areas, as well as the defined runway.

Condor_Tiles draws the defined runway and its centre (red), and three items in blue: 1) the glider take-off path on the left, the tow plane landing path on the right with its return to the take-off position, and the standard position of a windsock (square).

- Adding Trees,  Flatening

NOTE:  I noticed you didn't have a runway.  Right now they aren't covered in our Tutorial.  I can give you one tip for a smoother takeoff.  Load your scenery in the landscape editor.  Click on 'Airports' and zoom in on your location.  Then click on 'Height map' and you will see a bunch of elevation numbers.  Then click on 'FLATTEN'.  Set the 'Altitude' to what you used for the Airport, and then to start an 'Edge slope' of about 1:3 and a 'Radius' about 25 pt.  When you move your cursor you will see two circles.  The inner circle will be forced to that exact elevation, the outer circle will be a slop area for a gradual transition.

Makes for a much smoother takeoff.  You have to go thru all the save steps as below. WARNING - there is no easy way to undo these changes!

# APPENDIX FIVE – GNU Free Documentation License

Reference: https://www.gnu.org/licenses/fdl-1.3.en.html

Version 1.3, 3 November 2008



### 0. PREAMBLE

The purpose of this License is to make a manual, textbook, or other functional and useful document "free" in the sense of freedom: to assure everyone the effective freedom to copy and redistribute it, with or without modifying it, either commercially or noncommercially. Secondarily, this License preserves for the author and publisher a way to get credit for their work, while not being considered responsible for modifications made by others.

This License is a kind of "copyleft", which means that derivative works of the document must themselves be free in the same sense. It complements the GNU General Public License, which is a copyleft license designed for free software.

We have designed this License in order to use it for manuals for free software, because free software needs free documentation: a free program should come with manuals providing the same freedoms that the software does. But this License is not limited to software manuals; it can be used for any textual work, regardless of subject matter or whether it is published as a printed book. We recommend this License principally for works whose purpose is instruction or reference.

### 1. APPLICABILITY AND DEFINITIONS

This License applies to any manual or other work, in any medium, that contains a notice placed by the copyright holder saying it can be distributed under the terms of this License. Such a notice grants a world-wide, royalty-free license, unlimited in duration, to use that work under the conditions stated herein. The "Document", below, refers to any such manual or work. Any member of the public is a licensee, and is addressed as "you". You accept the license if you copy, modify or distribute the work in a way requiring permission under copyright law.

A "Modified Version" of the Document means any work containing the Document or a portion of it, either copied verbatim, or with modifications and/or translated into another language.

A "Secondary Section" is a named appendix or a front-matter section of the Document that deals exclusively with the relationship of the publishers or authors of the Document to the Document's overall subject (or to related matters) and contains nothing that could fall directly within that overall subject. (Thus, if the Document is in part a textbook of mathematics, a Secondary Section may not explain any mathematics.) The relationship could be a matter of historical connection with the subject

or with related matters, or of legal, commercial, philosophical, ethical or political position regarding them.

The "Invariant Sections" are certain Secondary Sections whose titles are designated, as being those of Invariant Sections, in the notice that says that the Document is released under this License. If a section does not fit the above definition of Secondary then it is not allowed to be designated as Invariant. The Document may contain zero Invariant Sections. If the Document does not identify any Invariant Sections then there are none.

The "Cover Texts" are certain short passages of text that are listed, as Front-Cover Texts or Back-Cover Texts, in the notice that says that the Document is released under this License. A Front-Cover Text may be at most 5 words, and a Back-Cover Text may be at most 25 words.

A "Transparent" copy of the Document means a machine-readable copy, represented in a format whose specification is available to the general public, that is suitable for revising the document straightforwardly with generic text editors or (for images composed of pixels) generic paint programs or (for drawings) some widely available drawing editor, and that is suitable for input to text formatters or for automatic translation to a variety of formats suitable for input to text formatters. A copy made in an otherwise Transparent file format whose markup, or absence of markup, has been arranged to thwart or discourage subsequent modification by readers is not Transparent. An image format is not Transparent if used for any substantial amount of text. A copy that is not "Transparent" is called "Opaque".

