



Team:

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Client: Paweł Moll, ARM

ARM

Problem



- Network signal strength coverage maps
 - ▣ Inaccurate, based only on digital models (i.e. predictions)
 - ▣ Limited in range of different signal strength levels
 - ▣ Without guarantee that data is up to date

Example #1

Coverage checker

3

Coverage checker.

Postcode
 [Find](#)

Place name
 [Find](#)

Map view

☐ Map only

☒ Voice, text & internet coverage

Level of coverage

This is predicted coverage and can't always be guaranteed.

☒ **Indoor & outdoor coverage**

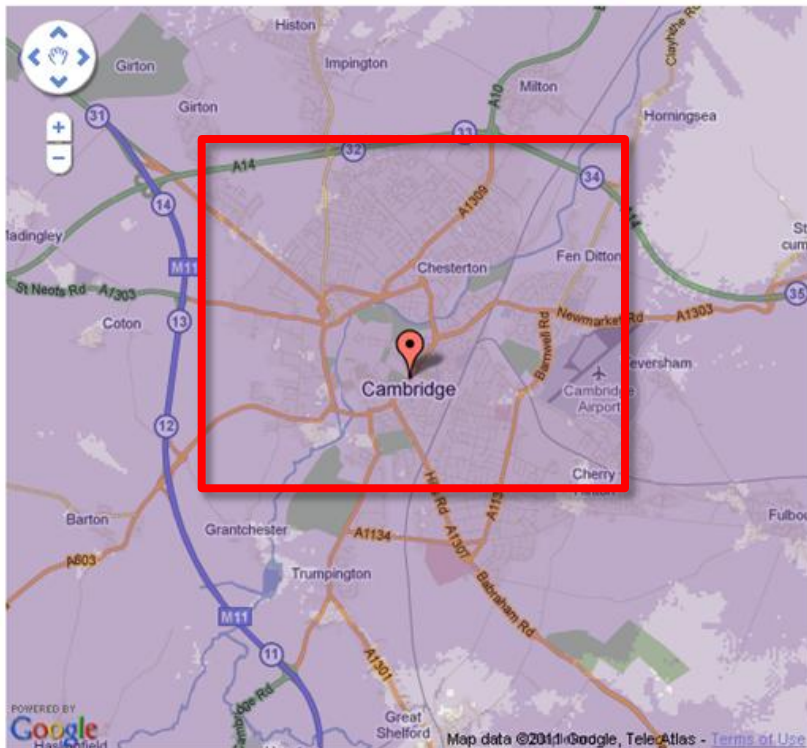
You can use your mobile to make calls, send texts and use the internet in most instances. When you're indoors the signal strength may be better in different rooms.

☐ **Outdoor coverage**

You can use your mobile to make calls, send texts and use the internet in most outdoor locations. If you're inside you may struggle to get a signal.

