Innovation and Exploitation : Great Britain's Permanent GNSS network infrastructure

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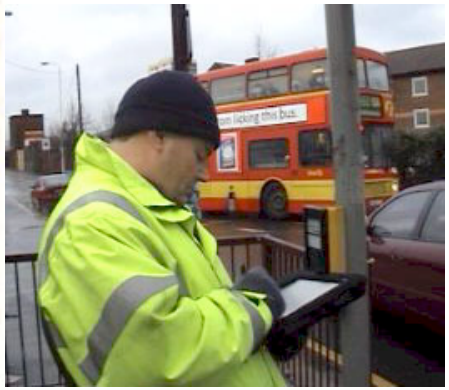
Aim of presentation

- An update on the Ordnance Survey OS Net® GNSS network
- Describe future developments for the network
- Illustrate OS Net's internal, scientific and commercial uses

Ordnance Survey underpins £100 billion of economic activity in Great Britain





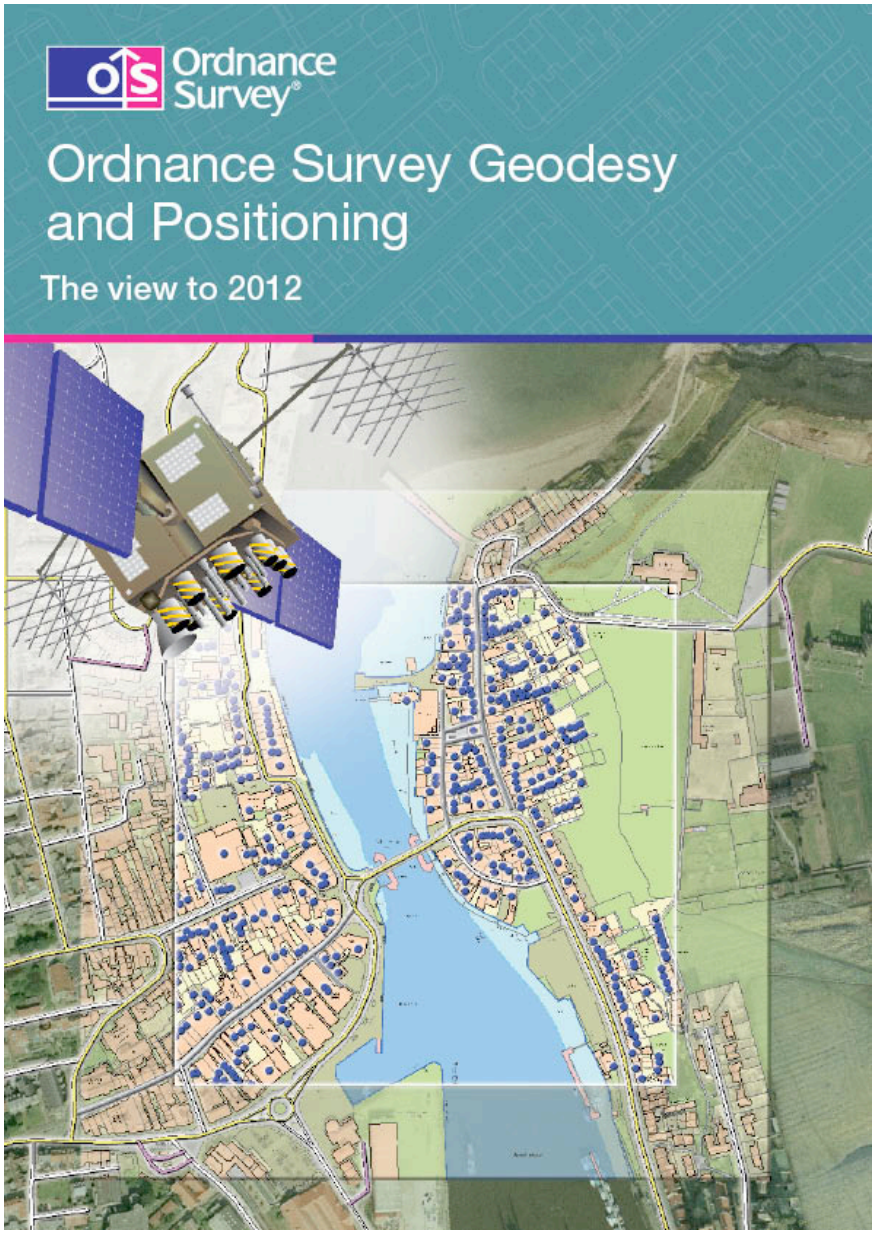



What we collect

To meet customer needs we collect many different types of data:

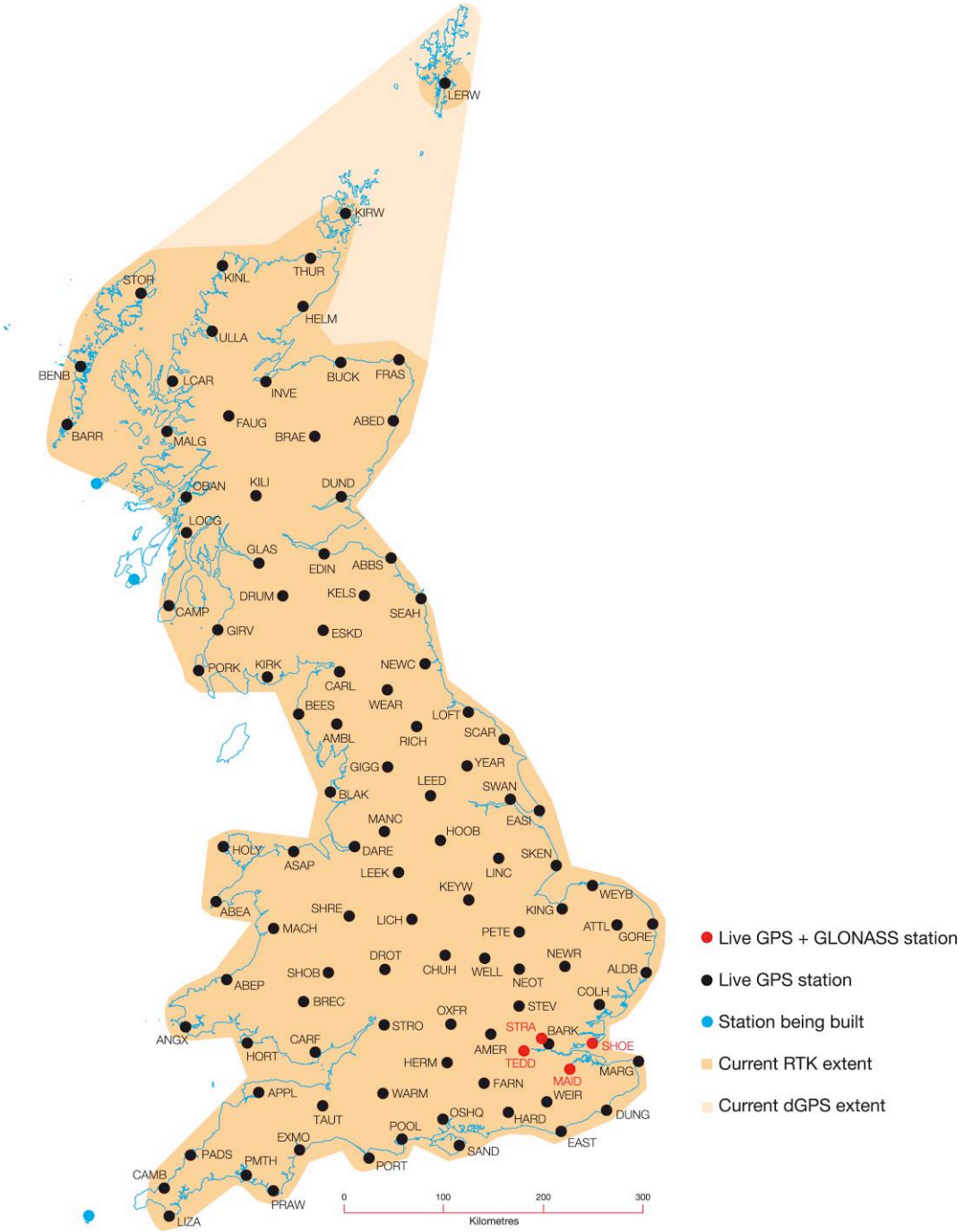
ADDRESS

More than 450 million different features are mapped in detail.



Available from: www.ordnancesurvey.co.uk/OSNet

OS Net base station backbone (2008)



OS Net stations

Future direction of OS Net

- During 2008/9, full equipment refresh initiated:
  - GPS, GLONASS and upgradeable to Galileo, Compass
  - Improved availability and reliability of data streams

Future direction of OS Net

- Develop the GeoNet network of 12 rock-anchored base stations by early 2009

OS Net user community

- Definition and access to the national coordinate reference frame
- Provides internal positioning services
- Provides a backbone for commercial services
- Data for scientific and government use (e.g. www.bigf.ac.uk)

GNSS correction service to Ordnance Survey Surveyors

- 150 (290) surveyors have survey grade GPS equipment
- GPRS dial-in service (with local repeater)
- 1-2cm real-time positioning to update the National topographic database
- Greater than 50 % improvement in efficiency
- Driver for change and Standard Operating Procedures

