

5 June
2013

Smart Cities

Session 4: Lecture 2:

The Virtual City: GIS, 3D and Virtual Reality Representations

Michael Batty

m.batty@ucl.ac.uk

 @jmmichaelbatty

<http://www.spatialcomplexcity.info/>

<http://www.casa.ucl.ac.uk/>

This is a visualisation of a 'tooth' using ImageCutter and displayed using the Google Maps as a Picture Viewer



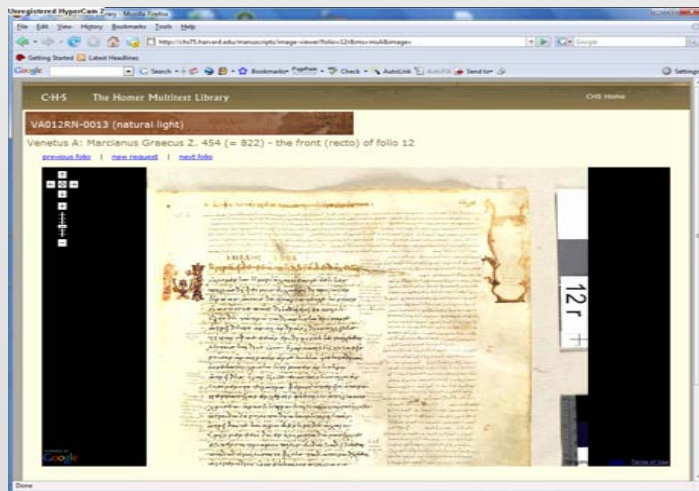
Tooth courtesy of
Johan Lundin
Biomedical Informatics Research Group
Department of Oncology
University of Helsinki
<http://www.webmicroscope.net/>



WebMicroscope
home atlases supplements slide seminars applications services/products contact WM network
help connection test
Slide seminars
start page / index
ECP 2007
Cytology 2008
huslab
Weekly slide meetings
Division of Pathology, HUSLAB,
University Central Hospital,
Helsinki, Finland

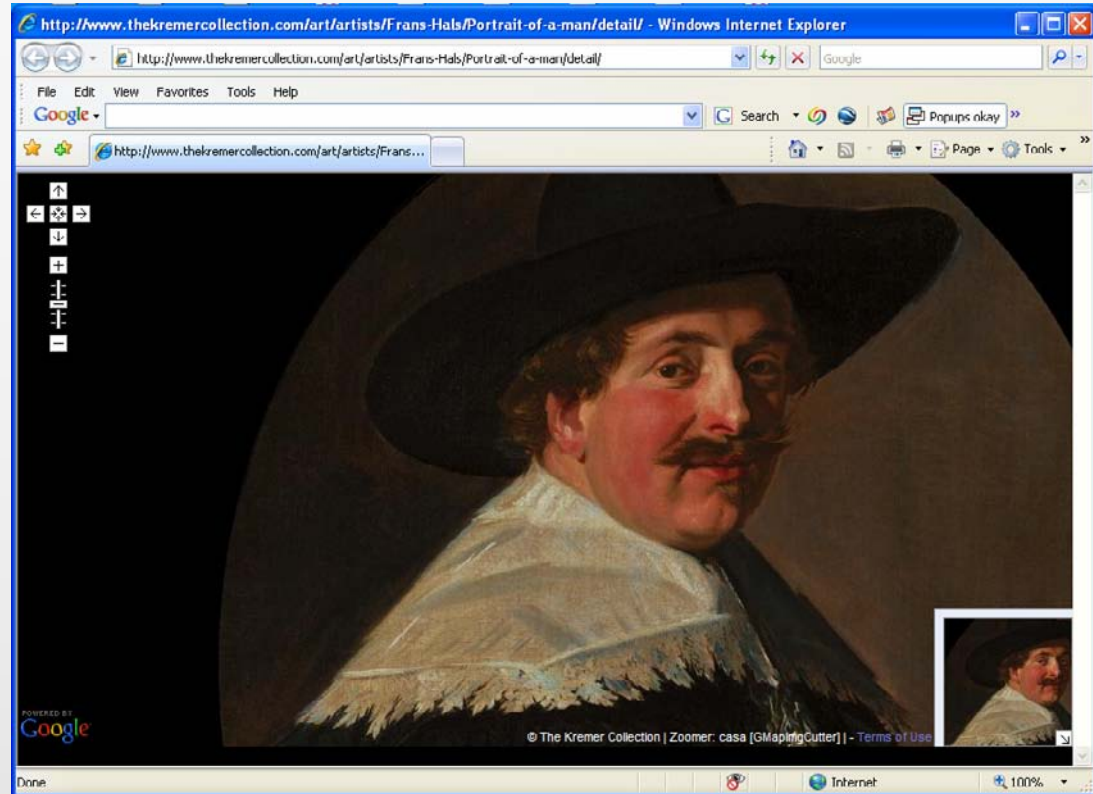
The Kremer Collection

<http://www.thekremercollection.com/>



CHS The Homer Multitext Library
VA012RN-0013 (natural light)
Venetus A: Marciianus Graecus Z. 454 (= 822) - the front (recto) of folio 12
CHS Home

<http://chs75.harvard.edu/manuscripts/>



http://www.thekremercollection.com/art/artists/Frans-Hals/Portrait-of-a-man/detail/ - Windows Internet Explorer
http://www.thekremercollection.com/art/artists/Frans-Hals/Portrait-of-a-man/detail/
File Edit View Favorites Tools Help
Google Search
http://www.thekremercollection.com/art/artists/Frans...
Zoomed portrait of a man in a hat, likely Frans Hals. The image is displayed in a web browser window with a zoomed-in view of the portrait. The browser title is "http://www.thekremercollection.com/art/artists/Frans-Hals/Portrait-of-a-man/detail/". The browser address bar shows the URL. The browser menu includes File, Edit, View, Favorites, Tools, and Help. The browser status bar shows "Done" and "Internet".

One of my key points in this talk is that software being developed for a particular spatial application often easily generalises to a quite different one But let me first outline my talk before elaborating

Outline

Pushing pictures – displaying and communicating data, spatial data – it's all about Web 2.0! Maptube again

GMapCreator and ***ImageCutter***

MapTube: a kind of ***YouTube*** + ***Napster***

Pulling pictures – pulling spatial data – crowdsourcing

2D to 3D: GIS to CAD and back and on the web

From geometry to geography and back – populating really large spatial data bases

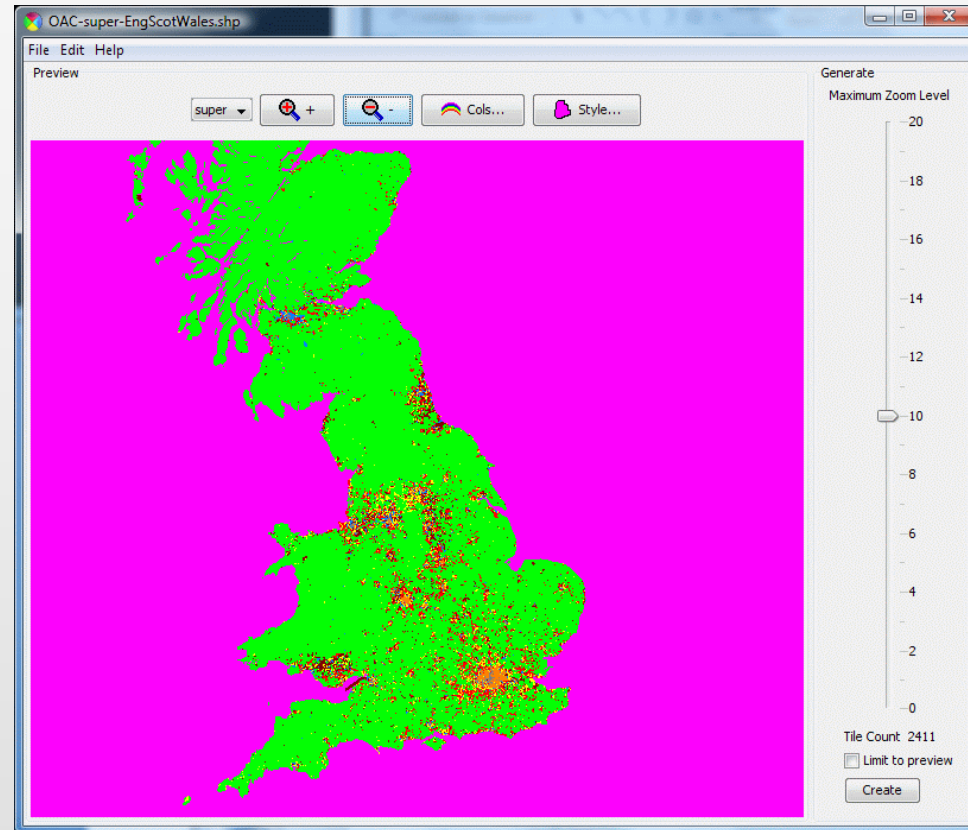
The future – disseminating spatial data in multimedia – games and virtual worlds

GMapCreator and *ImageCutter*

The *Google Map Creator* creates *Google Maps* websites from thematic data contained in shapefiles.

