GEOGRAPHY & RESOURCE MANAGEMENT 地理與資源管理學系

香港中文大學 The Chinese University of Hong Kong

casa

UCL University College London

Session 4

New Media and the Smart City:
Networks Again, Virtual Cities, & Crowdsourcing

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http://www.spatialcomplexity.info/

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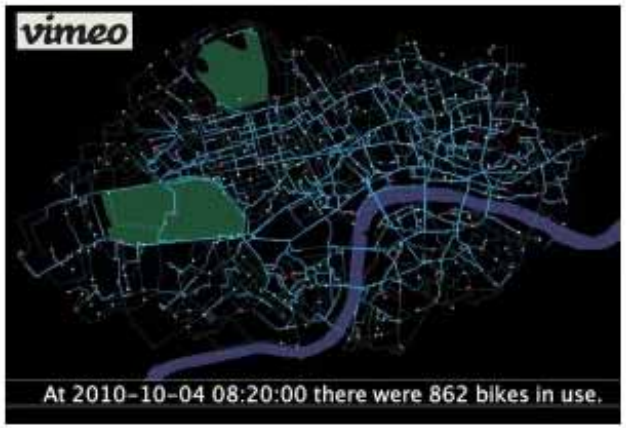
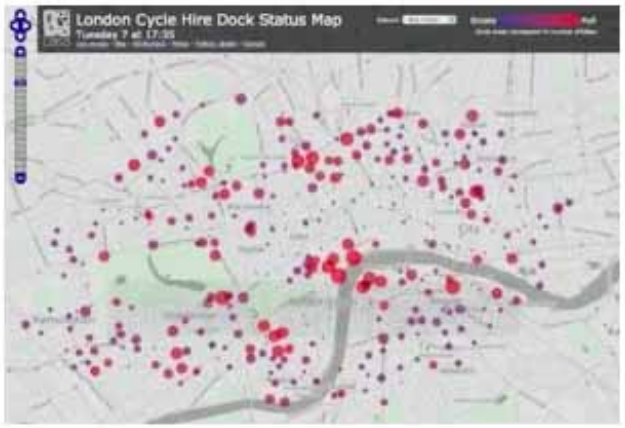
@jmichaelbatty

Outline

- A Little Bit More on Networks and on Flows – Public Transport, Bikes, and Tweets
- The Construction of Virtual Cities
- Alternative Virtual Media
- Traditional Media Informed by Computation: Analogies
- More on Dashboards, Portals and Gateways to the Digital World
- Crowdsourcing: The Power of the Web
- Things We Haven't Discussed: The Delivery of Services Using Web- Based Technologies: New Disruptive Technologies such as Uber, Autonomous Vehicles



Animations of Public Bike Movements



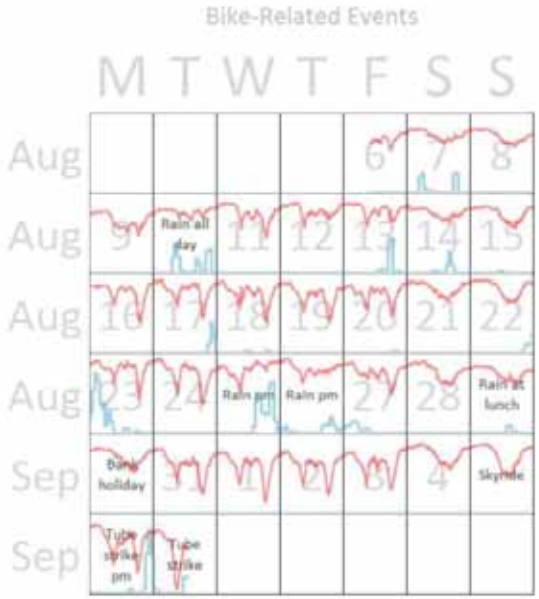
Animations of Changes in the Bike Nodes: Docking

Bike-o-Meter
casa.ucl.ac.uk/bom

- Tweet-o-Meter for bikes
  - Steven Gray (@frogo)
  - Using Google Gauges
- See the real life Tweet-o-Meters at the new British Library "Growing Knowledge" exhibition
  - Should be easy to hack to show the Bike-o-Meters instead ☺

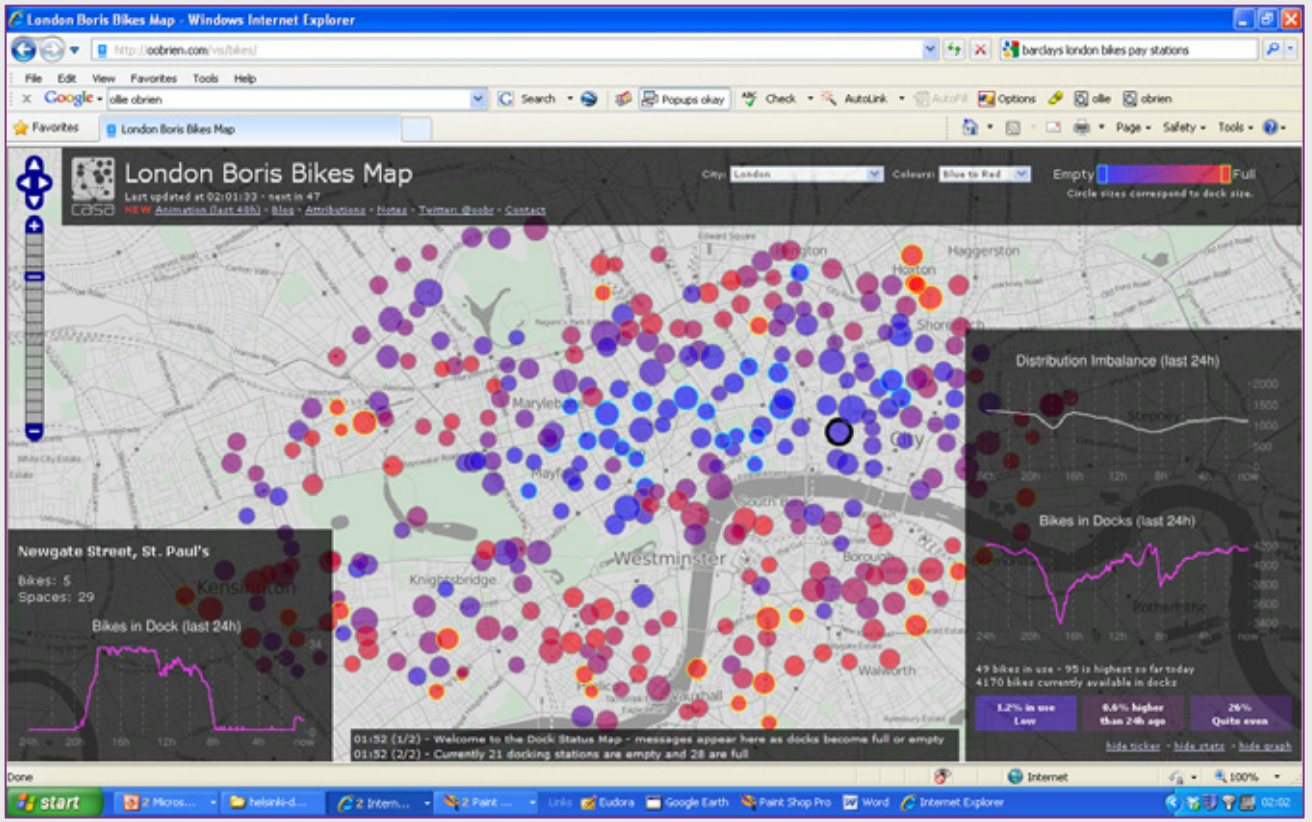
More Analysis

- **London**
- Graph shows number of bikes available to hire
- Effect of rain
  - Using the CASA weather station
- Effect of the tube strikes



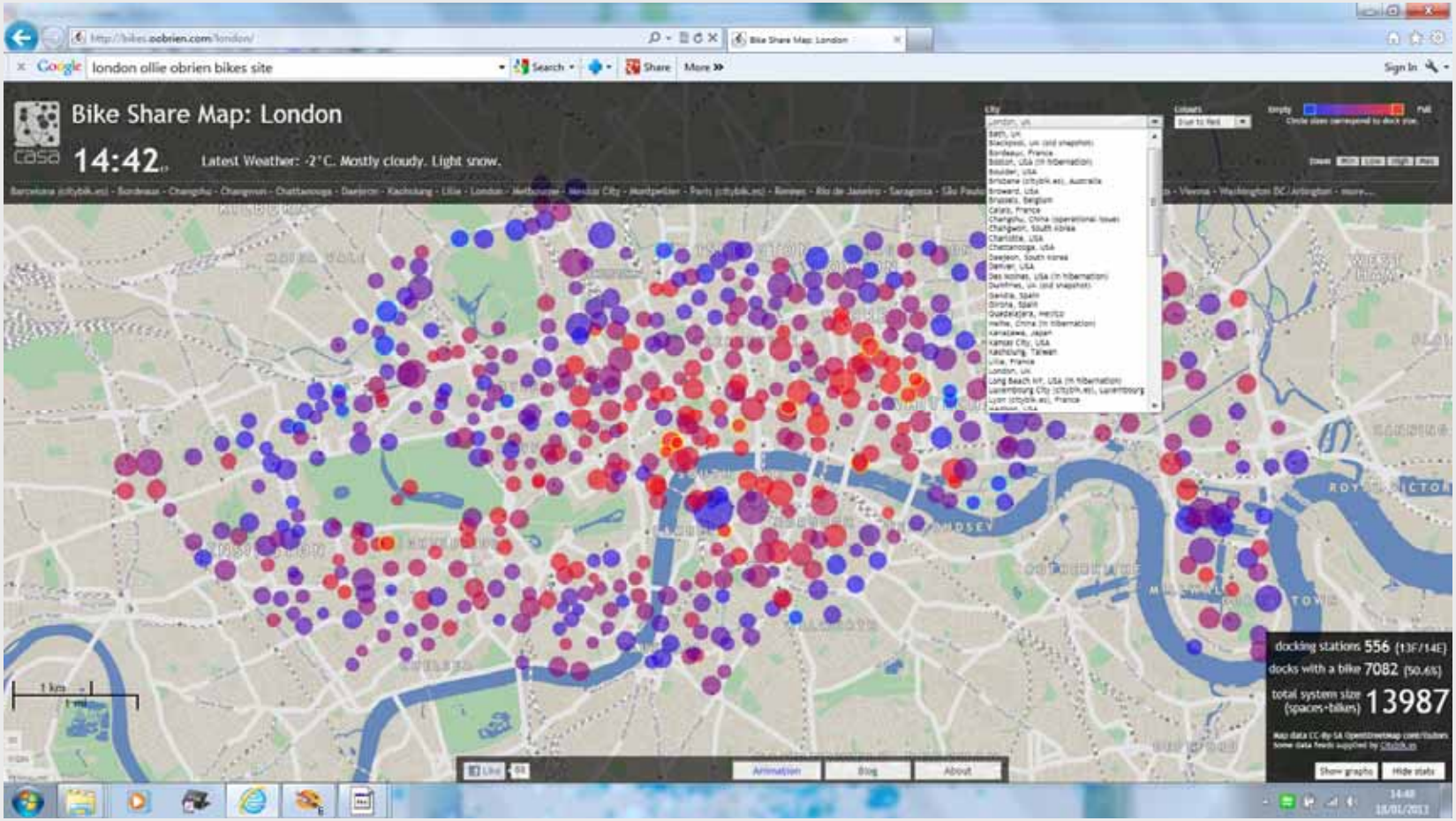
Related Real-Time Data: Bikes, Social Media

A lot of data is now coming online for travel and one of our group Oliver O'Brien has some 97 bike schemes world wide for which he has online data in real time - Bikes Data – 4200 bikes, started Nov 2010, all the data– everything – all trips, all times, all stations/docks



The Website: Real Time Visualisation of Origins and Destinations Activity

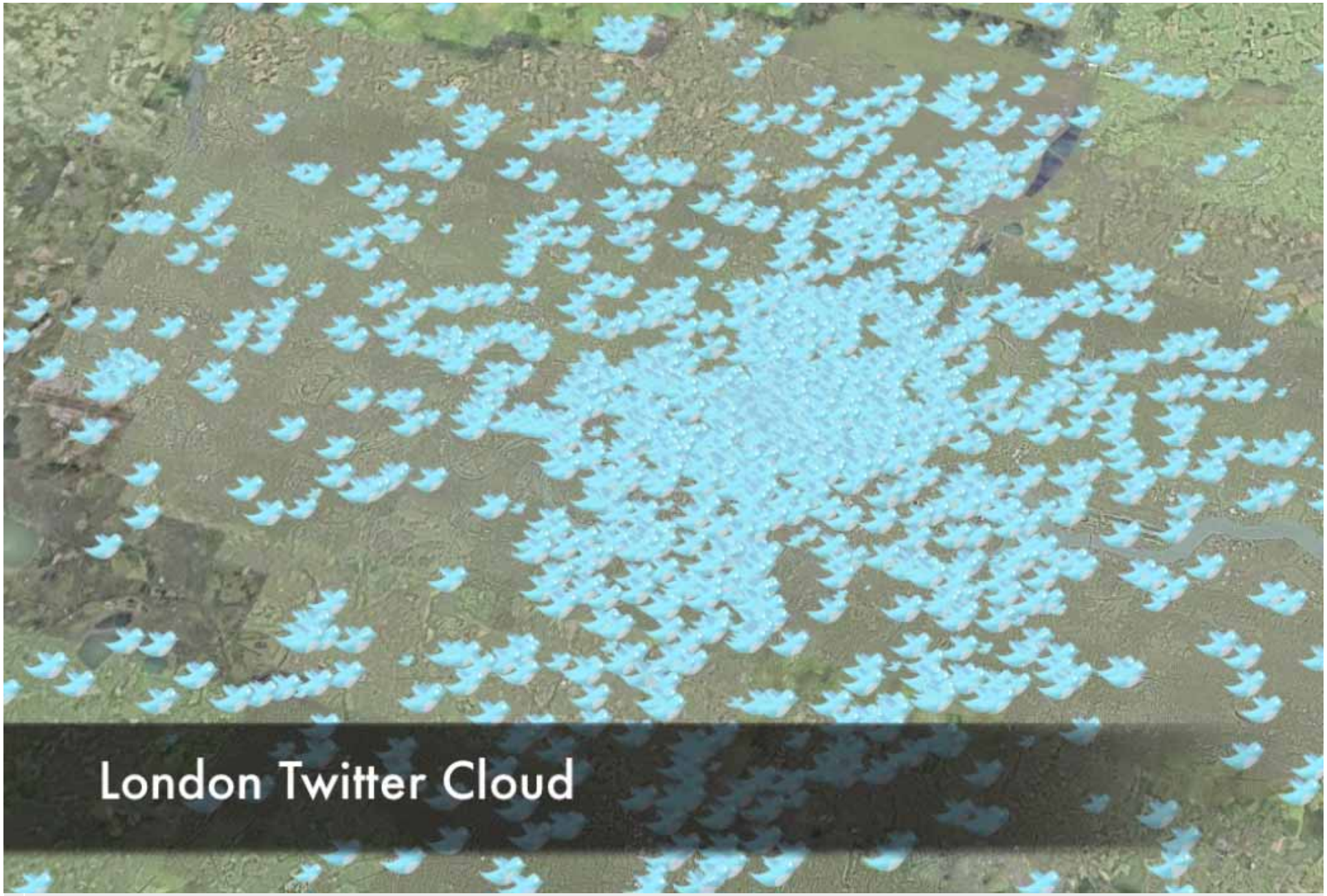
http://bikes.oobrien.com/london/

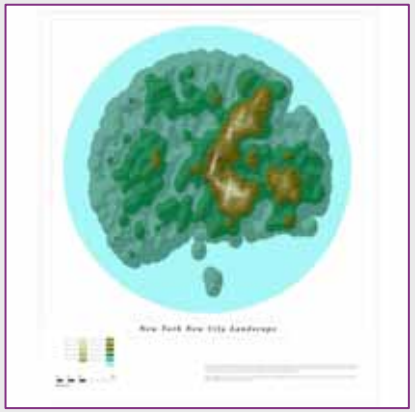


Extracting and Mapping Social Media

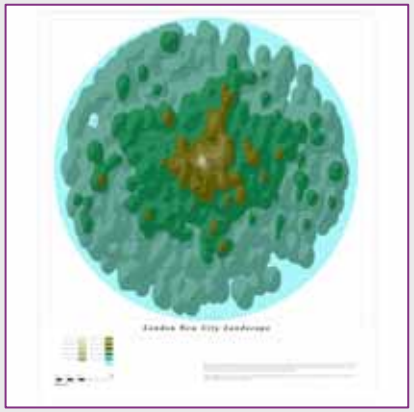
We have started to mine, map, interpret much social media because of the ease of its availability – and we have started looking at Short Text Messaging – Twitter data. We have also begun to look at phone tracking data – from the iPhone for example but many of our data sets such as the bikes data, the Oyster card and such like data are really part of the same domain of new bottom up data. We have no control over this but some of the social media data we are mining we have greater control over. Here are some examples.