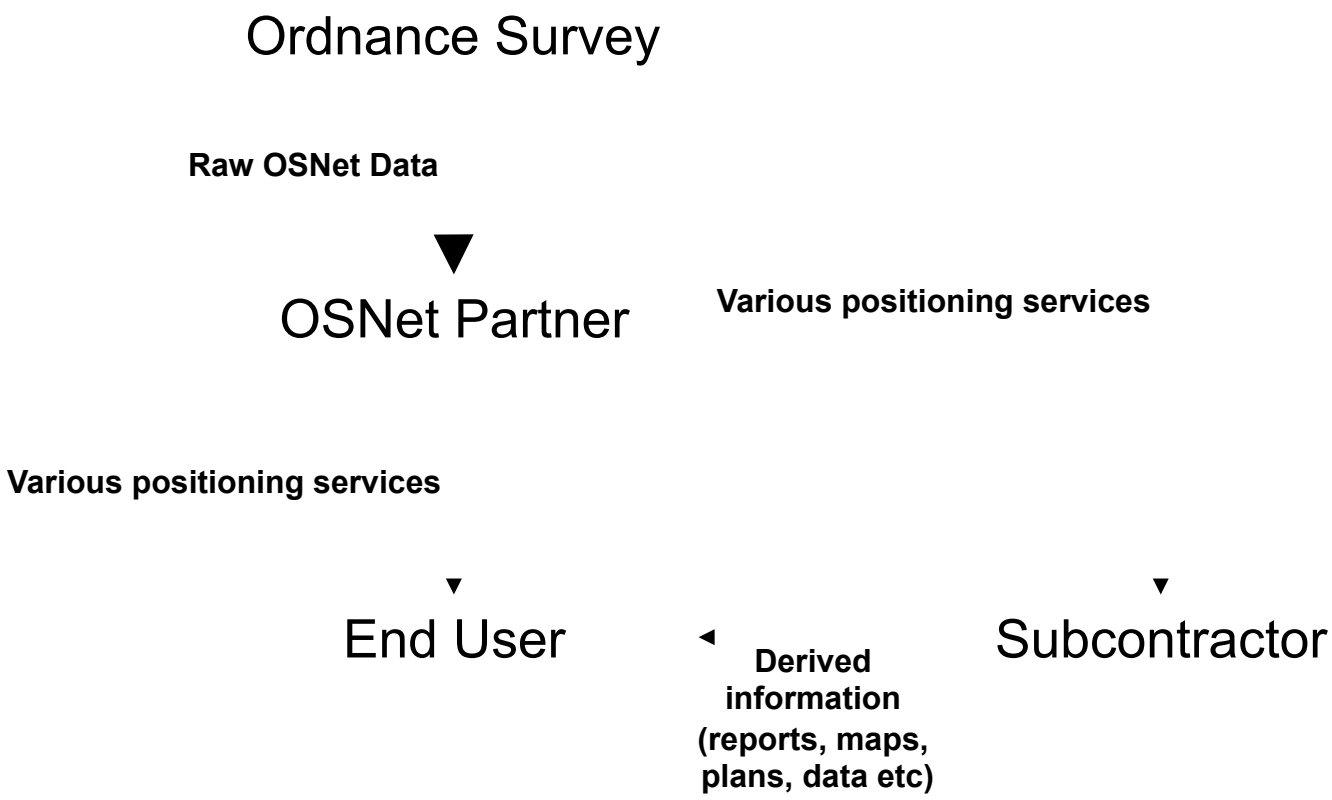

Basic dGPS: 0.8-3m
RTK:1-2cm
High Quality dGPS: 20-80cm
Standalone GPS: 5-10m

Commercial exploitation of OS Net

- 3 Main Partners in place
- Licence by Specific Use Contract
- Wide adoption through the GB survey, utility and construction community

Image: Highways Agency

Commercialisation through Partners



Case Study 1

HIGHWAYS AGENCY

- The main aim of the Highways Agency is to manage, maintain and improve England's motorway and trunk road network
- 100,000 accidents on the HA network every year, 5000 require police investigation
- HA work with the 38 Police Forces in England to give them the tools to carry out accurate investigations

The end result

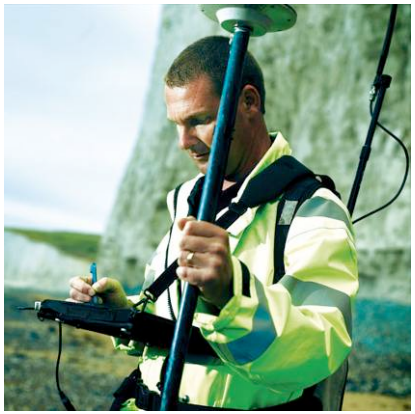
- Highways Agency studies have shown that, on average, roads are opened 40 minutes quicker