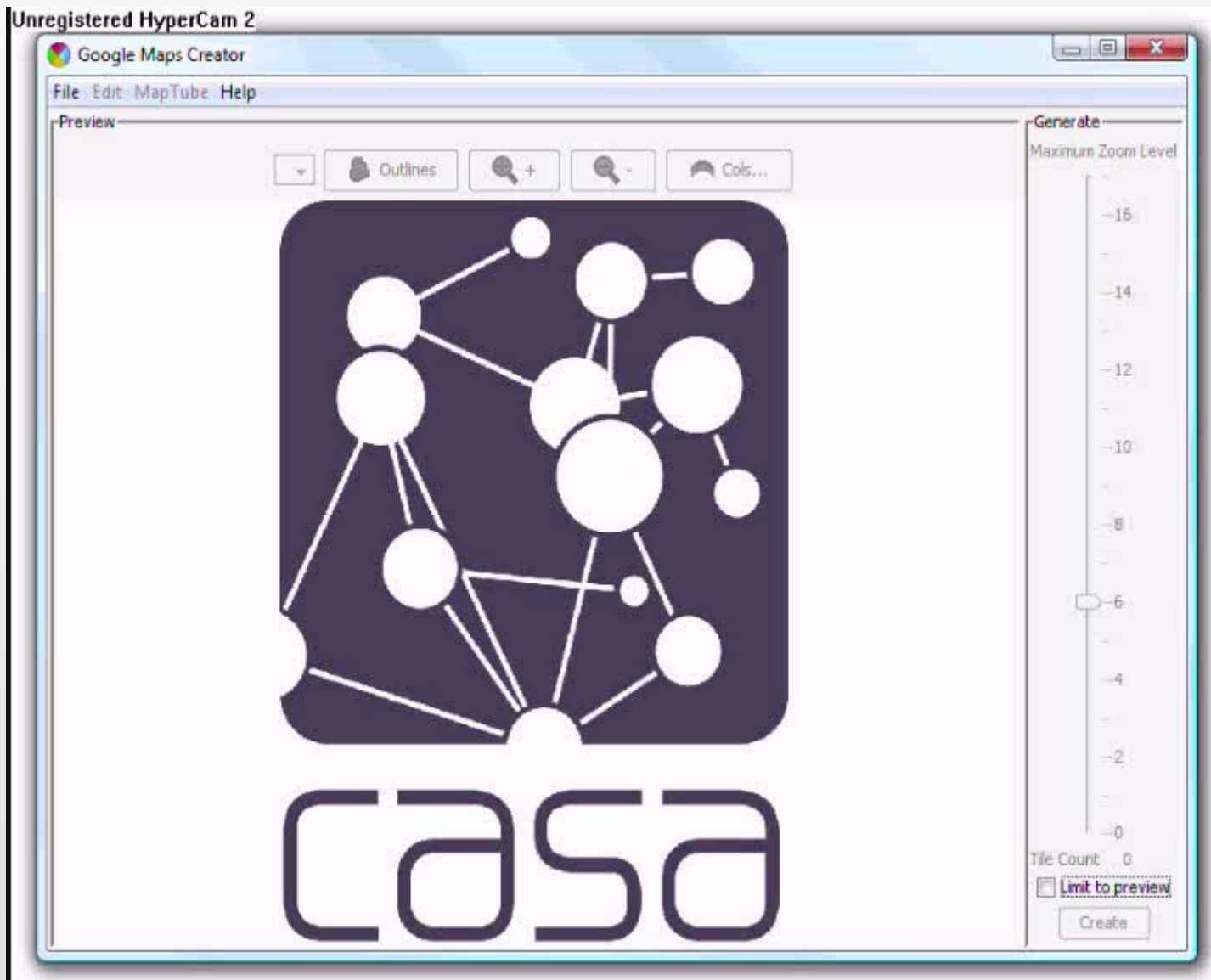
It effectively layers your map on top of a *Google Map* or the *Google Map*

Don't be misled – a map is not a picture – it is a bunch of vector geometries and a set of attributes – and a



shape file is a proprietary but widely used format by ESRI – the makers of **ArcGIS** – that map files can be converted to prior to use in *GMapCreator*

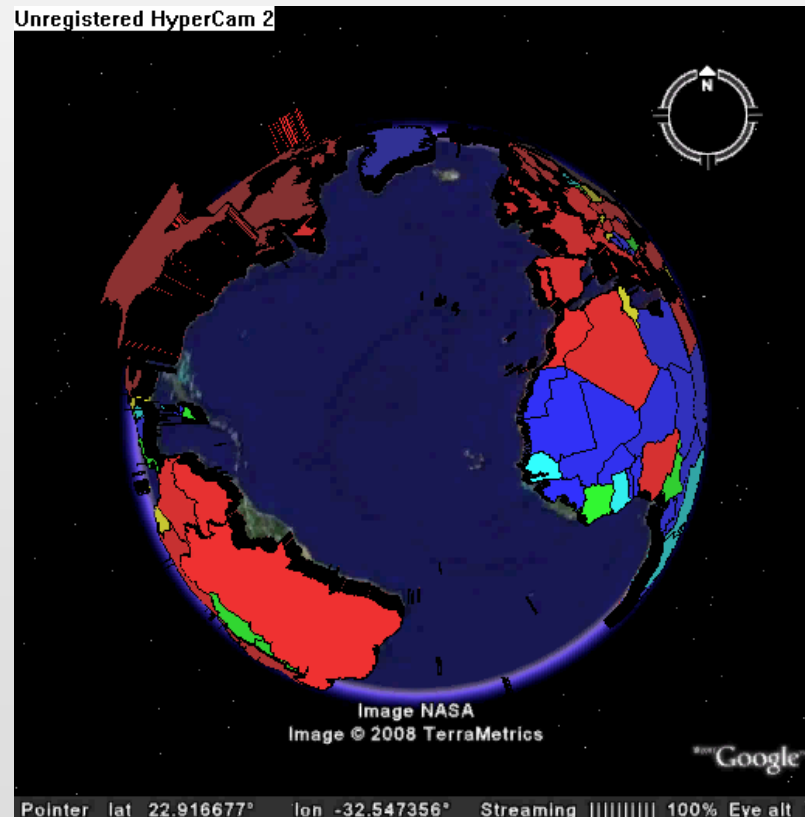
Let us see how it works



We can do the same sort of thing in 3D of course with ***GEarthCreator*** – the key is to convert the shapefiles to KML files – and there are many other maphacks using similar open map bases like ***Open Street Map***



From all of this we have devised an open resource for maps called ***MapTube***



Search CASA's site



casa

- [+] ABOUT
- [+] EVENTS
- [+] PEOPLE
- [+] BLOGS
- [+] WEBSITES
- [+] PUBLICATIONS
- [+] RESEARCH
- [+] MOVIES
- [-] SOFTWARE

- DUEM CA Model
- GMap Creator
- Image Cutter
- Isovist Analyst
- Photo Overlay
- Rank Clocks
- Space Syntax
- Von Thunen

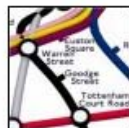
CASA News



AGI EDUCATION
Professor Stewart
University of Ir
(and things) /



ELECTED TO T
Mike Batty was
and design usin



COMINGS, GO
Andrew Crooks
Computational
University on 2
has his tube me



CASA REBUILD
We have four n
SCALE a TO
details.

Search CASA's site



casa

- [+] ABOUT
- [+] EVENTS
- [+] PEOPLE
- [+] BLOGS
- [+] WEBSITES
- [+] PUBLICATIONS
- [+] RESEARCH
- [+] MOVIES
- [-] SOFTWARE

- DUEM CA Model
- GMap Creator
- Image Cutter
- Isovist Analyst
- Photo Overlay
- Rank Clocks
- Space Syntax
- Von Thunen

The GMapCreator

The GMapCreator is a freeware application designed to make thematic mapping using Google Maps. It takes a shapefile containing geographic areas linked with attributes and automatically generates a map. It does this by pre-creating all the necessary files and saving them into a directory. It's a matter of copying files onto a web server, allowing Google Maps to be used with the map.



Download version 1.31 now (released 27 May 2008)

The following is an example produced using the application:



MapTube: a kind of *YouTube* + *Napster*

Let me explain: every time someone downloads our software, there is a high probability they make a map.

As it sits on a common base – a **Google Map** – if they create the map of some place and someone else creates another map of the same place, it would be nice if we or they could compare them as layers

However, in the UK map bases are copyrighted – you can't do for copying OS map data and it is serious –

So we ask the user not to put their map created from our software on our site, but to give us their URL where their map is and thus **MapTube** is a bunch of pointers to URLs - this is what it looks like with demo













Unregistered HyperCam 2
 MapTube - A Place to Put Maps - Internet Explorer provided by Dell
 http://www.maptube.org/

File Edit View Favorites Tools Help
 MapTube - A Place to Put Maps

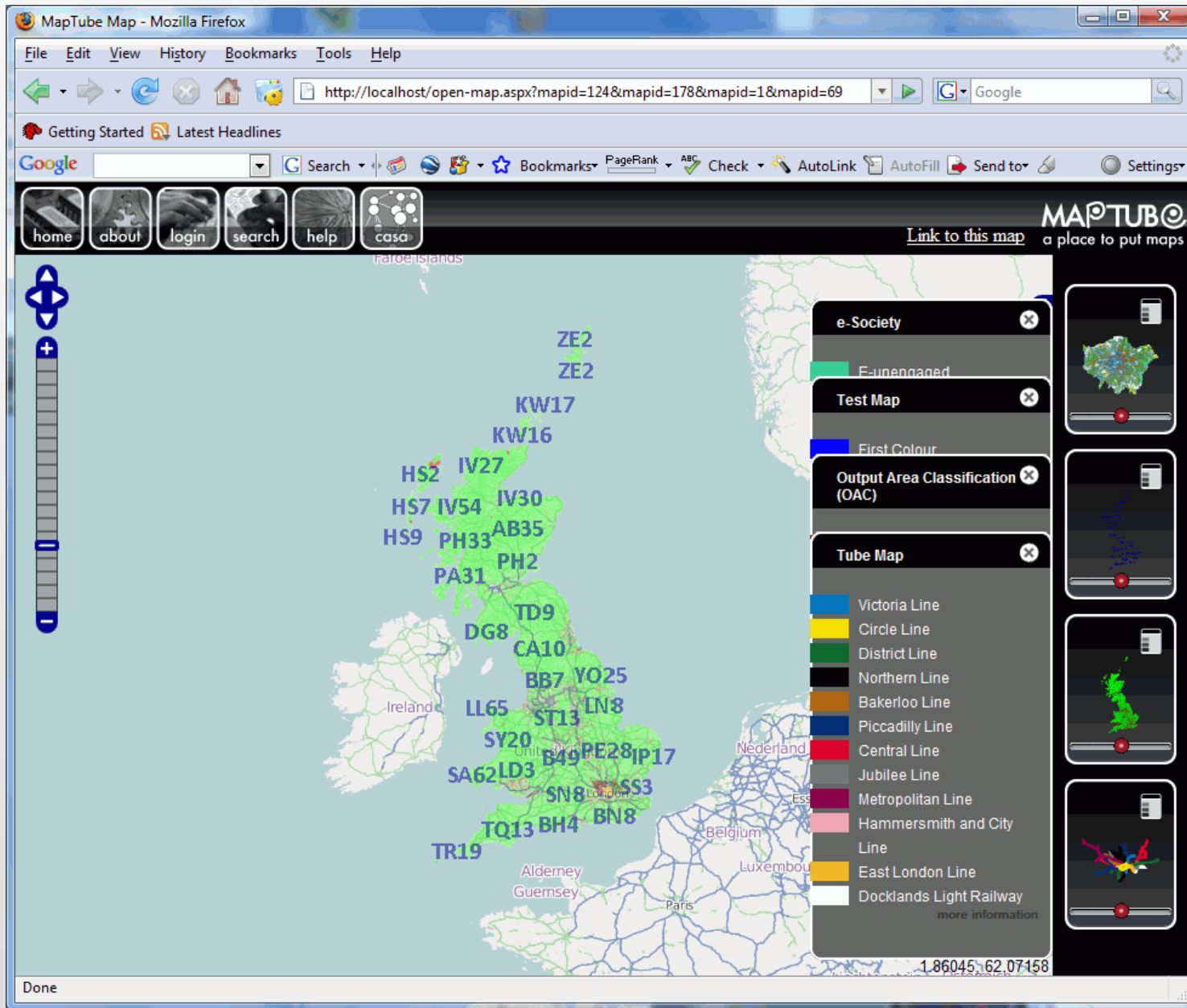
home about login search help case

MAPTUBE
 a place to put maps

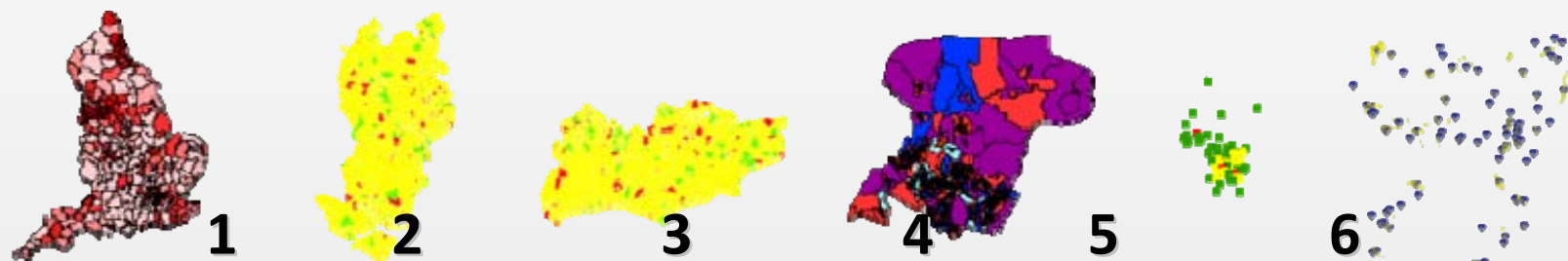
Popular Maps
 Showing records 1 to 12 of 45