Examples of suitable formats for Transparent copies include plain ASCII without markup, Texinfo input format, LaTeX input format, SGML or XML using a publicly available DTD, and standard-conforming simple HTML, PostScript or PDF designed for human modification. Examples of transparent image formats include PNG, XCF and JPG. Opaque formats include proprietary formats that can be read and edited only by proprietary word processors, SGML or XML for which the DTD and/or processing tools are not generally available, and the machine-generated HTML, PostScript or PDF produced by some word processors for output purposes only.

The "Title Page" means, for a printed book, the title page itself, plus such following pages as are needed to hold, legibly, the material this License requires to appear in the title page. For works in formats which do not have any title page as such, "Title Page" means the text near the most prominent appearance of the work's title, preceding the beginning of the body of the text.

The "publisher" means any person or entity that distributes copies of the Document to the public.

A section "Entitled XYZ" means a named subunit of the Document whose title either is precisely XYZ or contains XYZ in parentheses following text that translates XYZ in another language. (Here XYZ stands for a specific section name mentioned below, such as "Acknowledgements", "Dedications", "Endorsements", or "History".) To "Preserve the Title" of such a section when you modify the Document means that it remains a section "Entitled XYZ" according to this definition.

The Document may include Warranty Disclaimers next to the notice which states that this License

applies to the Document. These Warranty Disclaimers are considered to be included by reference in this License, but only as regards disclaiming warranties: any other implication that these Warranty Disclaimers may have is void and has no effect on the meaning of this License.

**2. VERBATIM COPYING**

You may copy and distribute the Document in any medium, either commercially or noncommercially, provided that this License, the copyright notices, and the license notice saying this License applies to the Document are reproduced in all copies, and that you add no other conditions whatsoever to those of this License. You may not use technical measures to obstruct or control the reading or further copying of the copies you make or distribute. However, you may accept compensation in exchange for copies. If you distribute a large enough number of copies you must also follow the conditions in section 3.

You may also lend copies, under the same conditions stated above, and you may publicly display copies.

**3. COPYING IN QUANTITY**

If you publish printed copies (or copies in media that commonly have printed covers) of the Document, numbering more than 100, and the Document's license notice requires Cover Texts, you must enclose the copies in covers that carry, clearly and legibly, all these Cover Texts: Front-Cover Texts on the front cover, and Back-Cover Texts on the back cover. Both covers must also clearly and legibly identify you as the publisher of these copies. The front cover must present the full title with all words of the title equally prominent and visible. You may add other material on the covers in addition. Copying with changes limited to the covers, as long as they preserve the title of the Document and satisfy these conditions, can be treated as verbatim copying in other respects.

If the required texts for either cover are too voluminous to fit legibly, you should put the first ones listed (as many as fit reasonably) on the actual cover, and continue the rest onto adjacent pages.

If you publish or distribute Opaque copies of the Document numbering more than 100, you must either include a machine-readable Transparent copy along with each Opaque copy, or state in or with each Opaque copy a computer-network location from which the general network-using public has access to download using public-standard network protocols a complete Transparent copy of the Document, free of added material. If you use the latter option, you must take reasonably prudent steps, when you begin distribution of Opaque copies in quantity, to ensure that this Transparent copy will remain thus accessible at the stated location until at least one year after the last time you distribute an Opaque copy (directly or through your agents or retailers) of that edition to the public.

It is requested, but not required, that you contact the authors of the Document well before redistributing any large number of copies, to give them a chance to provide you with an updated version of the Document.

**4. MODIFICATIONS**

You may copy and distribute a Modified Version of the Document under the conditions of sections 2

and 3 above, provided that you release the Modified Version under precisely this License, with the Modified Version filling the role of the Document, thus licensing distribution and modification of the Modified Version to whoever possesses a copy of it. In addition, you must do these things in the Modified Version:

- A. Use in the Title Page (and on the covers, if any) a title distinct from that of the Document, and from those of previous versions (which should, if there were any, be listed in the History section of the Document). You may use the same title as a previous version if the original publisher of that version gives permission.
- B. List on the Title Page, as authors, one or more persons or entities responsible for authorship of the modifications in the Modified Version, together with at least five of the principal authors of the Document (all of its principal authors, if it has fewer than five), unless they release you from this requirement.
- C. State on the Title page the name of the publisher of the Modified Version, as the publisher.
- D. Preserve all the copyright notices of the Document.
- E. Add an appropriate copyright notice for your modifications adjacent to the other copyright notices.
- F. Include, immediately after the copyright notices, a license notice giving the public permission to use the Modified Version under the terms of this License, in the form shown in the Addendum below.
- G. Preserve in that license notice the full lists of Invariant Sections and required Cover Texts given in the Document's license notice.
- H. Include an unaltered copy of this License.
- I. Preserve the section Entitled "History", Preserve its Title, and add to it an item stating at least the title, year, new authors, and publisher of the Modified Version as given on the Title Page. If there is no section Entitled "History" in the Document, create one stating the title, year, authors, and publisher of the Document as given on its Title Page, then add an item describing the Modified Version as stated in the previous sentence.
- J. Preserve the network location, if any, given in the Document for public access to a Transparent copy of the Document, and likewise the network locations given in the Document for previous versions it was based on. These may be placed in the "History" section. You may omit a network location for a work that was published at least four years before the Document itself, or if the original publisher of the version it refers to gives permission.
- K. For any section Entitled "Acknowledgements" or "Dedications", Preserve the Title of the section, and preserve in the section all the substance and tone of each of the contributor acknowledgements and/or dedications given therein.
- L. Preserve all the Invariant Sections of the Document, unaltered in their text and in their titles. Section numbers or the equivalent are not considered part of the section titles.
- M. Delete any section Entitled "Endorsements". Such a section may not be included in the Modified Version.

- N. Do not retitle any existing section to be Entitled "Endorsements" or to conflict in title with any Invariant Section.
- O. Preserve any Warranty Disclaimers.

If the Modified Version includes new front-matter sections or appendices that qualify as Secondary Sections and contain no material copied from the Document, you may at your option designate some or all of these sections as invariant. To do this, add their titles to the list of Invariant Sections in the Modified Version's license notice. These titles must be distinct from any other section titles.

You may add a section Entitled "Endorsements", provided it contains nothing but endorsements of your Modified Version by various parties—for example, statements of peer review or that the text has been approved by an organization as the authoritative definition of a standard.

You may add a passage of up to five words as a Front-Cover Text, and a passage of up to 25 words as a Back-Cover Text, to the end of the list of Cover Texts in the Modified Version. Only one passage of Front-Cover Text and one of Back-Cover Text may be added by (or through arrangements made by) any one entity. If the Document already includes a cover text for the same cover, previously added by you or by arrangement made by the same entity you are acting on behalf of, you may not add another; but you may replace the old one, on explicit permission from the previous publisher that added the old one.

The author(s) and publisher(s) of the Document do not by this License give permission to use their names for publicity for or to assert or imply endorsement of any Modified Version.

**5. COMBINING DOCUMENTS**

You may combine the Document with other documents released under this License, under the terms defined in section 4 above for modified versions, provided that you include in the combination all of the Invariant Sections of all of the original documents, unmodified, and list them all as Invariant Sections of your combined work in its license notice, and that you preserve all their Warranty Disclaimers.

The combined work need only contain one copy of this License, and multiple identical Invariant Sections may be replaced with a single copy. If there are multiple Invariant Sections with the same name but different contents, make the title of each such section unique by adding at the end of it, in parentheses, the name of the original author or publisher of that section if known, or else a unique number. Make the same adjustment to the section titles in the list of Invariant Sections in the license notice of the combined work.

In the combination, you must combine any sections Entitled "History" in the various original documents, forming one section Entitled "History"; likewise combine any sections Entitled "Acknowledgements", and any sections Entitled "Dedications". You must delete all sections Entitled "Endorsements".

## 6. COLLECTIONS OF DOCUMENTS

You may make a collection consisting of the Document and other documents released under this License, and replace the individual copies of this License in the various documents with a single copy that is included in the collection, provided that you follow the rules of this License for verbatim copying of each of the documents in all other respects.

You may extract a single document from such a collection, and distribute it individually under this License, provided you insert a copy of this License into the extracted document, and follow this License in all other respects regarding verbatim copying of that document.

## 7. AGGREGATION WITH INDEPENDENT WORKS

A compilation of the Document or its derivatives with other separate and independent documents or works, in or on a volume of a storage or distribution medium, is called an "aggregate" if the copyright resulting from the compilation is not used to limit the legal rights of the compilation's users beyond what the individual works permit. When the Document is included in an aggregate, this License does not apply to the other works in the aggregate which are not themselves derivative works of the Document.