- Over 200 Licenses for use of the system

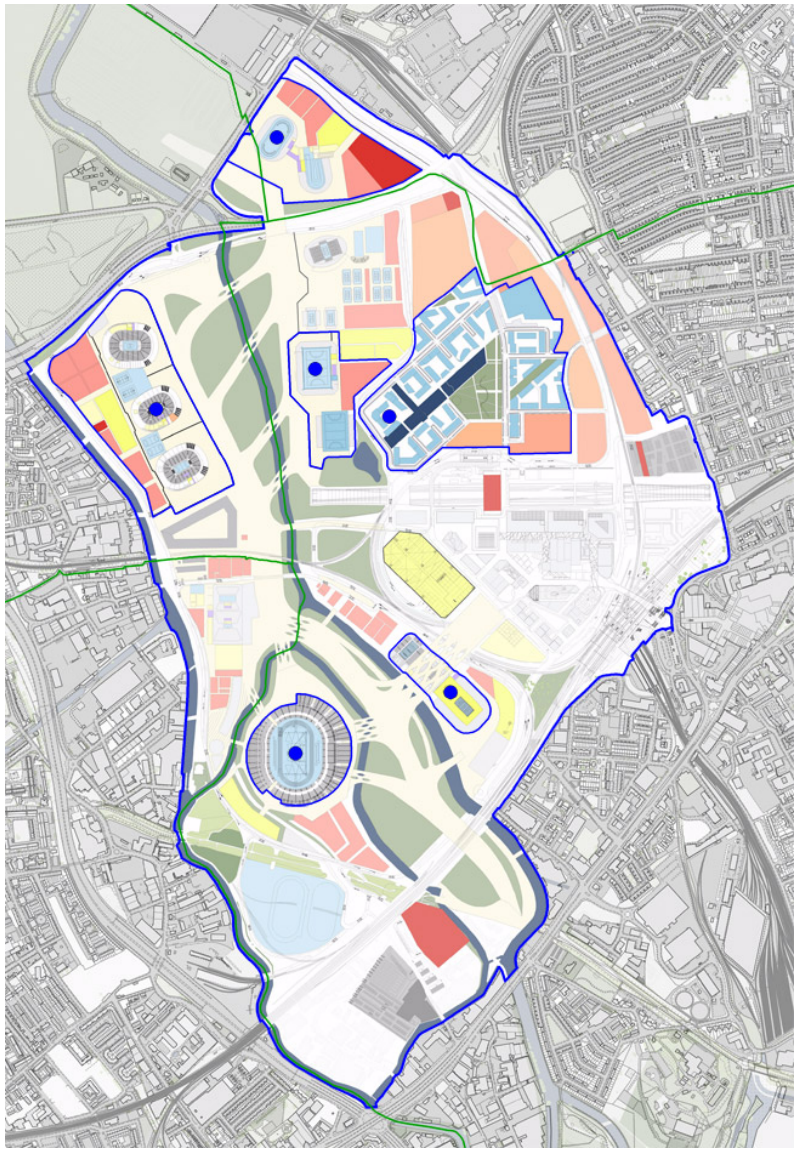
- “The Highways Agency is really demonstrating how it is committed to working with the police across the country, in a bid to make the roads safer for drivers, as well as making journey times more reliable. This is a sound investment in new technology that can really make a difference for everyone involved.” - Tom Harris, Roads Minister.

Case Study 2 Olympic Delivery Authority (ODA)

- ODA - public body responsible for developing and building the new venues and infrastructure for the Games as well as their use post 2012
- ODA has procured an OS Net partner correction service for the Olympic Park site
- Service is available to all contractors on site
- Will help ensure that all development takes place in the site-wide Olympic Grid coordinate system



