

Geospatial tech in teaching

ED*i*NA

A National Data Centre

Based at



Supported by

JISC



<http://pafciu17.dev.openstreetmap.org/?module=map¢er=-3.18,55.935&zoom=17&width=400&height=400type=cycle>



What?

EDINA seeks to enhance the productivity, quality and cost-effectiveness of research and education in the UK and beyond.



<http://www.flickr.com/photos/santos/230060595/sizes/z/in/photostream/>

EDINA innovates, generating knowledge, expertise and trust, through a focus on ease and continuity of access to scholarly resources and tools.

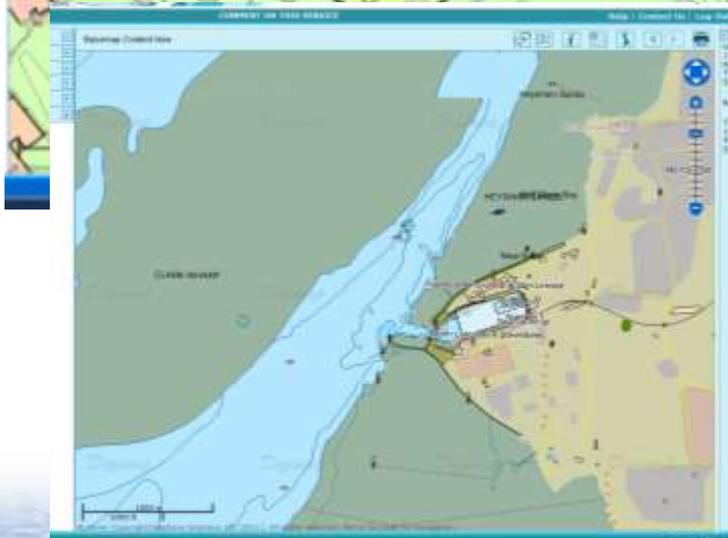
Enhance Preserve Research
Innovate Continuity Community
Expertise Support Infrastructure



EDINA®

Need maps?

Digimap[®]



Annotate maps

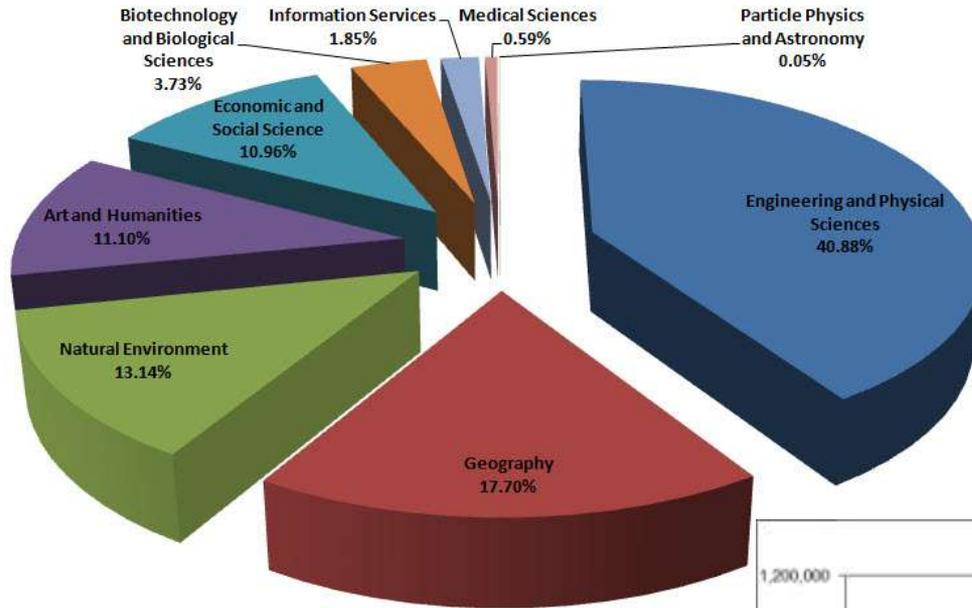
Sample Annotations

Annotate maps to guide visitors to events



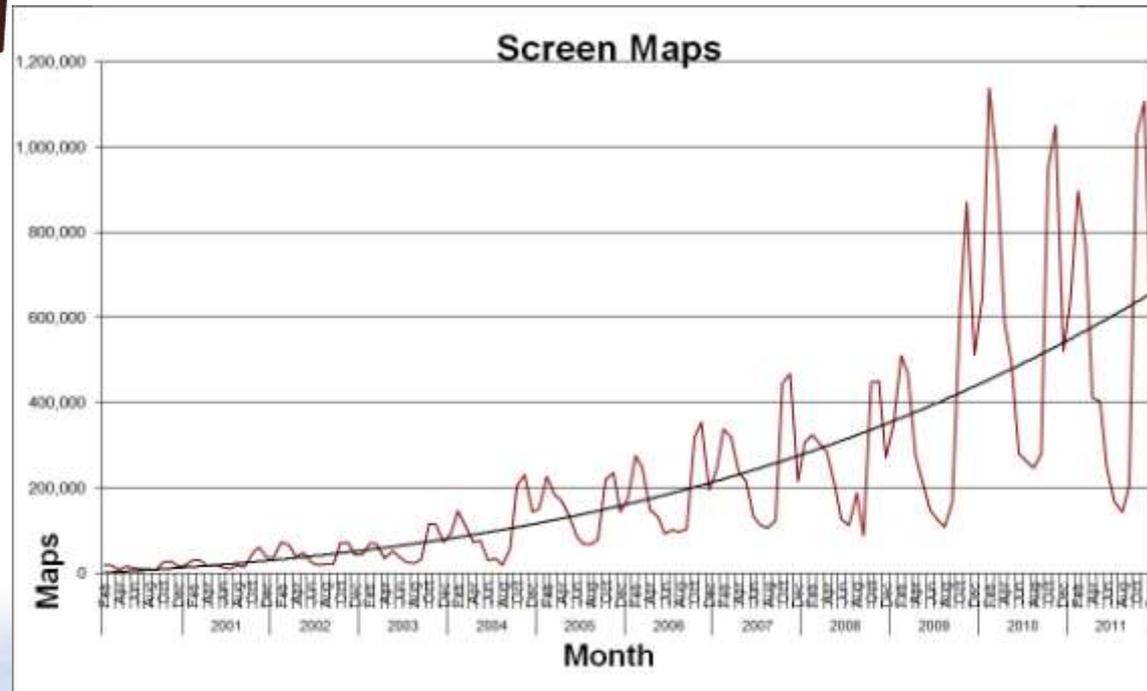
Sample Annotations
in Digimap Roam.