 Dan Vickers' Output Area Classification (OAC) Output Area Classification for England, Scotland and Wales. more information Viewed 281 times	 Mouse Prices House Price Data more information Viewed 215 times	 Post Office Locations The locations of post offices in England, Scotland and Wales. The data was obtained from the post office web site in October 2007. more information Viewed 87 times
 London Tube Map A map of the London Underground with geographically correct station positions taken from wikimedia. more information Viewed 83 times	 Remoteness Index Canada Remoteness index for Canada more information Viewed 42 times	 English Population The percentage of the population in London who are English in origin. more information Viewed 41 times
 IMD Total IMD Total more information Viewed 37 times	 London Output Area Classification London Output Area Classification more information Viewed 26 times	 eSociety Postcode Points Coloured points corresponding to the eSociety classification. more information Viewed 25 times
 TFL Travelcard Zones Rough approximation of the tube travel zones in London more information Viewed 25 times	 e-Society The e-Society gendemographic classification is based on levels of awareness of information and communications technologies, usage patterns, and attitudes in their effects	 Output Area Classification Output Area Classification more information Viewed 17 times

Internet | Protected Mode: On 100%

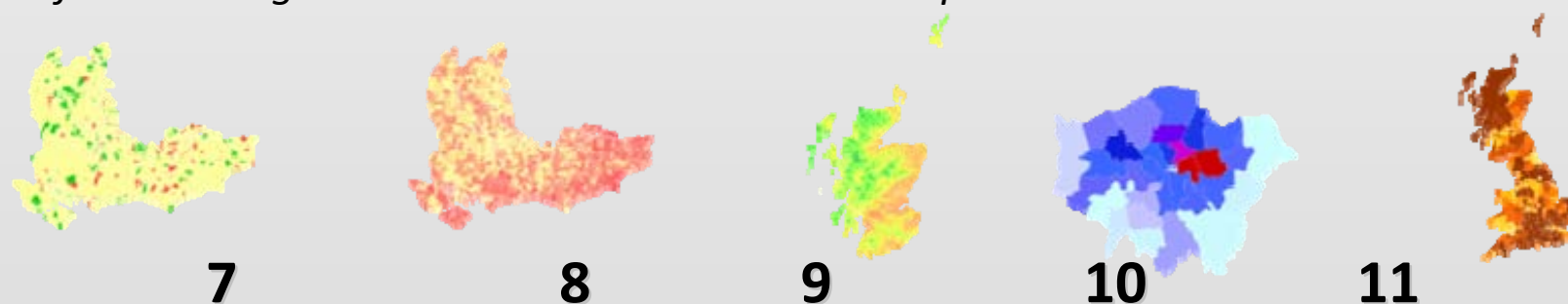


Here are some of the user map data in/on **MapTube**



1. Knife Crime Update, **2.** SC IMD Score, **3.** SEC IMD Score, **4.** PCT Obesity, **5.** NO₂ Bristol, **6.** AGFC Wildlife

The data behind the knife crimes map (1) has been in the news the last few days after it emerged that the Government had manipulated the data.



7. Southeast IMD, **8.** Southeast IMD (LSOA), **9.** Wild Land Quality Scotland, **10.** NSSeC L8 (never worked)%, **11.** CO₂ index

Pulling pictures – pulling spatial data – crowd-sourcing

We have turned all this around and basically used the system to record spatial responses to topical questions

We broadcast the questions through TV and radio and then ask users to respond and key in their post code – 7 digit in UK but actually only record postcode sector – first three or four digits

Then our server issues a request to scan the continually refreshed database and rebuilds the map on the fly so to speak, every half hour, using GMapCreator etc

We have so far looked at the credit crunch, antisocial behaviour and the Manchester road pricing proposal



MAPTUBE
a place to put maps



Radio 4: Mapping the Credit Crunch

Welcome to Radio 4 Listeners, below is the Credit Crunch question, simply select an option and then input the first part of your postcode - for example RG11

MapTube will then take your answer and every hour automatically create a map of the nation's mood.

What single factor is hurting you most about the credit crunch?

- Mortgage or Rent
- Petrol
- Food Prices
- Job Security
- Utility Bills
- Not Affected

Enter the first part of your postcode:

Submit

Centre for Advanced Spatial Analysis - University College London - 1-19 Torrington Place - London - WC1E 7HB - ☎ +44 (0)20 7679 1782 - Fax +44 (0)20 7813 2843 - Email casa@ucl.ac.uk Copyright © 1999-2008 UCL

<http://www.maptube.org/creditcrunch/>

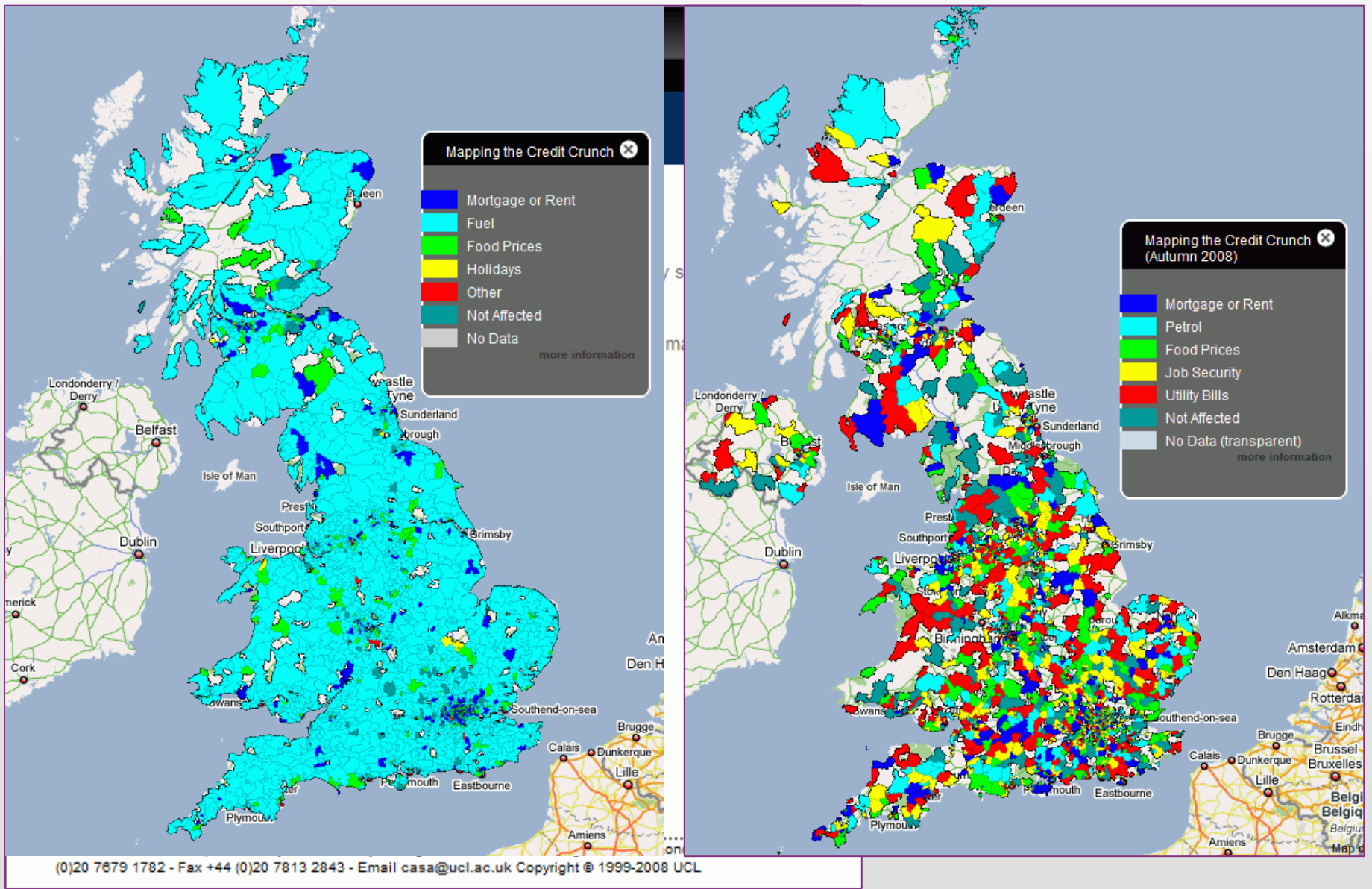
23,475 responses
April, May, June 2008

A new credit crunch survey started in October and currently has 3,802 responses.