And Here is a Map of Tweets above London which uses Google maps to visualise these data

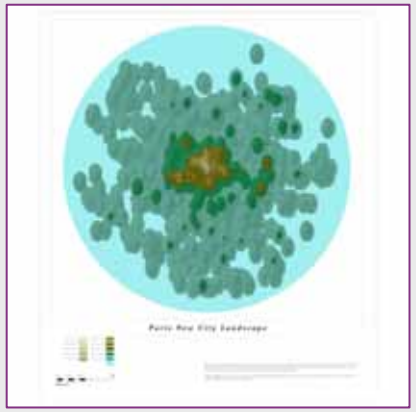

London Twitter Cloud



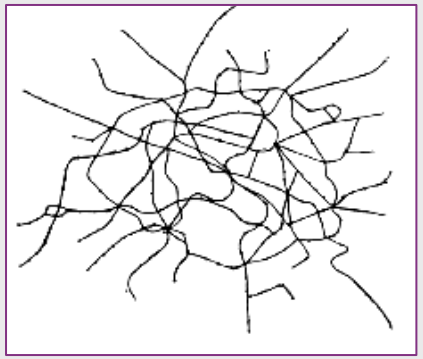
New York

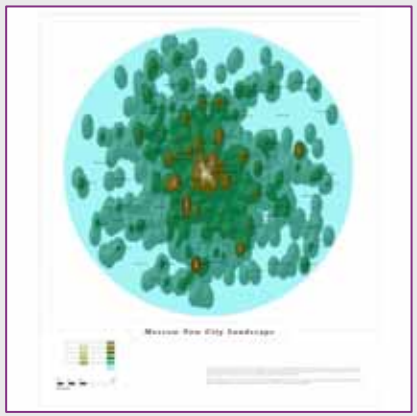


London

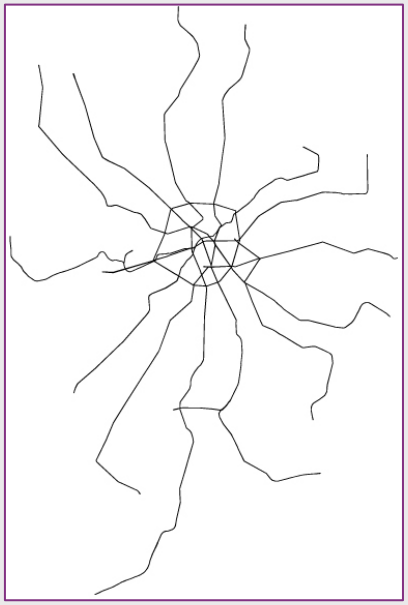


Paris

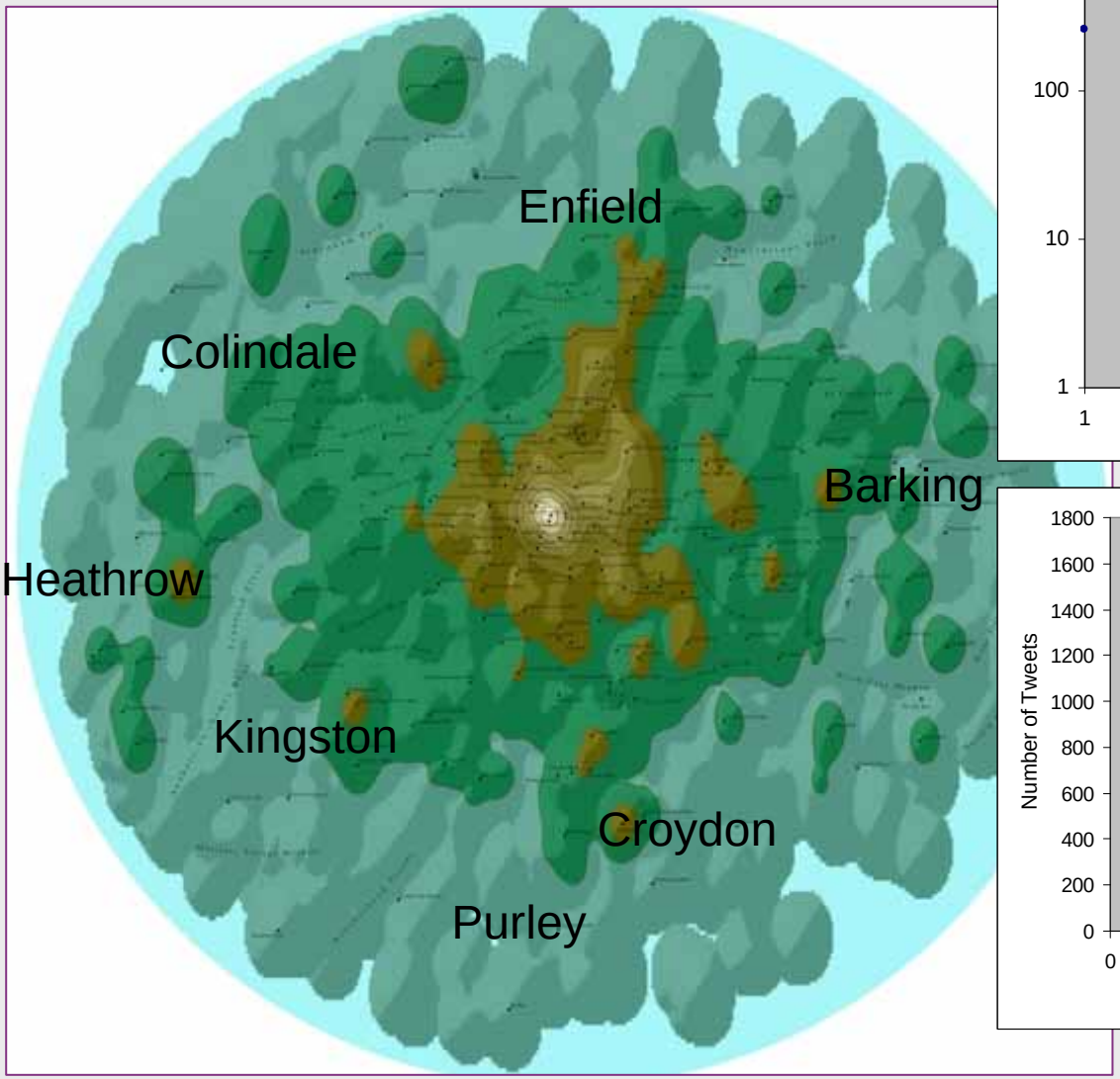


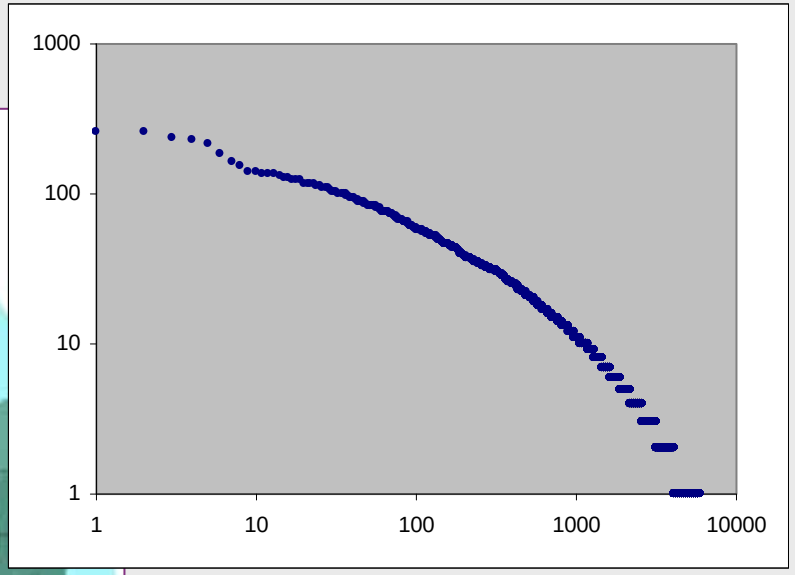


Moscow



London


Enfield
Colindale
Barking
Heathrow
Kingston
Croydon
Purley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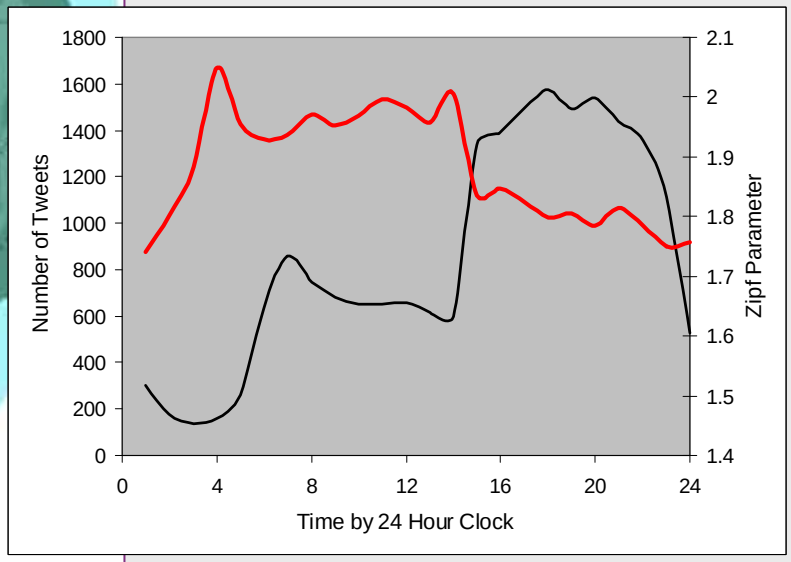
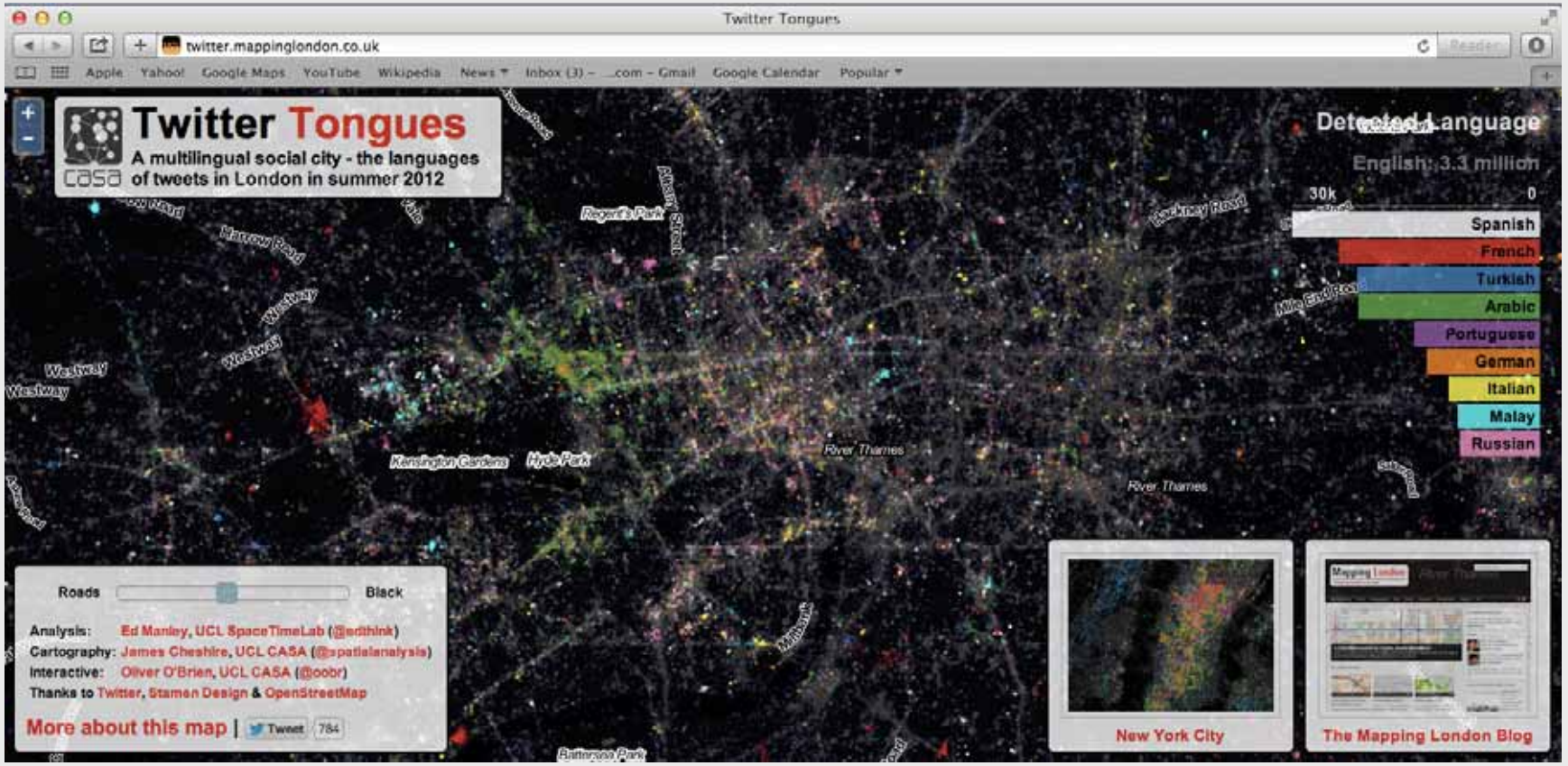
10000

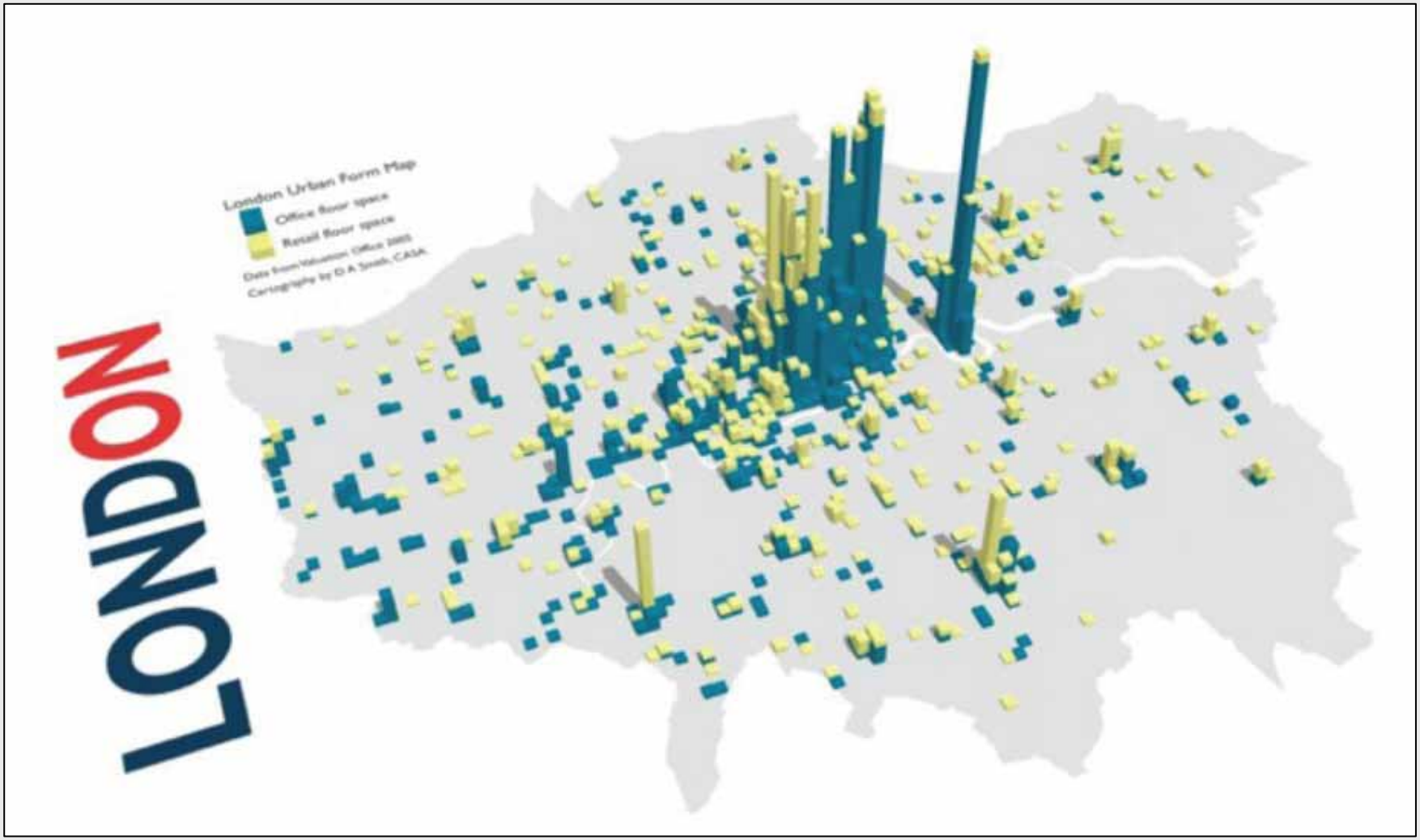

1800
1600
1400
1200
1000
800
600
400
200
0
Number of Tweets
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
Zipf Parameter
0
4
8
12
16
20
24
Time by 24 Hour Clock

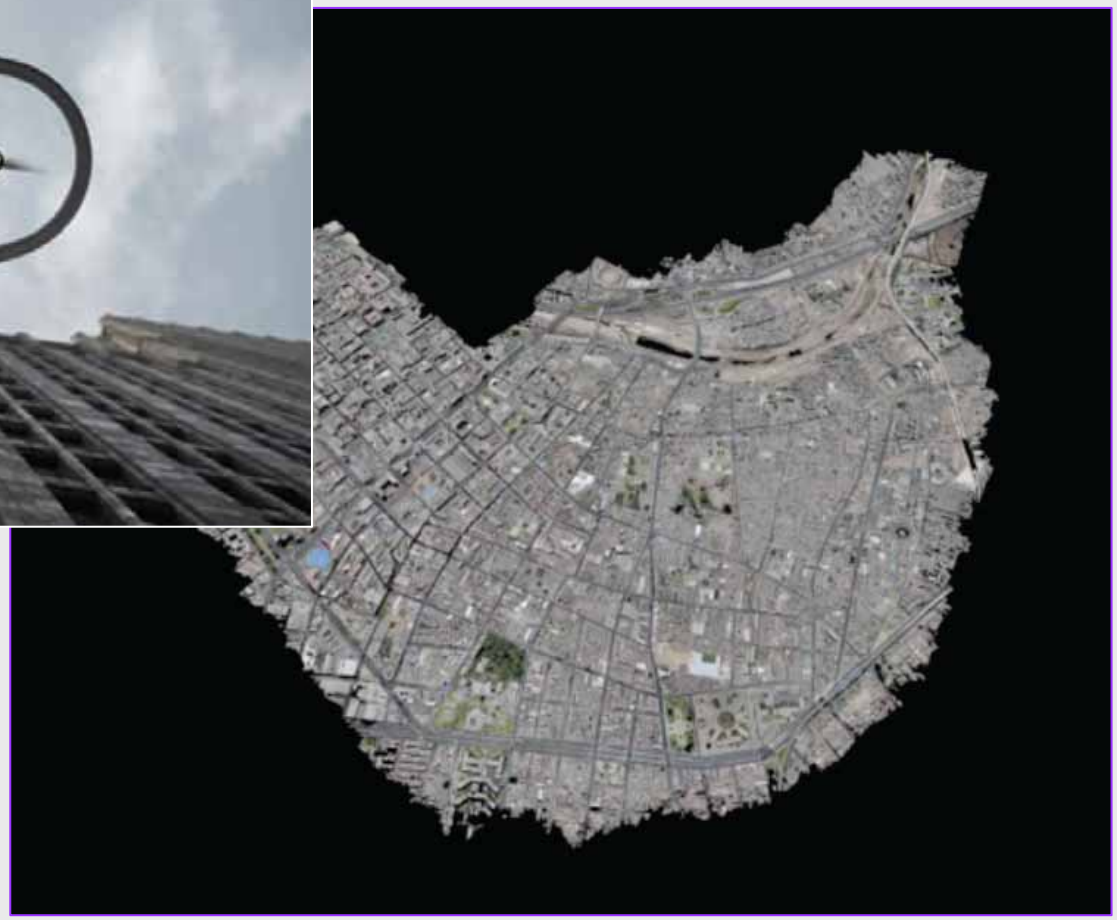

Twitter Tongues
twitter.mappinglondon.co.uk
Twitter Tongues
A multilingual social city - the languages of tweets in London in summer 2012
casa
Detected Language
English: 3.3 million
30k
0
Spanish
French
Turkish
Arabic
Portuguese
German
Italian
Malay
Russian
Roads
Black
Analysis: Ed Manley, UCL SpaceTimeLab (@edthink)
Cartography: James Cheshire, UCL CASA (@spatialanalysis)
Interactive: Oliver O'Brien, UCL CASA (@oobr)
Thanks to Twitter, Stamen Design & OpenStreetMap
More about this map |
Tweet
784
New York City
The Mapping London Blog
Regent's Park
Kensington Gardens
Hyde Park
River Thames
Battersea Park