Use of Digimap

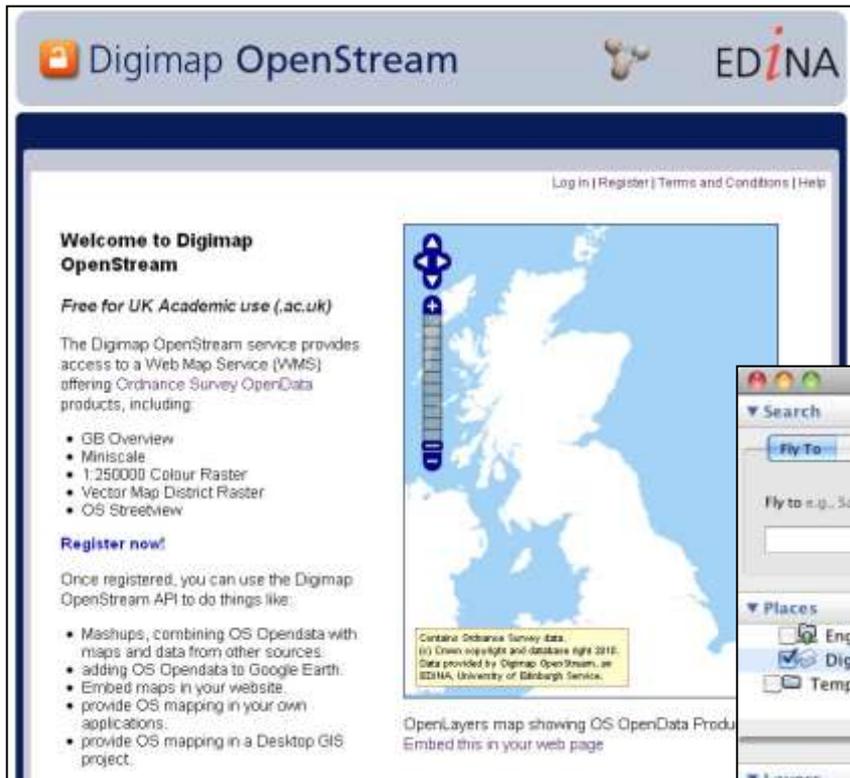


Breakdown of Digimap services by discipline

Digimap ROAM Screen maps



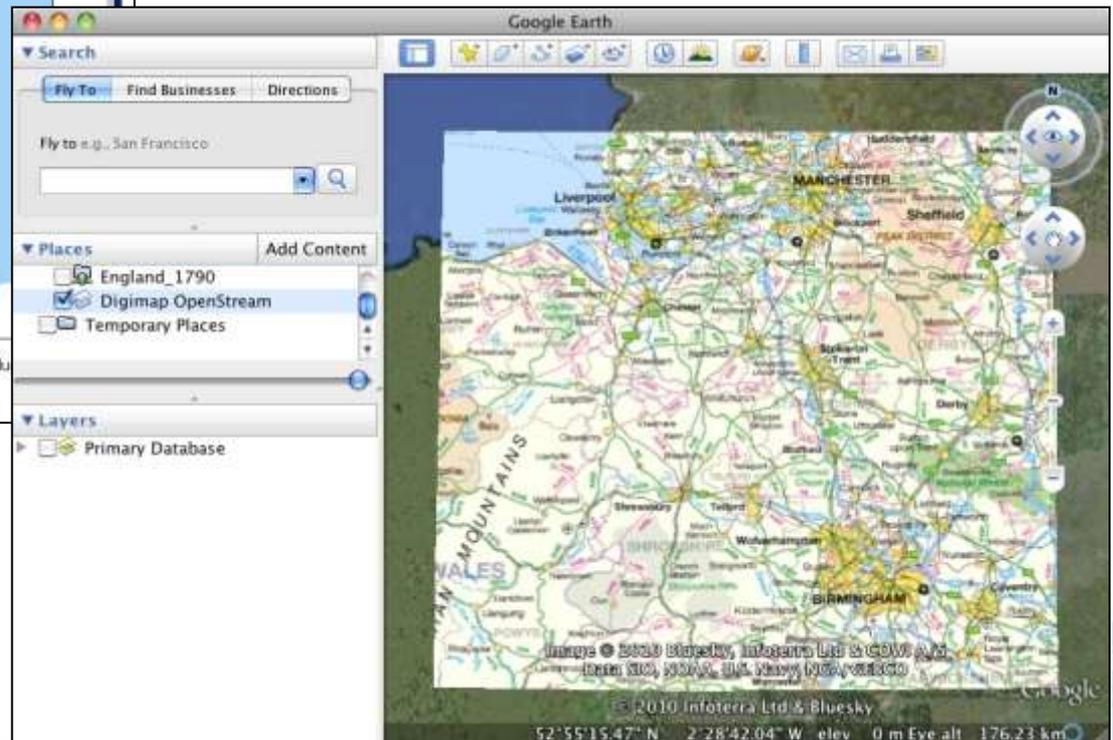
Maps on YOUR website?