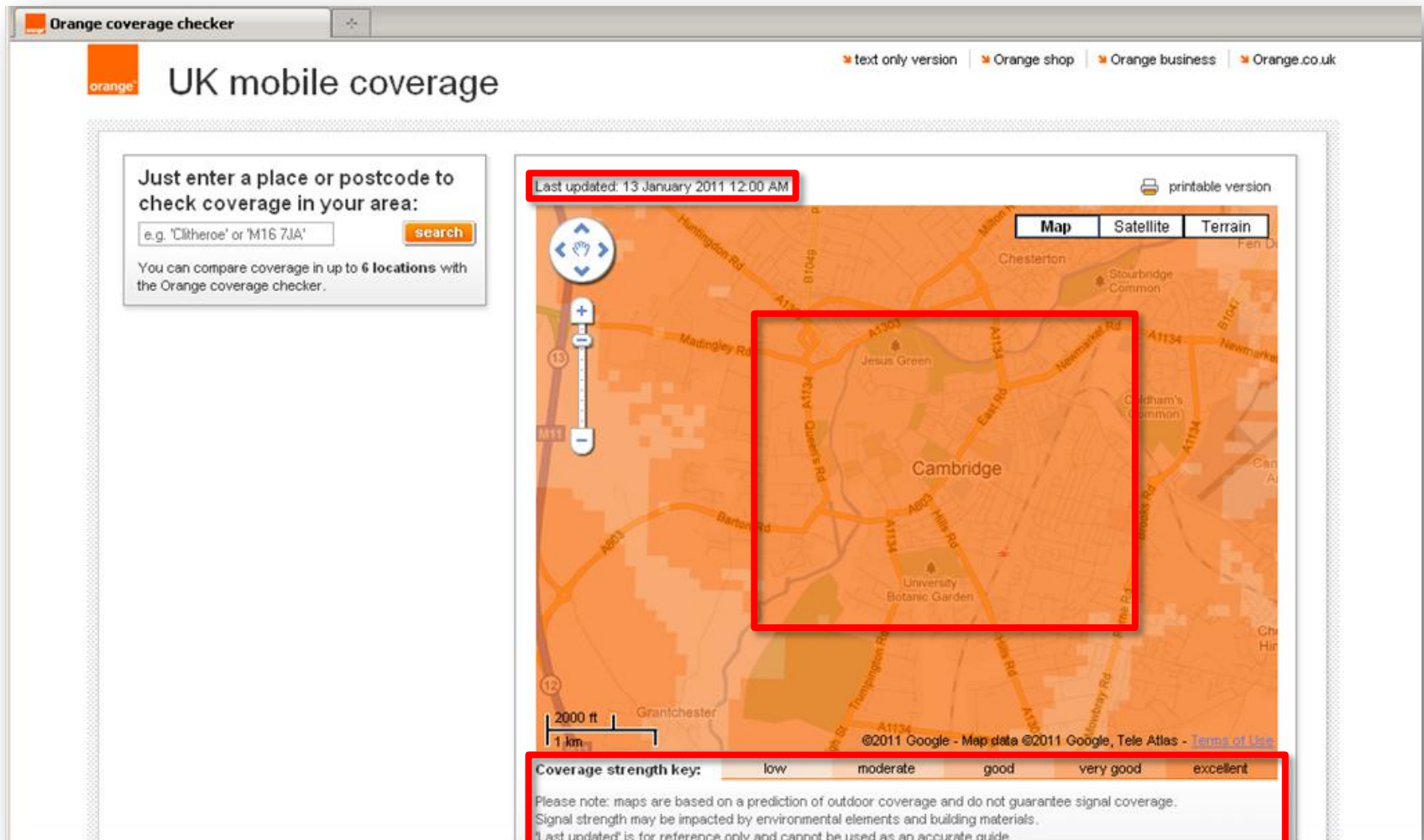
[Help](#)

» [Help with this map](#)