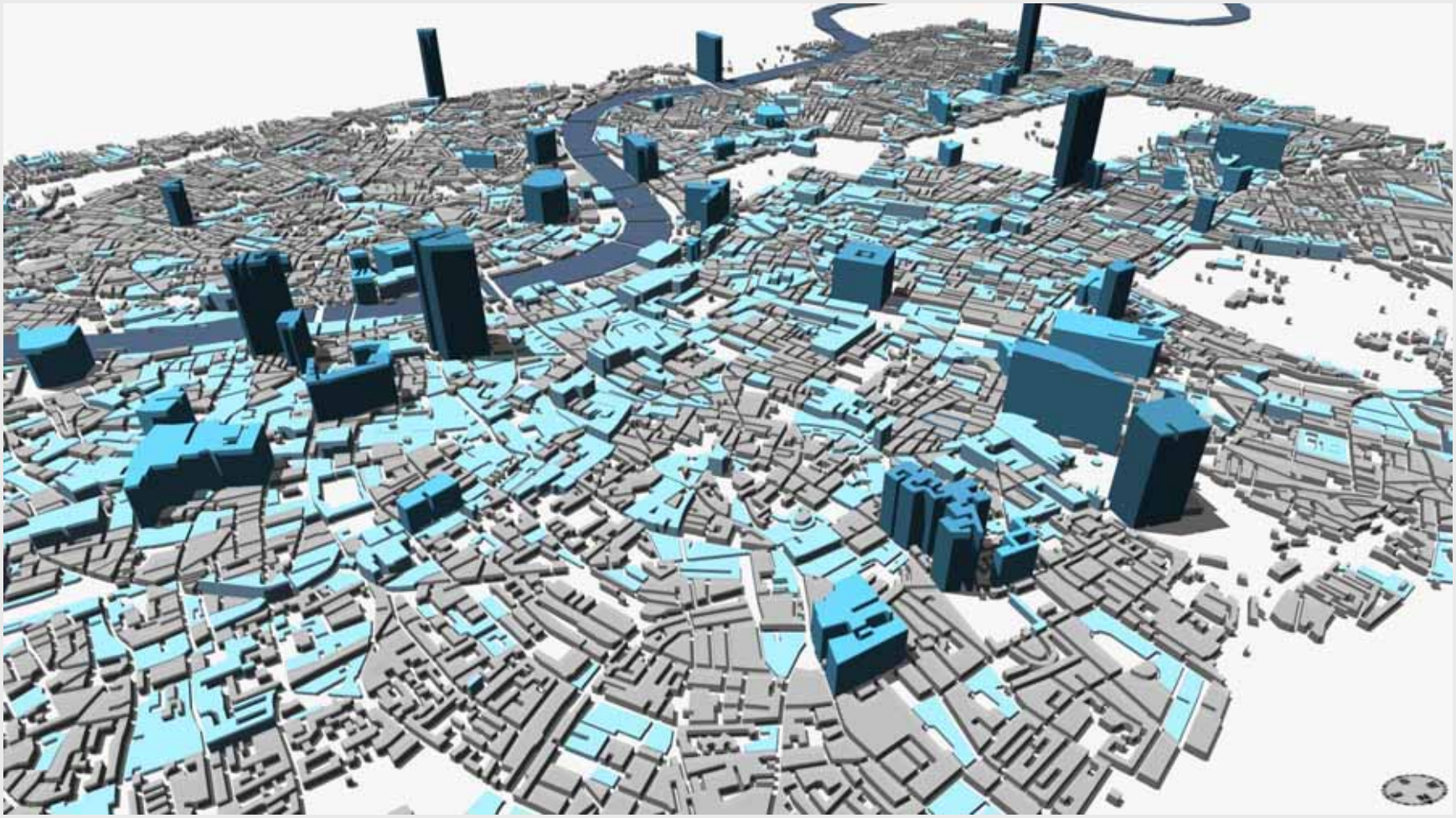
Returning to our old exemplars – these are being enriched with new tools and new data and new animations

Our LUTI models are being informed by 3-d visualisation and can now be imported into 3-D in working form

Our 3-d visualisations are being enriched with new and rapid sensing technologies using everything from phones to drones and new data attributes in terms of social media.


LONDON
London Urban Form Map
Office floor space
Retail floor space





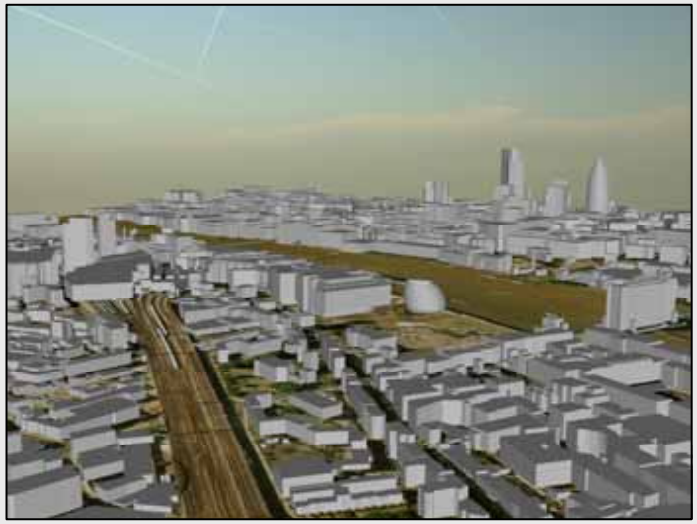
My second set of example: how do we model the city iconically, visually. How do we use 3D technologies to make sense of the traditional city which is fast becoming the smart city

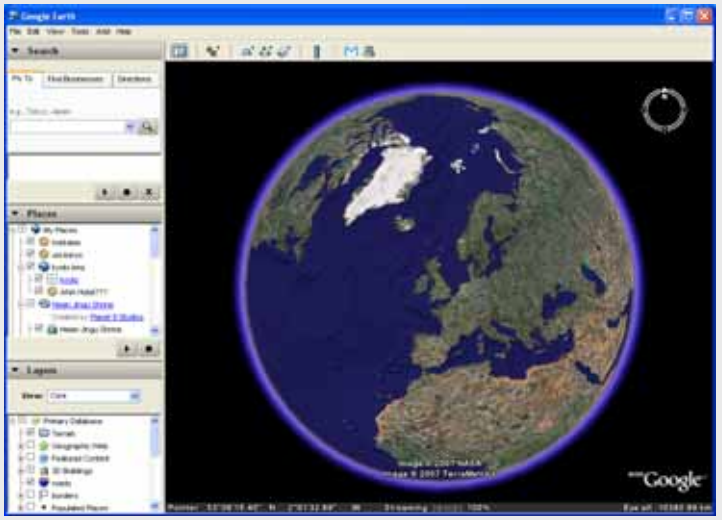
Fifty years ago iconic models were barely conceived as very being digital but our Virtual London model is now a routine digital 'architects' model of the physical form of the city.

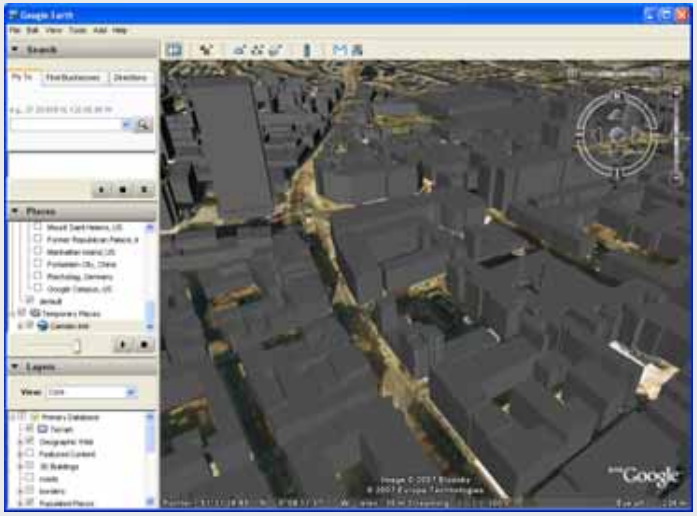
It is built in 3D-GIS, ArcGIS, ported in and out of CAD and Games software, into Google Earth, Second Life, and so on.

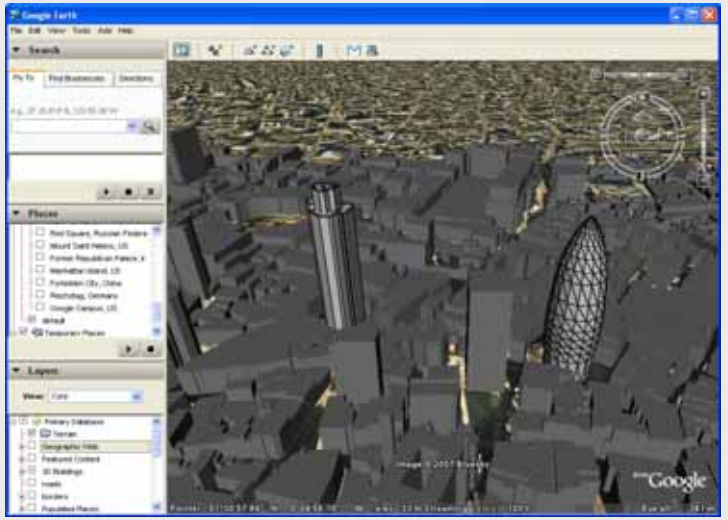
We use it as our test bed for multimedia. This is linked to much of our representational and multimedia work that I will tell you about later.

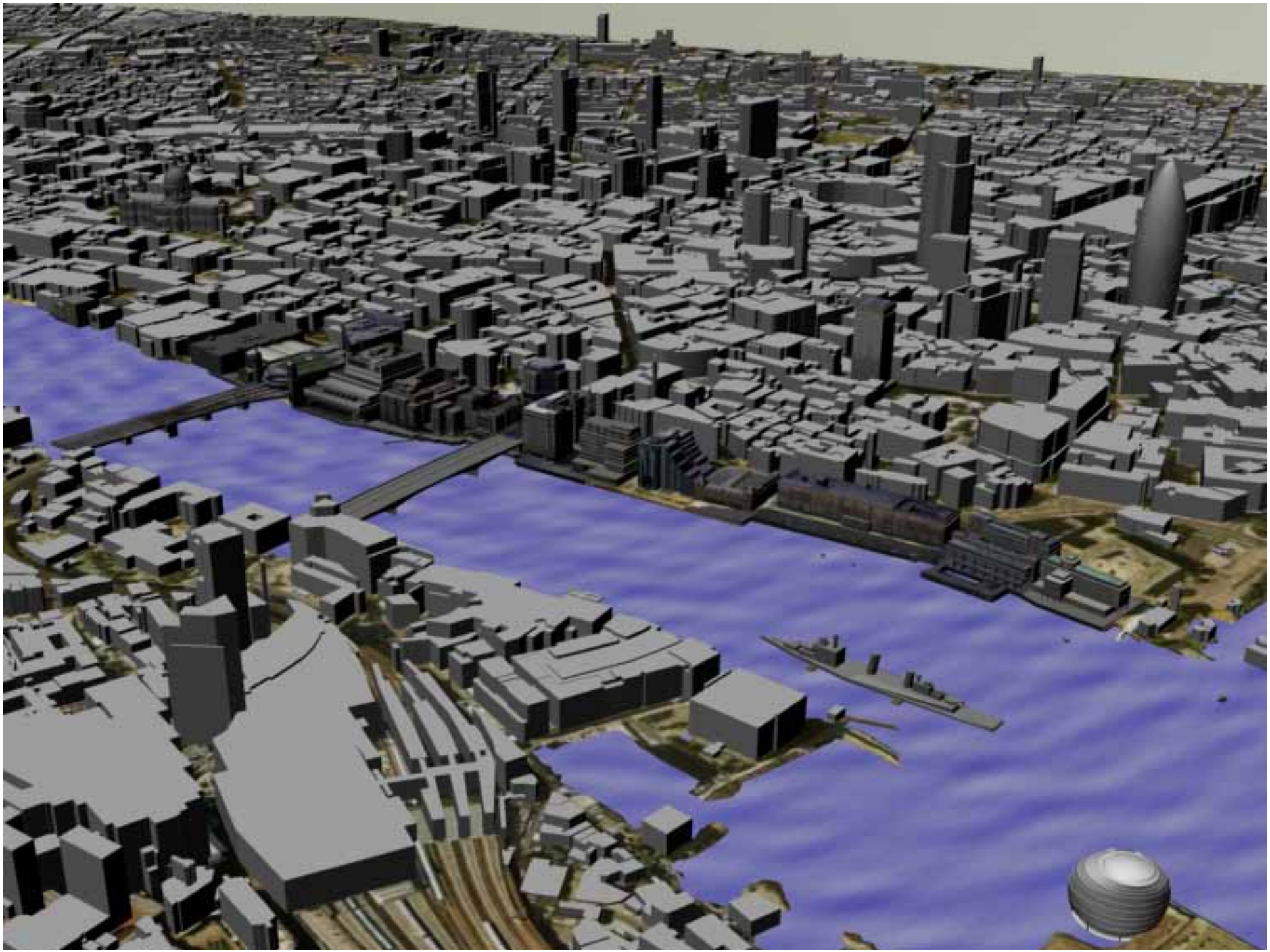
2D to 3D: GIS to CAD and back and on the web