The screenshot shows the Digimap OpenStream website. At the top, there is a logo for Digimap OpenStream and the EDINA logo. Below the header, there is a navigation bar with links for "Log in", "Register", "Terms and Conditions", and "Help". The main content area features a "Welcome to Digimap OpenStream" message, followed by a "Free for UK Academic use (.ac.uk)" notice. A list of services is provided, including GB Overview, Miniscale, 1:250000 Colour Raster, Vector Map District Raster, and OS Streetview. A "Register now!" button is present. Below this, there is a list of use cases for the API, such as mashups, adding data to Google Earth, and embedding maps. On the right side, there is a map of the United Kingdom with a zoom control. A small text box on the map states: "Contains Ordnance Survey data. (c) Crown copyright and database right 2010. Data provided by Digimap OpenStream, an EDINA, University of Edinburgh Service." Below the map, there is a link to "OpenLayers map showing OS OpenData Products" and a note to "Embed this in your web page".

Stream OS Opendata directly into:

- Web apps
- Google Earth
- Desktop GIS



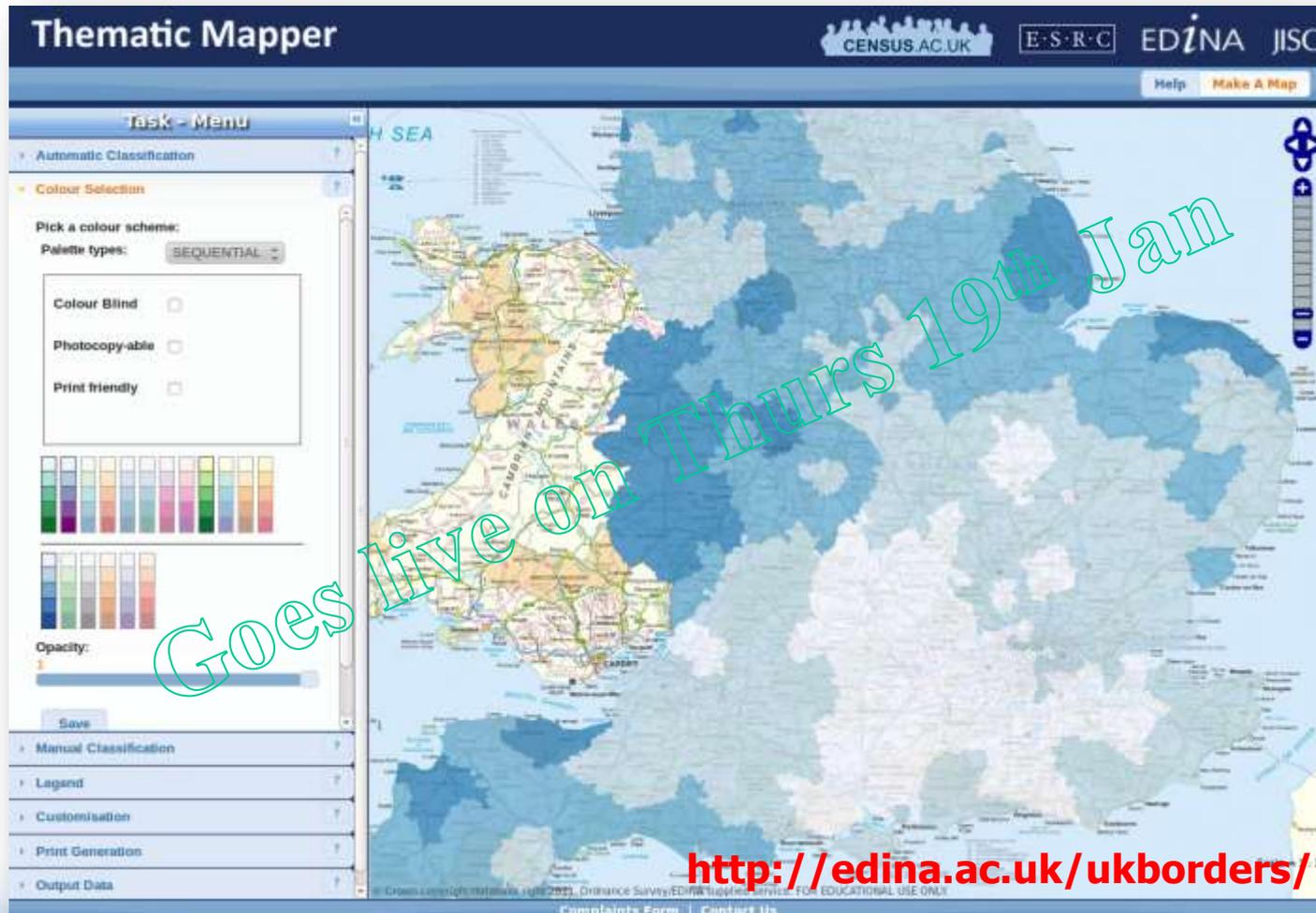
The screenshot shows the Google Earth interface. The search bar at the top contains "Fly To: Find Businesses Directions" and "Fly to e.g., San Francisco". Below the search bar, there is a "Places" list with "England_1790", "Digimap OpenStream" (checked), and "Temporary Places". The "Layers" panel on the left shows "Primary Database". The main map area displays a detailed view of the Manchester region, with various geographical features and labels. The bottom of the map shows coordinates: "52°55'15.47\" N 2°28'42.04\" W elev. 0 m Eye alt. 176.23 km".