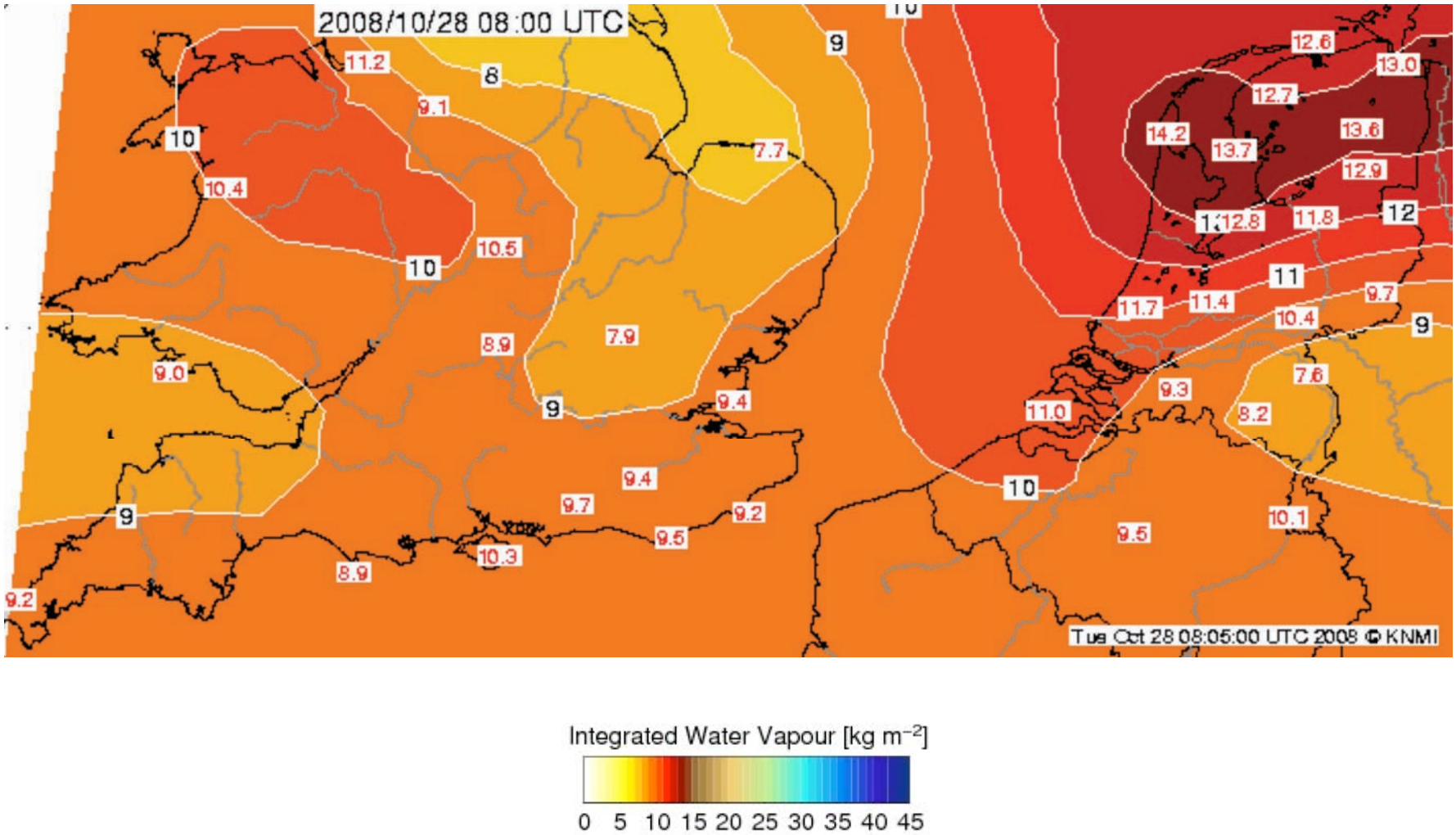
Helping define the Olympic site masterplan