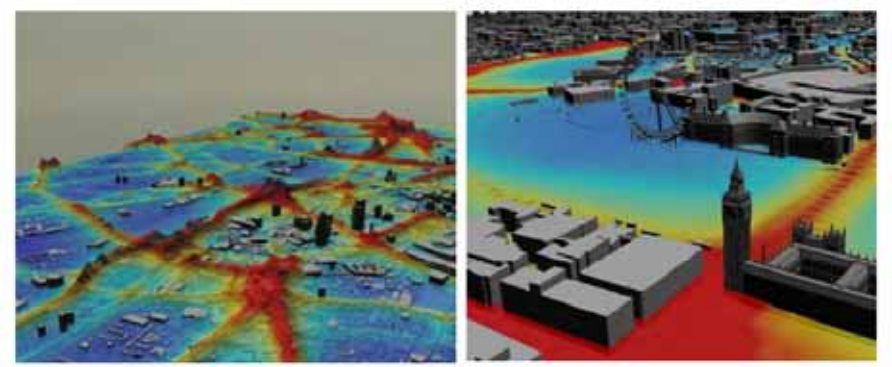


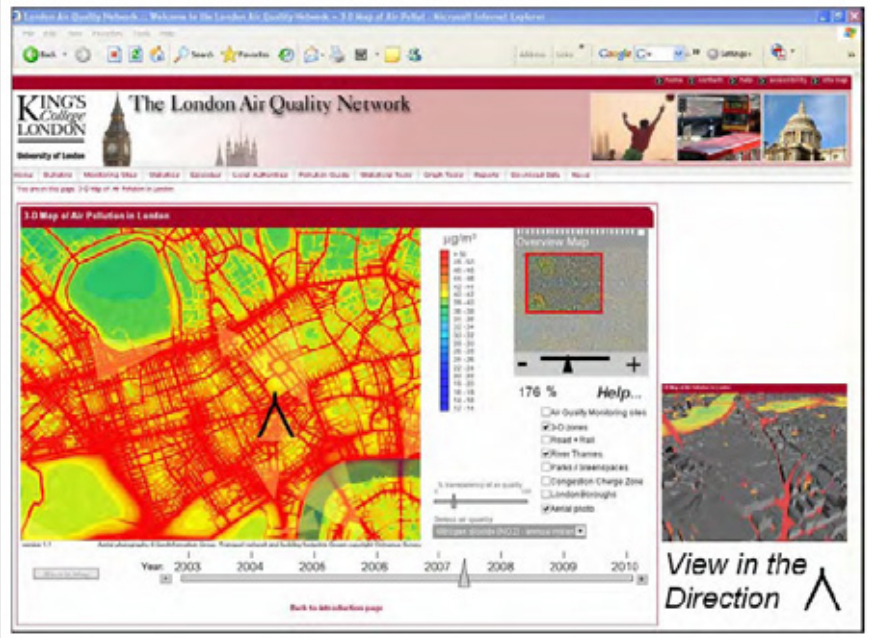


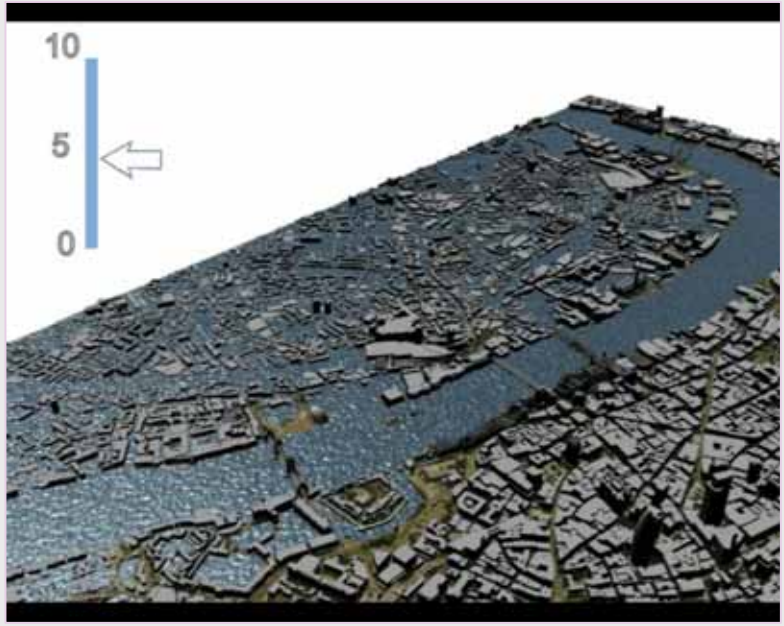









The London Air Quality Network
3-D Map of Air Pollution in London
Overview Map
176 %
Help...
Year: 2003 2004 2005 2006 2007 2008 2009 2010
View in the Direction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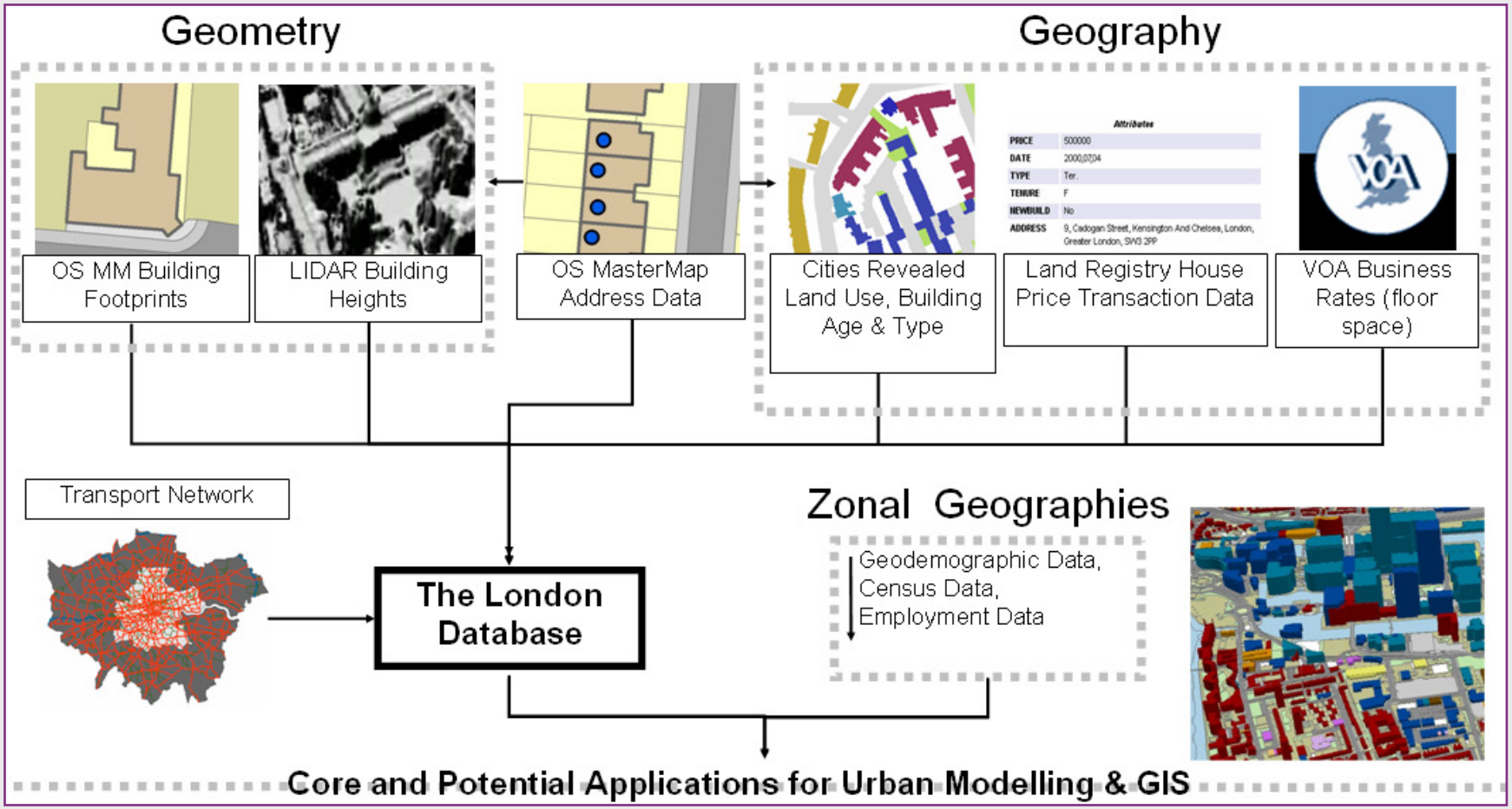
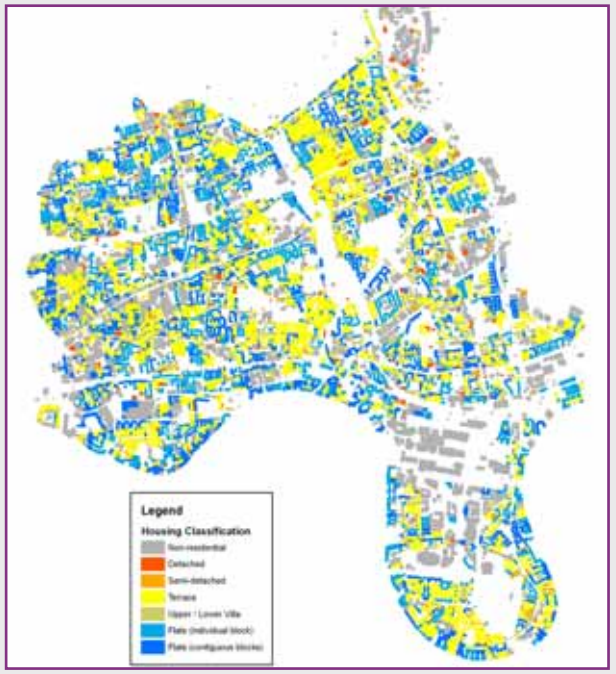
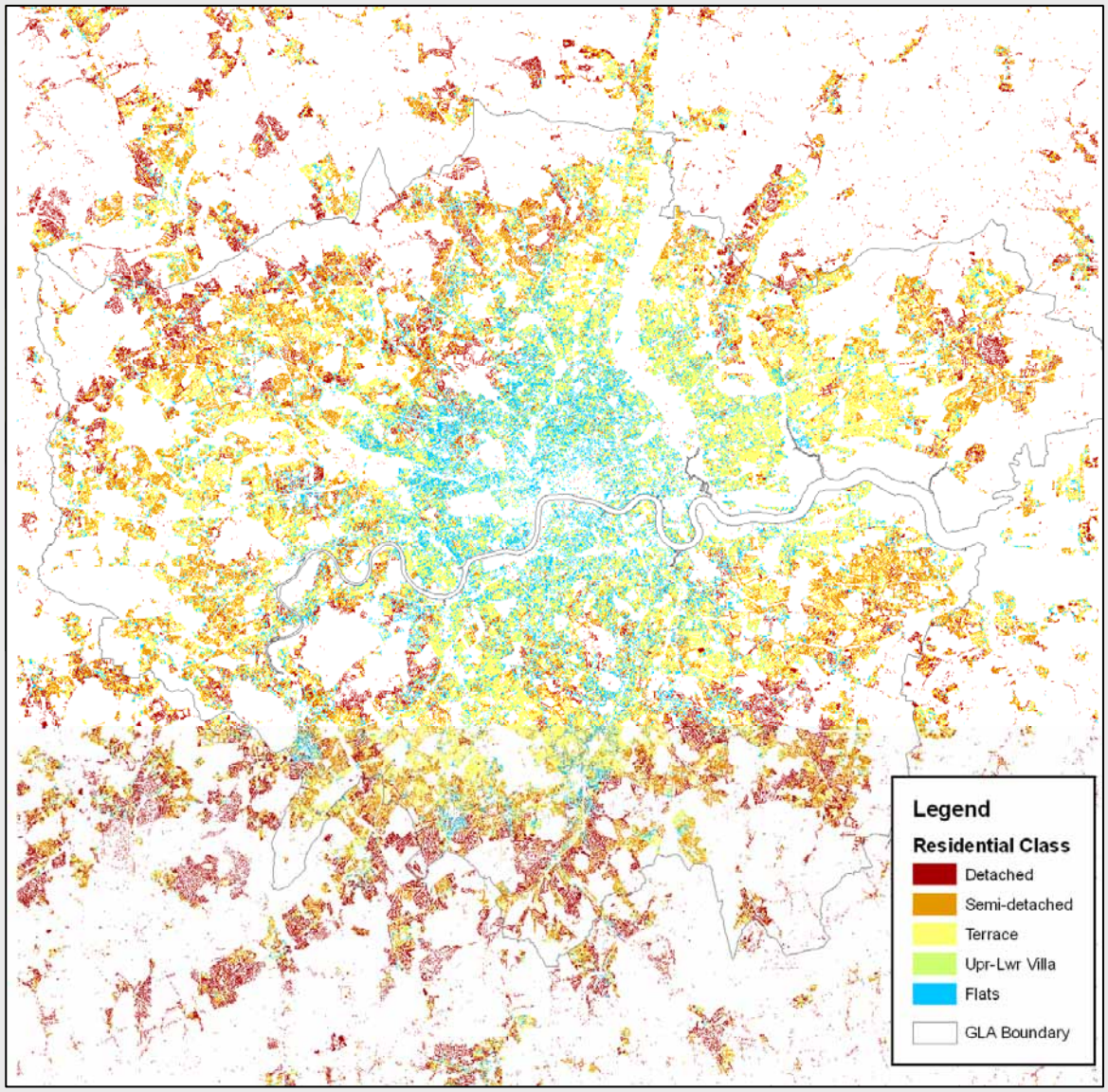
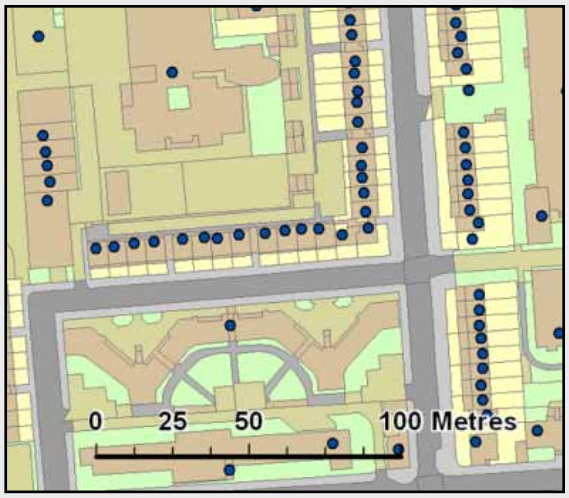
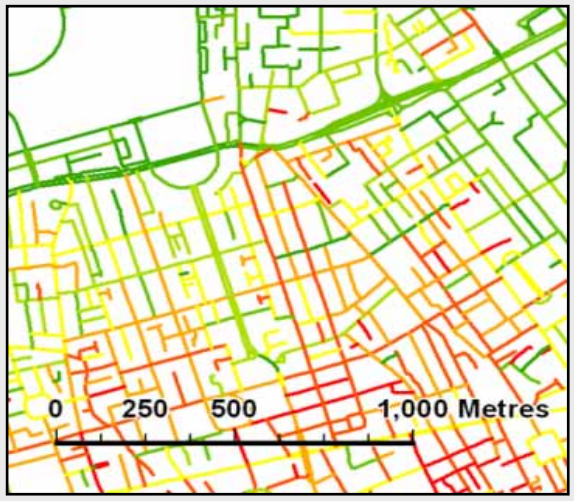
From geometry to geography and back – populating really large spatial data bases and using the model as a visualisation tool for analytic purposes

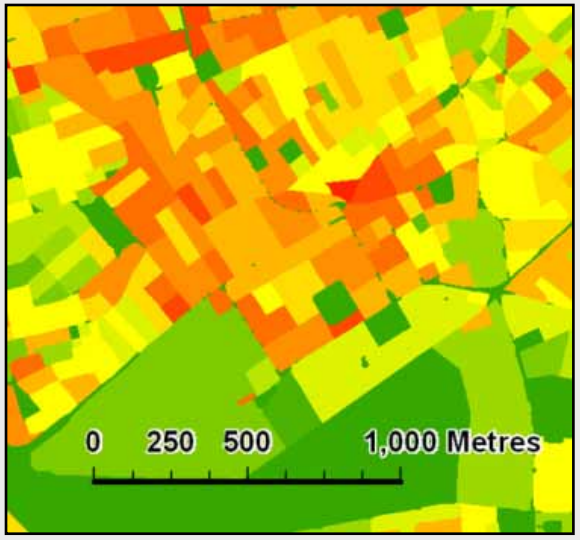


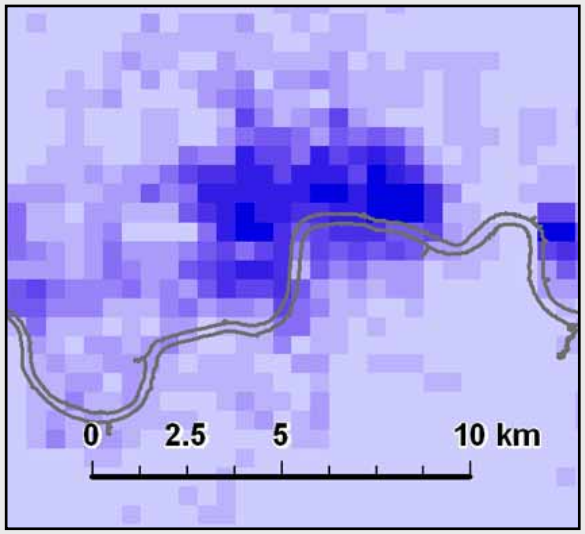

Legend
Housing Classification


Legend
Residential Class
Detached
Semi-detached
Terrace
Upr-Lwr Villa
Flats
GLA Boundary

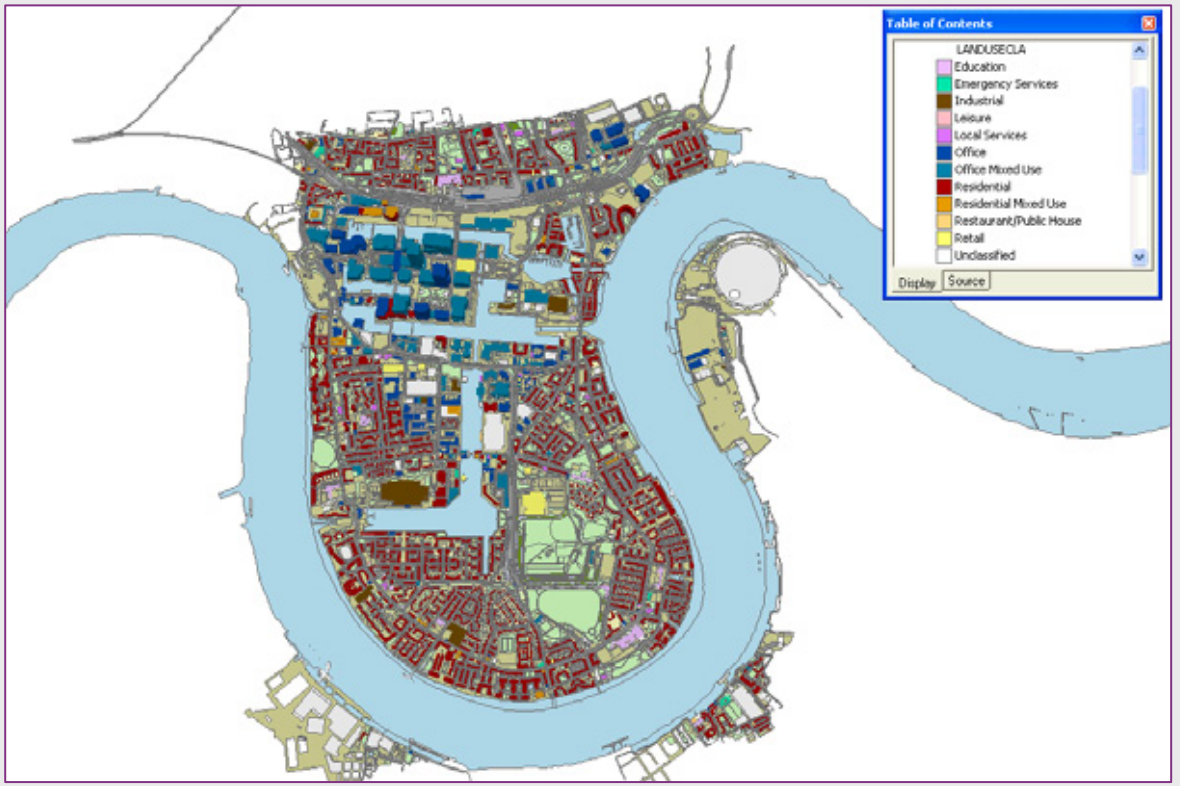








Adding Land Use, Transport and Populations and Aggregating Scales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LANDUSECLA
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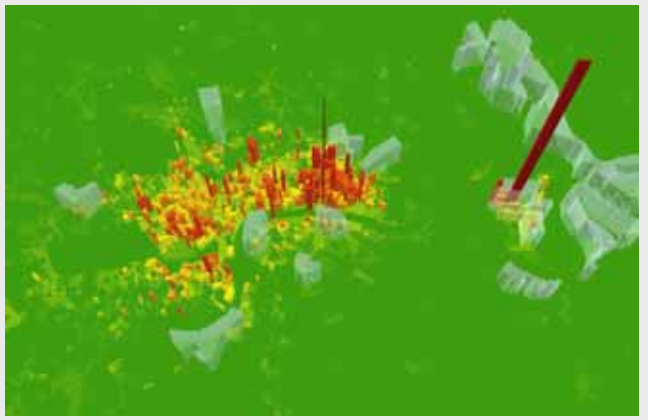
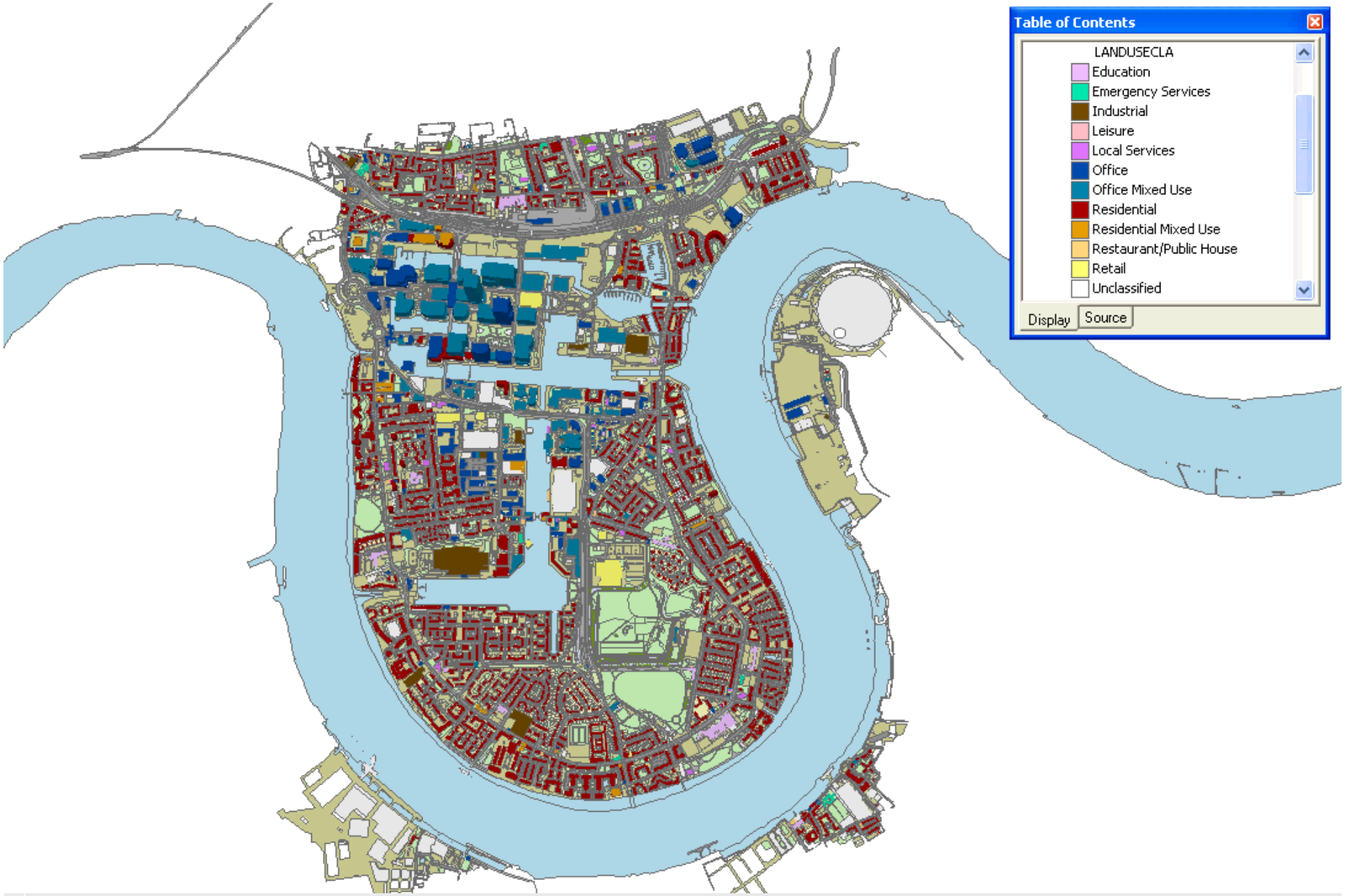
Emergency Services
Industrial
Leisure
Local Services
Office
Office Mixed Use
Residential
Residential Mixed Use
Restaurant/Public House
Retail
Unclassified
Display
Source

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Retail
Unclassified
Display
Source

Moving it into related media

Into games engines, virtual worlds, and into back into the material world by printing the model e.g.