Over 1000 registered users
Non-academic use

<http://openstream.edina.ac.uk/>

Thematic Mapper

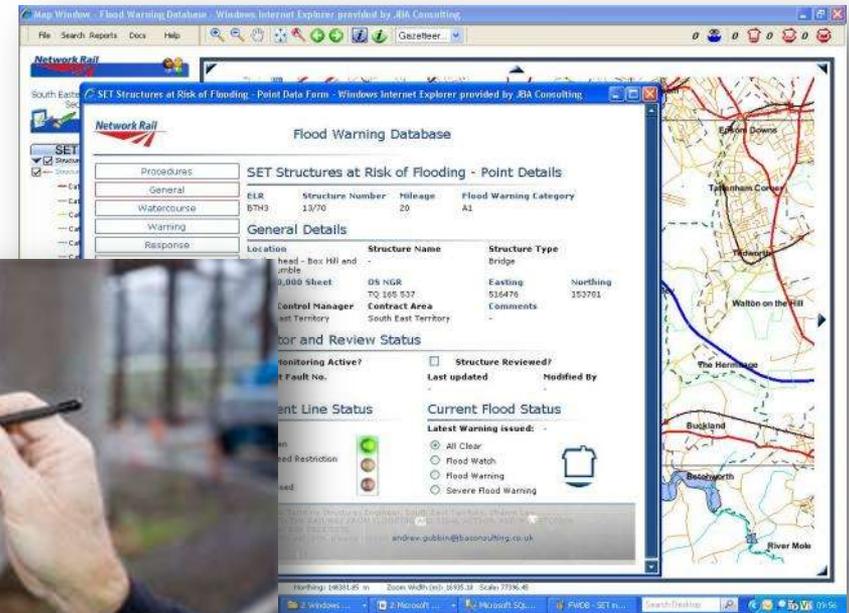
showing proportion of households within English local authorities defined as being in fuel poverty. Data grabbed from <http://www.decc.gov.uk> & uploaded to Thematic Mapper application to create map.



Why are we teaching geospatial tech?

Geospatial awareness is a core skill in many environment sector job descriptions. Students need to be aware of geospatial tech and need to know what it's potential is.

Geospatial tech is a key tool of the public and private sectors for locating and capturing asset data. Most asset management systems are now digital so it makes sense to capture data digitally.



So what does this tell us?

Location is necessary but it is not sufficient

Smartphone's are booming, GPS is seen as a standard bit of kit on phones, but they carry a host of other sensors.

Making use of the sensor web in teaching and learning has huge potential

**RISE
OF THE
PLANET
OF THE
APPS**

CMOS light sensor

OK, it is commonly called a **camera** but the sensor is capable of much more than just taking pictures:

Image recognition (face, labels, buildings)

Distance ranging

Change Detection

Improve Positional Accuracy

The interesting things happen when the CMOS sensor integrates with other sensors.

e.g. get a rough fix with the GPS, then use the CMOS to improve this through image matching and then track your position with the gyroscope and accelerometer.



CMOS – Indoor Navigation

Image recognition is another way that indoor navigation / locating can be achieved.

Images might be barcodes, QR codes or even image triggers.

Junaio have created an app that allows users to build their own custom apps for navigating indoor spaces



http://www.youtube.com/watch?feature=player_embedded&v=jRcSFXvoPkU

Augmented Reality

AR relies on:

- Cameras and Displays
- GPS, Positional, and Locative Technologies
- Image Recognition



Product	GPS	Mrkr basd	Mrkr Less	Built-in User Actns	Pblsh API	App API	AR View Content	POI actions	Offline mode	Pltfrm
Layar	Yes	No	No	Web View	open key	custom	3d., 3d-anim, 2d	Info, Audio, Music, Video, Call, Email, SMS, Map, Event	Online only	iPhone, Android, Symbian
Junaio	Yes	Yes	Yes	Post text, Post image, Post photo, Post 3d, social	open key +, crowd	custom	3d, 3d-anim, 2d	Info, Audio, Video, Map, Event,	Online only	iPhone, Android, Nokia (N8)
Wikitde API	Yes	No	No		Bndle	open	3d, 2d	Info, Event	Offline	iPhone Android
Wikitde Worlds	Yes	No	No		open, key	custom	2d	Info, Map, Email, Call	Cachble	iPhone Android Symbian
Sekai Camera	Yes	No	No	Post text, Post photo, Post sound, social	restr + crowd	comm	2d	Info, Audio, Map, Social	Online only	IPhone, Android, iPad, iPodTouch
Libre Geo Social	Yes	src	plugin	Post text, post picture, post sound, social	crowd + open src	open	2d	Info, Audio, Map, Social,	Online only	Android

