The role of a National Mapping Agency in Geo information Management

**Ordnance Survey**

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Unprecedented challenges at global, national, regional and local level

What does the future hold ?

- **Societies**
  - Increased mobility and also transience
  - Constantly changing and evolving

- **Users**
  - More demanding
  - Require immediate responses
  - Require customised information

- **Technology**
  - Convergence of technologies
    - miniaturisation
    - intelligence in device/network
    - increased bandwidth & processing power distributed via GRID computing

- **Automation**
  - Significantly increasing
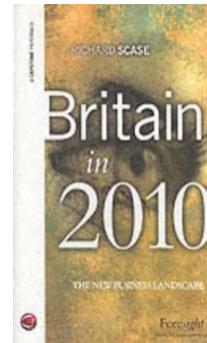
…a world driven by community participation

Creating place based, theme based and web based communities and enhancing physical communities

Geographic information community is playing a leading role

Local

Lift sharing

Sentience –
significant efficiencies

Global

Geography: underpinning the nation

Geography has gone mobile

The GI Community plays a leading role

- Everything happens somewhere
- Geography is the **stage** on which all natural and human activity occurs
- Geography and geographic information are essential ingredients in tackling the challenges humanity and the globe faces
- Location is the fourth driver of decision-making for business and the public sector

Ordnance Survey Great Britain

- Ordnance Survey is 218 years old
- Civilian organisation since 1983; 1415 staff
- Independent Government Department and Executive Agency reporting directly to a Government Minister
- Trading Fund since April 1999
- Annual Report for 2007/08: operating turnover of £118.2m ($177.6m)
- Less than 50% of our trading revenue is sourced from the public sector
- Headquarters in Southampton with 28 field offices around Great Britain

Ordnance Survey today

- Creates and maintains the 'master map' of Great Britain from which others derive benefit
- Manages complete national large scale digital data down to building level detail
- Maintains a database of 460 million features with approximately 5,000 changes made daily
- In 2007/08, 99.9% of real world features were represented in the database within six months of completion on the ground
- From the database, Ordnance Survey produces a range of digital data and paper maps for business, leisure, educational and administrative use
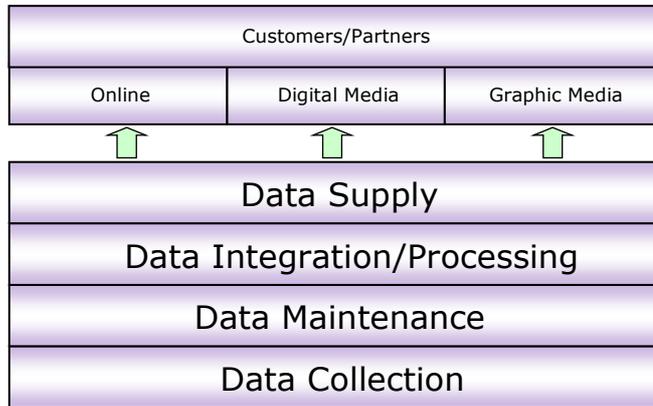
Provides the underpinning geographic framework for Great Britain

Ordnance Survey's business

Customers/Partners		
Online	Digital Media	Graphic Media

Data Supply

Data Integration/Processing

Data Maintenance

Data Collection

Updating the Ordnance Survey database

Change intelligence from:
- Ordnance Survey field staff
- Third party commercial sources
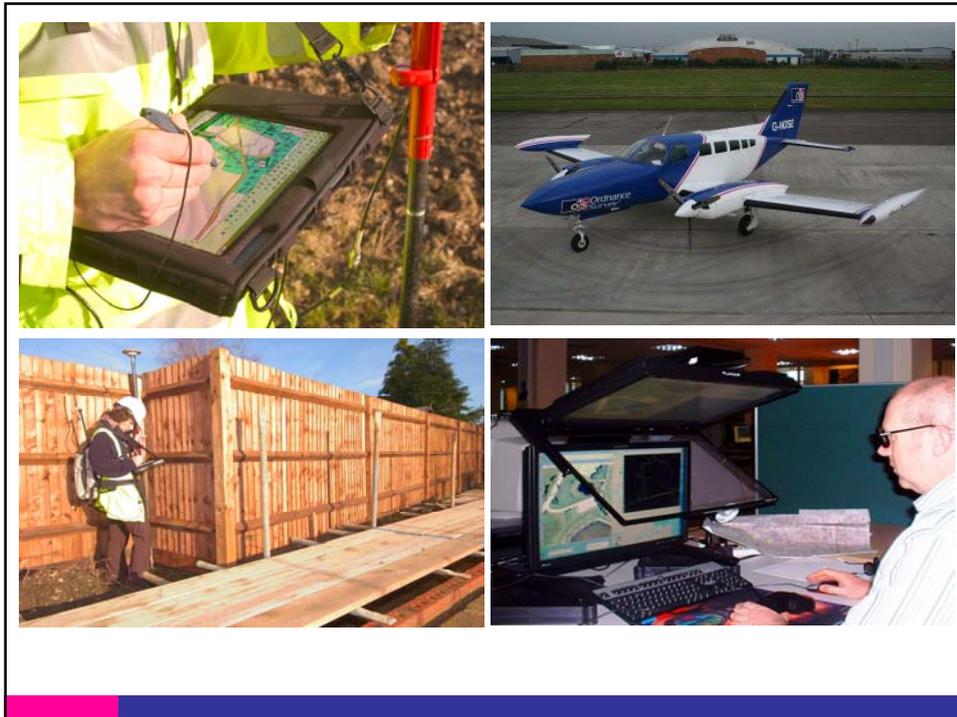
Field survey

