# Geospatial tech in teaching

EDiNA

A National Data Centre

Based at

THE UNIVERSITY OF EDINBURGH

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

Supported by JISC

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# 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/23006059 5/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

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# Need maps?

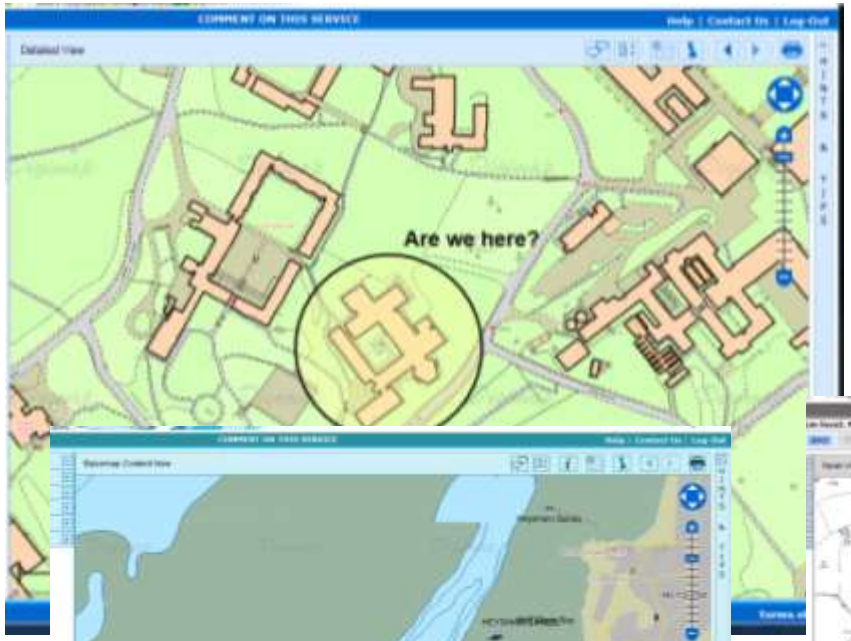
Digimap®

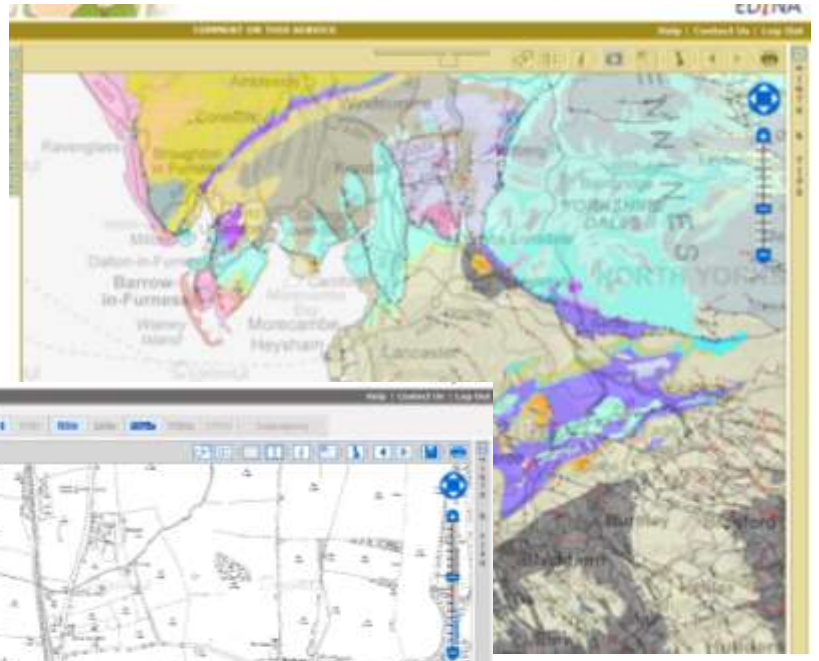
OS

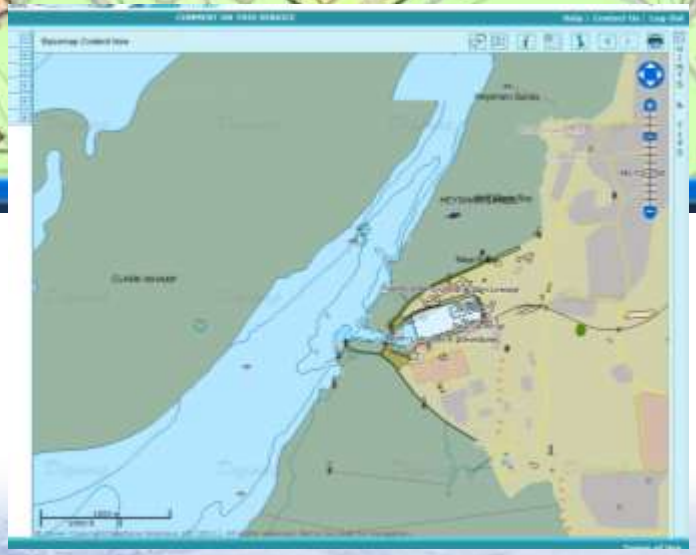
BGS 1835

SeaZone

LANDMARK Information Group





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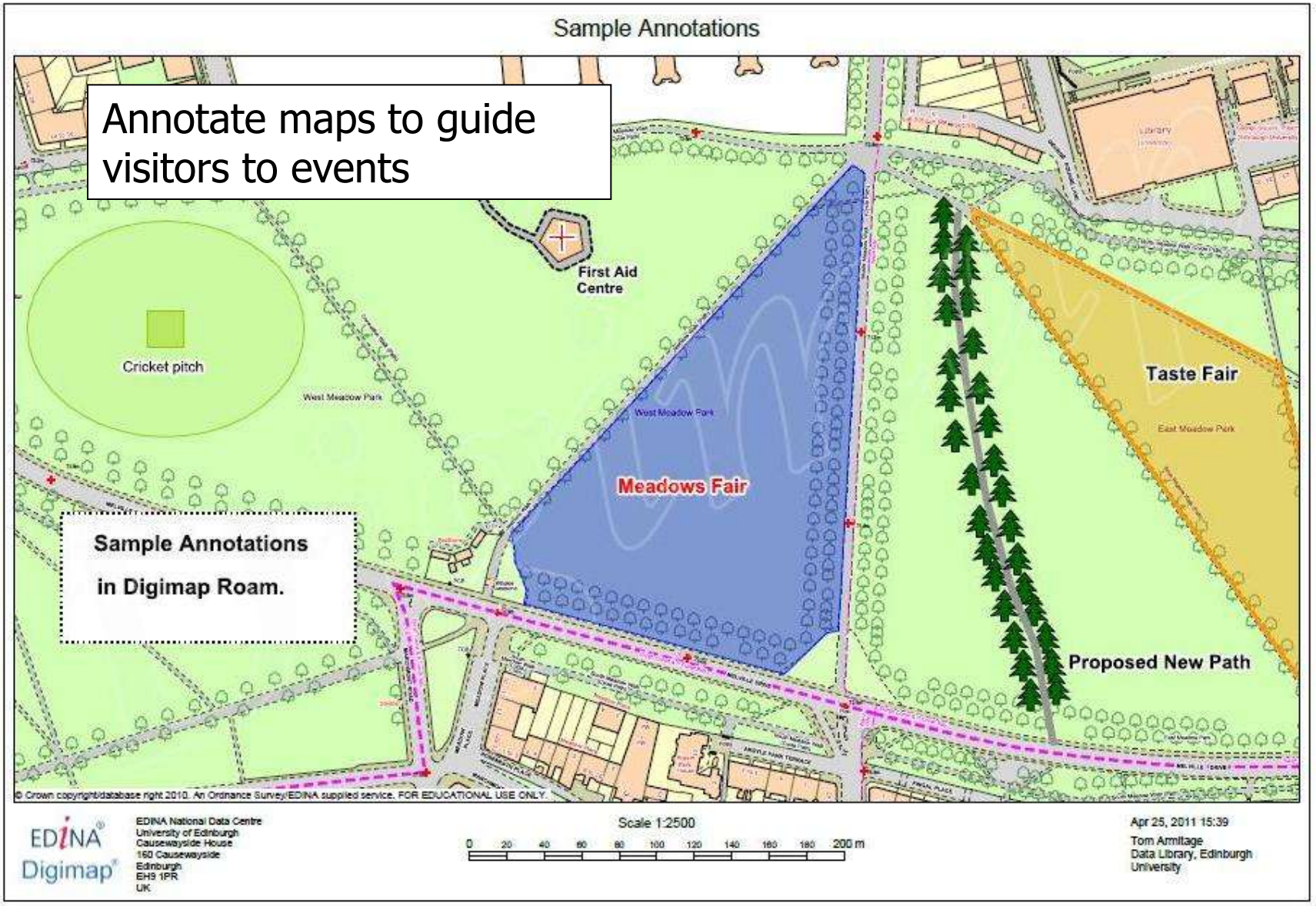
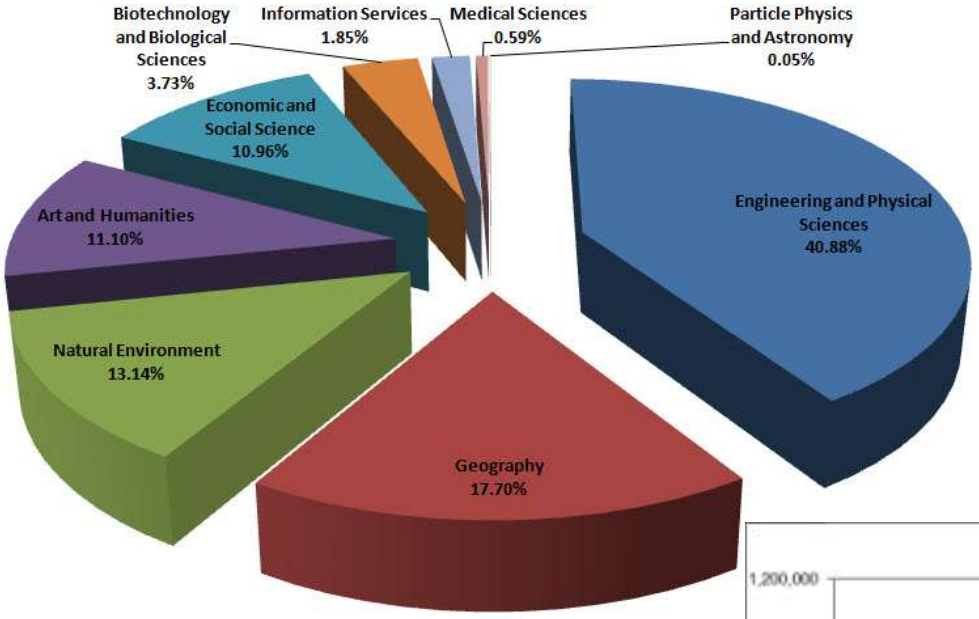
# Annotate maps