If the Cover Text requirement of section 3 is applicable to these copies of the Document, then if the Document is less than one half of the entire aggregate, the Document's Cover Texts may be placed on covers that bracket the Document within the aggregate, or the electronic equivalent of covers if the Document is in electronic form. Otherwise they must appear on printed covers that bracket the whole aggregate.

## 8. TRANSLATION

Translation is considered a kind of modification, so you may distribute translations of the Document under the terms of section 4. Replacing Invariant Sections with translations requires special permission from their copyright holders, but you may include translations of some or all Invariant Sections in addition to the original versions of these Invariant Sections. You may include a translation of this License, and all the license notices in the Document, and any Warranty Disclaimers, provided that you also include the original English version of this License and the original versions of those notices and disclaimers. In case of a disagreement between the translation and the original version of this License or a notice or disclaimer, the original version will prevail.

If a section in the Document is Entitled "Acknowledgements", "Dedications", or "History", the requirement (section 4) to Preserve its Title (section 1) will typically require changing the actual title.

## 9. TERMINATION

You may not copy, modify, sublicense, or distribute the Document except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, or distribute it is void, and will automatically terminate your rights under this License.

However, if you cease all violation of this License, then your license from a particular copyright holder is reinstated (a) provisionally, unless and until the copyright holder explicitly and finally terminates your license, and (b) permanently, if the copyright holder fails to notify you of the violation by some reasonable means prior to 60 days after the cessation.

Moreover, your license from a particular copyright holder is reinstated permanently if the copyright holder notifies you of the violation by some reasonable means, this is the first time you have received notice of violation of this License (for any work) from that copyright holder, and you cure the violation prior to 30 days after your receipt of the notice.

Termination of your rights under this section does not terminate the licenses of parties who have received copies or rights from you under this License. If your rights have been terminated and not permanently reinstated, receipt of a copy of some or all of the same material does not give you any rights to use it.

**10. FUTURE REVISIONS OF THIS LICENSE**

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. See https://www.gnu.org/licenses/.

Each version of the License is given a distinguishing version number. If the Document specifies that a particular numbered version of this License "or any later version" applies to it, you have the option of following the terms and conditions either of that specified version or of any later version that has been published (not as a draft) by the Free Software Foundation. If the Document does not specify a version number of this License, you may choose any version ever published (not as a draft) by the Free Software Foundation. If the Document specifies that a proxy can decide which future versions of this License can be used, that proxy's public statement of acceptance of a version permanently authorizes you to choose that version for the Document.

**11. RELICENSING**

"Massive Multiauthor Collaboration Site" (or "MMC Site") means any World Wide Web server that publishes copyrightable works and also provides prominent facilities for anybody to edit those works. A public wiki that anybody can edit is an example of such a server. A "Massive Multiauthor Collaboration" (or "MMC") contained in the site means any set of copyrightable works thus published on the MMC site.

"CC-BY-SA" means the Creative Commons Attribution-Share Alike 3.0 license published by Creative Commons Corporation, a not-for-profit corporation with a principal place of business in San Francisco, California, as well as future copyleft versions of that license published by that same organization.

"Incorporate" means to publish or republish a Document, in whole or in part, as part of another Document.

An MMC is "eligible for relicensing" if it is licensed under this License, and if all works that were first

published under this License somewhere other than this MMC, and subsequently incorporated in whole or in part into the MMC, (1) had no cover texts or invariant sections, and (2) were thus incorporated prior to November 1, 2008.

The operator of an MMC Site may republish an MMC contained in the site under CC-BY-SA on the same site at any time before August 1, 2009, provided the MMC is eligible for relicensing.

## APPENDIX SIX – Misc: Turnpoint files, splash images

**Turnpoints** - If you look in the top folder of your landscape, you will find a <landscape>.cup (just put all your turnpoints in that file). NOTE: Condor2 creates a hidden copy of the .cup in your Documents\ Condor\Turnpoints folder, you must delete that one and then restart Condor2 to pick up the new one.

Splash Screen Images – These are displayed while Condor2 is loading your landscape. Theses are stored in the <lanscape>\Images folder (just check Slovenia), they are .jpg, 1920x1080, and use a number for the name. It will cycle thru them.