Centre for Advanced Spatial Analysis





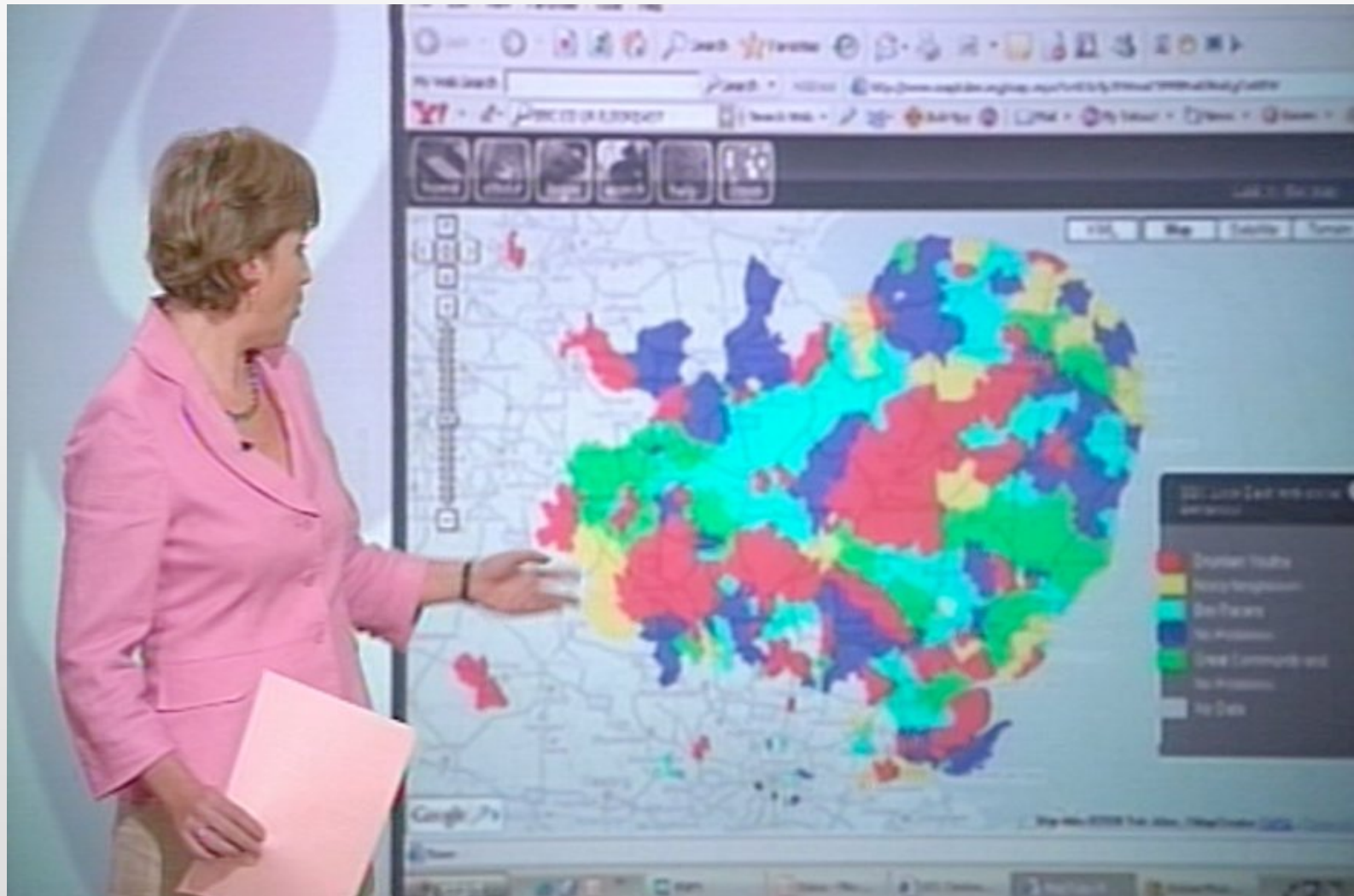
<http://www.maptube.org/creditcrunch/>



Centre for Advanced Spatial Analysis

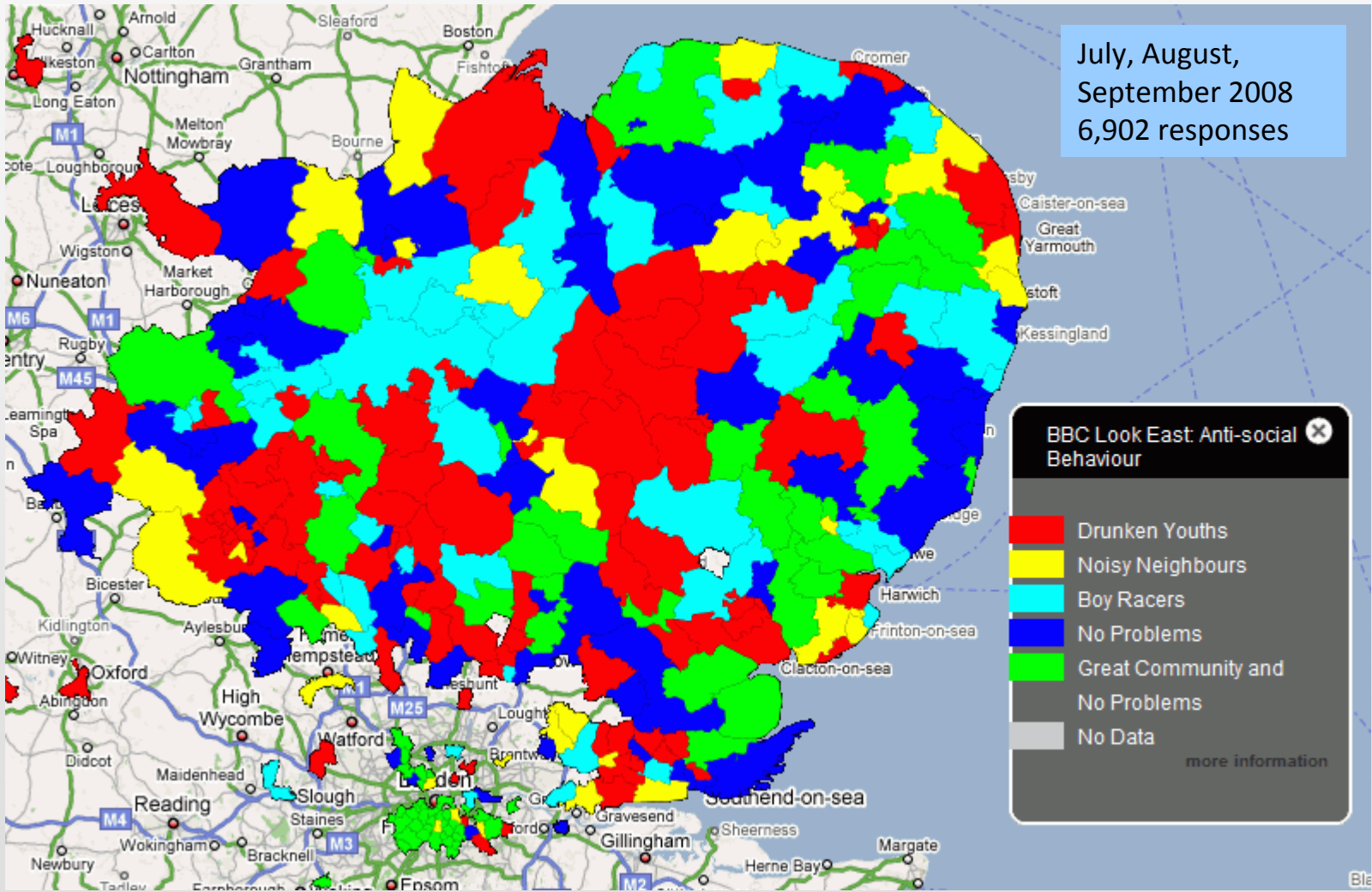


BBC Look East: Anti-Social Behaviour



<http://www.maptube.org/lookeast>

BBC Look East: Anti-Social Behaviour



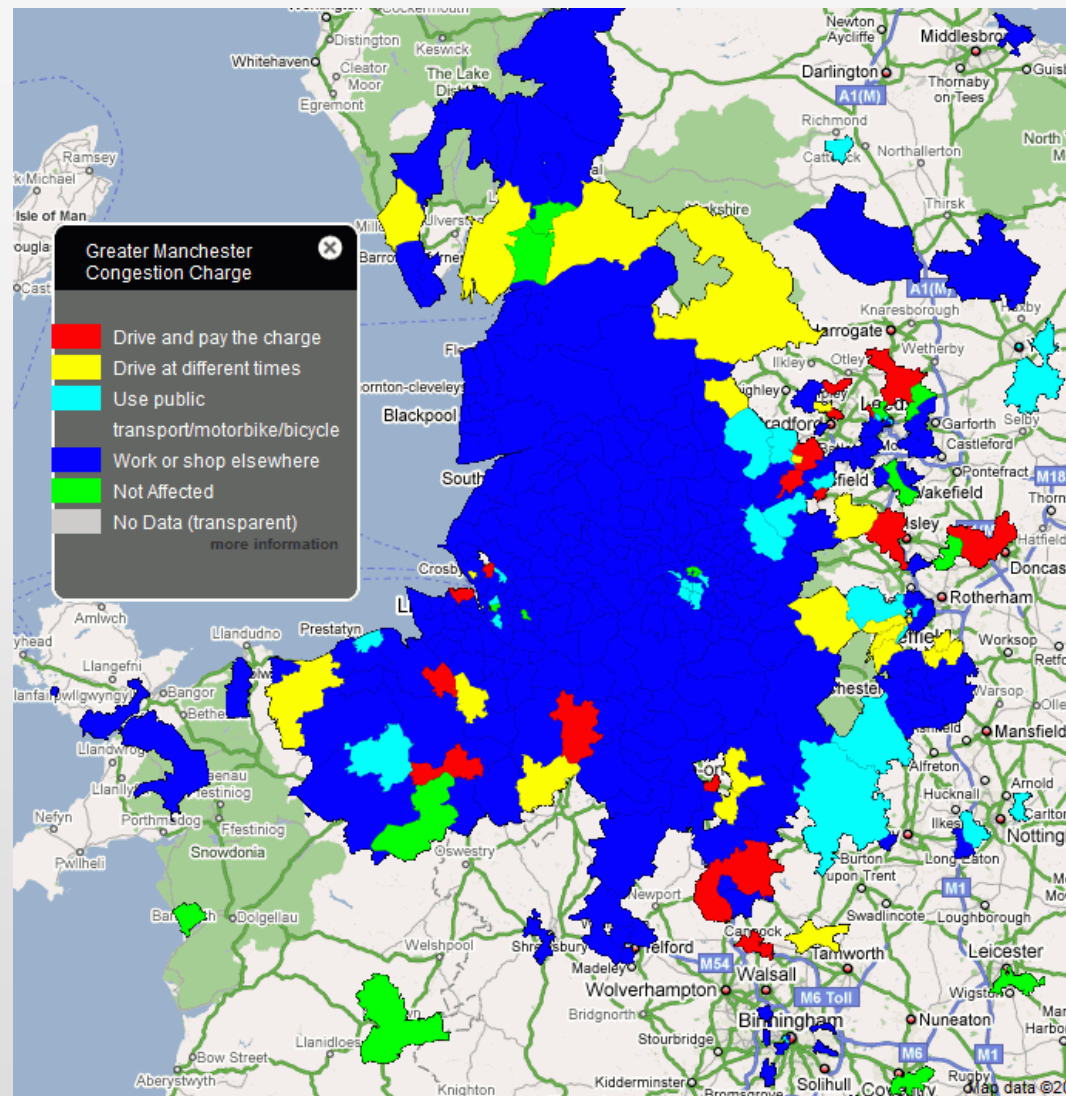
<http://www.maptube.org/lookeast>



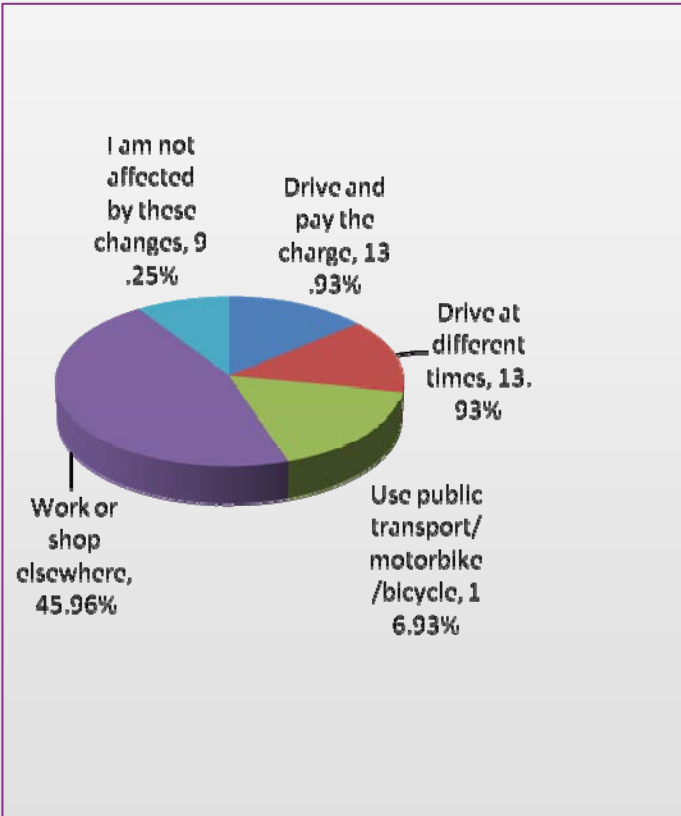