index.gif - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://www.casa.ucl.ac.uk/atmos/ Go Links

Google Search Web 86 blocked AutoFill Options

LONDON

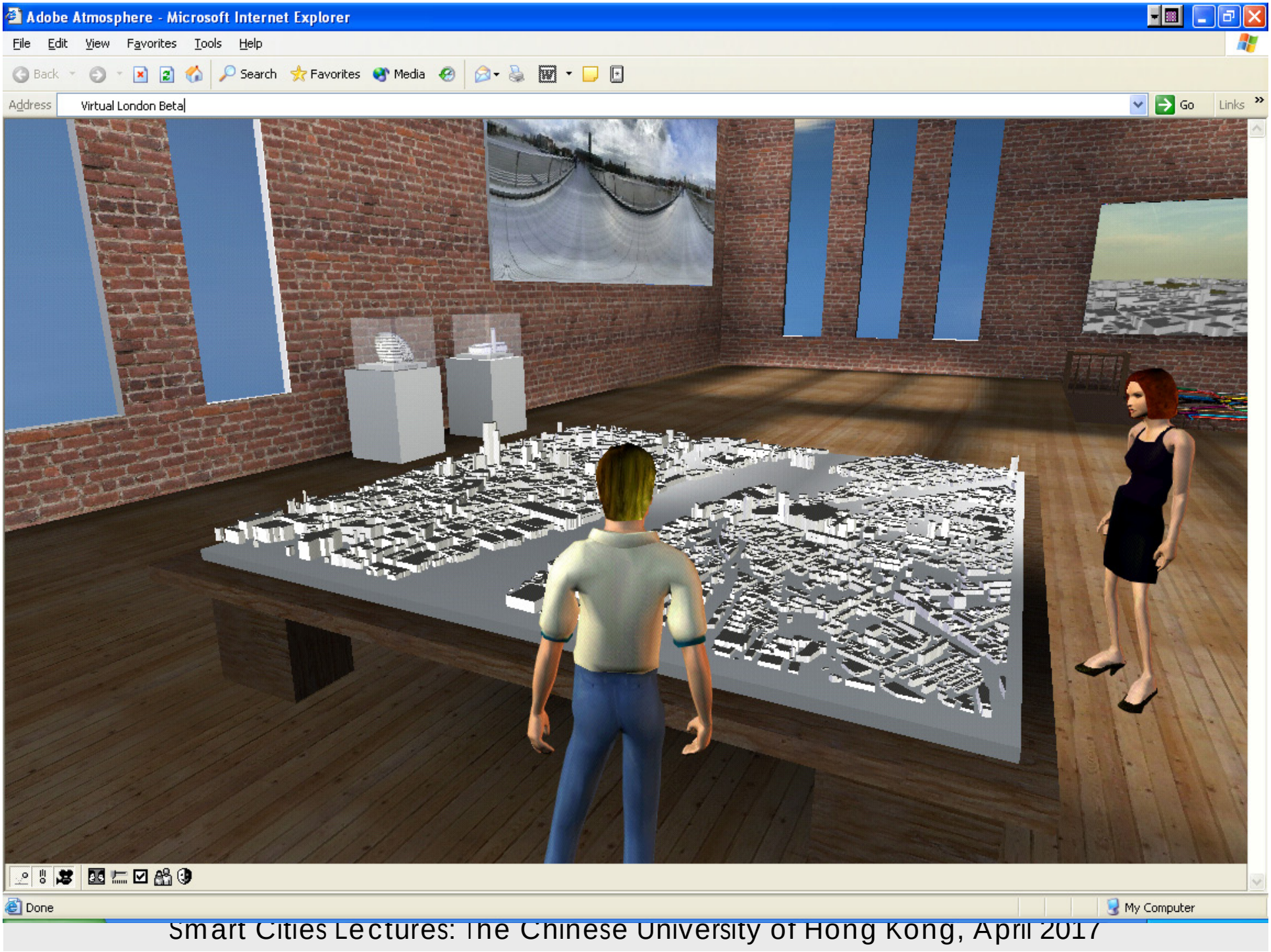
Welcome to the Virtual London 'multi-user' gallery. If its your first visit the software will automatically install on your machine. Its simple to use and provides and insight into the development of Virtual London at the Greater London Authority.

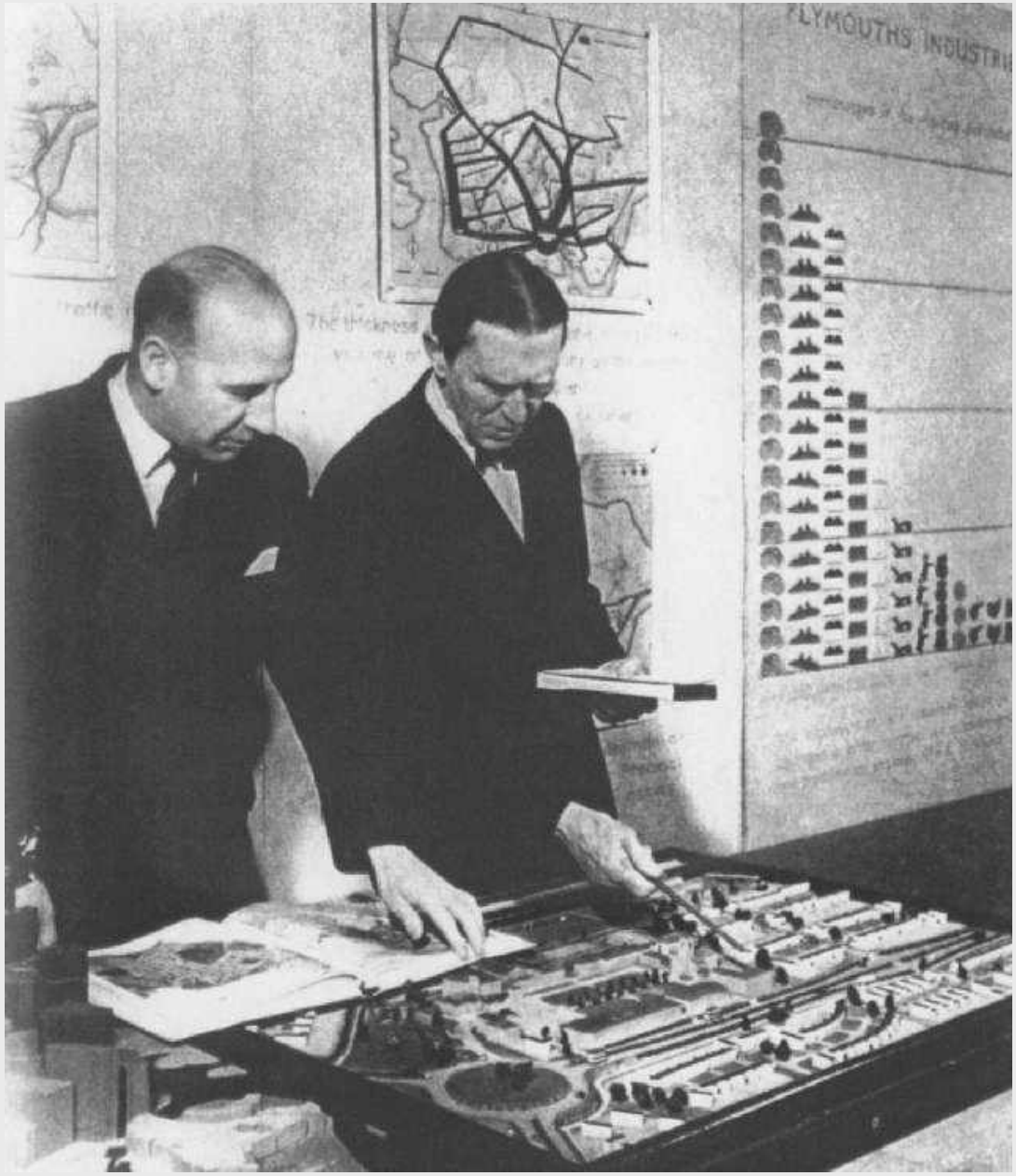
Virtual London was developed at the Centre for Advanced Spatial Analysis, University College London. Please contact asmith@geog.ucl.ac.uk for help or further information.

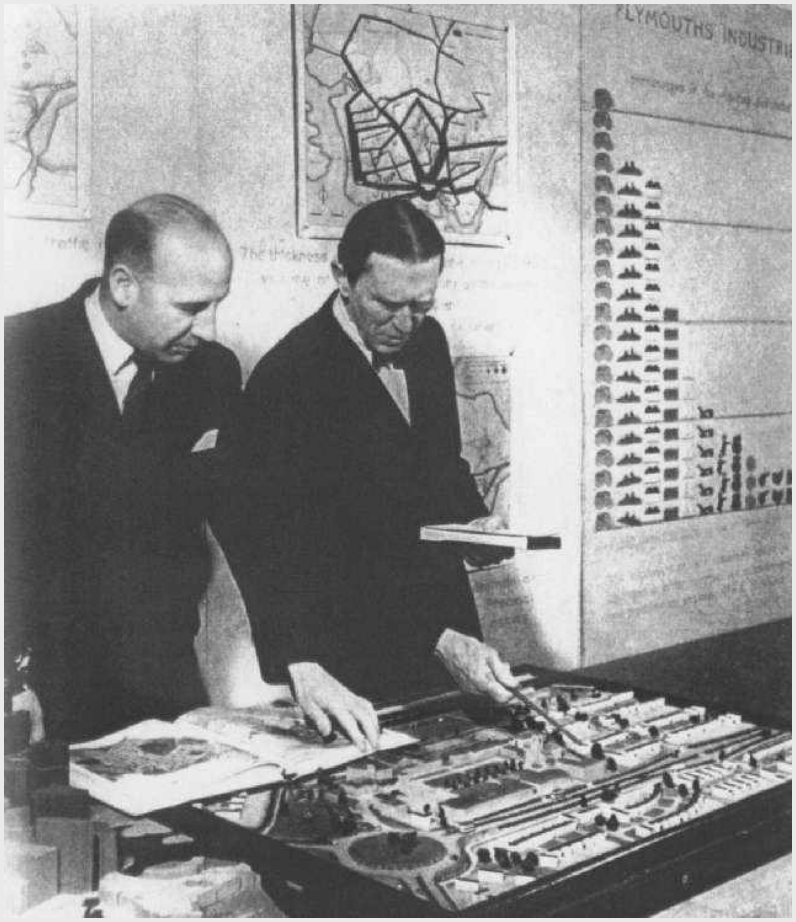
Use your arrow keys or mouse to move in the Virtual World.

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

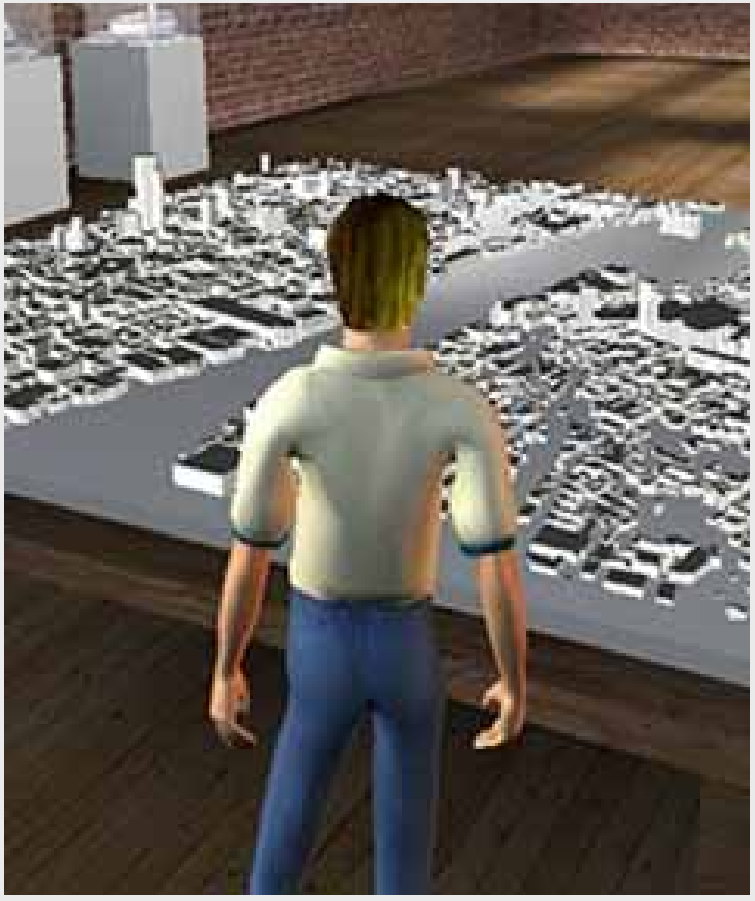
We can show a movie of this


Adobe Atmosphere - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address Virtual London Beta
Go Links
Done
My Computer


PLYMOUTHS INDUSTRI



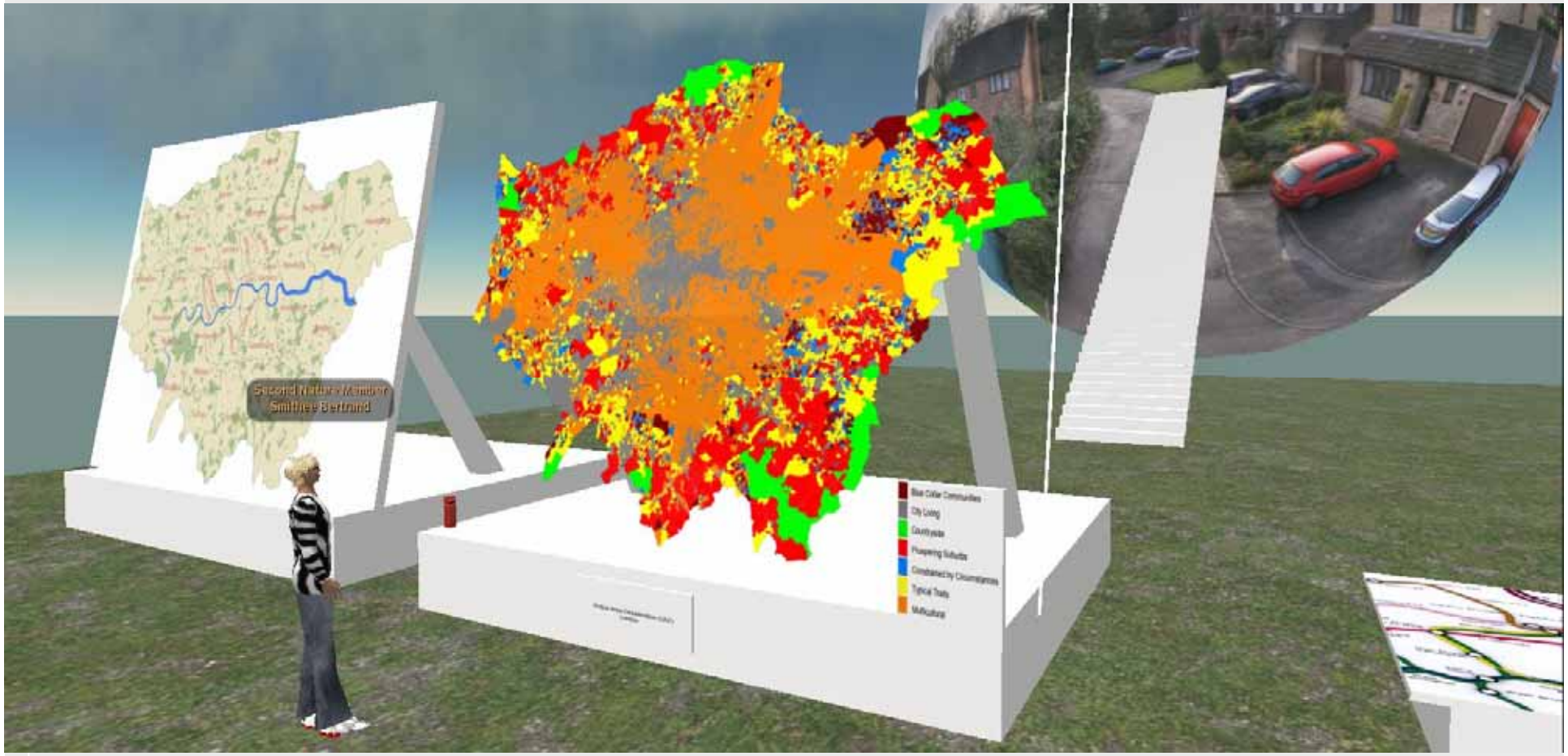
How did we get from here to there?

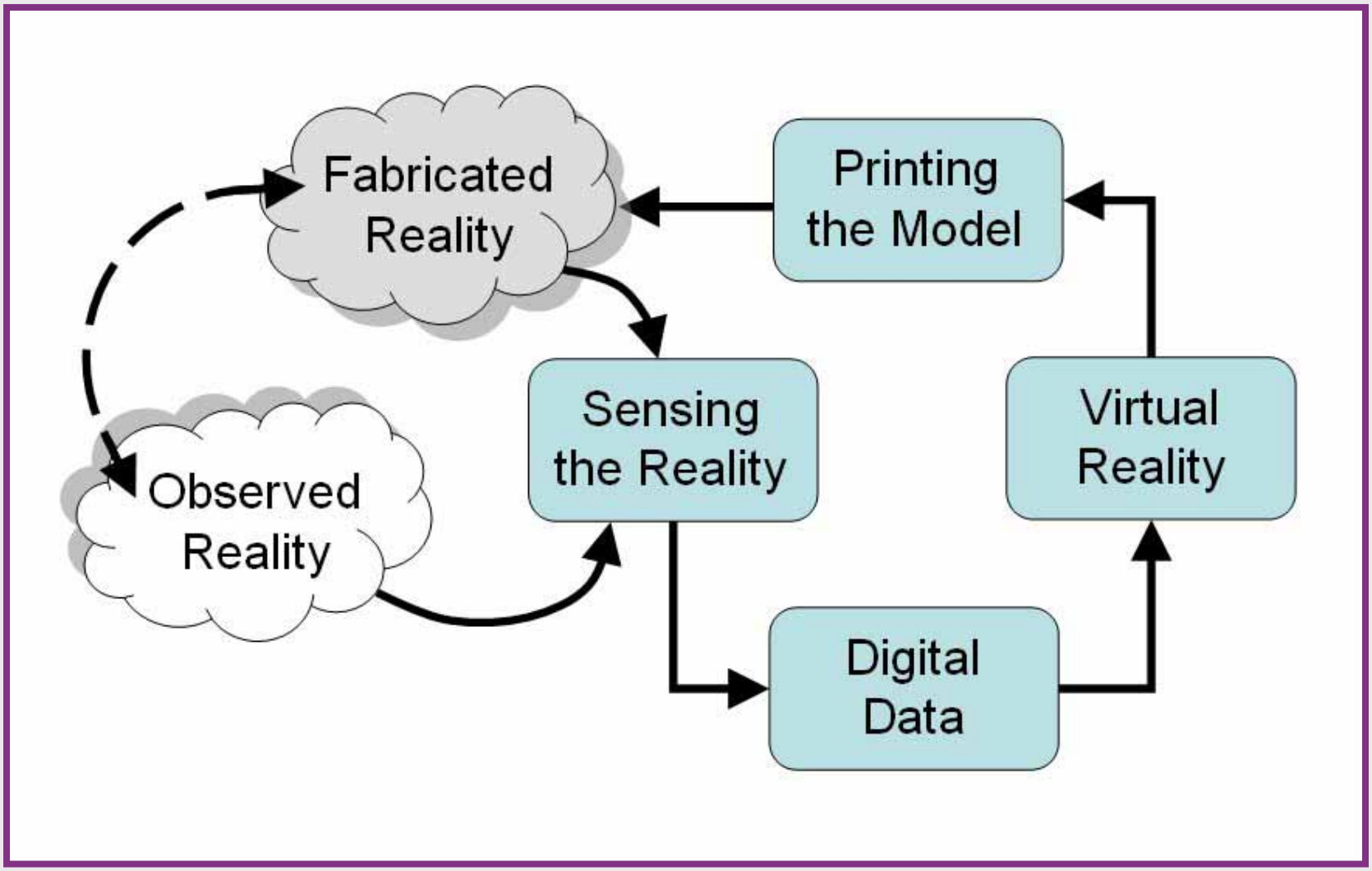


And can we do it all any better?