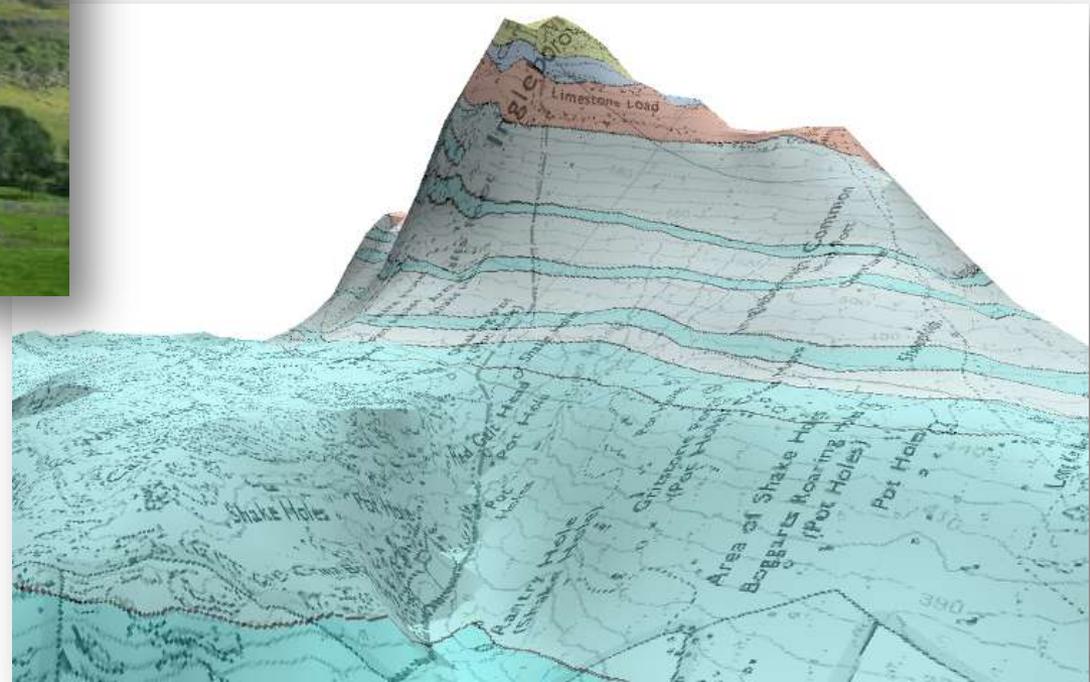


Online / Offline / Caching



AR – Enhance Fieldtrips

Enhance field course learning by revealing details that cannot be seen.



Eh, this is obviously not on a mobile but you get the idea and it is something we would like to offer.

We have the data, but would it be useful?

AR – Pedestrian Navigation

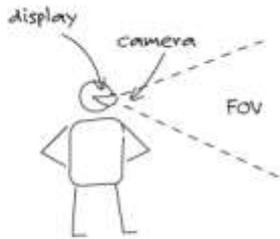
Navigation can work better when you use landmarks.

“come out the station steps and follow the pavement round to the left onto the North bridge. Keep straight ahead till the Blockbuster, turn right, go down one block, turn left, straight ahead, passing the 1930’s Art Deco wine shop and just before the BP garage on your right, the pub is on the left”

You can navigate from Waverly to The Old Bell

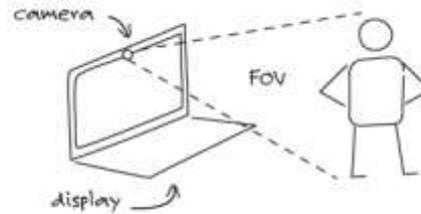


AR - Pico Projectors



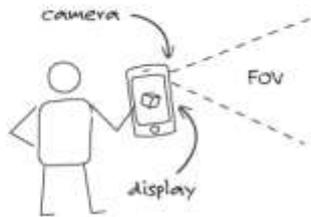
PRIVATE

- Only extremities in FOV
- 1 Participant
- Currently almost zero installed base



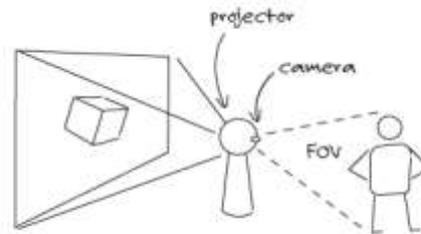
INTIMATE

- Whole body/upper torso in FOV
- Fewer spectators
- Wider distribution



PERSONAL

- Only extremities or head in FOV
- 1-2 Participants
- Wide distribution & locations



PUBLIC

- Whole body in FOV
- More spectators
- Limited distribution

AR needn't be a 1to1 activity. Pico Projectors are starting to appear that would allow the AR experience to be shared between a small group.



<http://ar-ux.com/tag/modes>

So what's stopping us?

There are a number of issues that need to be thought about before the potential of this technology can be fully realised for teaching and learning.