Centre for Advanced Spatial Analysis



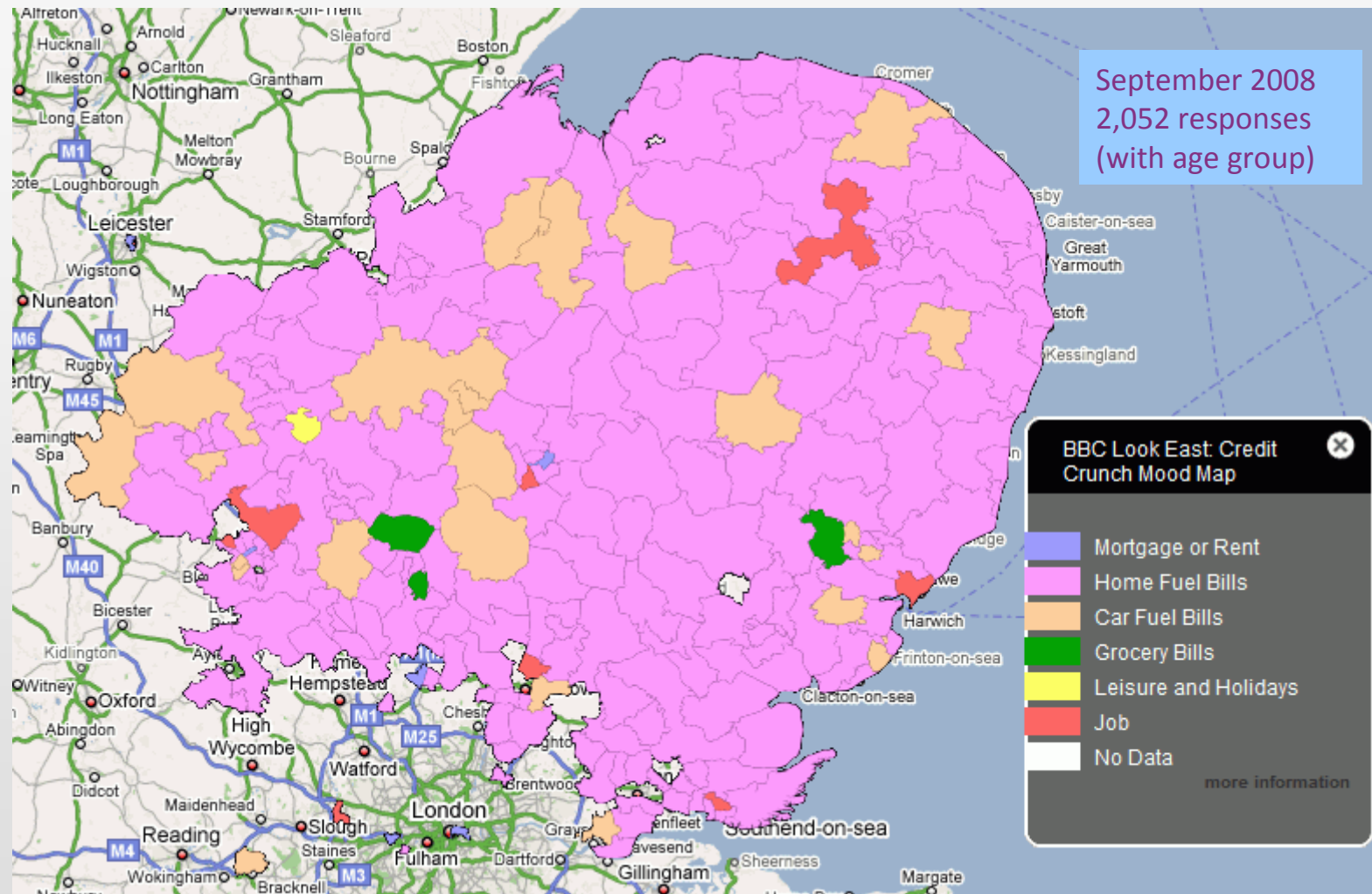
Manchester Congestion Charge



15,902 responses
October to December 2008

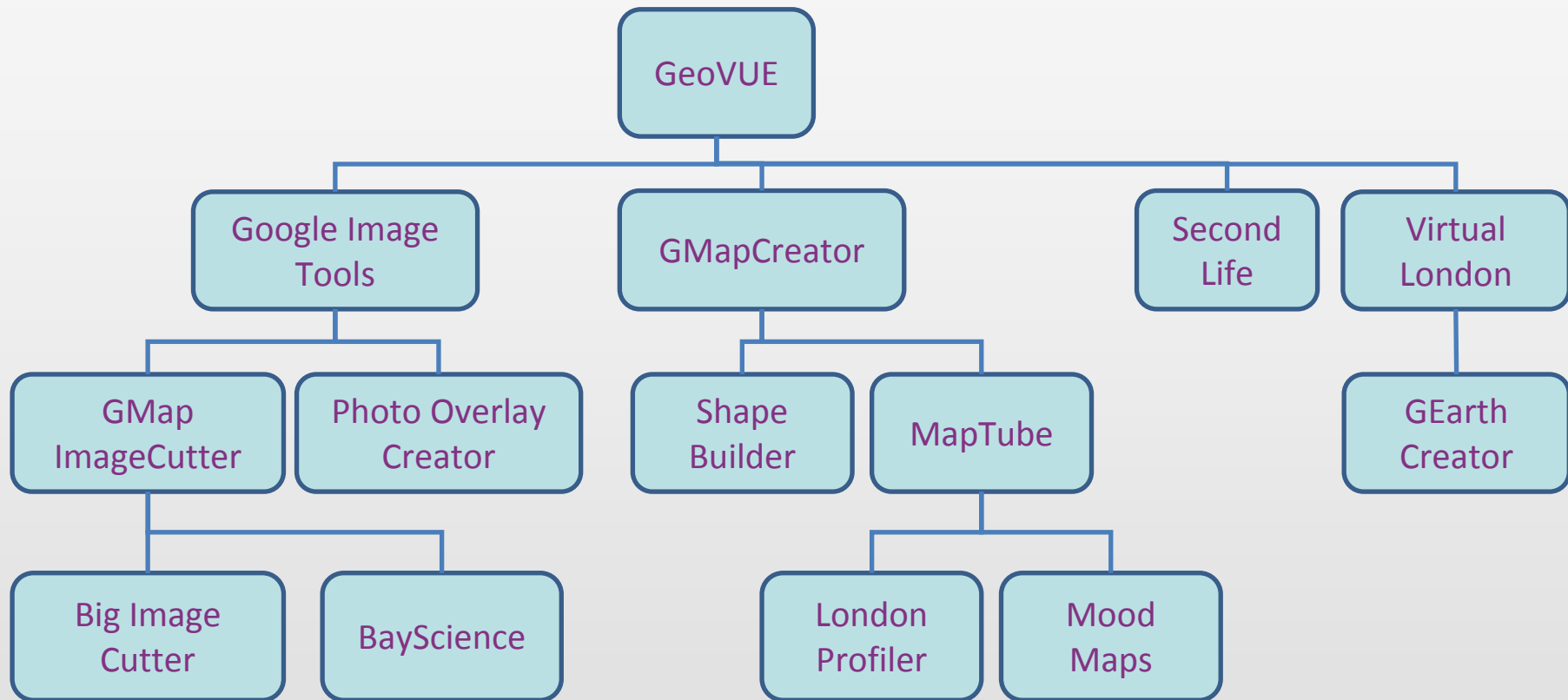


BBC Look East: Credit Crunch

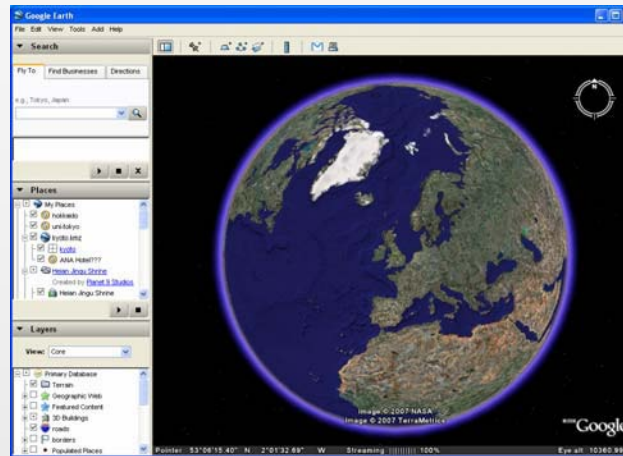


<http://www.maptube.org/LookEastCreditCrunch/>

GeoVUE Family Tree

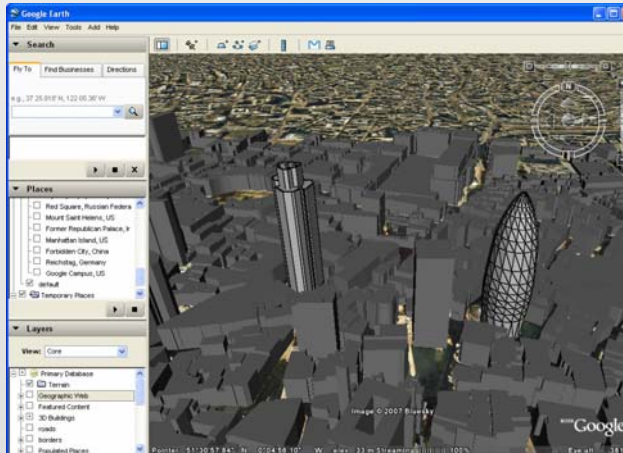
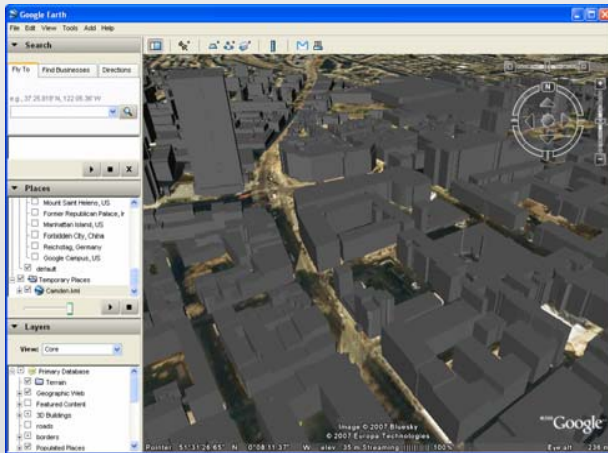