Case Study 3

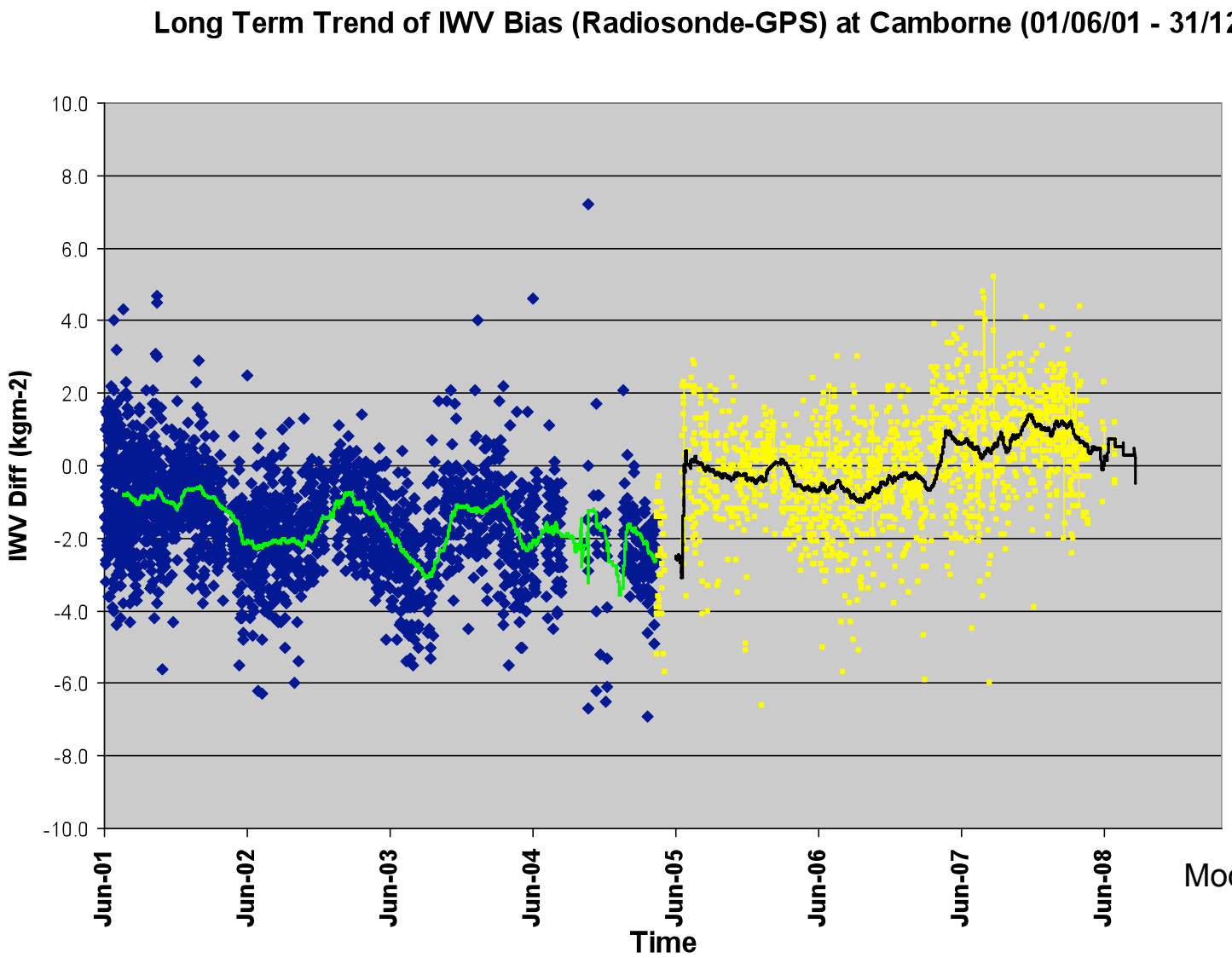
- The Met Office provides Ordnance Survey sites for OS Net stations
- Met Office receives the OS Net data stream in near real-time for their live forecasting system
- The GPS signal is sensitive to water vapour - the delay in the signal is proportional to the water vapour present