Off-line caching

Authentication

Licences

Devices

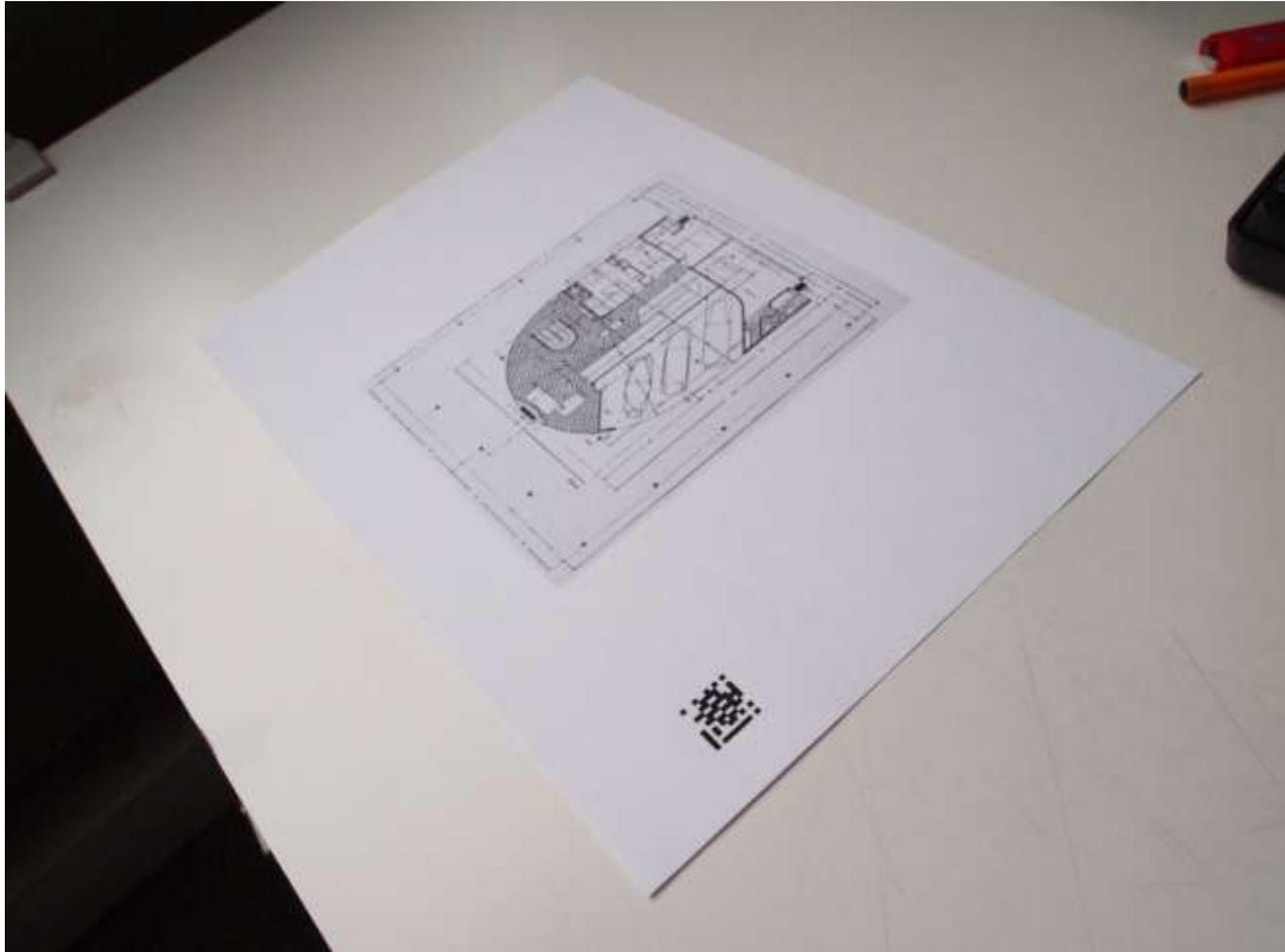
Speed

Usability

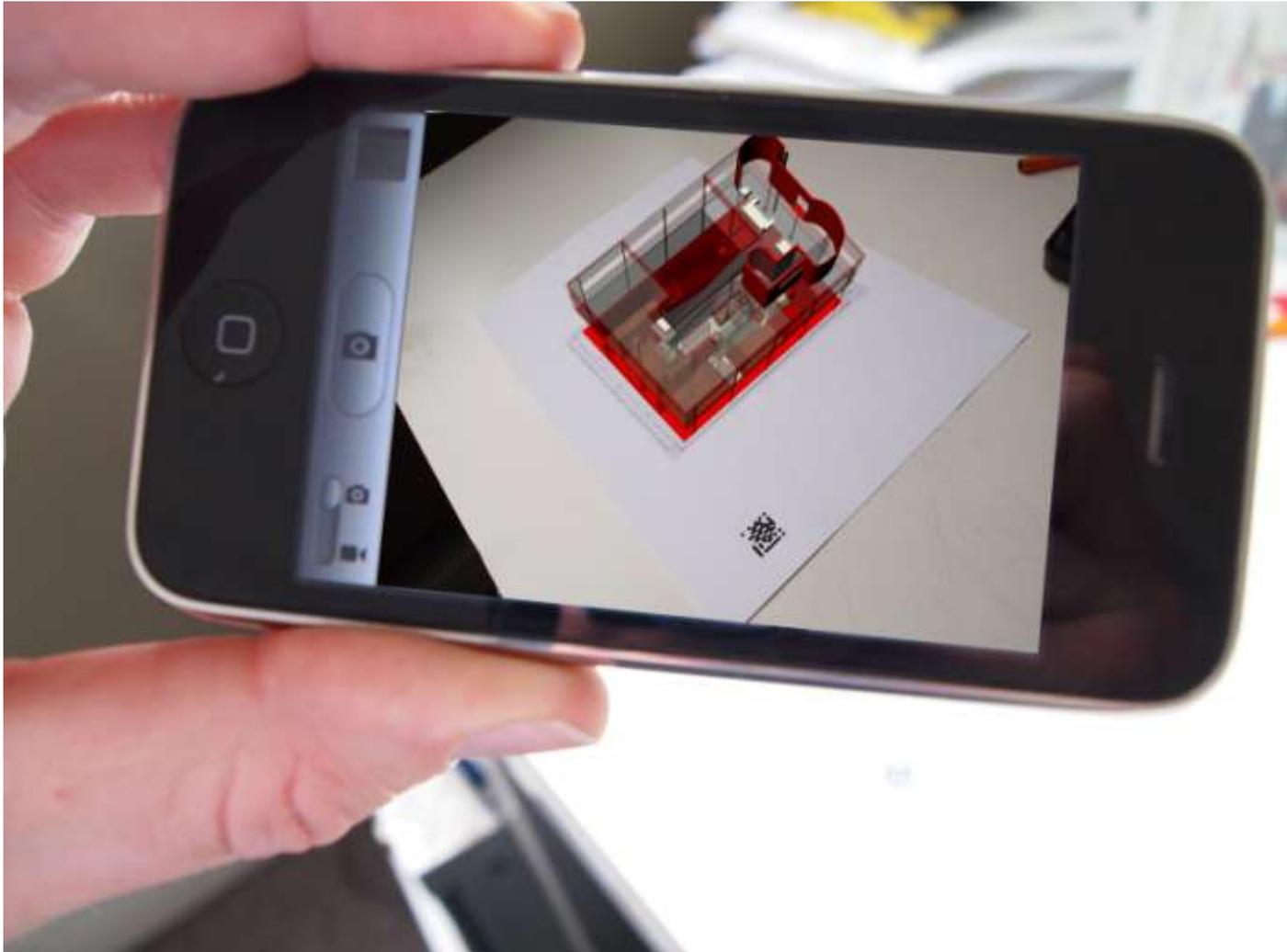