2D to 3D: GIS to CAD and back and on the web

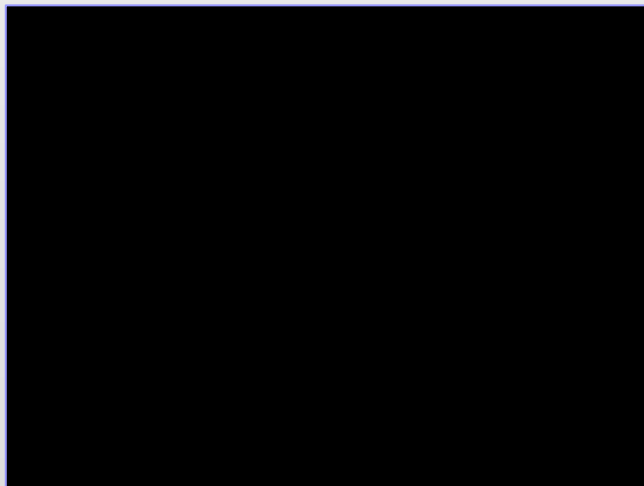
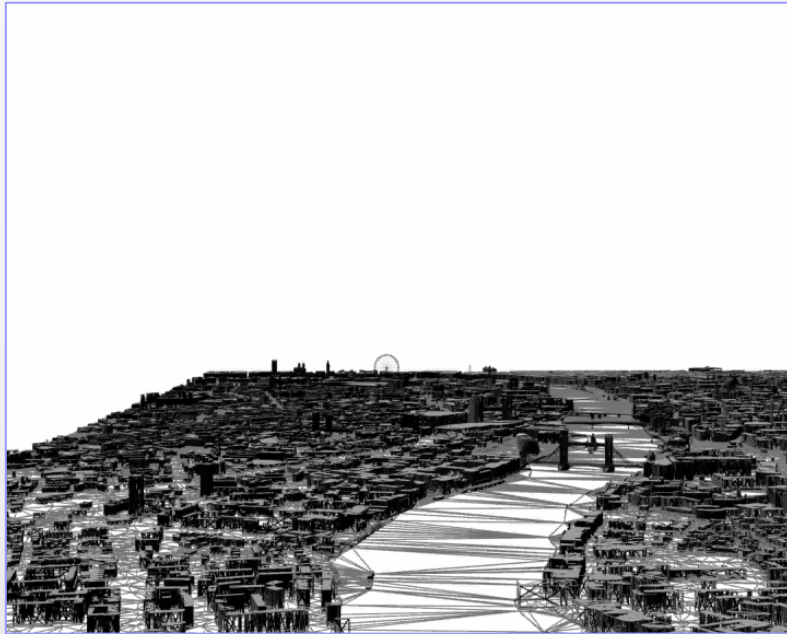


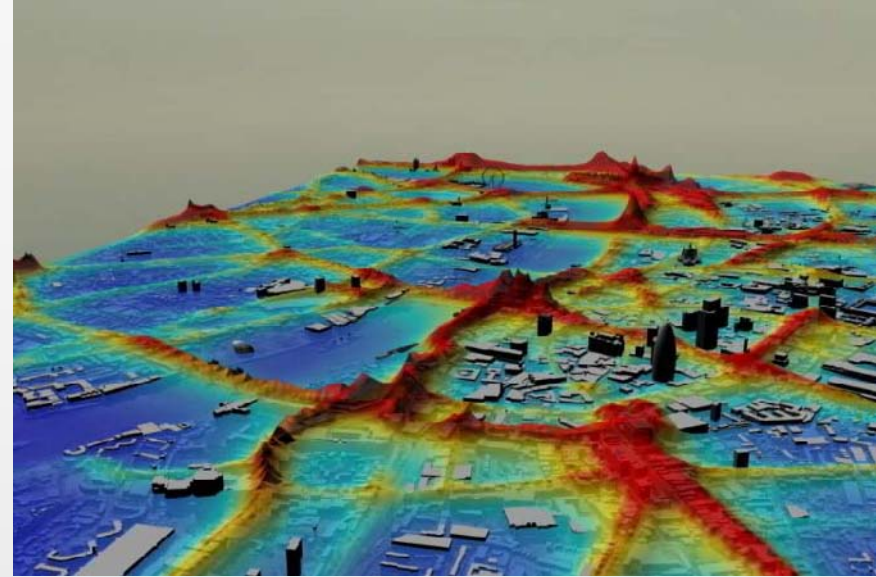
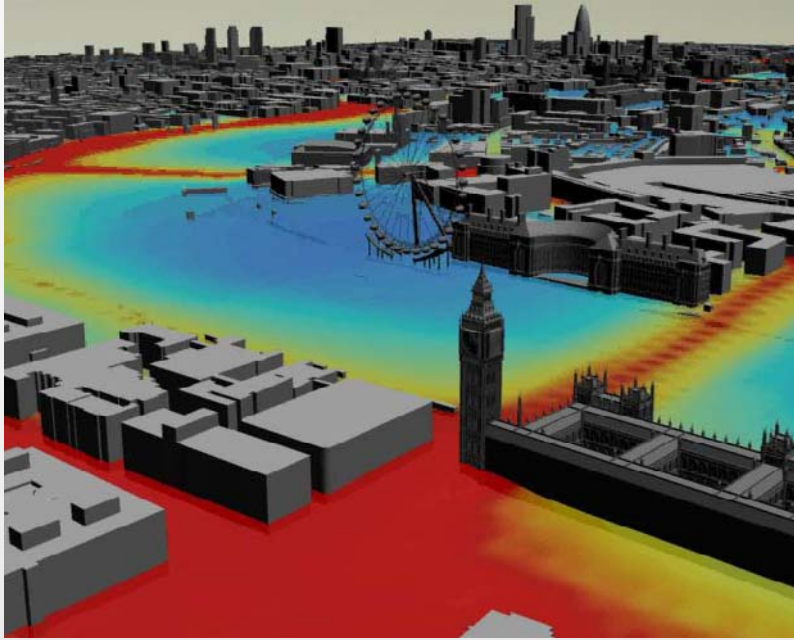
Maps in 3D are rather abstract and thus **GEarthCreator** is rather contrived –

True 3D exists at a finer scale and one of our workhorses to develop such data is our 3D block model of Greater London