- GPS water vapour modelling yields:
  - Improvements in humidity fields, cloud cover and surface temperatures
  - Stable long term climate modelling
  - Calibration of biases in other meteorological instruments

OS Net data used to model water vapour



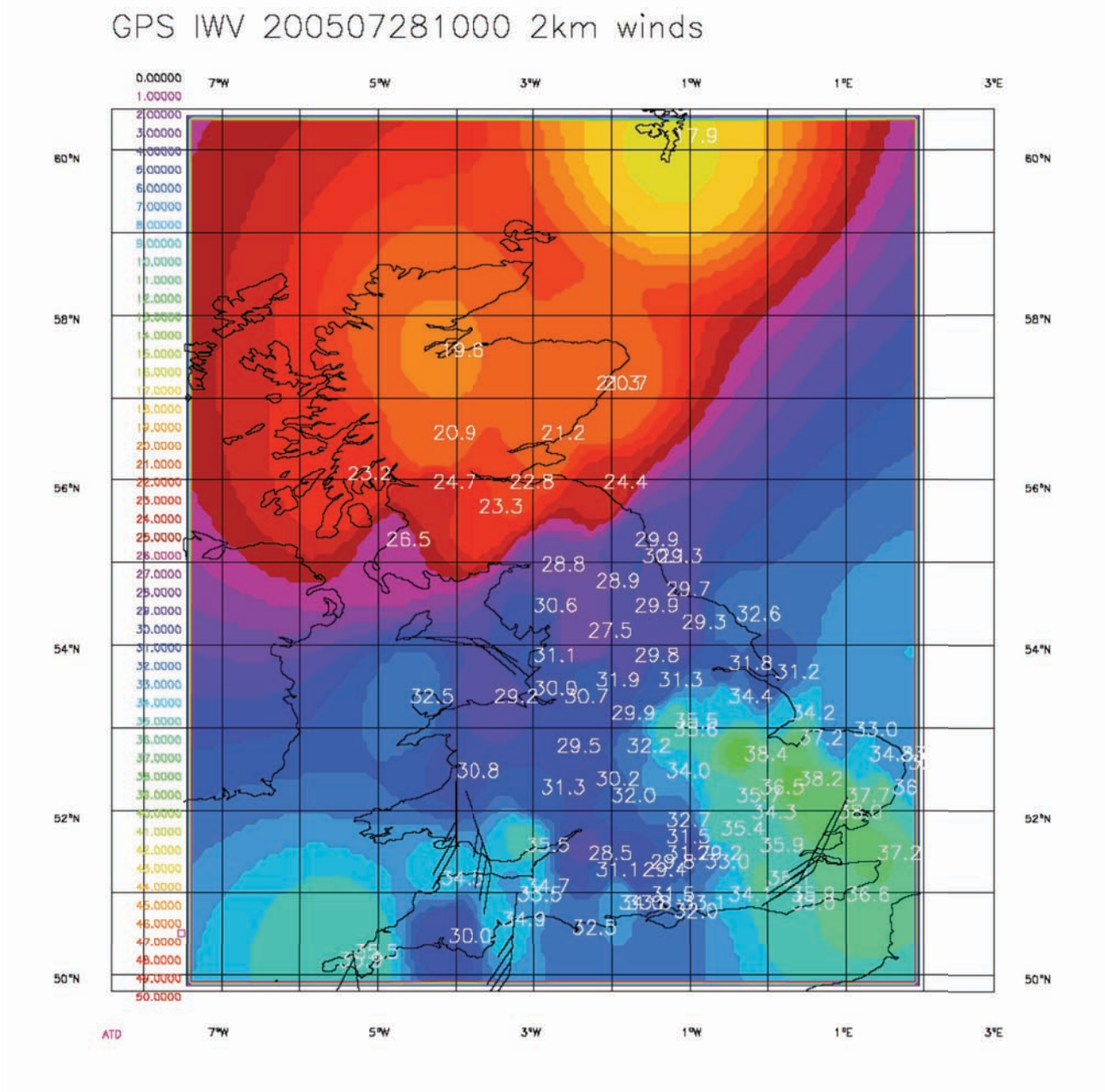
From: www.knmi.nl/research/groundbased_observations/gps/real_time_IWV.html

