How to convert freely available satellite images from Google and Bing into an image which is georeferenced to the British National Grid.

These instructions show how to obtain aerial photos from online source such as Google and Bing, and convert them to a single image georeferenced to British National Grid (Ordnance Survey) suitable for use as a background map in OCAD. It uses two programs, the first called SASPlanet can do the downloading step, but will not output in OS coordinates. The second program gdalwarp.exe performs the necessary coordinate transformation. These instructions first show how do to download and configure the necessary programs, and then how to use them.

Installation and Configuration

Step 1 Download and Install SASPlanet.

1. SASPlanet can be downloaded from: http://www.sasgis.org/programs/sasplanet/nightly.php
2. Extract the contents of the zip archive to somewhere suitable on your computer.

Step 2 Download and Install gdalwarp.exe.

1. You need to download the GDAL collection of programs. This can be obtained from http://www.gisinternals.com/release.php
2. Extract the contents of the zip archive to somewhere suitable on your computer.
3. Add information required to convert to from OSGB1936 to British National Grid. This is done by creating a file called OSGB1936ToBritishNationalGrid.prj in the folder bin/gdal-data of the GDAL distribution. Its contents are:

```
PROJCS["OSGB 1936 / British National Grid",
    GEOGCS["OSGB 1936",
        DATUM["OSGB_1936",
            SPHEROID["Airy 1830",6377563.396,299.3249646,
                AUTHORITY["EPSG","7001"]],
            TOWGS84[446.448,-125.157,542.06,0.15,0.247,0.842,-20.489],
            AUTHORITY["EPSG","6277"]],
        PRIMEM["Greenwich",0,
            AUTHORITY["EPSG","8901"]],
        UNIT["degree",0.0174532925199433,
            AUTHORITY["EPSG","9122"]],
        AUTHORITY["EPSG","4277"]],
    PROJECTION["Transverse_Mercator"],
    PARAMETER["latitude_of_origin",49],
    PARAMETER["central_meridian",-2],
    PARAMETER["scale_factor",0.9996012717],
    PARAMETER["false_easting",400000],
    PARAMETER["false_northing",-100000],
    UNIT["metre",1,
        AUTHORITY["EPSG","9001"]],
    AXIS["Easting",EAST],
    AXIS["Northing",NORTH],
    AUTHORITY["EPSG","27700"]]
```

4. Edit the file <home folder>\Documents\WindowsPowerShell\Microsoft.PowerShell_profile.ps1 and add the following lines:
   $env:GDAL_DATA= ";<GDAL folder>\bin\gdal-data"
   $env:Path += ";<GDAL folder>\bin\gdal\apps"
   $env:Path += ";<GDAL folder>\bin"

   You need to replace <home folder> with the location of your home folder and <GDAL folder> with the folder where you stored the gdal package
5. Right click on the Window start button and choose Windows Power Shell.
6. Type in
   Set-ExecutionPolicy -Scope CurrentUser Unrestricted
   in powershell, then close the window.

The instructions above need only to be executed once, the following is the procedure to follow every time you want to produce a new aerial photo background image.

Creating an Image

Start the program SASplanet from the folder you stored it in earlier.

1. Choose either Google or Bing satellite as the source from the top toolbar.
2. Zoom into until the area you require is on the screen.
3. Type Alt-R to start creating a rectangular selection of the area you need.
4. Click at the top left of the area you require.
5. Click at the bottom right of the area you require.
6. Selection Manager will now appear, choose Zooms 19 on the Download tab.
7. Click Start, the necessary images will be downloaded, when it finishes click Quit.
8. Type Ctrl-B to reopen the SelectionManager.
9. Select “Stitch” tab and choose
   9.1 Output Format GeoTIFF
   9.2 Zoom 19
   9.3 Geographic (Latitude/Longitute) /WGS84 /EPSG:4326
   9.4 Compression: None
   9.5 Click on the … next to “Save to” and navigate to the folder where you want the file to end up, and give it a suitable name.

Output from SASPlanet is in format WGS 84. We need to first convert it to OSGB 36, and then convert to British National Grid (see: https://communityhub.esriuk.com/geoxchange/2012/3/26/coordinate-systems-and-projections-for-beginners.html for an explanation). We use the program gldwarp to modify this file. Start File explorer and navigate to the folder where you just created the aerial photo, then click on File>Open Windows PowerShell and execute the following commands

1. Convert to OSGB 1936 ..
   gdalwarp.exe -t_srs 'EPSG:4277' .\<FilenameFromSAS> .\<FilenameforOSGB36formatfile>
   where you need to substitute in the correct names for the items between <> brackets.
2. Project to National Grid
   gdalwarp.exe -t_srs $env:GDAL_DATA\OSGB1936ToBritishNationalGrid.prj .
.\<FilenameforOSGB36formatfile> .\<FilenameforBNGformatfile>

You can now open the file FilenameforBNGformatfile> as a background image in OCAD. It will be correctly georeferenced for the British National Grid. If you want to know what EPSG codes are about you can look here: https://www.epsg-registry.org/.I hope you find these instructions useful. Please get in touch if you spot a problem or can suggest an improvement.

Alex Finch (SROC mapping officer)
Alex@finchfamily.org.uk