Network coverage

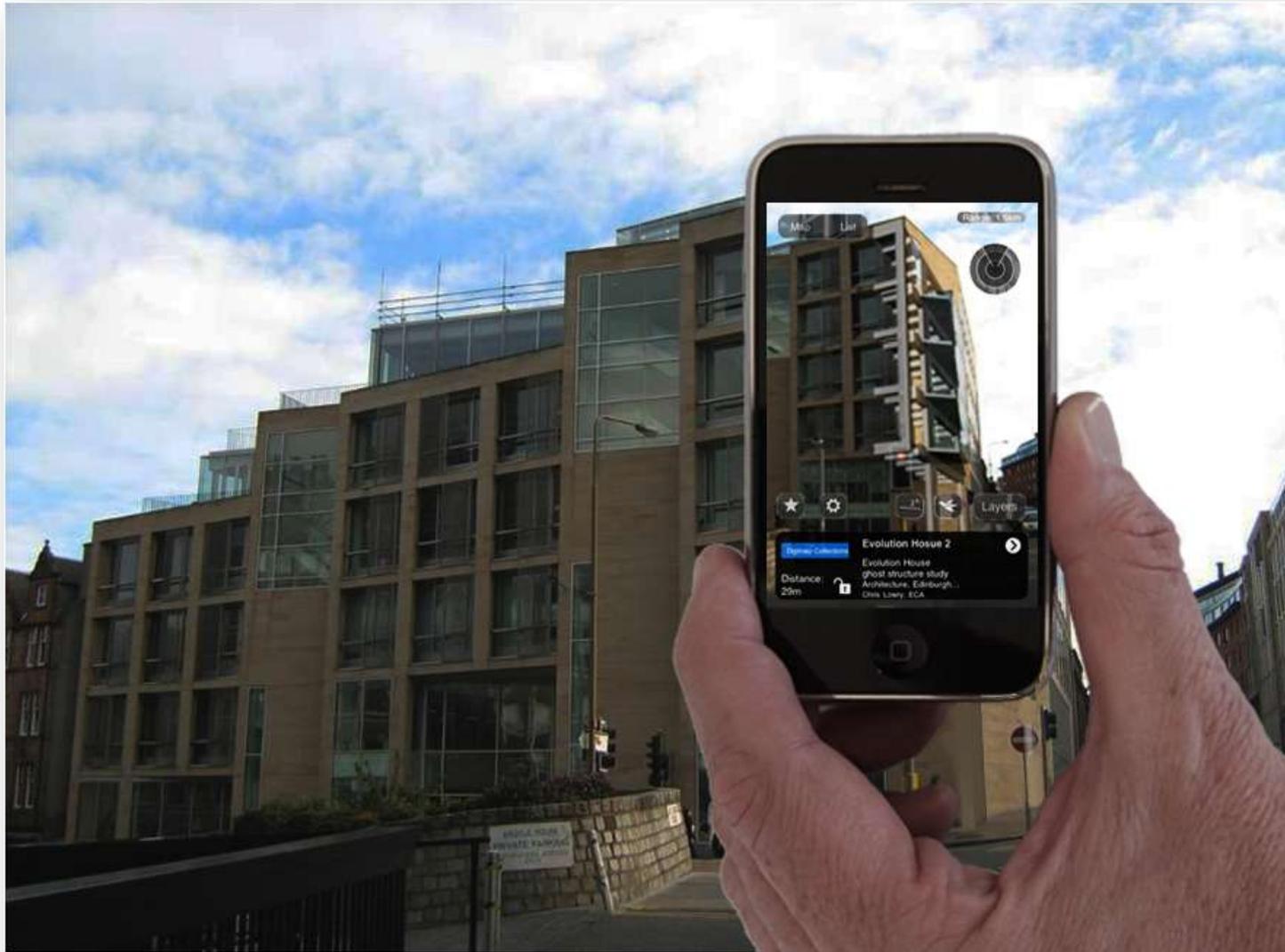




CMOS → Virtual Reality

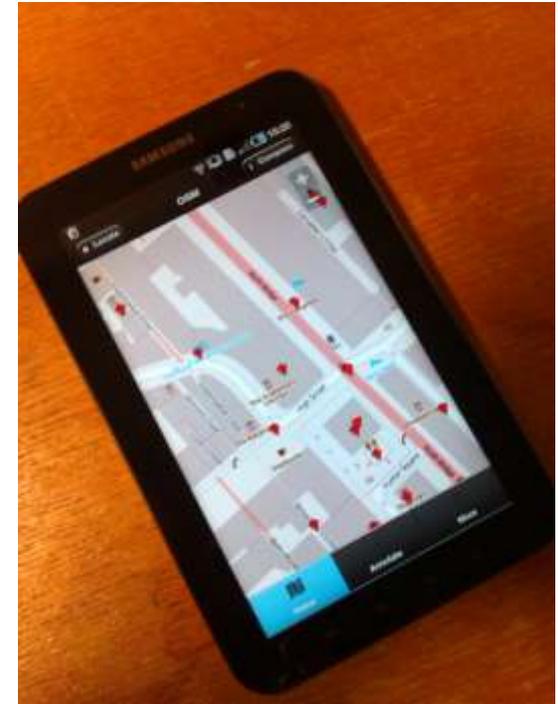
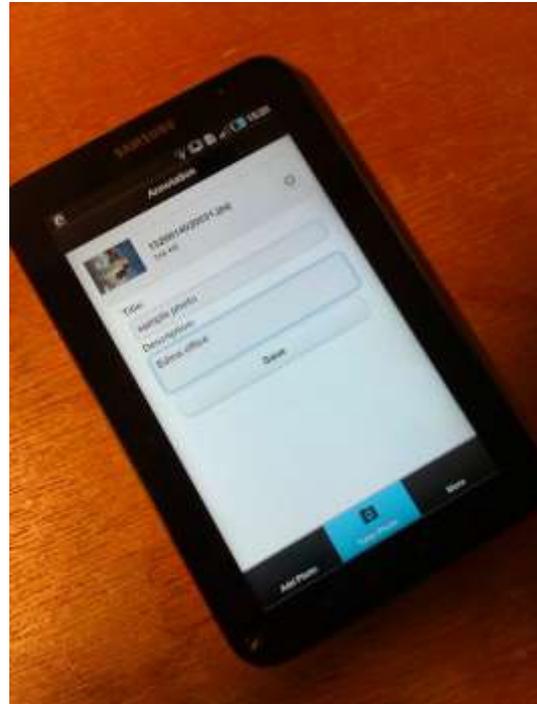