Aerial survey

Photogrammetry

Data from external sources

460 million records

5,000 daily changes

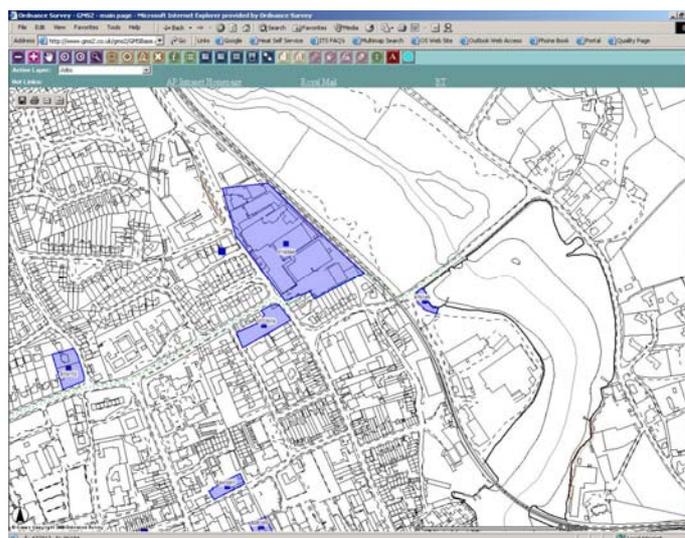**National Geospatial Database** *generates* **OS MasterMap**
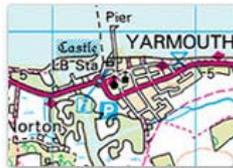
Customers

How Ordnance Survey identifies change.

Managing Change Intelligence using GIS

- Information about proposed developments including descriptions.

- Key dates and current status is managed within a web-based GIS.

And…Attributed data

Small scales   **Boundaries**

Address

There are **27 million** addresses in the database and we check **42 000** new addresses every month.
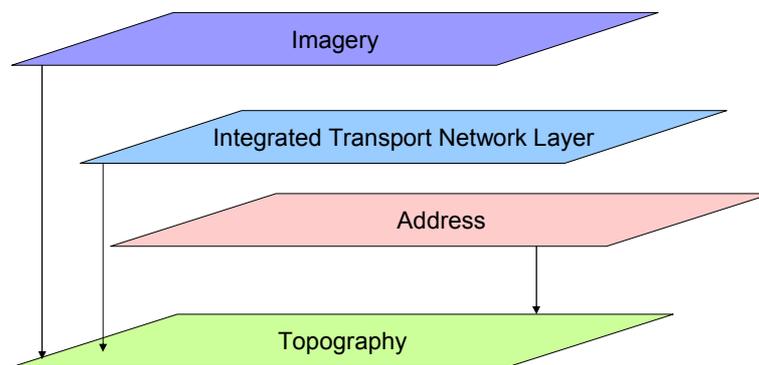

Tourist information

Address Layer 2

Address Layer 2 contains a range of data, such as:

- Objects without postal addresses

- Multi-occupation without postal addresses

- Alternative geographic Addresses

- Building name aliases

- Welsh alternatives

- Classifications

OS MasterMap current layers

Imagery

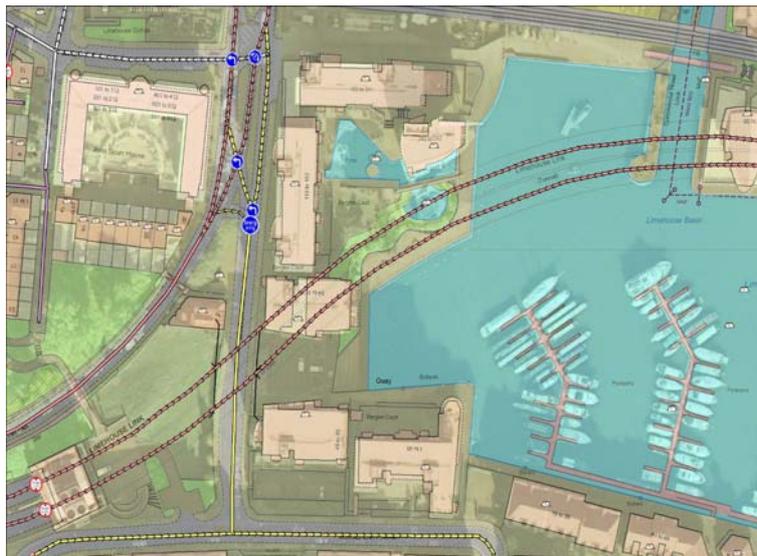Integrated Transport Network Layer

Address

Topography

OS MasterMap – integrated layers

Topography – Address – Imagery – Integrated Transport Network

Layers of OS MasterMap
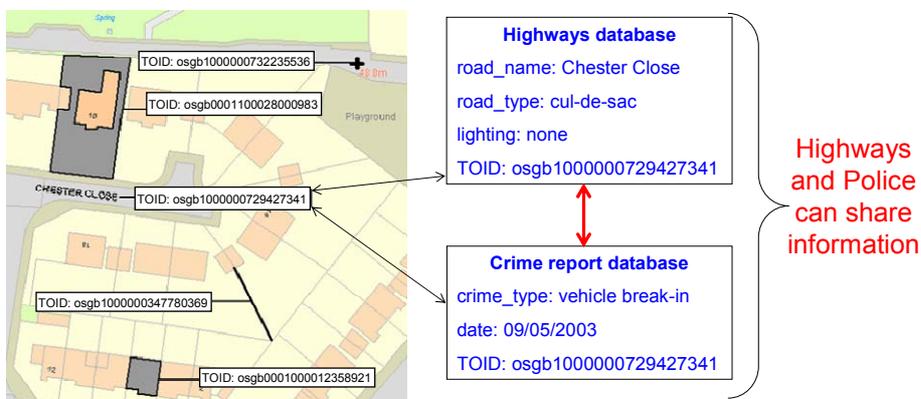

Topography

Addresses

Integrated
Transport
Network

Imagery

Combination of Imagery, Address Layer and ITN data

A geographic database to connect information

- Every object represented in OS MasterMap has a unique identifier called a TOID. These TOIDs can be used to connect other information.