Real and Virtual Design Studios

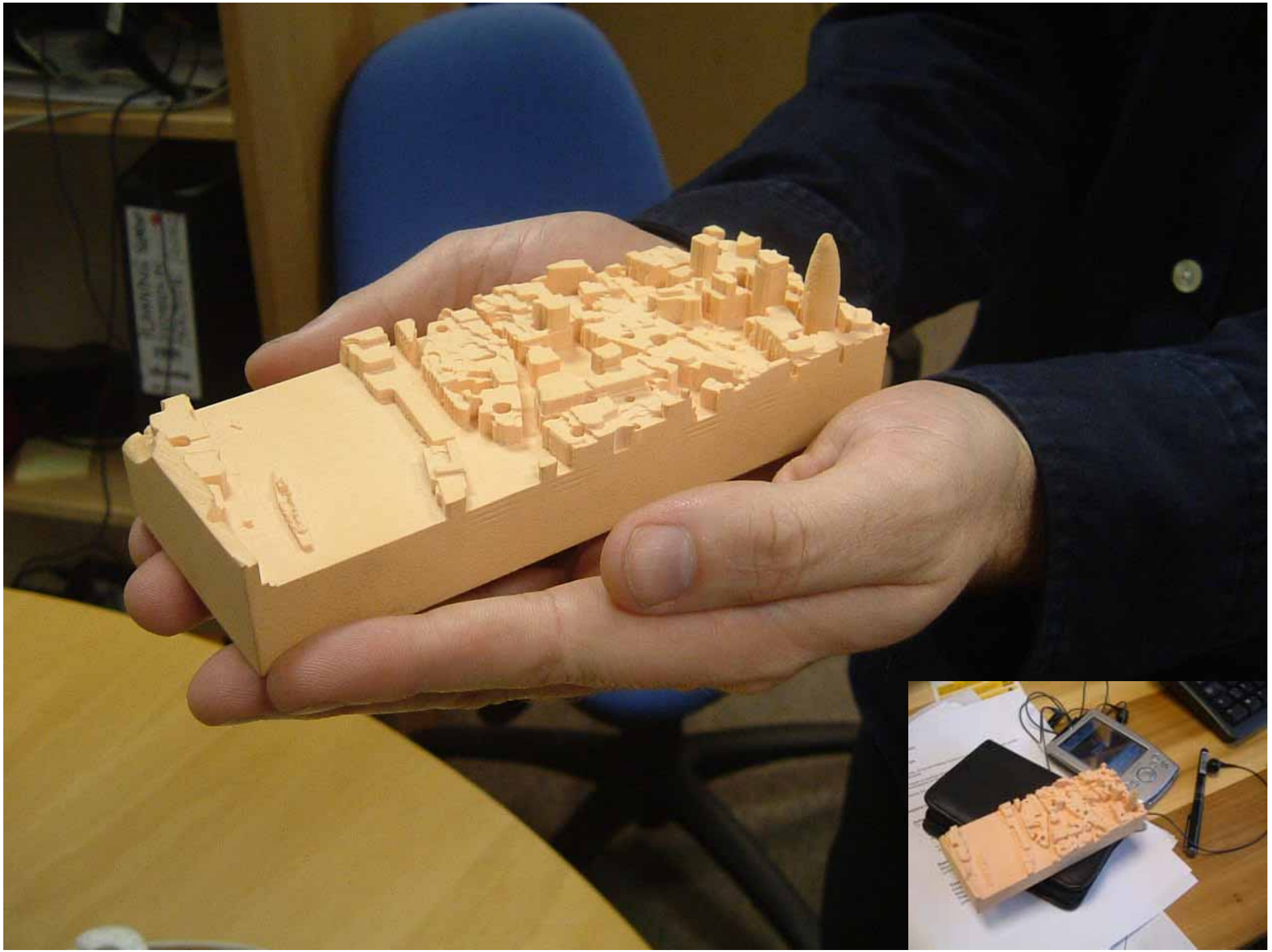
Our recent forays are into ***Second Life*** where maps from our geodemographics project are being ported as 'geographic media' into these virtual worlds ……

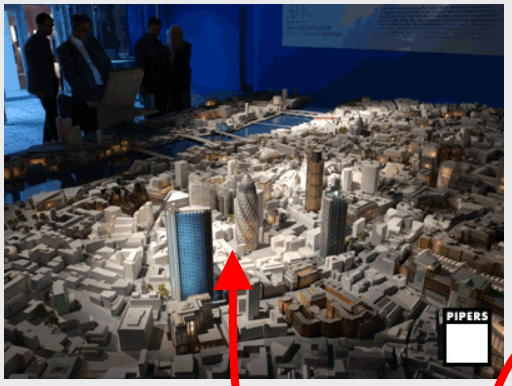


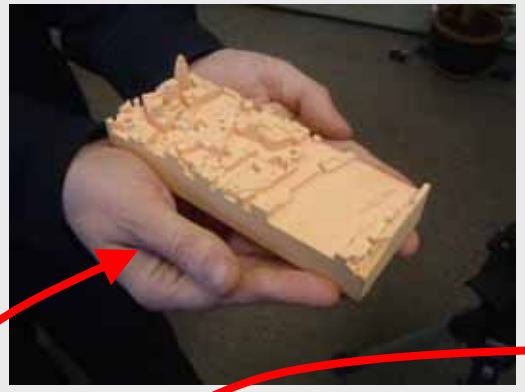


Moreover we can the take this manufactured world and create other digital worlds from it, and so on ....

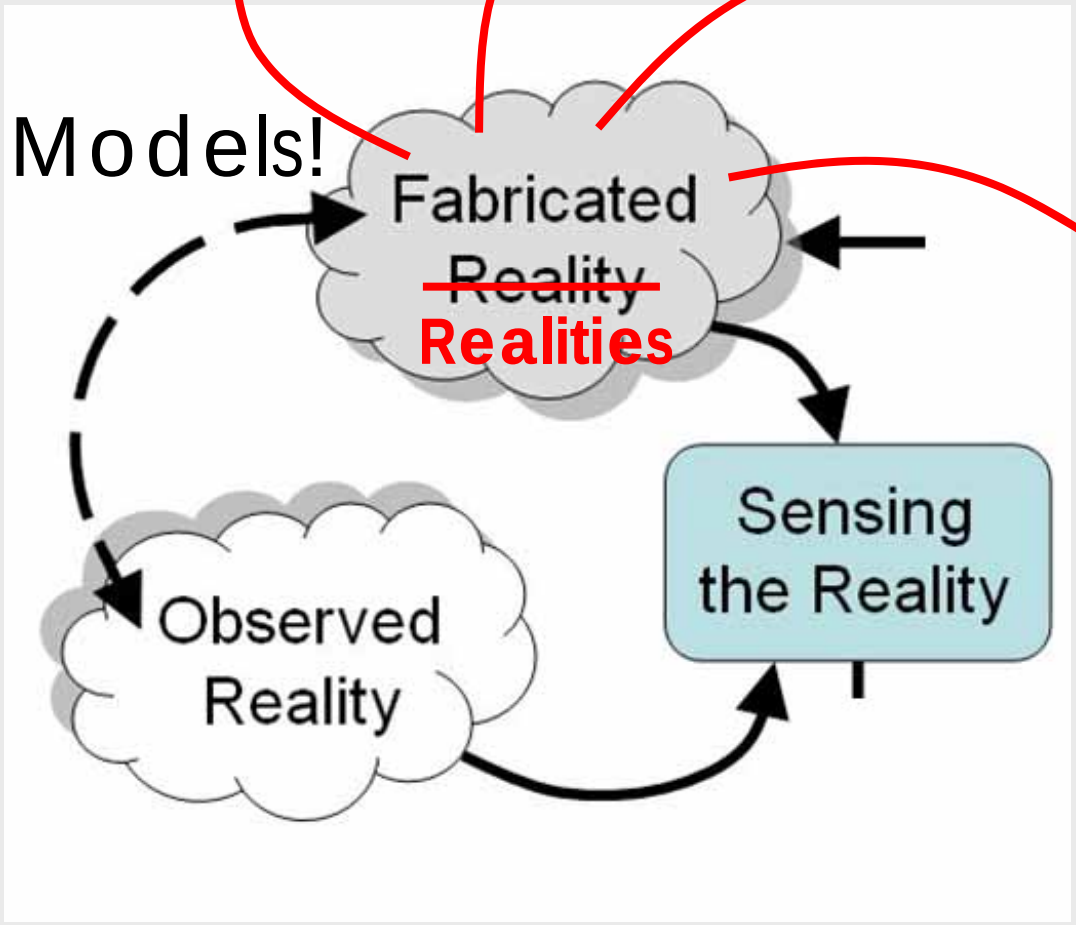
Hard Copy from Soft Copy: Printing Bits of Virtual London

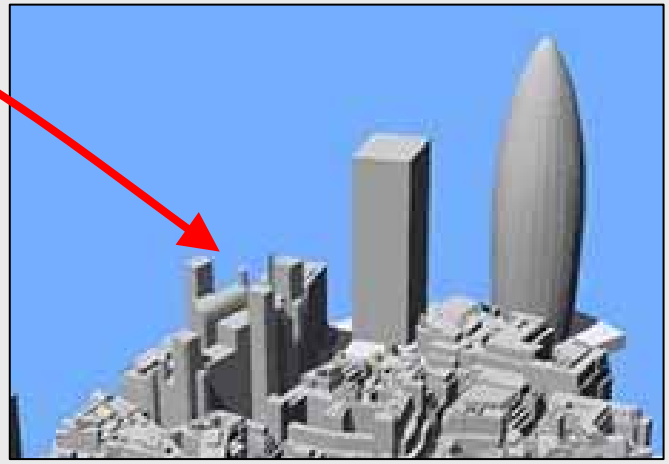






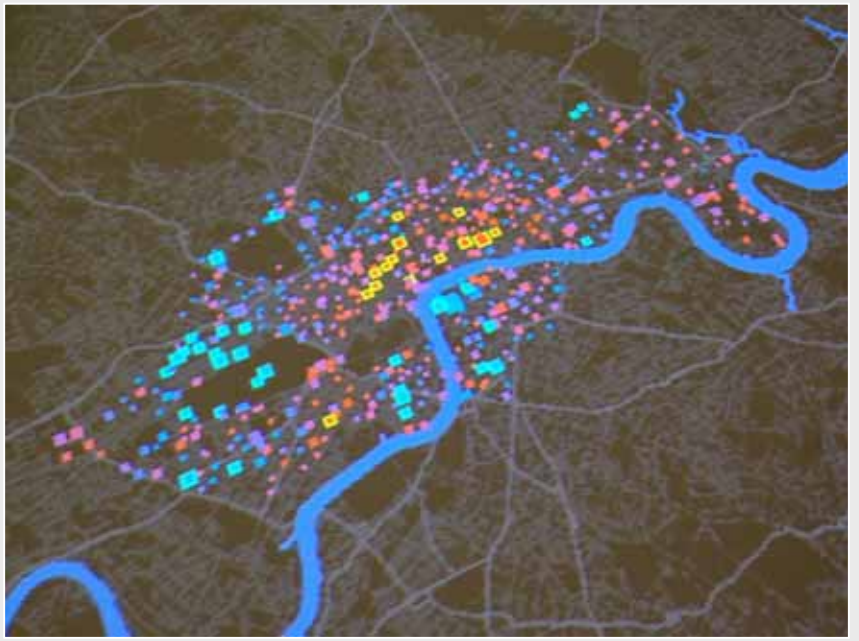
Models!

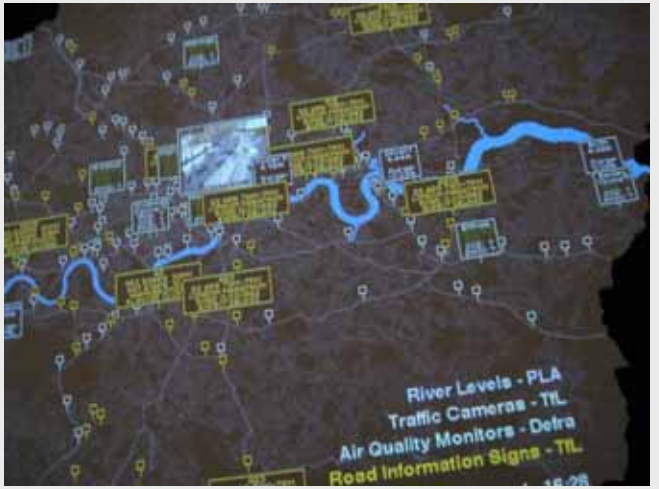




Not one model but many!

UCL
London Data Table
www.casa.ucl.ac.uk



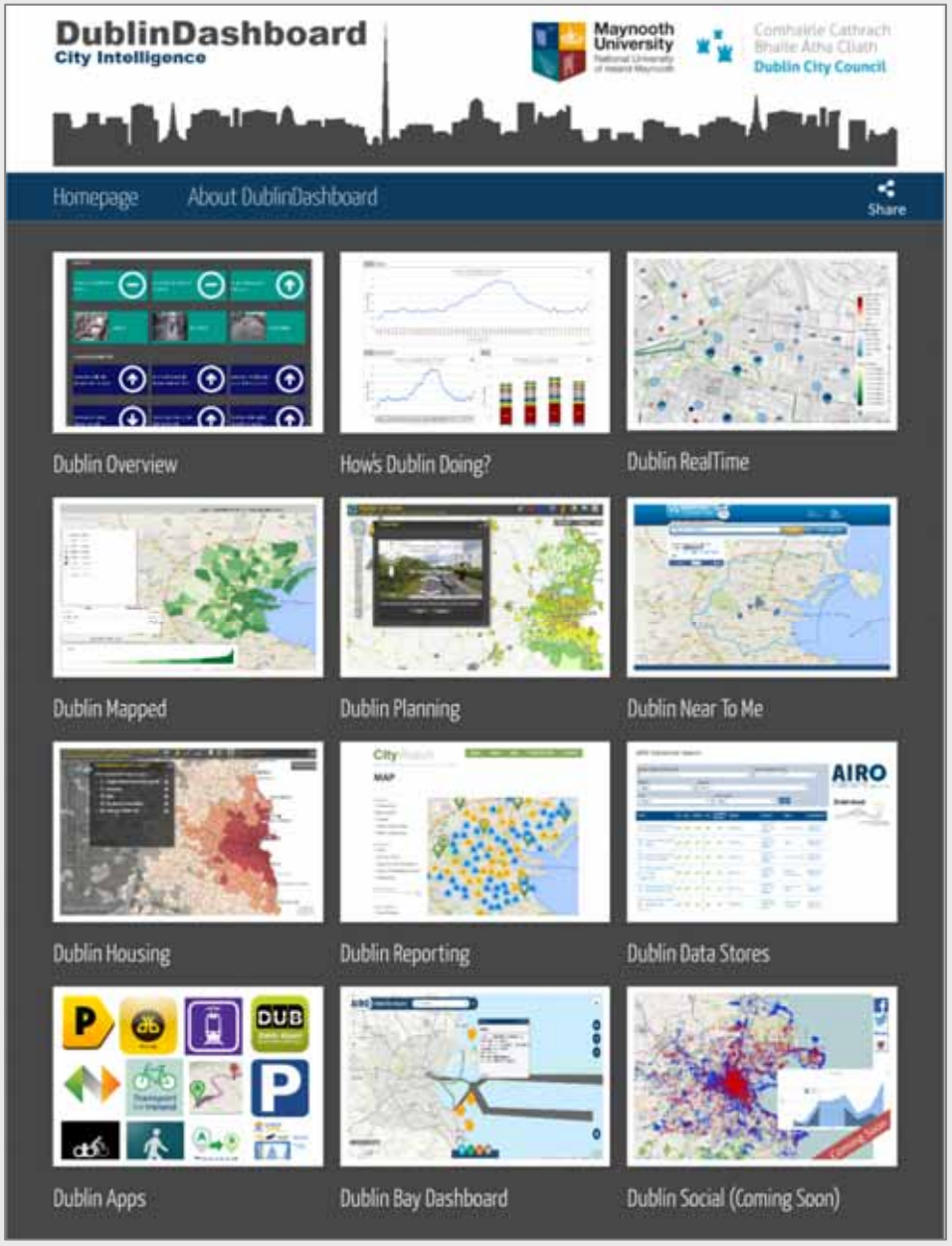

River Levels - PLA
Traffic Cameras - TfL
Air Quality Monitors - Defra
Road Information Signs - TfL

UCL
Pigeon Sim
Pigeon Sim harnesses 3D vision and rendering technology to provide an interactive fly-through of London (and beyond), augmented with real-time data as it is sensed throughout the city. It gives a bird's eye view of tides, pollution levels, traffic and more.
casa
CASA Smart Cities

SIM OVER

Let me now deal again with portals – dashboards – you have seen some of these in a previous lecture

CENTRO DE OPERAÇÕES
PREFEITURA DO RIO


DublinDashboard
City Intelligence
Maynooth University
Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council
Homepage
About DublinDashboard
Share
Dublin Overview
How's Dublin Doing?
Dublin RealTime
Dublin Mapped
Dublin Planning
Dublin Near To Me
Dublin Housing
Dublin Reporting
Dublin Data Stores
Dublin Apps
Dublin Bay Dashboard
Dublin Social (Coming Soon)

