Geography
3D Terrain Printing
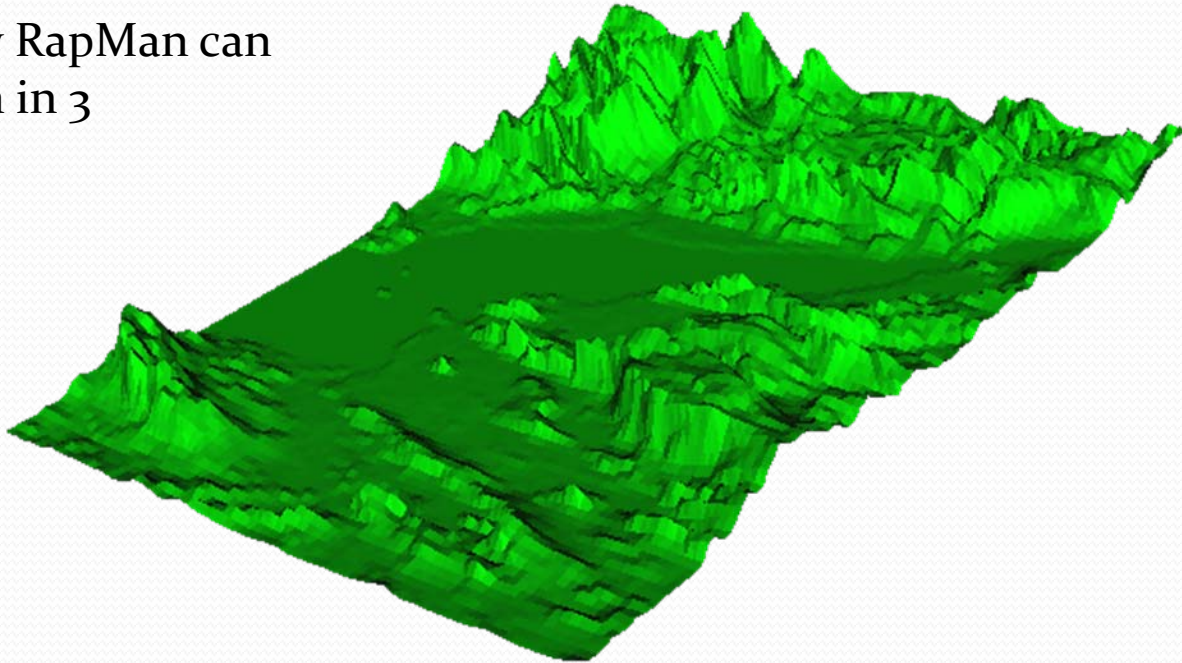
Using RapMan