Highways database
road_name: Chester Close
road_type: cul-de-sac
lighting: none
TOID: osgb1000000729427341

Crime report database
crime_type: vehicle break-in
date: 09/05/2003
TOID: osgb1000000729427341

Highways and Police can share information

TOID: osgb1000000732235536
TOID: osgb0001100028000983
CHESTER CLOSE — TOID: osgb1000000729427341
TOID: osgb1000000347780369
TOID: osgb0001000012358921

The need for a referencing framework

- In Britain there are well-established sources of base information
- There are many established users with different applications
- The challenge - establish principles to make information sources accessible and connectable
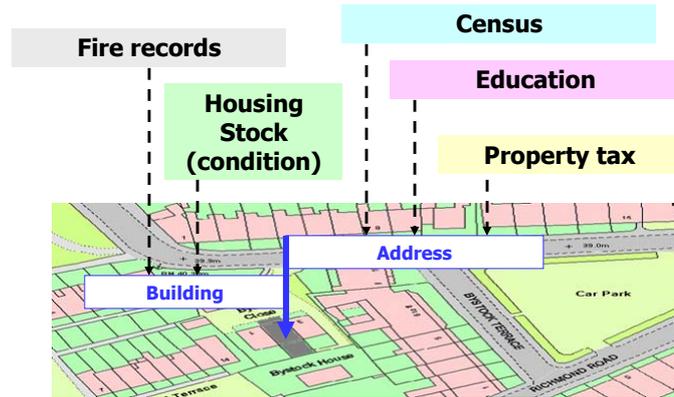
DNF for managing buried services

- The cost of not knowing precisely where pipelines and cables are buried is extremely high
- There are 4 million road excavations every year
- The Institution of Civil Engineers has recommended that all buried services should from now on be captured to DNF standards and principles

Basic dGPS: 0.8-3m

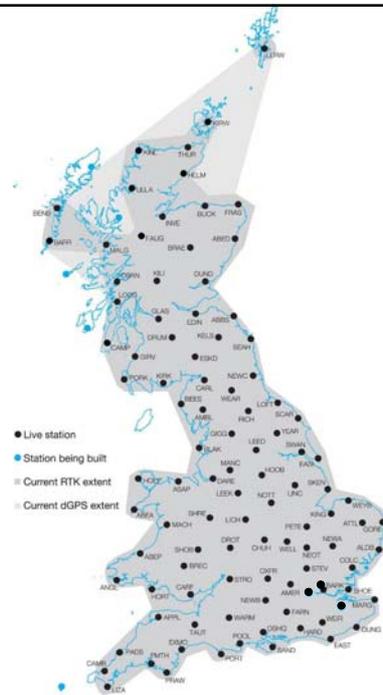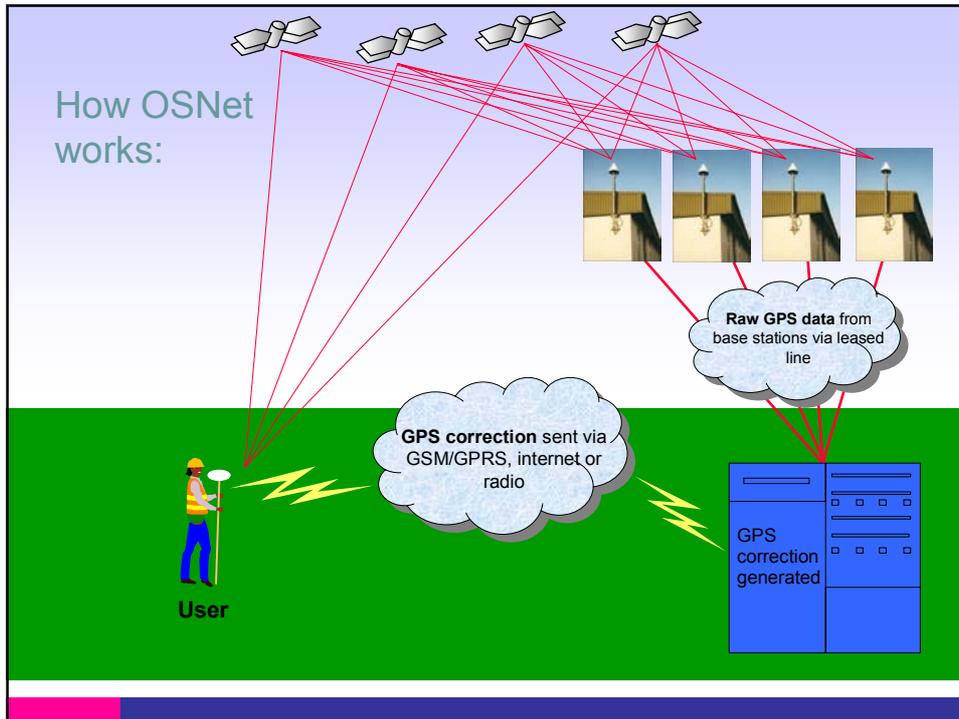RTK:1-2cm

High Quality dGPS: 20-80cm

Standalone GPS: 10m

The Current Network

- Near national 1-3cm 3d GPS coverage achieved

- GPS+GLONASS network in place around London

- Free GPS products from; www.ordnancesurvey.co.uk/GPS

Typical Installation

- Live station
- Station being built
- Current RTK extent
- Current dGPS extent

How OSNet works:

Raw GPS data from base stations via leased line

GPS correction sent via GSM/GPRS, internet or radio
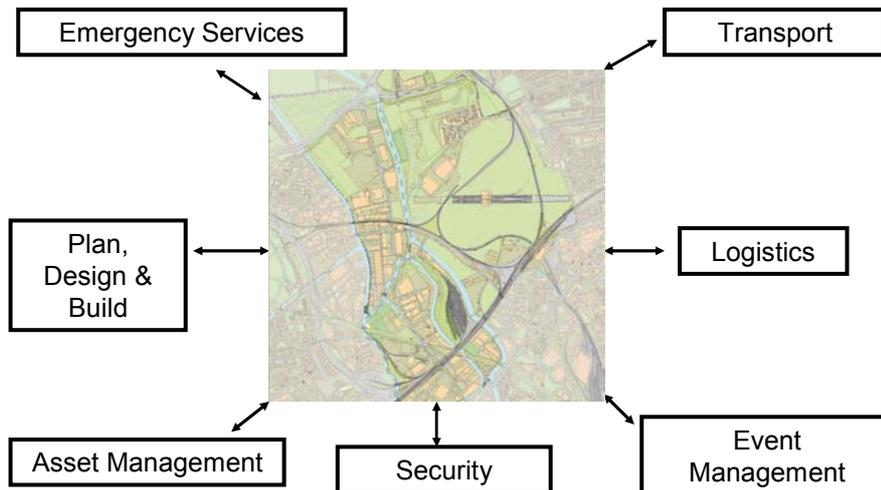
User

GPS correction generated

OS Net underpinning the construction of London 2012

- Ordnance Survey has upgraded the OS Net network around the Olympic Park and across the Thames Gateway region
- Ordnance Survey has been acting as consultants to the ODA on grid coordinate system definitions and the fitting of Olympic Grid to National Grid
- All developer contractors and subcontractors will be able to access very high accuracy GPS positioning via OS Net, leading to higher accuracy and positional uniformity across the site

Ordnance Survey's Objective
Provide a mapping framework to support the 2012 agenda

Emergency Services

Transport

Plan, Design & Build

Logistics

Asset Management

Security

Event Management

HIGHWAYS AGENCY

- 100,000 accidents on this network every year, 5000 require police investigation
- The Highways Agency work closely with the 38 Police Forces in England to give them the tools to carry out accurate investigations
- The Highways Agency started to investigate new survey methods in 2005
- Ordnance Survey worked with Warwickshire and Surrey Police forces to pilot using OS Net GPS
- OS Net provides up to 1cm level positioning
- This is now the primary method adopted by all police forces

The end result

- Highways Agency studies have shown that, on average, roads are opened 40 minutes quicker
- "The Highways Agency is really demonstrating how it is committed to working with the police across the country, in a bid to make the roads safer for drivers, as well as making journey times more reliable. This is a sound investment in new technology that can really make a difference for everyone involved."

Tom Harris, Roads Minister.

Utility efficiencies by linking customer records to Assets to billing

- What the asset department believes it supplies (blue)…
- Who the billing department believes they are billing (green)…
- Leaving those in red…

Northumbrian Water Limited – investing in GI

The return on investment is real and demonstrable and includes:

- Additional income alone of well over £1m ($1.5m) through improved management of empty properties.

- A sustainable cut of at least £60,000 ($90,000) in operating costs through the call centre solve-at-source principle.

- Significant savings in time and cost in the provision of timely and accurate asset information to field technicians.

Ian Donald, Customer Services Director concludes: *'From the customers' point of view and from the business point of view, GIS has been of great benefit and our investment has been well worth it'.*

Council improves school transport services

- East Riding Council used OS MasterMap Integrated Transport Network (ITN) data

- East Riding Council saved £160,000 ($240,000) annually by improving school bus services for just two secondary schools

Increasing patient registrations
Birmingham Health and Well-being partnership

- **Identifying patient spread**
  - OS MasterMap Address Layer 2 is used with multiple occupancy information
  - The Trust can quickly identify addresses where there is no record of a registered patient
- **Reaching the unregistered**
  - Targeted mail shots encourage people to register with a GP
- **Maximising the benefits**
  - An increase in patient registrations in areas identified as having low registrations
  - Improved patient address list will support future health campaigns and surveys

Population by Households
Size of icon represents number of people in household
14
7
2

Daventry District Council – Optimising waste collection using OS MasterMap Integrated Transport Network Layer

- Daventry generated new waste collection routes in all seven districts using OS MasterMap Integrated Transport Layer with Route Restriction Information

- Daventry has been able to rationalise the number of domestic waste collection route from nine to eight, reducing diesel costs by 12%, increasing spare capacity by 14% and eliminating overtime costs.


Photograph courtesy of Daventry District Council

'OS MasterMap ITN Layer and Road Routing Information has made it possible for us to meet our challenges of increasing efficiency, planning for growth and reducing landfill. In Daventry alone we are on target to achieve savings of around £100 000 per year, with much greater savings expected for the whole county.'
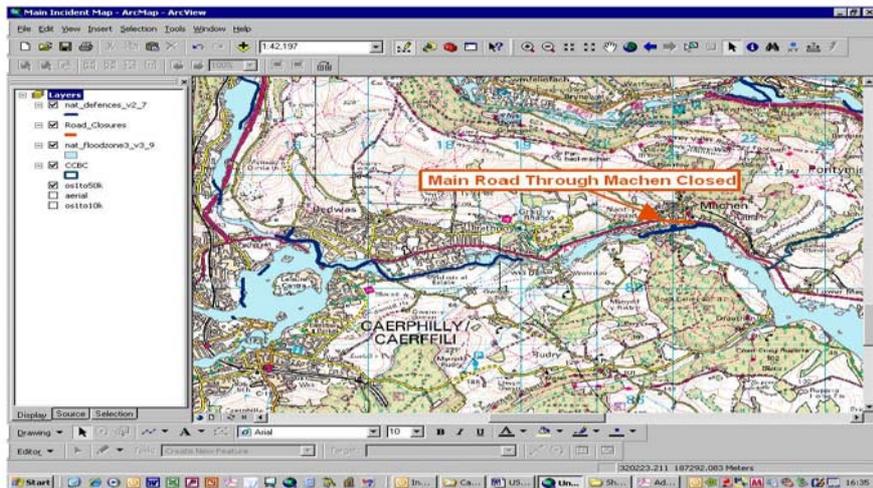
Jo Gilford
Corporate Manager for Public Space
Daventry District Council