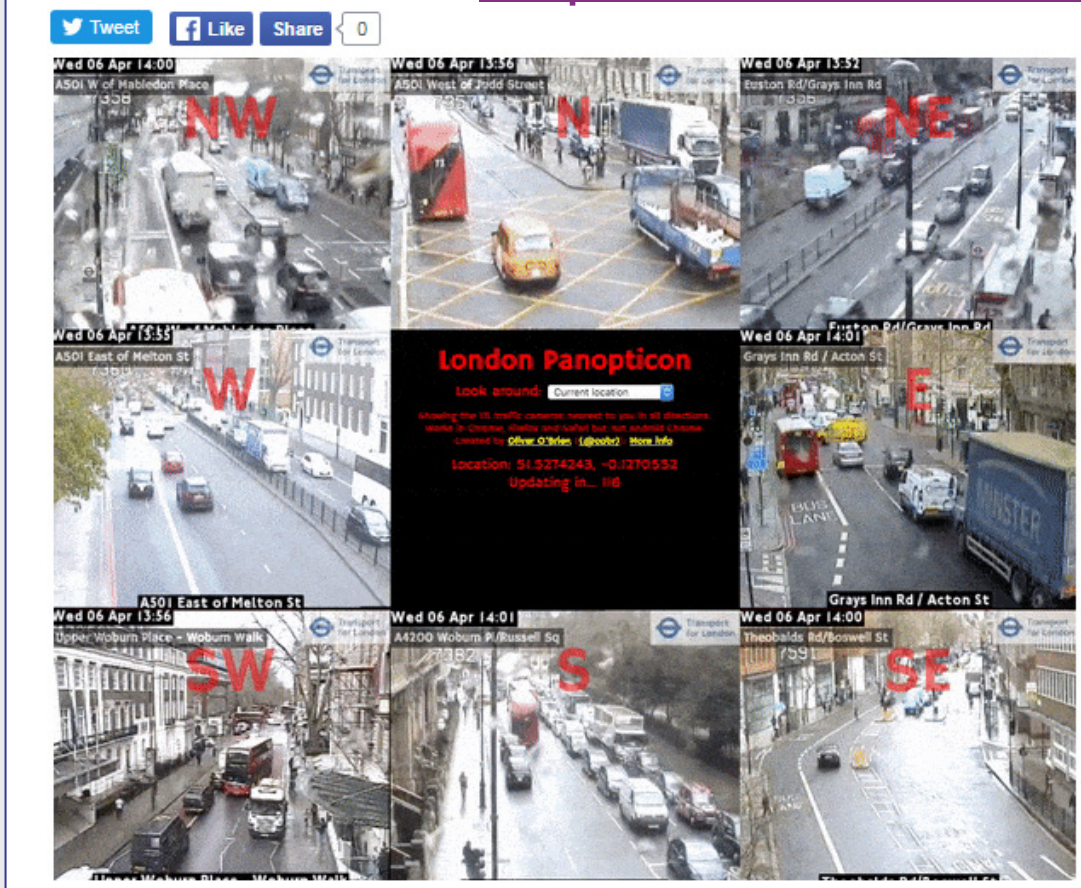
CITY of BOSTON
Employee Demographics
Last Updated: May 4, 2016
Gender
Annual Rate
Tenure - Years
Overall
Male 46.3%
Female 53.7%
By Annual Rate
By Ethnic Group
Ethnicity
Annual Rate
Tenure - Years
Overall
By Annual Rate

London
51.51 N, 0.13 W
14:26:09
Go to Map · Go to Grid · Change City
3.7 %
8.6 %
6134
589
CASA Office Desk
16
Thames (Tower Pier)
6.58
FTSE 100 Index
5480.47
Tom Maynard
#20FactsAboutMe
#CarersWeek
Nailbandian
Danny Fullbrook
Jack Osbourne
Katie Nash
MBE
Webb Simpson

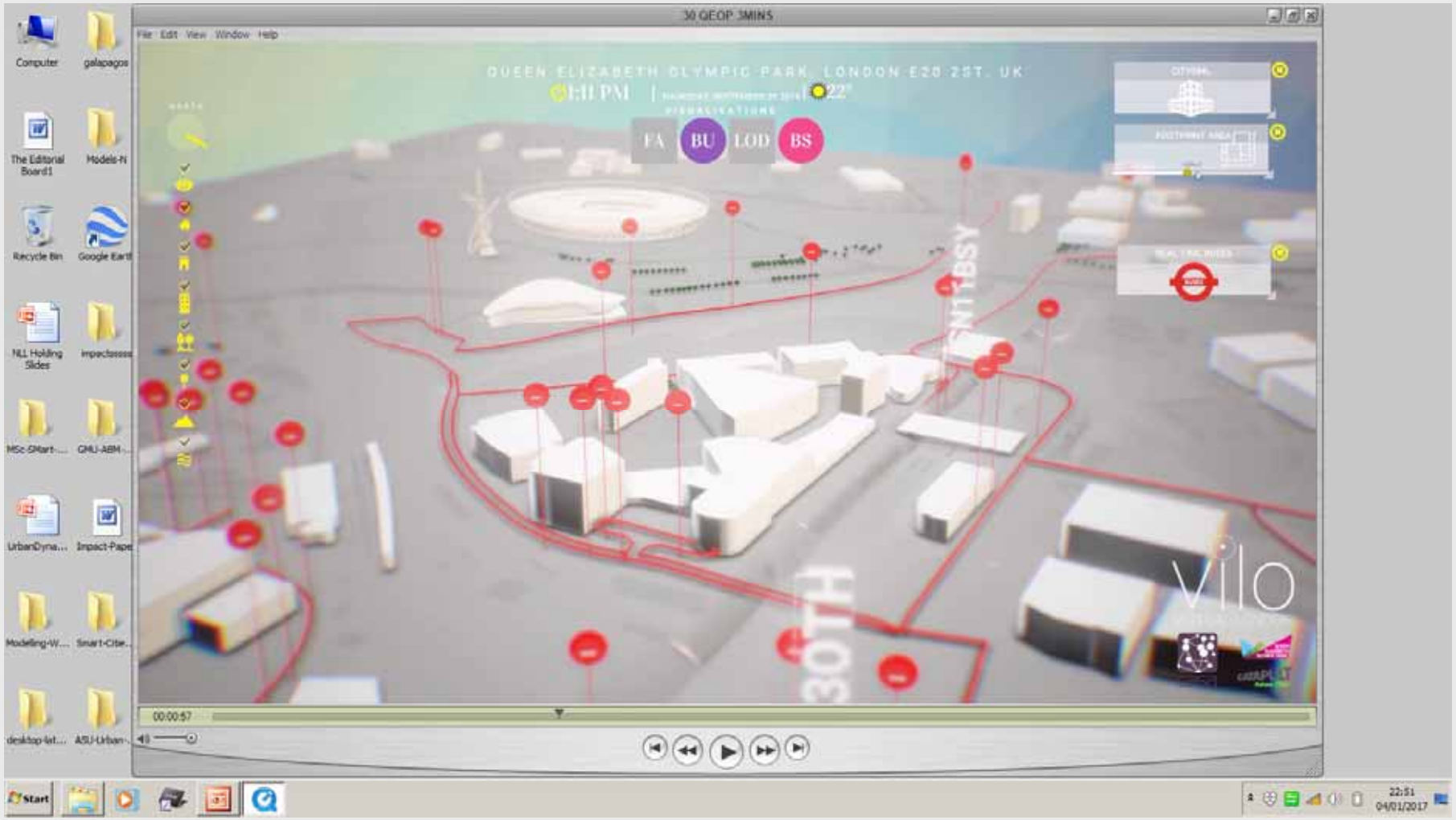
London Panopticon

6 April 2016 London

http://vis.oobrien.com/panopticon/



- We are building a 3D version of London which captures real time data in real time and displays it almost immediately – this kind of application is moving very fast at present and there are countless variants on the web



- Let me show this movie instead as it has some good real time content – no I can't show this one as I have to load Quick Time and we don't have time

I have a rather more detailed powerpoint of how to build a dashboard but I don't think we have time to show it

If there is, I will click on, but in any case, I will post it as an appendix to this fourth lecture

www.spatialcomplexity.info

home about login search help casa MAPTUBE a place to put maps

BBC RADIO 4

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

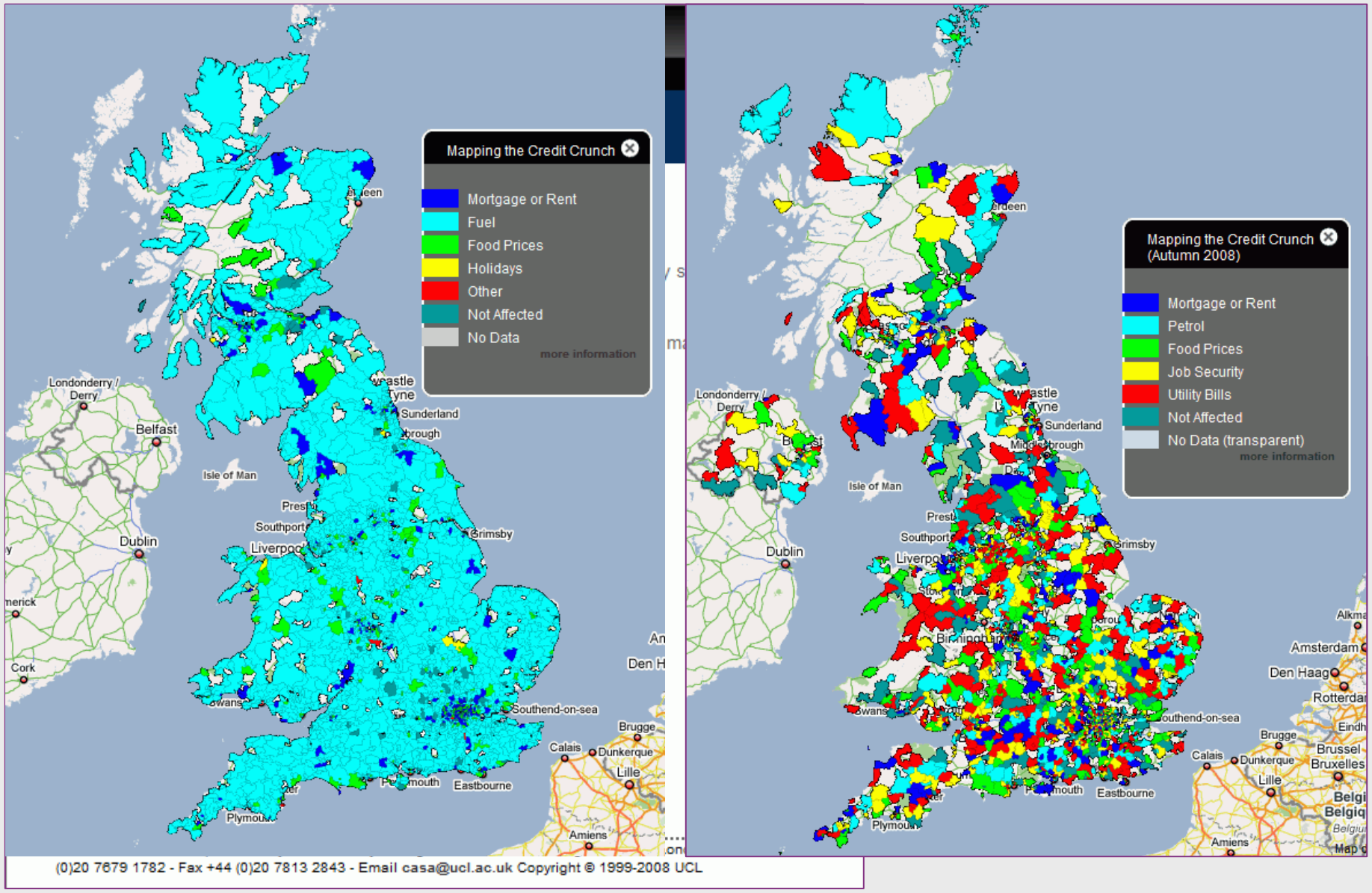
Enter the first part of your postcode: [ ]