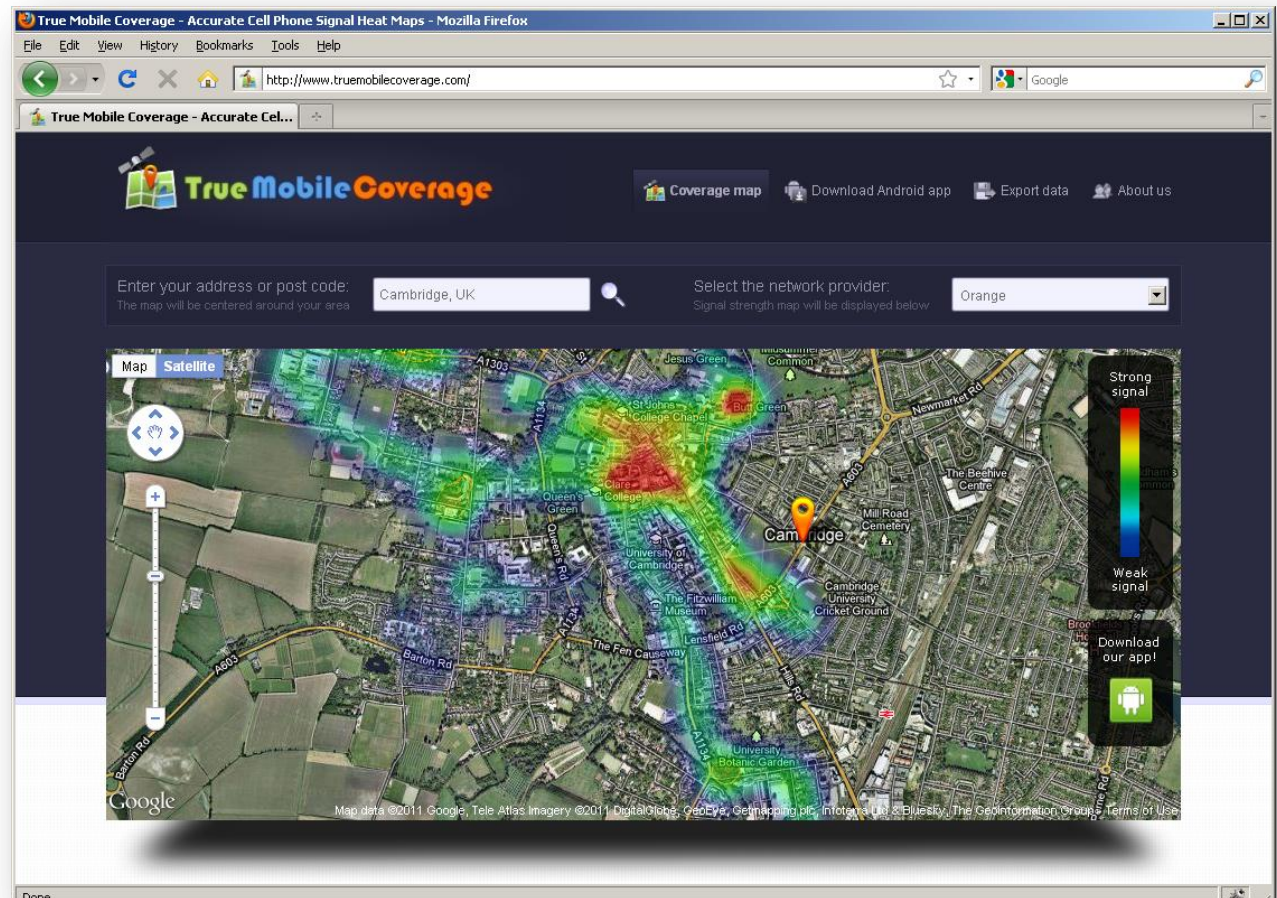
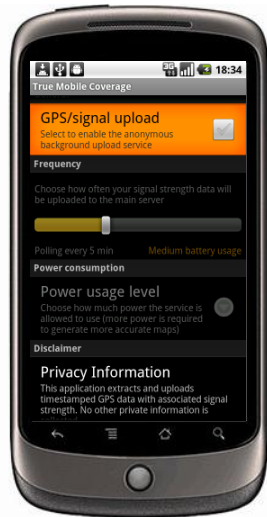
Map data ©2011 Google, TeleAtlas - [Terms of Use](#)

Example #2



Solution

- Crowd-source accurate mobile phone signal strength data!