BT Virtual Networks
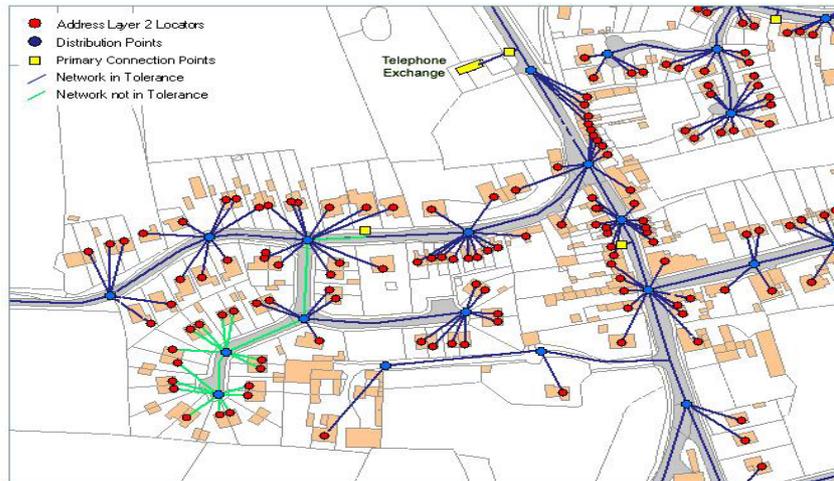
Situation mapping: Caerphilly, September 2008

Transport Direct – Underpinning multi mode transport services

- Transport direct is the first ever web portal giving instant access to comprehensive journey information by both public and private transport across Great Britain
- Create a transport portal using data from local authorities, transport operators, existing travel websites and other technology and service providers.
- The portal:
  - Enables users to plan journeys using a range of transport service providers and modes of travel
  - Provides realistic car journey plans that take account of historical congestion data.
  - Facilitates travel by public transport by passing planned journey details across to Internet coach and rail retailers to enable the purchase of tickets
  - Enables travellers to view travel plans, predict journey times and keep up to date with travel conditions.
  - Provides real-time information for all Britain's railway stations and for other modes of transport when available.

transport direct.info

Connecting PeopletoPlaces


Bus accident claim fraud

- Ordnance Survey supported the Motor Insurers' Bureau investigation.

- The case involved a bus being involved in a 'rear-end' collision.

- A series of whiplash claims were submitted.

- Allied to other evidence gathered, the Motor Insurance Bureau was able to use our mapping analysis in establishing that the claimants had prior knowledge that an 'accident' was going to happen.

- The scam disintegrated and 42 of the 43 claims were withdrawn or successfully rejected.

Climate change monitoring in Haringey
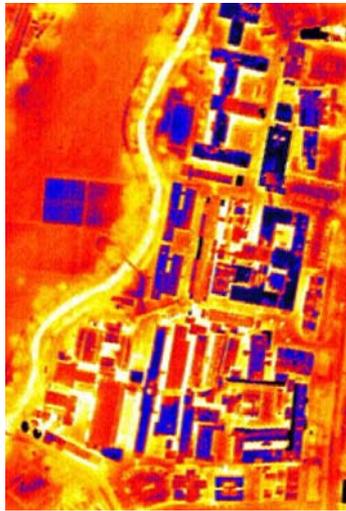
Thermal Imaging data
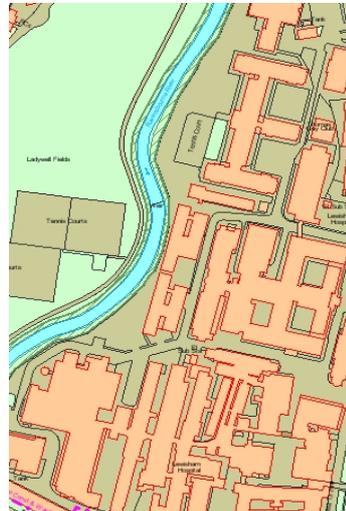
Ordnance Survey MasterMap

Climate change monitoring in Haringey

- The results of the heat loss survey were displayed on the internet in an easy to use interface
- This alerted home owners to heat loss and hopefully following action by the householder helps save money on heating bills
- Also creates a more energy-efficient building, which in turn will contribute to Haringey's efforts to tackle global warming at a local level.

Mapping for Emergencies


Mapping for Emergencies (MFE)

- **Yorkshire Floods**
- Rotherham Council Emergency Planning Council evacuated to nearby Police Station
- Request for contour mapping near Ulley reservoir
- Provided addresses of those to be evacuated
- Emergency flood planning
- Advice on position of at risk electricity sub stations