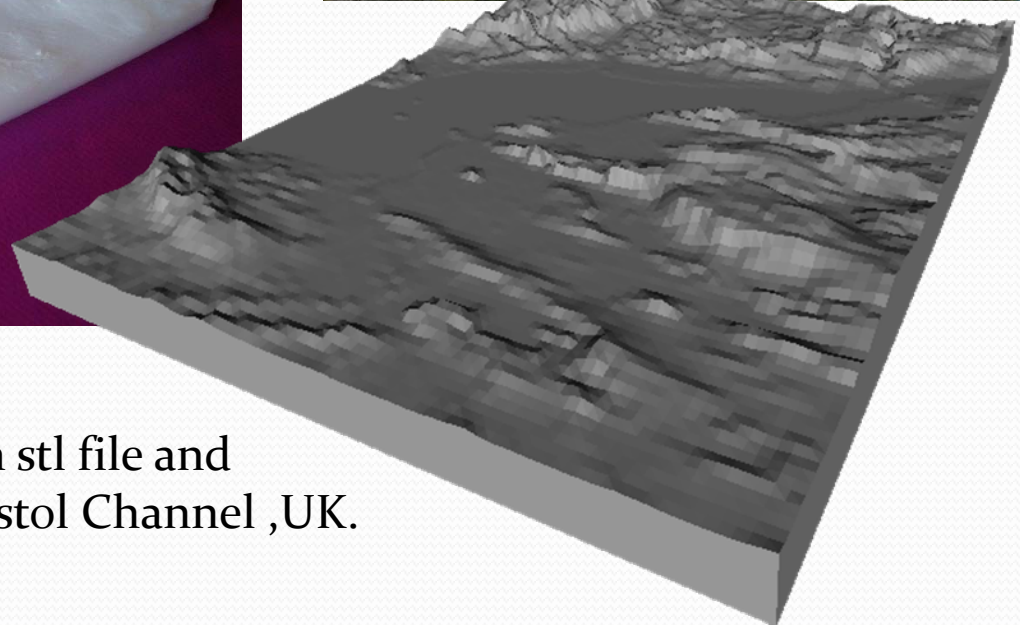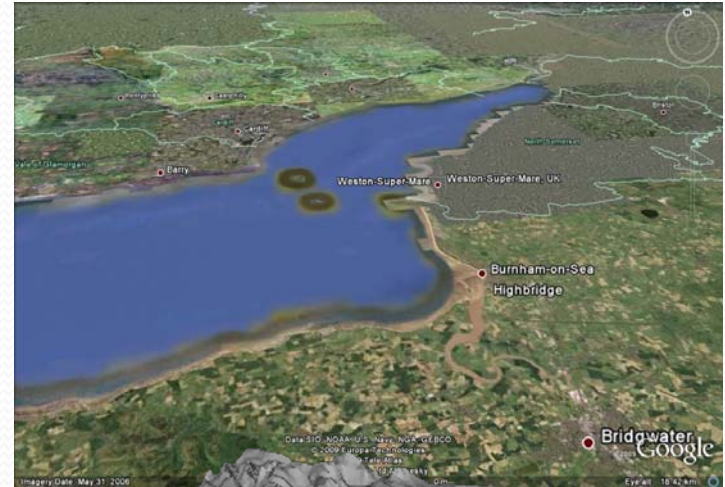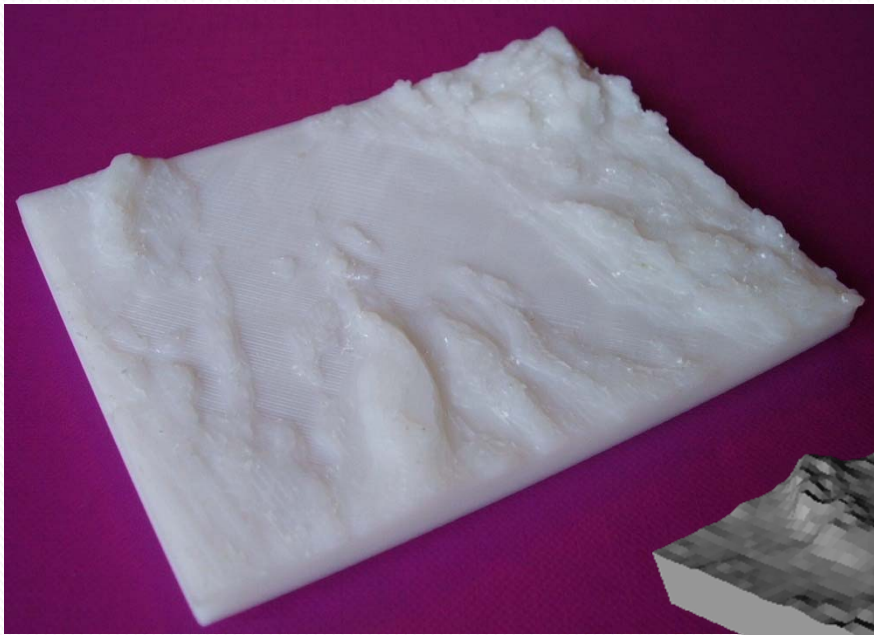Produced By- Dave White. Head of D&T Clevedon School

3D Terrain Printing

RapMan need not only be limited to Product Design, RMT, or Engineering. Why not see if you can cross over to include other areas of the curriculum.

This presentation shows how RapMan can be used for modelling terrain in 3 Dimensions.

3D Terrain

This page shows a 3D print, an stl file and
a Google Earth view of the Bristol Channel ,UK.

Getting the data

- To start producing the 3D map you need to download a file containing the 3D data. Depending which part of the world you want to cover you may need to search the internet.

- You will need a **digital elevation model** (**DEM**). This is a digital representation of ground surface topography or terrain. It is also widely known as a **digital terrain model** (**DTM**). A DEM can be represented as a raster (a grid of squares) or as a triangular irregular network. DEMs are commonly built using remote sensing techniques, but they may also be built from land surveying. DEMs are used often in geographic information systems, and are the most common basis for digitally-produced relief maps.