Long-term Water Vapour trend analysis



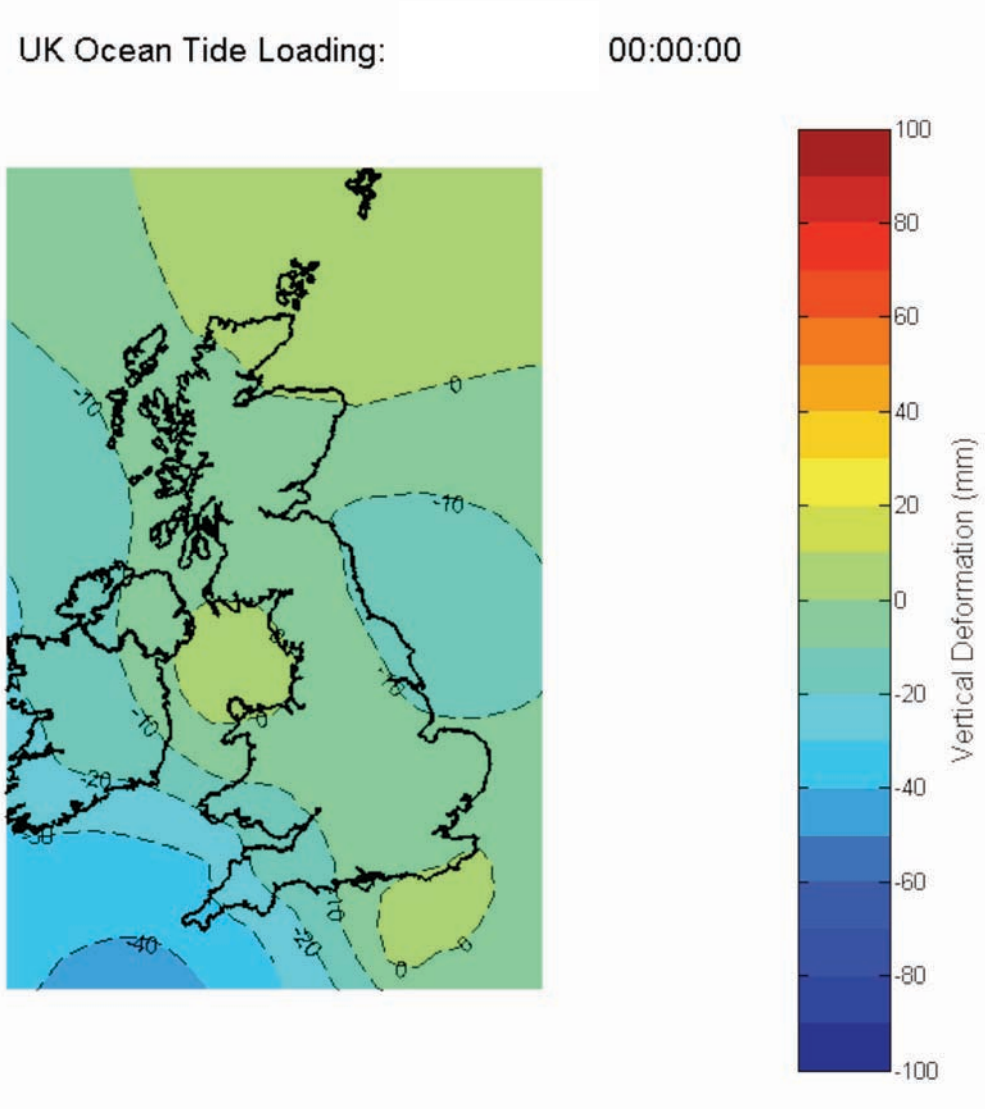
Model courtesy of Met Office

Applications



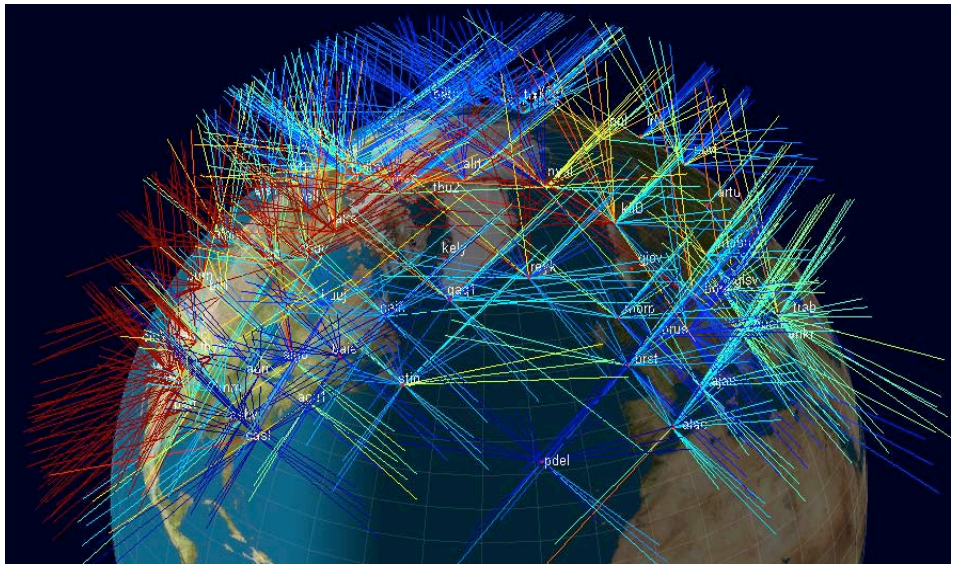
Model courtesy of Met Office

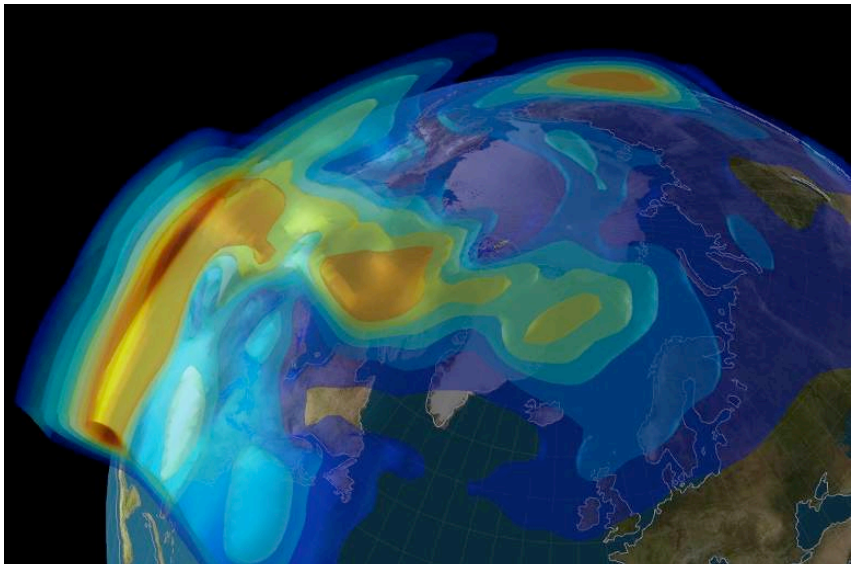
Scientific studies - Ocean tide loading modelling



Model courtesy of
Newcastle University

Scientific studies – OS Net for Ionospheric modelling





measurements of time-evolving TEC along rays

produce a time-evolving 3D distribution of electron density

Model courtesy of Bath University

Future direction of OS Net