This is built in ArcGIS, 3D Max etc. and is run in **Google Earth**



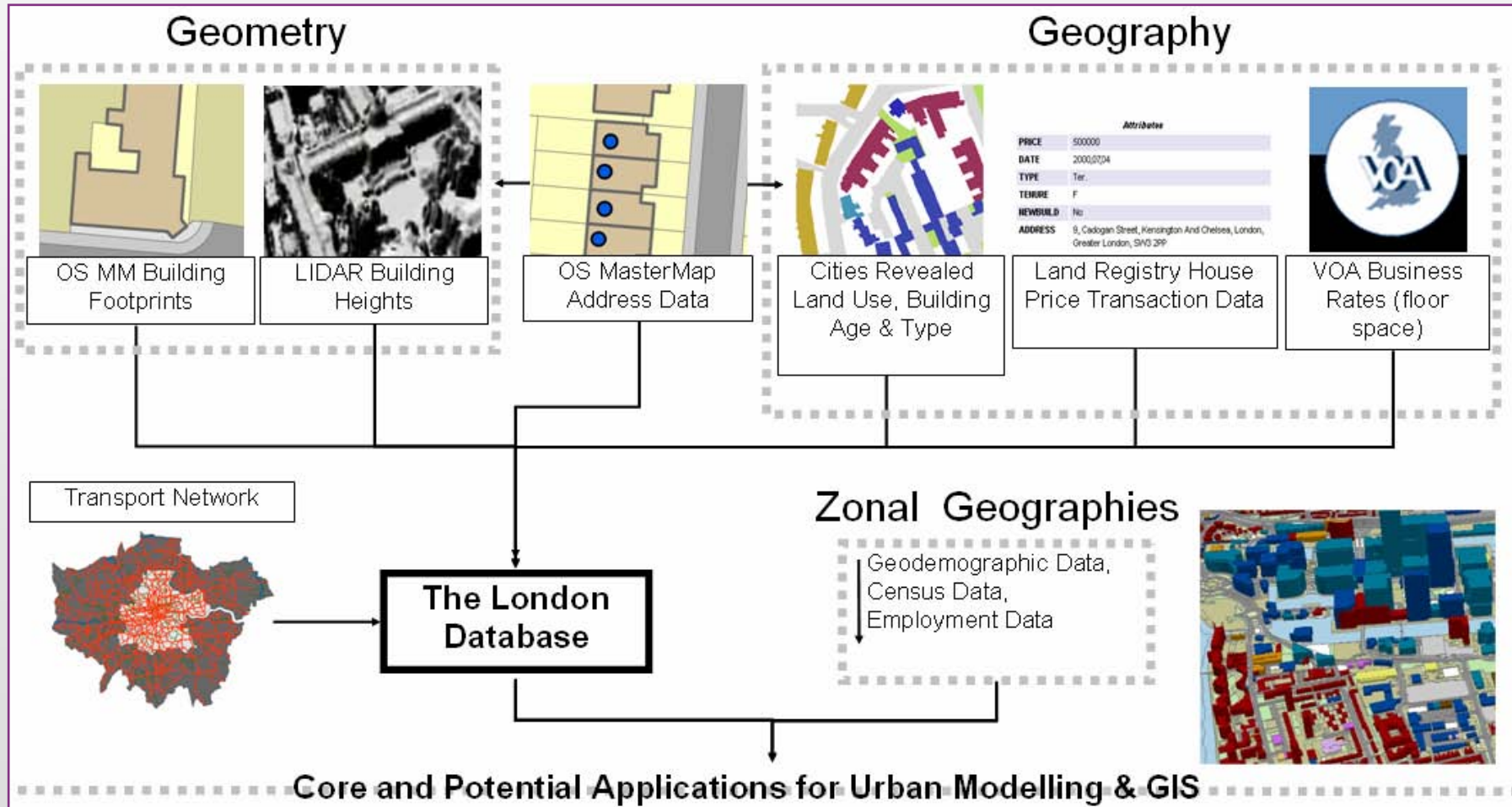


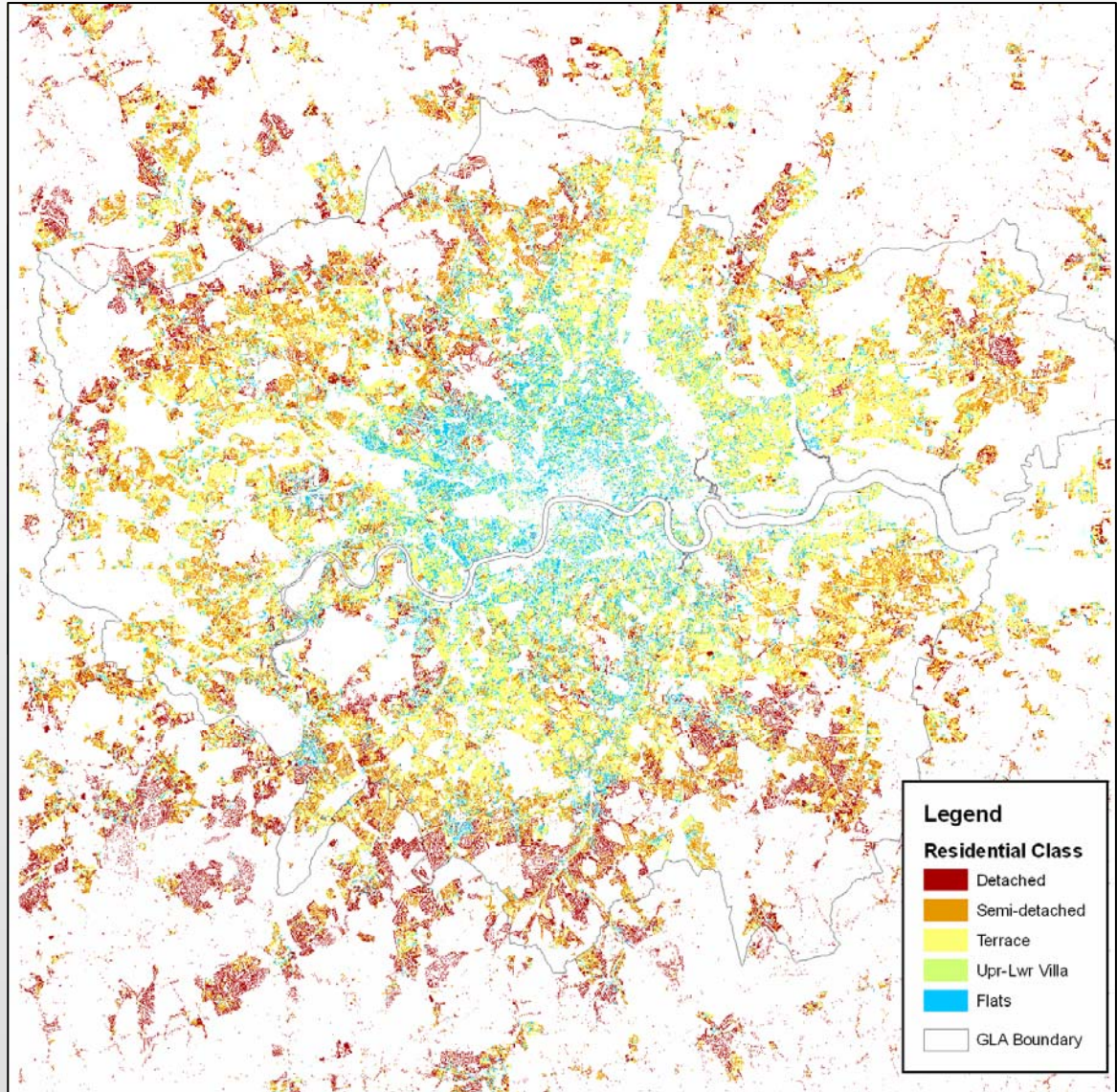
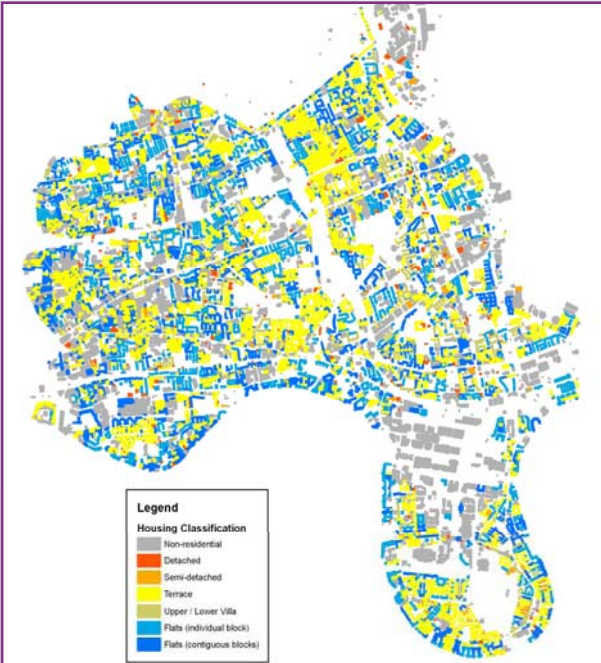
The key issue for us is to populate this data base of 3.6 million building blocks with socio-economic data

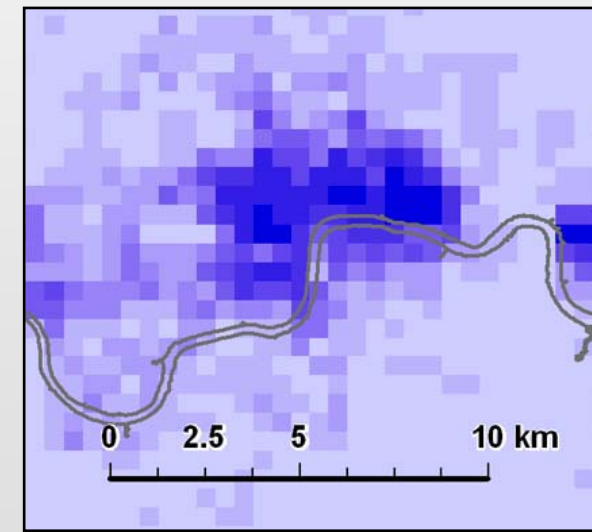
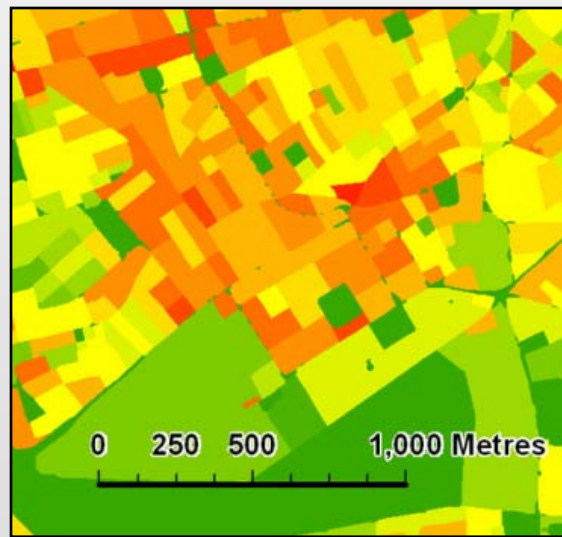
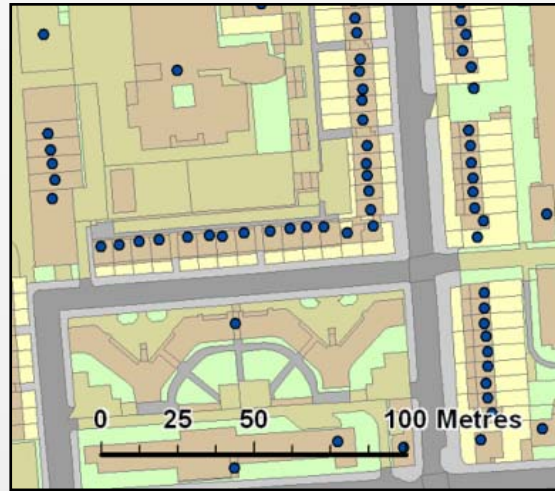
This is linking geometry to geography in a way that will explode the data base to levels much more reminiscent of large scale databases in the physical sciences than the rather modest social data bases based on aggregates of population

Linking these to individual address point data is another related issue too as well as tagging buildings to populations