- Data can be found at http://emrl.byu.edu/gsda/data_dem_obtain.html
http://www.webgis.com/srtm30.html

There are many different formats of DEM, for these examples GTOPO30 was used.

Software.

To open and edit the DEM file you need an appropriate software program.

AcuTrans3D is available as a 30 day trial and will allow you to select a small part of the map, scale it to a suitable size and to show heights better exaggerate the verticals.
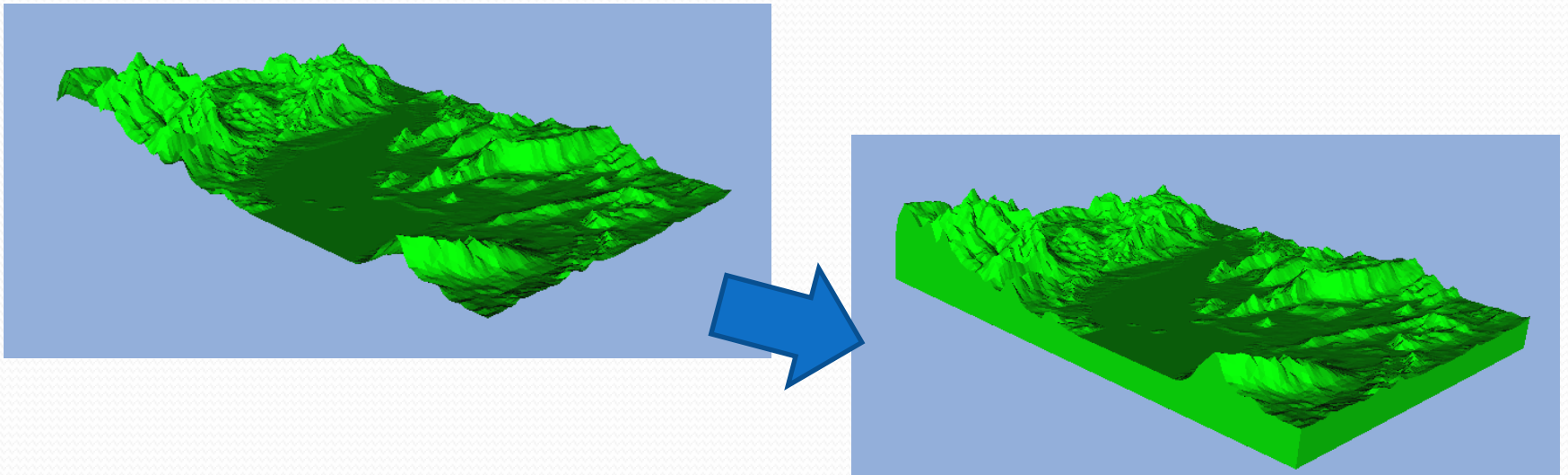
AccuTrans 3D can be downloaded from
http://www.micromouse.ca/
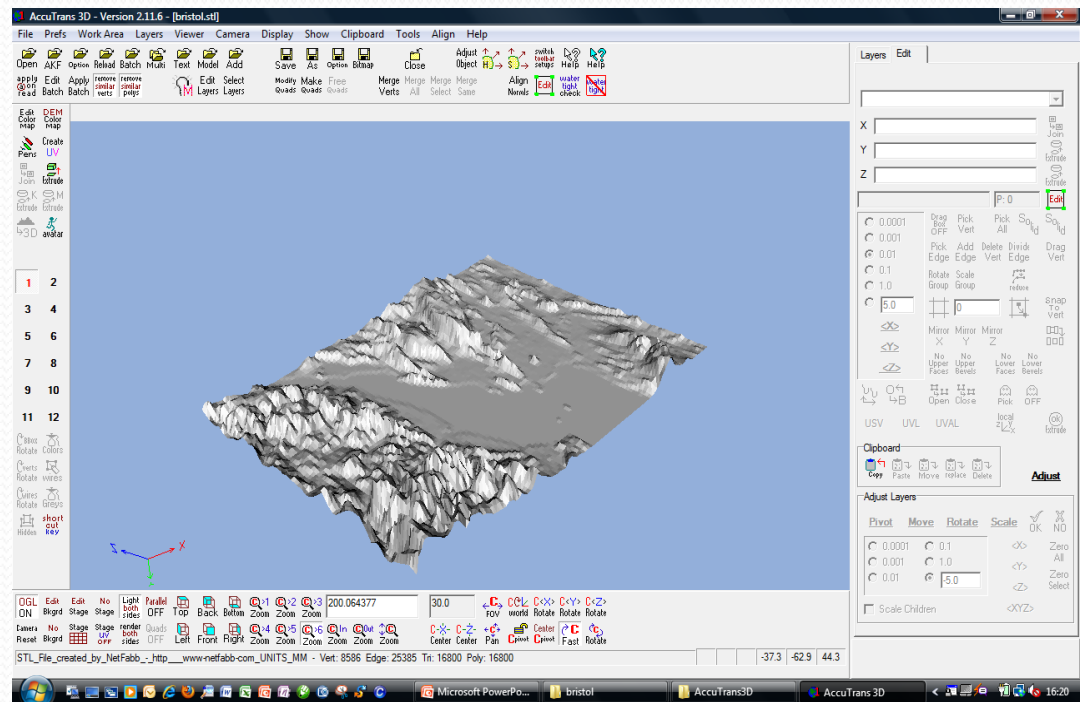
AccuTrans3D looks very complicated at first but it is not too difficult to learn!