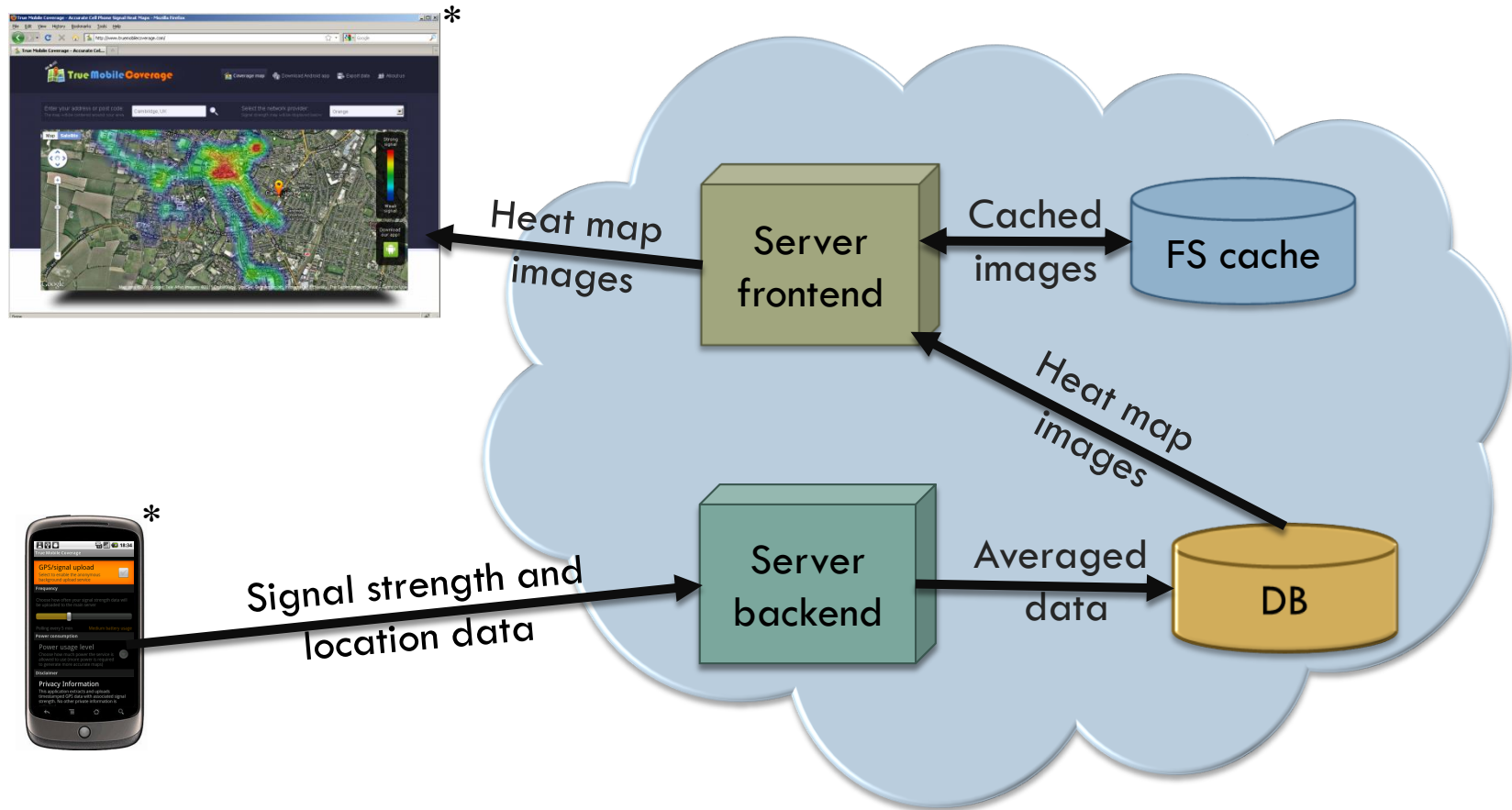
Priorities



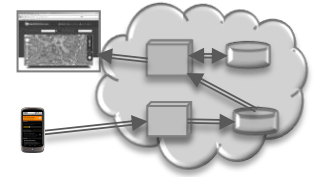
- Usability
- Reliability
 - ▣ Half of the project time allocated for testing
- Iterative development
 - ▣ First working version finished before the 1st client meeting
- “Featuritis” avoidance

Solution

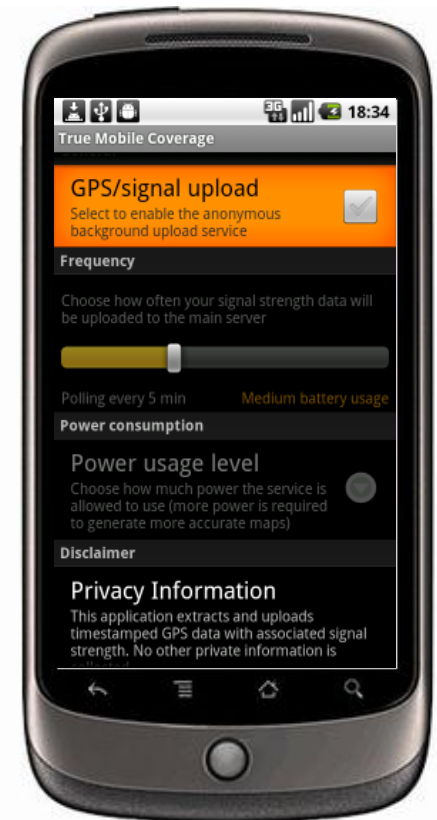
□ High-level design:



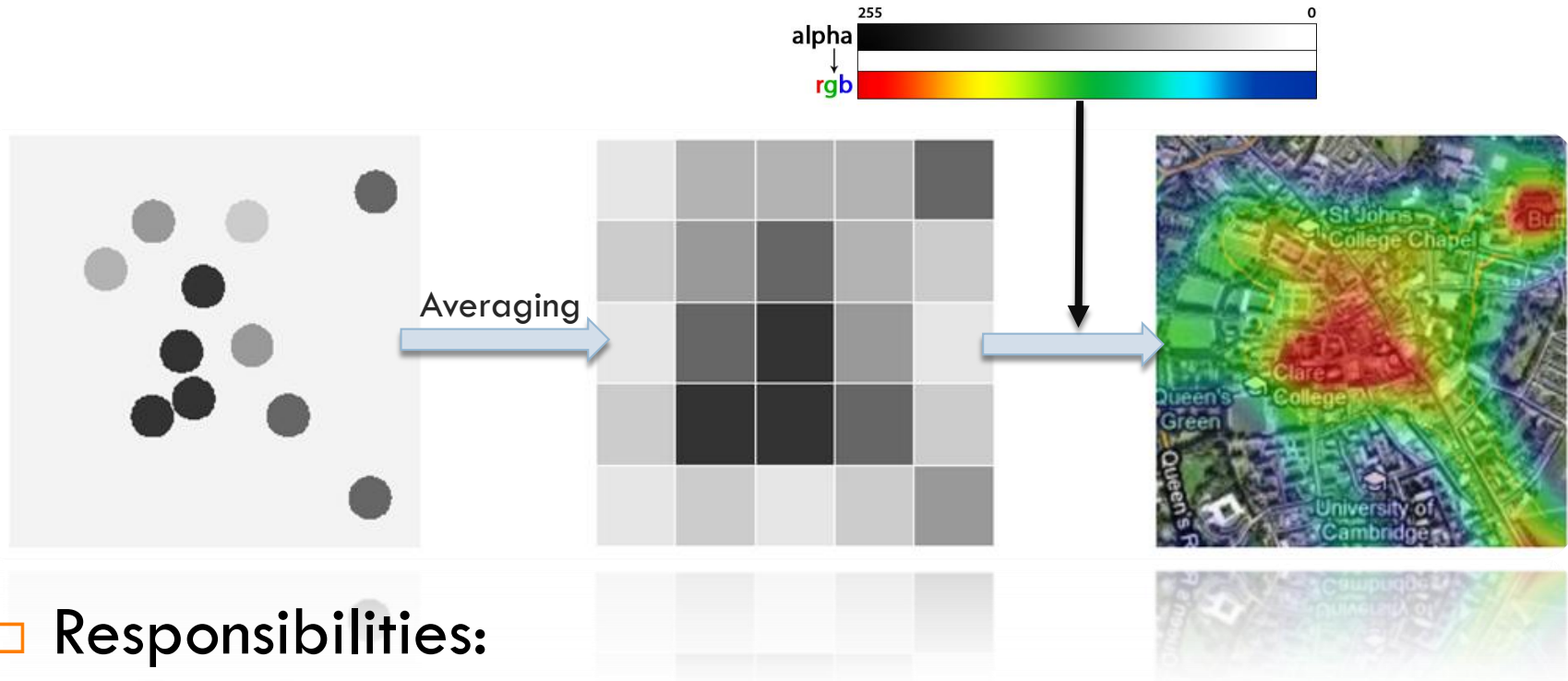
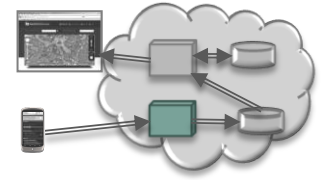
Phone client



- Responsibilities:
 - ▣ Polls GPS location and signal strength data
 - ▣ Uploads them to the server
- ▶ Design criteria:
 - ▶ Ease of use
 - ▶ Low power consumption
 - ▶ Privacy maintenance
 - ▶ Maximisation of the number of gathered data points

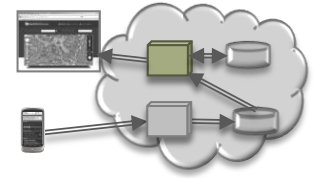


Server backend



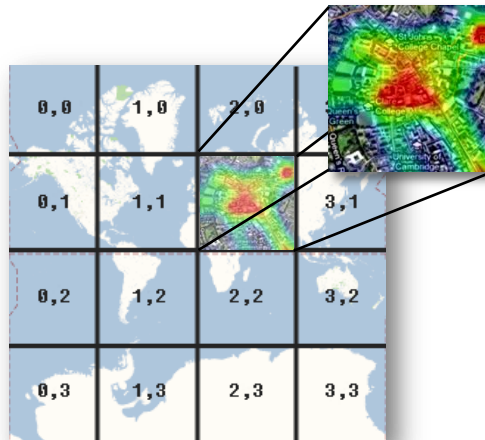
- Responsibilities:
 - ▣ Stores averaged data points
 - ▣ Generates image tiles