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

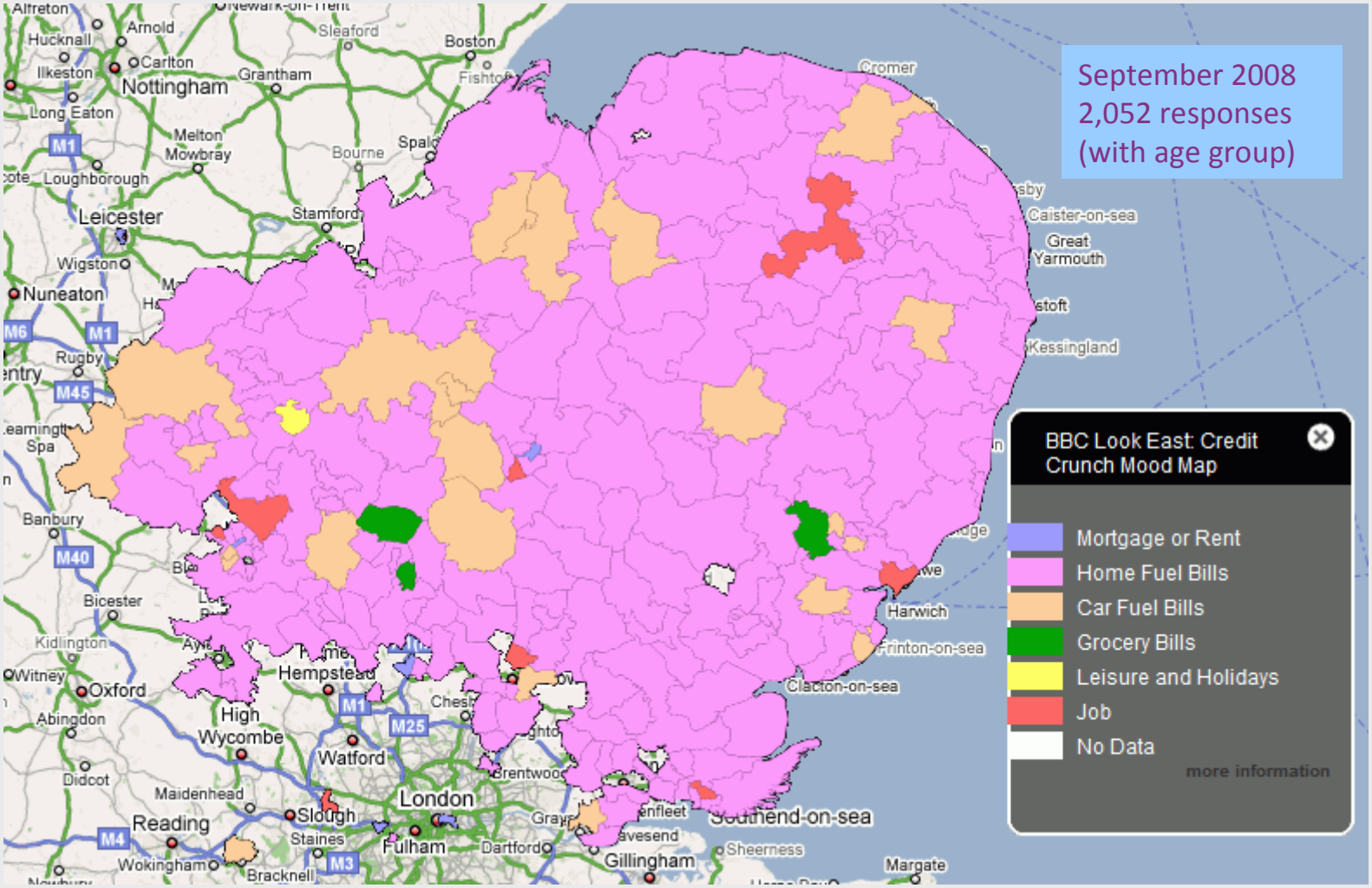
23,475 responses
April, May, June 2008

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



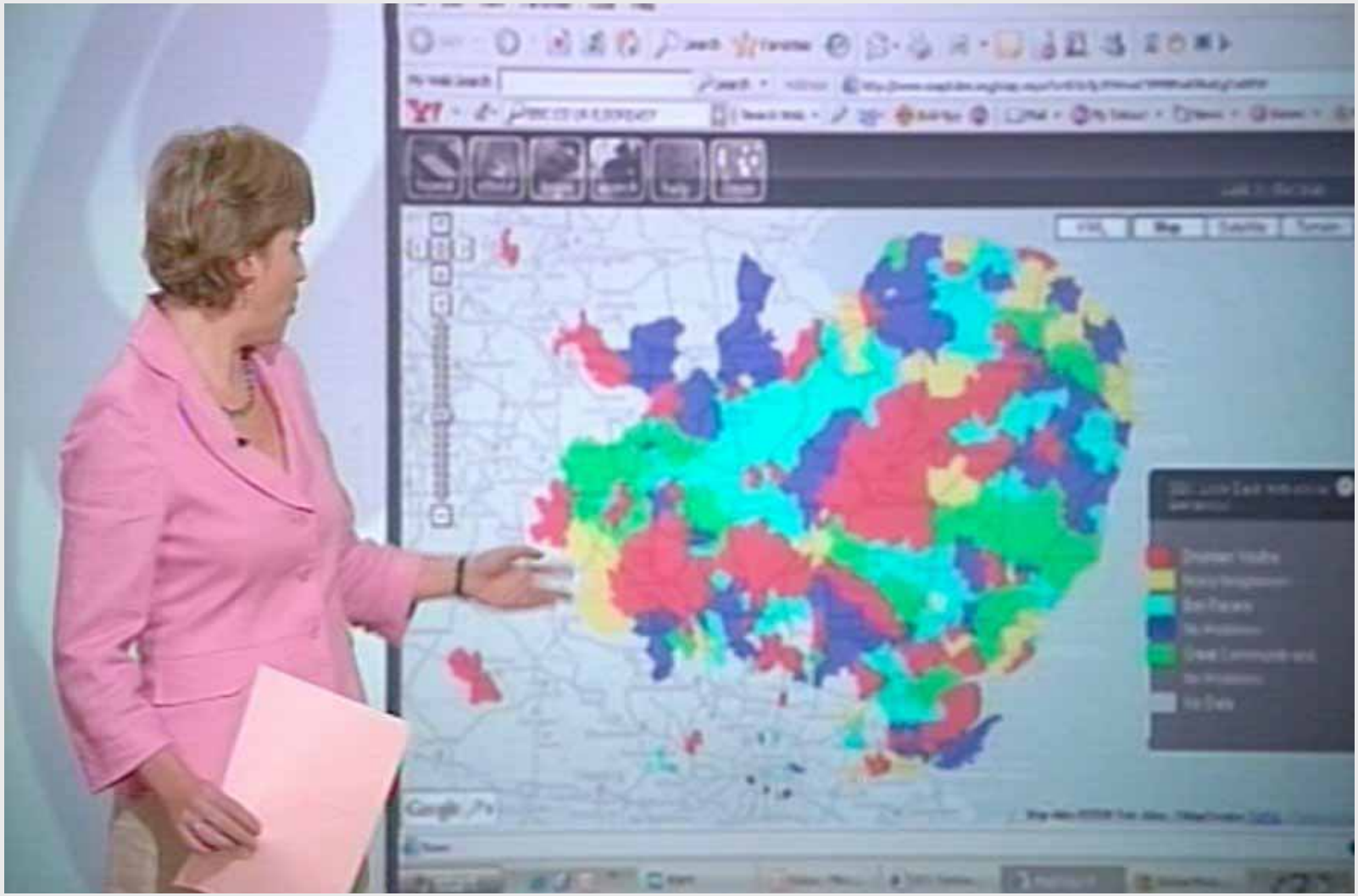
http://www.maptube.org/creditcrunch/

BBC Look East: Credit Crunch



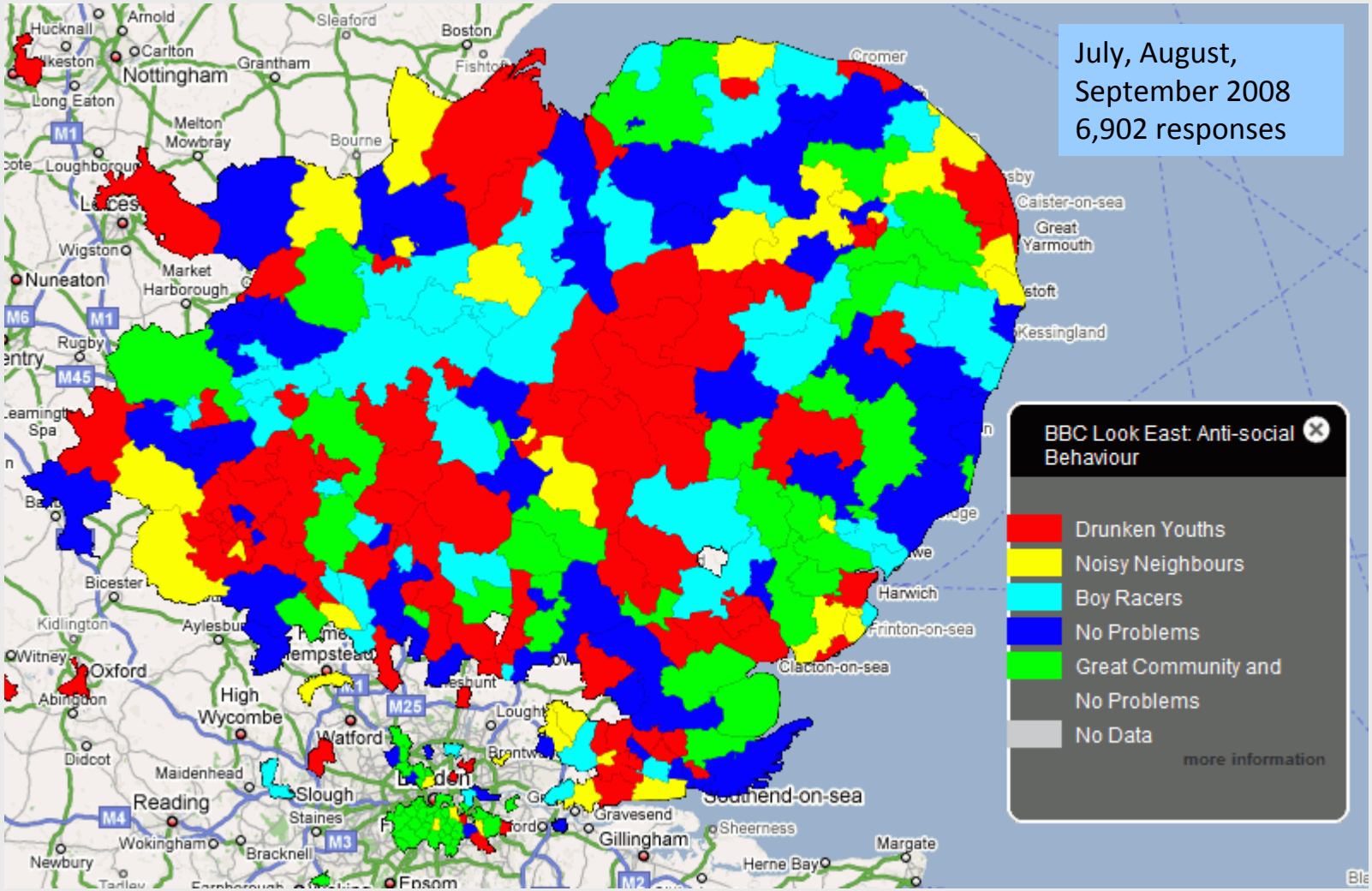
http://www.maptube.org/LookEastCreditCrunch/

BBC Look East: Anti-Social Behaviour



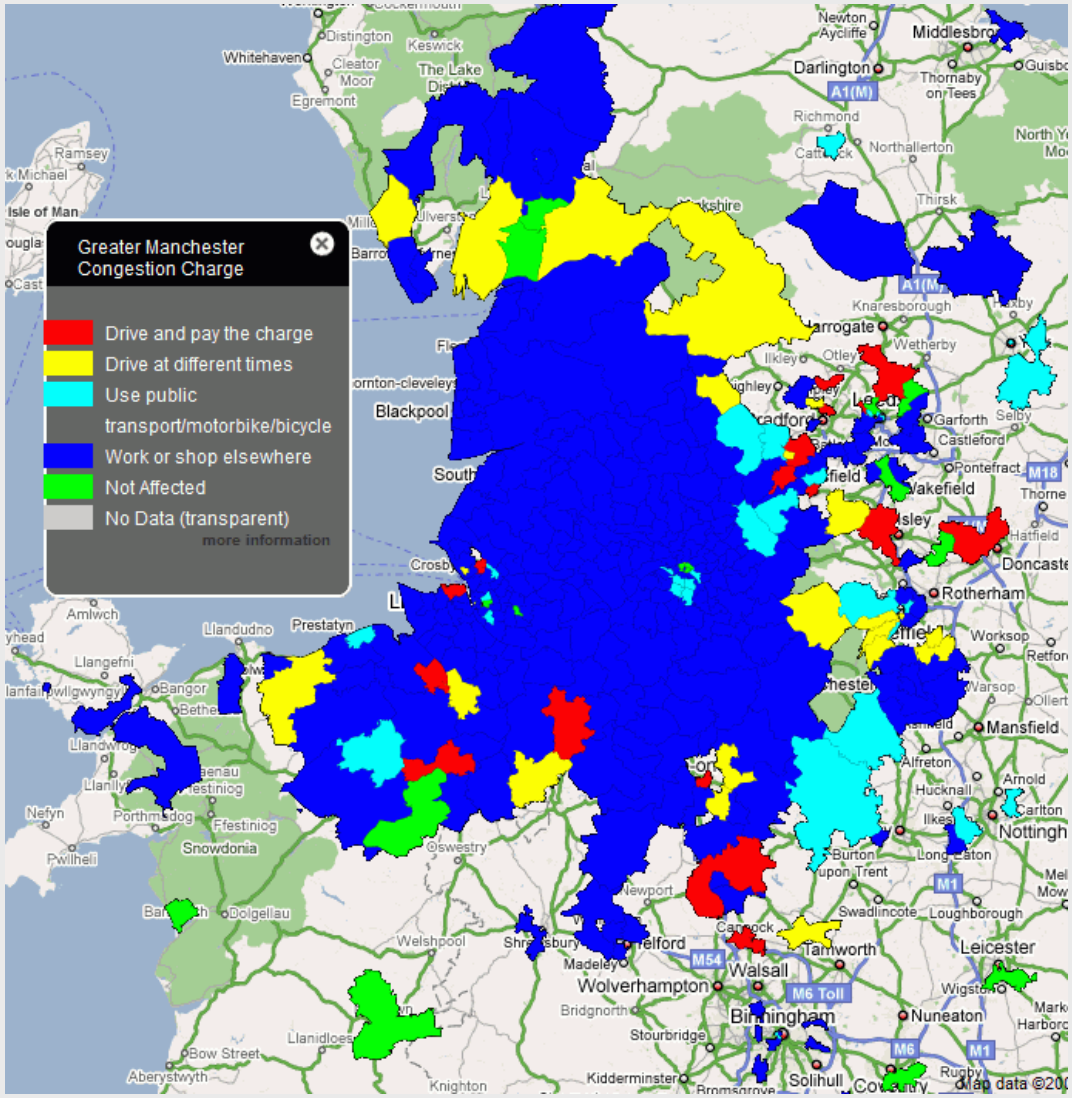
http://www.maptube.org/lookeast

BBC Look East: Anti-Social Behaviour

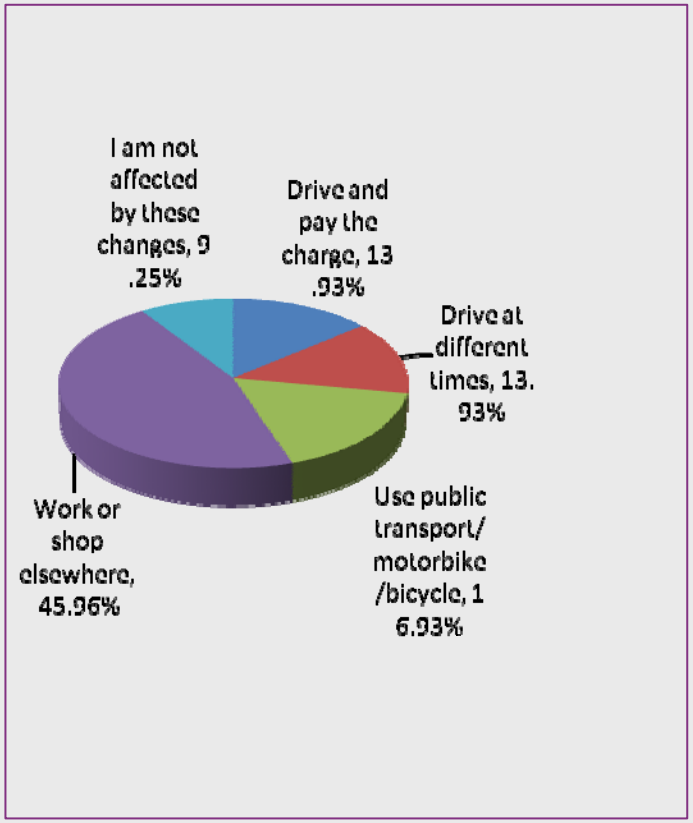


http://www.maptube.org/lookeast

Manchester Congestion Charge

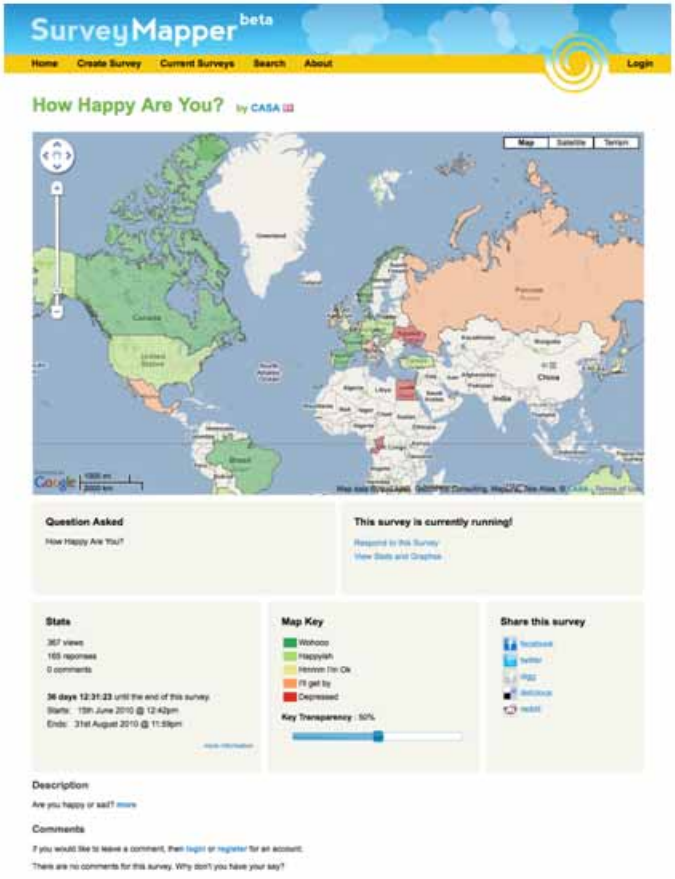


15,902 responses
October to December 2008

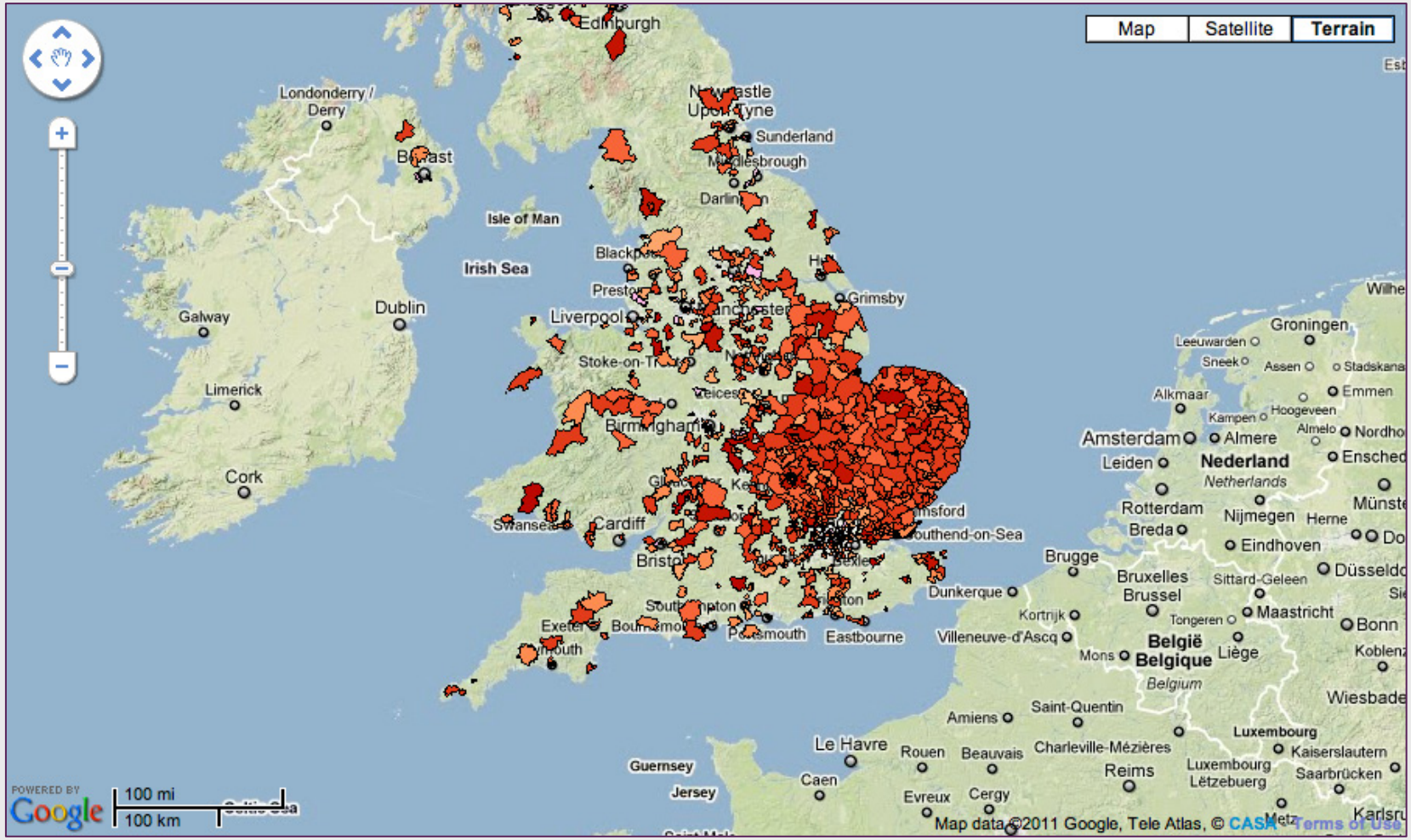


SurveyMapper

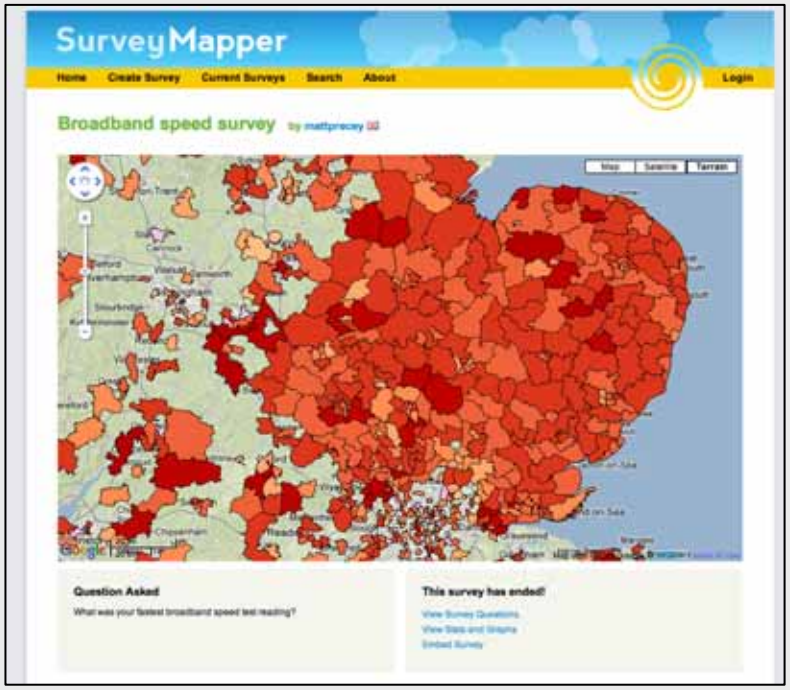
- Real-time Geographic survey tool.
- Up to 50 questions per survey
- Up to 50 answers per question
- Live stats and graphs
- Geographic Regions:
  - Worldwide Countries
  - European Countries
  - UK Counties
  - UK Postcode
  - Adding more soon
- Frequently updating regions

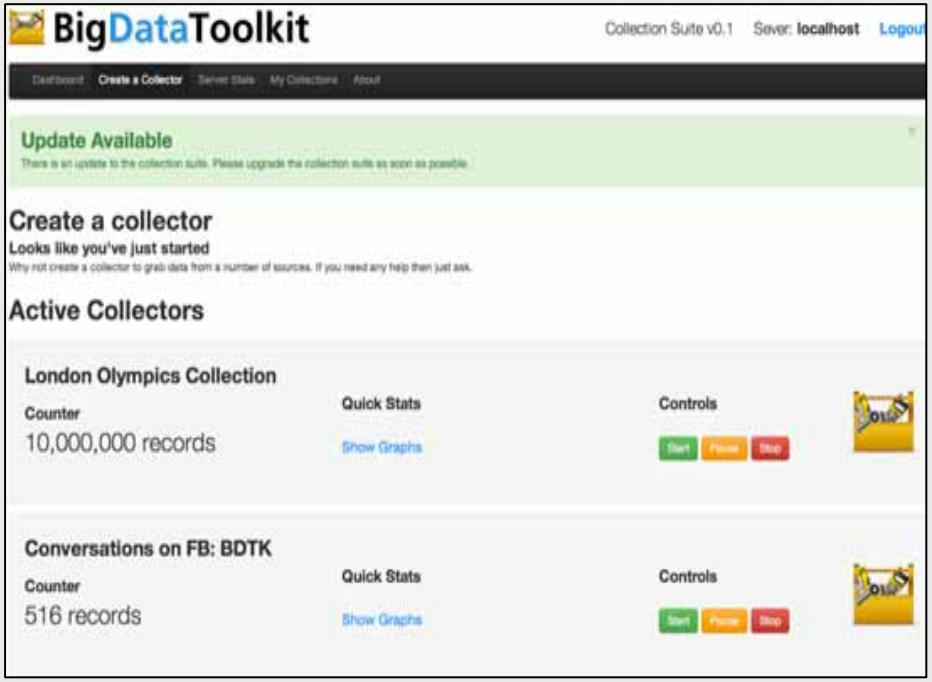


BBC Look East Survey - Broadband Speed Test



Data, Sensing, Capture, Extraction:





Crowd-Sourcing: Survey Mapper let's you create a survey and mount it on the web; this is part of the BigDataToolkit

Thanks

I hope you this has given you a taste of this new world and there is no doubt that there are some very profound implications for how we do science and build policy from these developments

http://www.complexcity.info/
http://www.spatialcomplexity.info/
http://blogs.casa.ucl.ac.uk/

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@jmichaelbatty