Potentially affected addresses

	Organisation	Building_Number	Sub_building	Building_Name	Thoroughfare	PostCode
1	Organisation	Building_Number	Sub_building	Building_Name	Thoroughfare	PostCode
2	THE SOFA FACTORY				LYME STREET	S60 1EH
3	MOTORCISE	32			BRIDGEGATE	S60 1PQ
5	SCOMAGG LTD			SCOMAGG HOUSE	DODDS CLOSE	S60 1BX
6	SHOPACHECK FINANCIAL SERVICES LTD			UNIT 6	RAWMARSH ROAD	S60 1RU
7	KLICK PHOTOPOINT	41			BRIDGEGATE	S60 1PL
8	W GORDON & SONS TRAVEL	9			CORPORATION STREET	S60 1NP
9	AMCO				LINCOLN STREET	S60 1RP
10	K B FRENCH POLISHING			UNIT 7	LINCOLN STREET	S60 1RP
11	THE RHINOCEROS			35-37	BRIDGEGATE	S60 1PL
12	P D R ELECTRICAL ENGINEERING LTD			UNIT 4	MASBROUGH STREET	S60 1EW
13	MORTGAGE BUREAU	3			THE POINT	S60 1BP
15	FACIA MANIA	77		MILTON HOUSE	SHEFFIELD ROAD	S60 1DA
16	SPRINT ENVELOPES LTD		UNIT B1-B2	THE BUSINESS CENTRE	BOW BRIDGE CLOSE	S60 1BY
18	SORTEC SOFTWARE DEVELOPMENT		UNIT 12	ASHTENNE CENTRE	BOW BRIDGE CLOSE	S60 1BY
19	LILLEKER ENGINEERING CO LTD			UNIT B3	LINCOLN STREET	S60 1RP
20	MARRIOTT TRAVEL			09-Oct	OLD TOWN HALL	S60 1QX
21	D V HOWELLS		UNIT 35	THE BUSINESS CENTRE	BOW BRIDGE CLOSE	S60 1BY
22	NEWBURG ENGINEERING			UNIT 10	BESSEMER WAY	S60 1FB
23	ROSEHILL PRESS LTD				BRADMARSH WAY	S60 1BW
24	MOWLEM			SWANAGE COURT	DODDS CLOSE	S60 1BX
25	QUAY PLASTICS			UNIT 3D	HOPE STREET	S60 1LH
26	INDUSTRIAL PUMPS			UNIT 3E	HOPE STREET	S60 1LH
27	CRAWFORDS		UNIT D7	THE BUSINESS CENTRE	BOW BRIDGE CLOSE	S60 1BY
30	SUNQUEST			18A	BRIDGEGATE	S60 1PQ
31	T H S TOOLS GROUP			SALISBURY HOUSE UNIT	BESSEMER WAY	S60 1FB
32	GOVERNMENT SURPLUS CLOTHING	104			WESTGATE	S60 1BD
33	BET FRED			18-20	BRIDGEGATE	S60 1PQ

Spread of Disease:
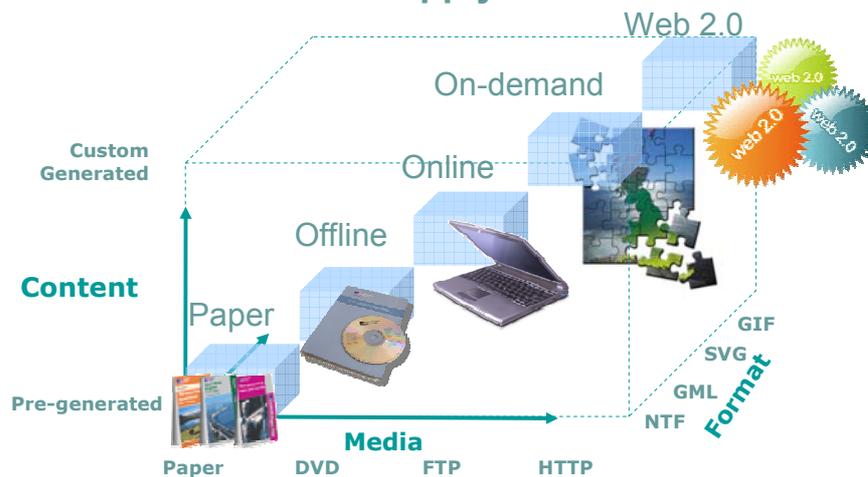# Bird Flu, Bluetongue & Foot & Mouth
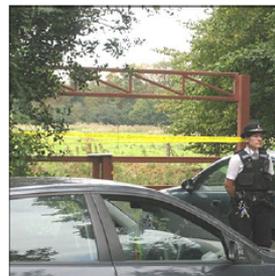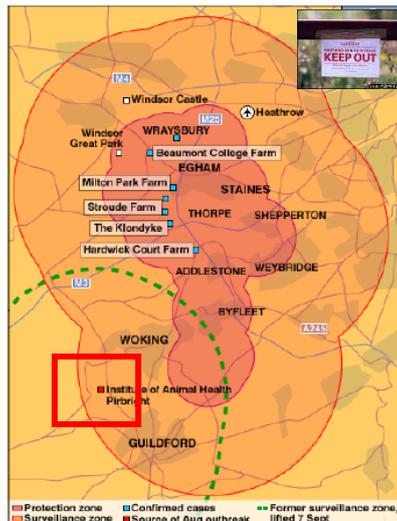
Carlisle Floods
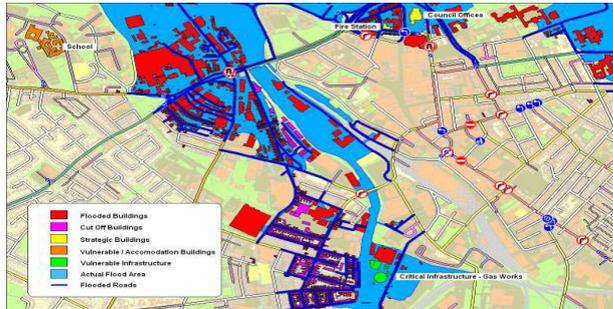
- the 'blue water area' shows the actual Carlisle flood limit and the roads that were covered
- due to lack of risk analysis the whole emergency plan coordination data was held in the basement of the Council Offices shown in the top right hand picture
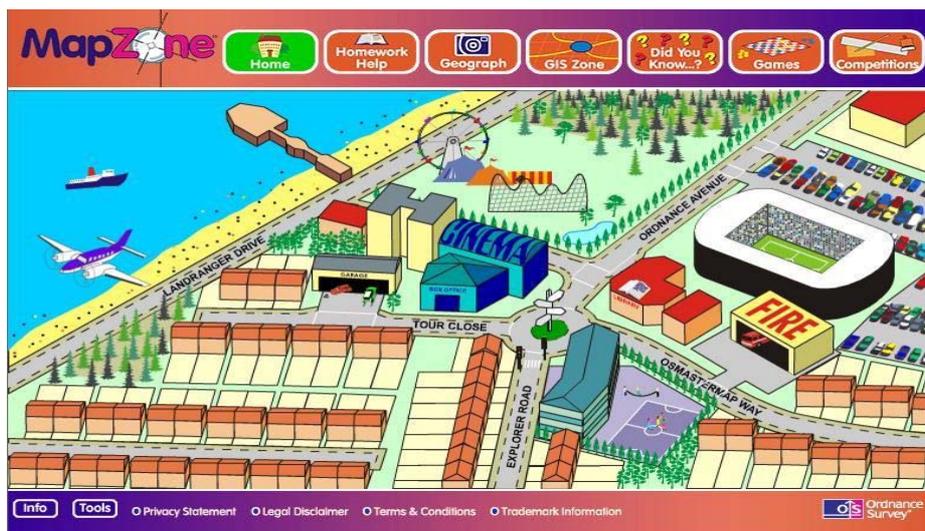