CMOS → AR



Digimap Mobile

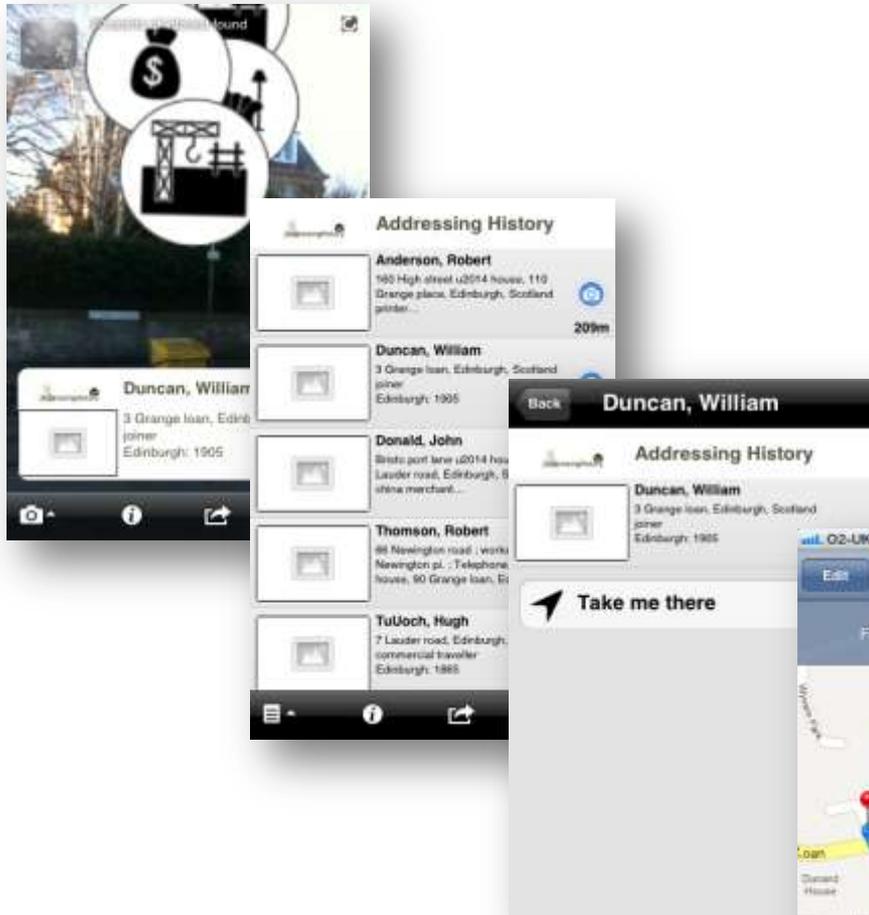
Work in progress on a mobile mapping client that will allow users to collect data in the field and then retrieve that data or integrate it with other EDINA services



What would you find useful?



Addressing History



App to explore the historic postal gazetteers of Edinburgh.

Still in development

<http://addressinghistory.edina.ac.uk/>



A chimpanzee is shown in the foreground, holding a large smartphone in its right hand. The phone's screen displays a grid of colorful app icons. The chimpanzee has its mouth wide open in a shout or scream. In the background, other chimpanzees are visible on the deck of the Golden Gate Bridge, with the bridge's red towers and cables extending into the distance under a cloudy sky.

Saviour or Slideshow?

Location is necessary but it is not sufficient.

“Smartphones will eat the web”

Bruce Sterling ARE2011 Keynote

“But, for more researchers to make full and effective use of the potential of sites, services and tools like this, the geospatial skills gap needs to be bridged. JISC is planning work to help do just that.”

Matthew Dovey - programme director for the digital infrastructure at JISC

The screenshot shows the Research Information website interface. At the top left is the 'Research Information' logo. To its right is a blue banner for 'SpringerReference' with the text 'Top quality, constantly updated and peer-reviewed reference works'. Below this is a navigation bar with 'HOME', 'NEWS' (highlighted), 'PRODUCTS', 'EVENTS', 'JOBS', and 'FEATURES'. A secondary navigation bar includes 'NEWS INDEX', 'INDUSTRY TRENDS', 'PUBLISHING NEWS', 'LIBRARY NEWS', and 'ANALYSIS & OPINION'. The main content area is under the 'ANALYSIS & OPINION' section, featuring the article 'Geospatial data gathering bears fruit' dated '11 January 2012' by 'Matthew Dovey'. To the right of the article is a 'SEARCH NEWS' box with a search input field and a 'Search' button. Below that is an 'OTHER ANALYSIS & OPINION' section with two article teasers: 'Researchers can disrupt publishing' (21 November 2011) and 'Professional publishers concerned about data exception in UK's IP plans'. On the far right are three vertical logos: 'DIRECT INDUSTRY', 'IPI CONFEX', and 'University Press Scholarship Online'.

http://www.researchinformation.info/news/news_story.php?news_id=876

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<http://www.gogeo.ac.uk>

EDINA website: <http://edina.ac.uk>



Links

http://people.csail.mit.edu/kapu/papers/mobile_visual_computing_pullisuvr09.pdf

Indoor Nav

<http://radar.oreilly.com/2011/10/indoor-navigation.html>

<http://dailyiphoneblog.com/2010/06/23/augmented-reality-indoor-usage-of-junaio-iphone-app/>

AR

<http://ar-ux.com/tag/modes>

<http://shareable.net/blog/five-ways-augmented-reality-is-making-your-life-more-shareable>

Pico

<http://gadgetmania.com/2011/01/mili-power-pico-projector/>

<http://www.youtube.com/watch?v=HUAVZhF43r8> (2010)

http://www.youtube.com/watch?v=qU_bTKYh5_Y