Server frontend

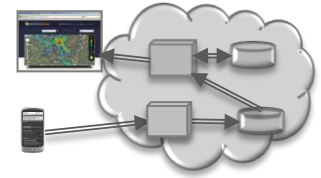


□ Responsibilities:

- *Efficiently* serves heat map images (overlayed on top of Google Maps by the browser)
 - Caching strategy (overlay images are updated every 2 hours)
- Provides data export to XML functionality



Website




True Mobile Coverage - Accurate Cell Phone Signal Heat Maps - Mozilla Firefox


File Edit View History Bookmarks Tools Help


http://truemobilecoverage.com/

True Mobile Coverage - Accurate Cel...

 **True Mobile Coverage**

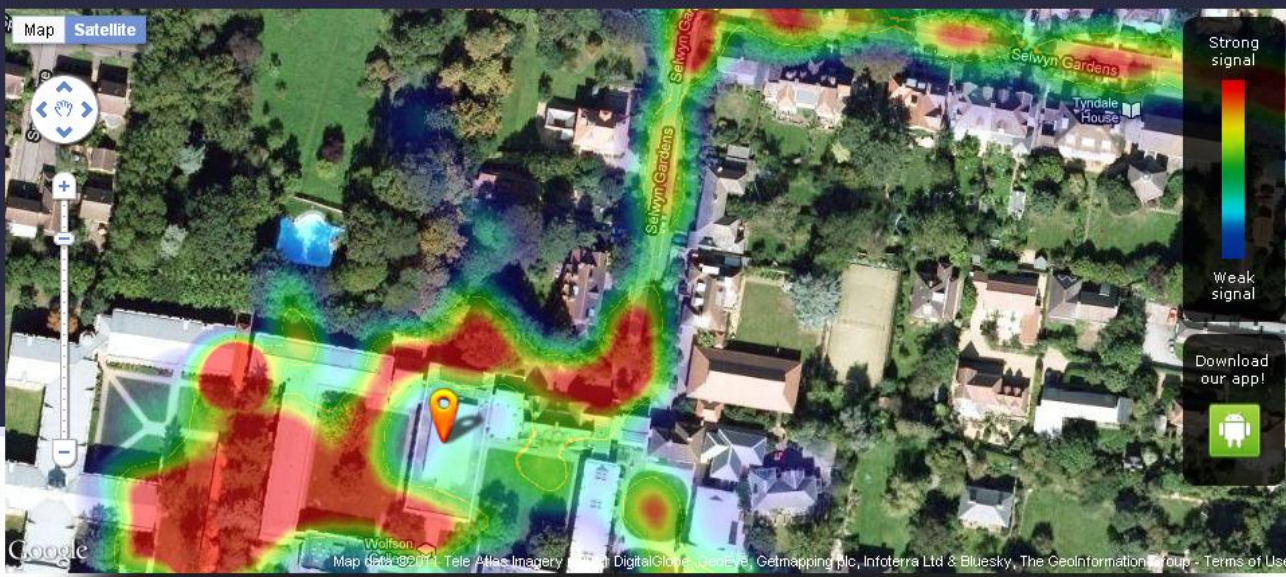
[Coverage map](#) [Download Android app](#) [Export data](#) [About us](#)

Enter your address or post code: 

Select the network provider: 

The map will be centered around your area. Signal strength map will be displayed below.

Map Satellite



Google Map © 2011 Tele Atlas Imagery © 2011 DigitalGlobe, Google, Getmapping plc, Infoterra Ltd & Bluesky, The GeoInformation Group - Terms of Use

Done

Extensions

- App for an iPhone
- Cell tower location mapping
- Dynamic upload frequency adjustment combined with movement detection
 - ▣ Using accelerometer/gyroscope
 - ▣ Using triangulation from cell towers
- ...