Customer Focused **Supply Models**

Web 2.0

On-demand

Online

Offline

Paper

Content

Custom Generated

Pre-generated

Media

Paper   DVD   FTP   HTTP

GIF
SVG
GML
NTF

Format

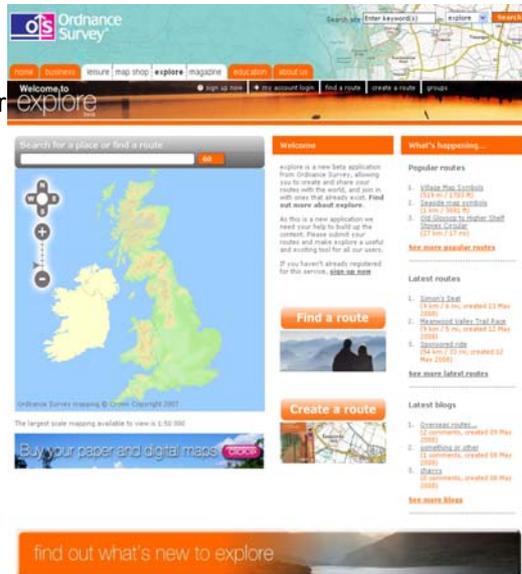5,000,000 maps and counting

Mapzone:
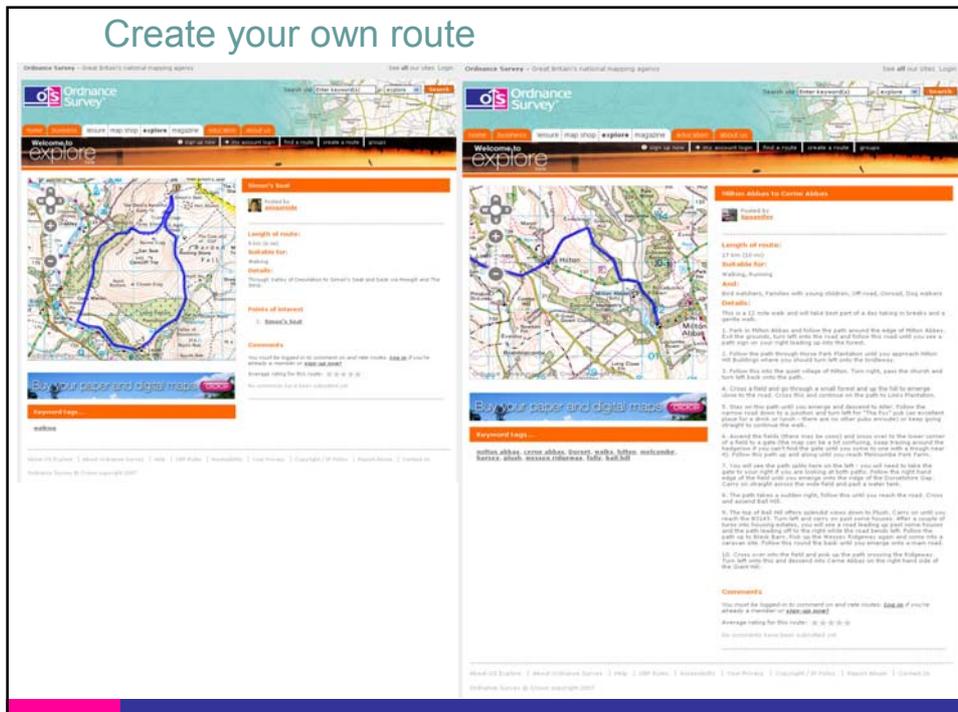http://www.ordnancesurvey.co.uk/mapzone

Explore!