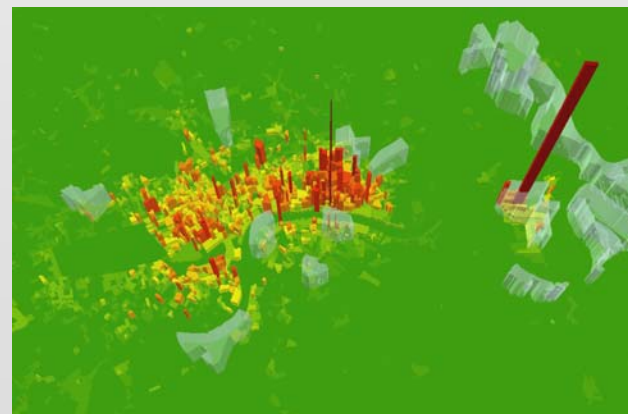
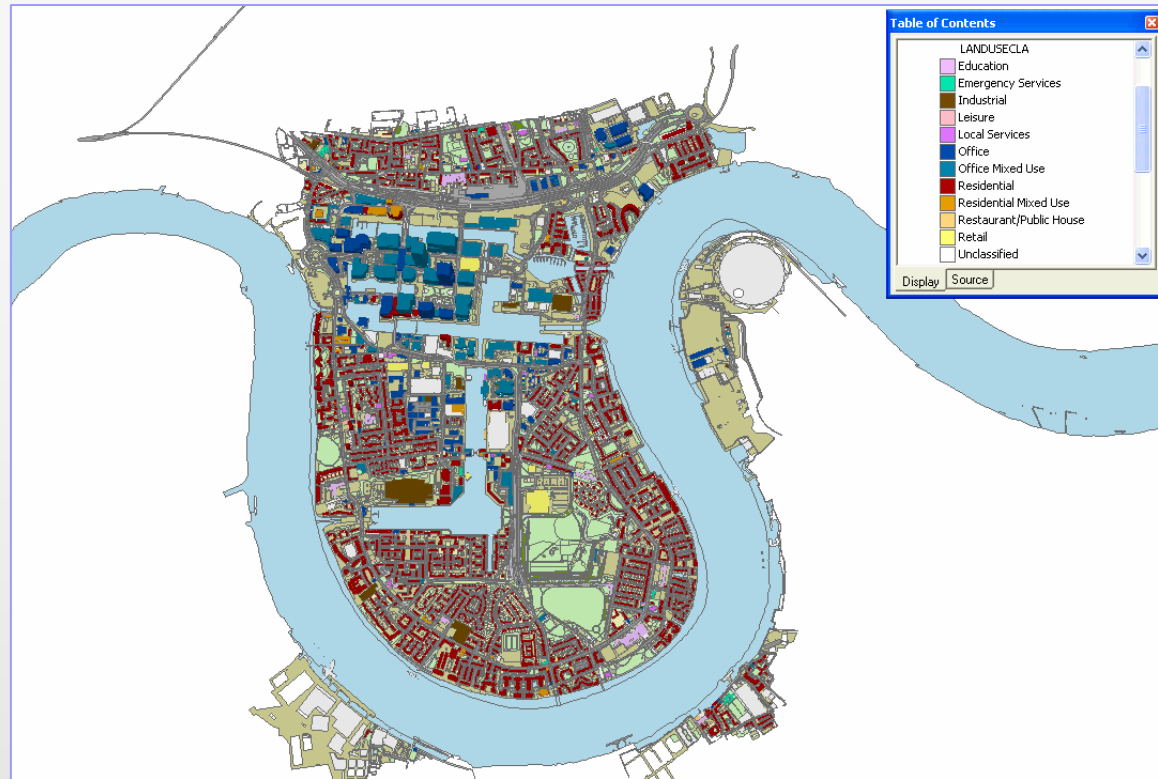
From geometry to geography and back – populating really large spatial data bases

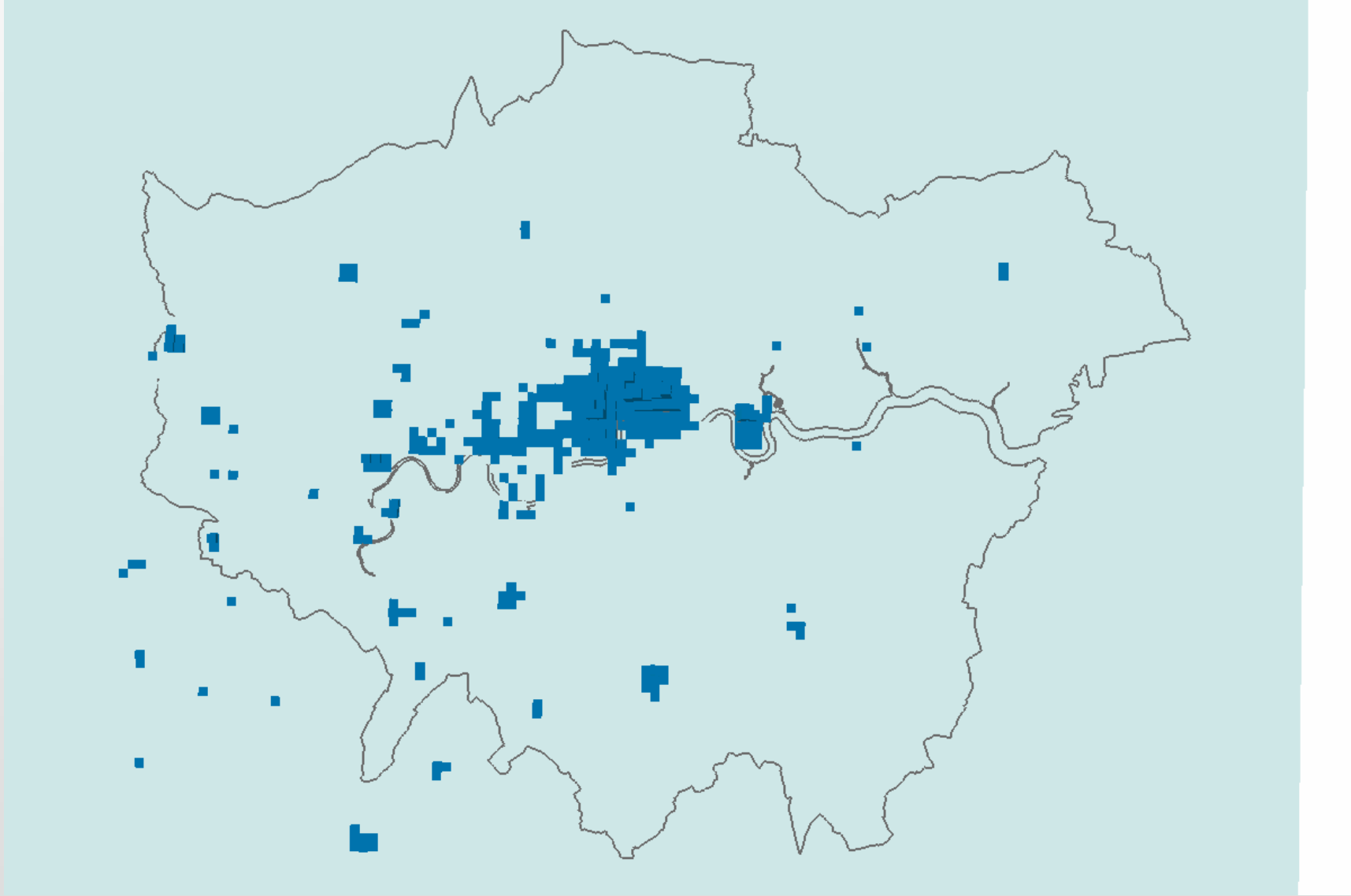






Adding Land Use, Transport and Populations and Aggregating Scales





The future – disseminating spatial data in multimedia – games and virtual worlds



LONDON



Use your arrow keys or mouse to move in the Virtual World.



To tilt your view, hold down the Ctrl key, and use the arrow keys or mouse.



Welcome to the Virtual London 'multi-user' gallery. If its your first visit the software will automatically install on your machine. Its simple to use and provides and insight into the development of Virtual London at the Greater London Authority.

Virtual London was developed at the Centre for Advanced Spatial Analysis, University College London. Please contact asmith@geog.ucl.ac.uk for help or further information.

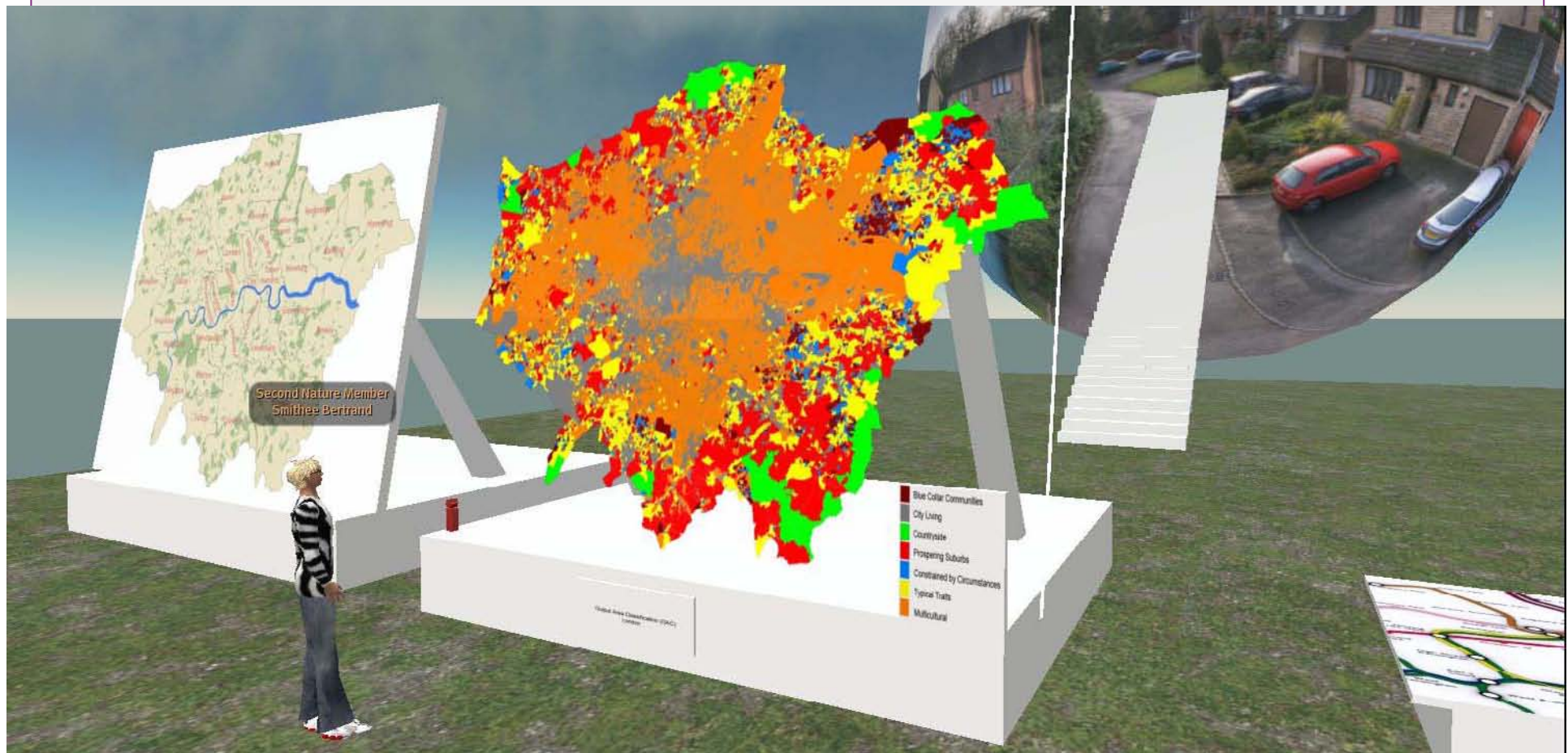
We can show a movie of this





Real and Virtual Design Studios


Our recent forays are into ***Second Life*** where maps from our geodemographics project are being ported as 'geographic media' into these virtual worlds



OPalMidHDforMike

File Edit View Window Help

OPAL in Action:
Preliminary Proposal to ESRC




Three Work Streams:


Virtual OPAL

Scientists, Citizens and
Environmental Knowledge
Generation

Perception and Display Issues in the
use of Landscape Visualisation for
Environmental Communication



00:01:08



Thanks, Any Questions?

Look at our web site

<http://www.casa.ucl.ac.uk/>

Our Blogs

<http://blogs.casa.ucl.ac.uk/>

And for 3D content

<http://www.digitalurban.org/>