Convert and Extrude

- The DEM has to be converted to a triangle mesh called an .stl (Stereo Lithography) file and as it is just a surface it has to be "extruded" to make a solid with a flat bottom.

Scale and origin

- The file needs to be scaled to an appropriate size for printing on the RapMan.
- The size depends on the material being used. If you are using ABS then 50mm – 80mm are considered to be the maximum as this material has a tendency to warp.
- You should check that the stl file will print in the centre of the machine.
- A useful program for doing both of these is called NetFabb Studio. This free software can be downloaded at http://www.netfabb.com/

Convert to g-code and print.

- From here on the process is the same as for any other 3D printing with RapMan. The .stl file is converted to g-code using the Skeinforge program. The file is copied to a SD card and inserted into the machine.
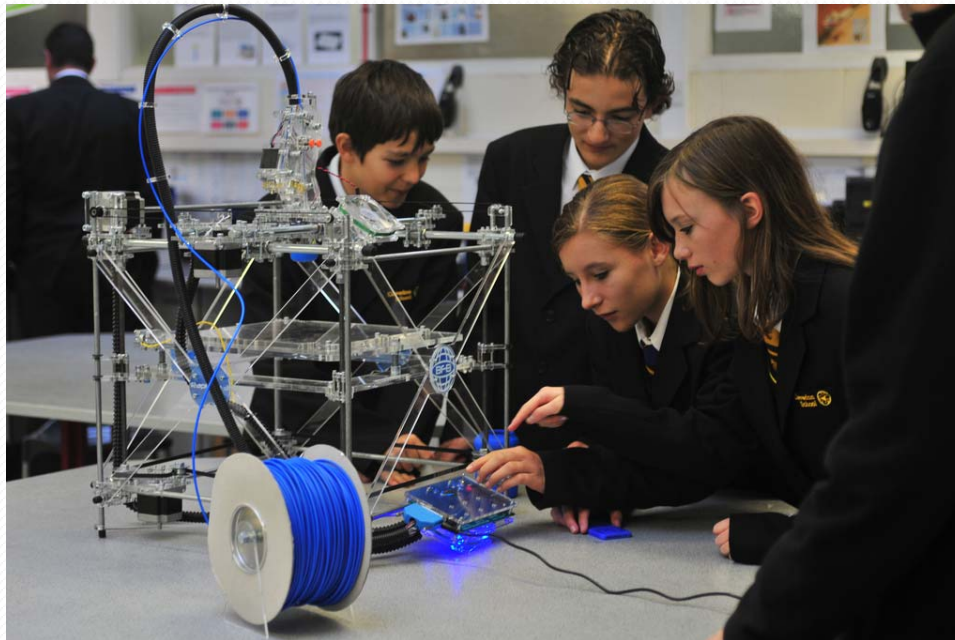
Examples

- This example is part of the Bristol Channel, UK. On this coast is the town of Clevedon… Home of RapMan!

Examples

- This example shows part of the Snowdonia National Park, Wales, UK. A mountainous region. It has been printed to a very different scale with very exaggerated heights.

Note, I forgot to extrude this file below sea level! Therefore the "raft" represents the surface of the sea... oops!

RapMan

- RapMan is a low cost 3D printer available from Bits from Bytes www.bitsfrombytes.com

- Further assistance can be found on the BfB forum and wiki.

Forum
http://www.bitsfrombytes.com/fora/user/index.php

Wiki http://www.bitsfrombytes.com/wiki