- Create routes with waypoint markers and plot them onto our 1:50 000 scale mapping
- Add user-generated points of interest, for example, a great tea shop or museum
- Share your favourite pictures, news and events

Create your own route

Add your photos and points of interest

Coledale Beck
by Spoonfer

Newlands Valley
by Spoonfer

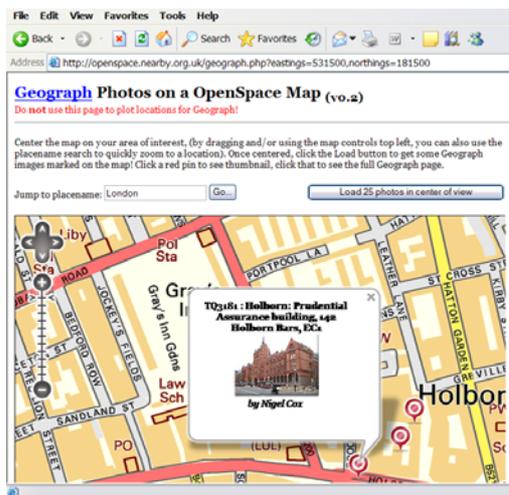Pike of Stickle/Gimmer Crag
by Spoonfer

The Borrowdale Valley
by Spoonfer

OS OpenSpace

- The focus is on experimentation
- The API enables 'Mash Up' applications
- Ordnance Survey data is available to OS OpenSpace users
- Non-commercial use only
- Provide support to commercialise ideas

The Minister responsible for Ordnance Survey, Iain Wright MP, says: *"In launching OS OpenSpace, Ordnance Survey is taking a lead in providing greater access to public information. The launch will allow others to innovate using geographic information, with confidence in the national consistency and currency of the data they use."*

OS OpenSpace stats

Since Open Alpha - 31st January 2008:

- >1336 registered developers
- 582,000 visitors to developers' applications
- 48 million tiles served

Budget 2009….22nd April

Ordnance Survey
BUSINESS STRATEGY

OS Ordnance Survey®

Ordnance Survey Business Strategy

Government has decided that a model where a user pays a licence fee for Ordnance Survey data continues to be the most effective way of balancing the need to increase the availability of geographic information to the wider UK economy and society whilst maintaining the quality of Ordnance Survey data. However, it has determined that Ordnance Survey should implement a new business strategy to meet the changing needs of customers and the wider market.

Within this framework, it has been agreed with Ministers to focus the business around five key areas. These are:

1. Promote innovation for economic benefit and social engagement
2. Increase the use of Ordnance Survey data
3. Support the sharing of information across the whole of the public sector
4. Increase efficiency to develop a sustainable business for the future
5. Enhance value through the creation of an innovative trading entity

The overall aim of this new business strategy is to provide the best balance between making information more widely available and creating a sustainable future for Ordnance Survey and the wider market.

The new strategy will be developed further and implemented over the coming 12 months but the work that has been undertaken so far is being opened up here for views, comments and input from Ordnance Survey's customers and other

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OS Ordnance Survey®

OS OpenSpace™ BETA

register now

home about support forum faq contact

Develop a great idea with Ordnance Survey

Got a great idea? Make it work with the best mapping in the world.

Experiment with OS OpenSpace to incorporate Ordnance Survey data into your web application.
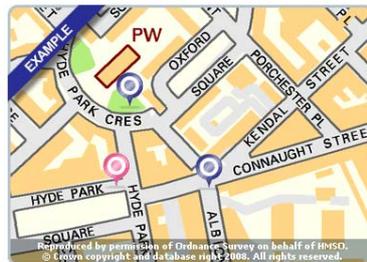
Develop your idea and see where it can take you.

Find out more

step 1
get started and **register now** for your API key

step 2
technical help is available from our **support** area

step 3
join our **forum** and share your thoughts

This is an example of what can be achieved with the OS OpenSpace API.

Part 1: Expanding OS OpenSpace

Extended user groups:
- Local community groups – WI/Parish/Societies
- National special interests – smaller charities
- Innovators – application developers

Extended uses
- Use of the mapping service for non-commercial purposes
- Allow advertising and sponsoring

Content includes:
- Official boundaries and OS Streetview (10K)
- Greater volumes of use up to certain pre-determined limits

Parameters to minimise commercial overlap
- Use for non-commercial and other innovative use – to combine control and flexibility and limit misuse
- Usage levels – sufficient for local/specialist/development
- Not for use inside business (behind firewall) or direct commercial exploitation

Where the use becomes commercial, users can move up the 'Innovation Ladder'

Examples of developers within "Fair Use Policy"

Definitely for
- Innovators
- Commercial developers
- Local charities
- Scouts
- Local clubs
- Sports teams
- Groups of friends
- Individuals
- Parish councils
- Education organisations

Subject to Fair Use Policy
- Local shops (low volume)
- Local businesses (low volume)
- Commercial activity of charities
- Political parties

Definitely not
- "Inappropriate" users
- Full corporate commercial use

The Location Strategy

Published 25th November 2008

www.communities.gov.uk
/publications/communities
/locationstrategy

Place matters:
the Location
Strategy for the
United Kingdom

November 2008

'everything happens somewhere'

- 'In almost everything, people need to know when and where things happen: place matters.'

- 'The Location Strategy for the United Kingdom is a thoughtful, authoritative and important document and its recommendations are closely aligned to the delivery of government policy in many areas. Ministerial colleagues share with me in recognising the reality, identified by the Strategy that 'everything happens somewhere'.

Baroness Andrews,Parliamentary, Under Secretary of State, Department for Communities and Local Government.

The Objective of the Location Strategy

- Maximise the value to public, government, UK business and industry of geographic information

- To provide a consistent framework to assist national, regional and local initiatives and service delivery

Place Matters: the Location Strategy for the United Kingdom

28. To ensure that the UK exploits the full value of its information the Location Strategy requires a programme of strategic actions which ensure that:

1. we know what data we have, and avoid duplicating it;

2. we use common reference data so we know we are talking about the same places;

3. we can share location-related information easily through a common infrastructure of standards, technology and business relationships;

4. we have the appropriate skills, both among geographic professionals and among other professional groups who use location information or support its use;

5. we have strong leadership and governance to drive through change including the implementation of this Strategy and the implementation of INSPIRE.

Relied on…
By government, business and individuals