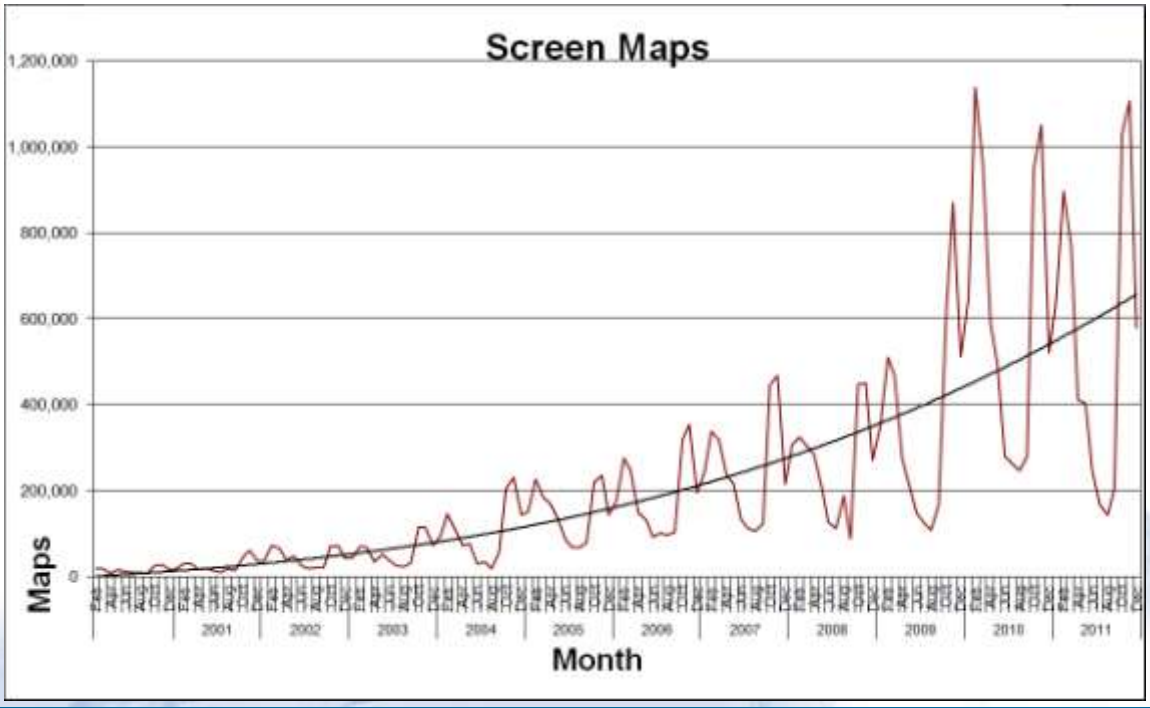


# Use of Digimap

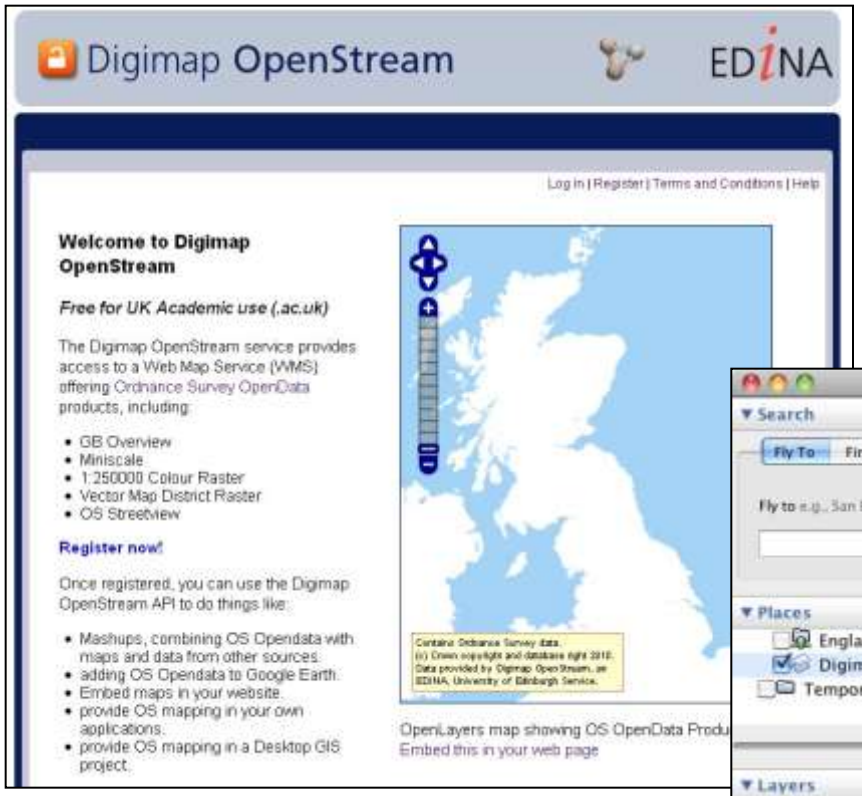



Breakdown of Digimap services by discipline

Digimap ROAM Screen maps

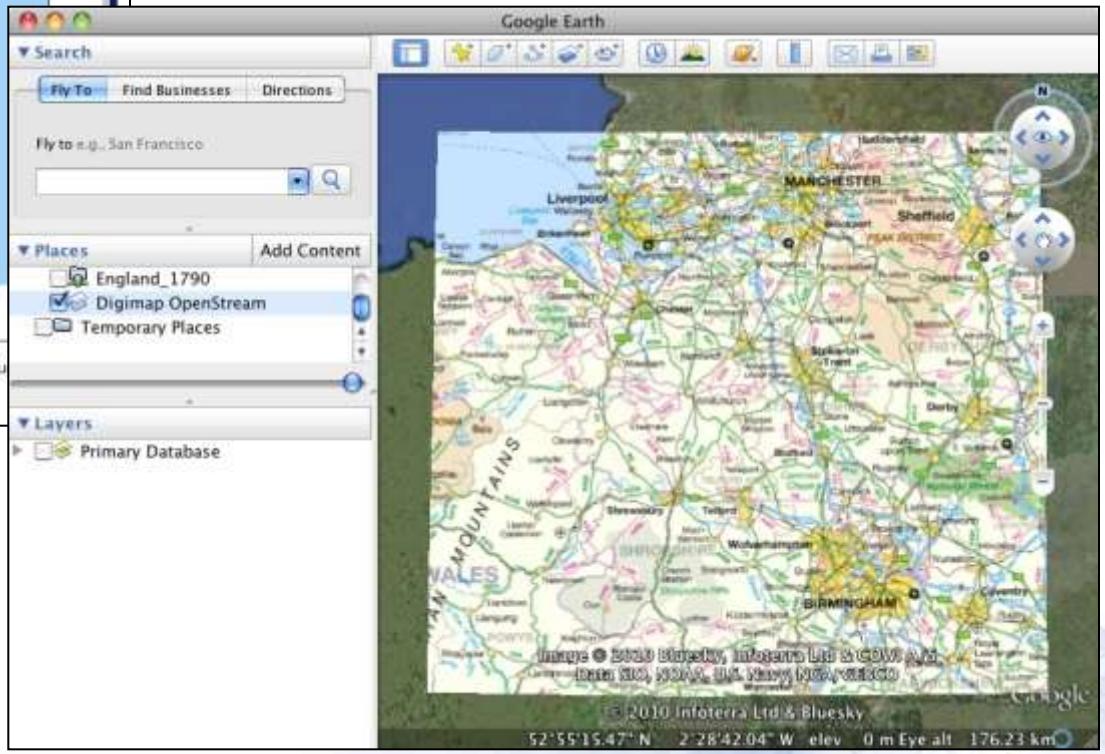


# Maps on YOUR website?




Stream OS Opendata directly into:

- Web apps
- Google Earth
- Desktop GIS




Over 1000 registered users
Non-academic use

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

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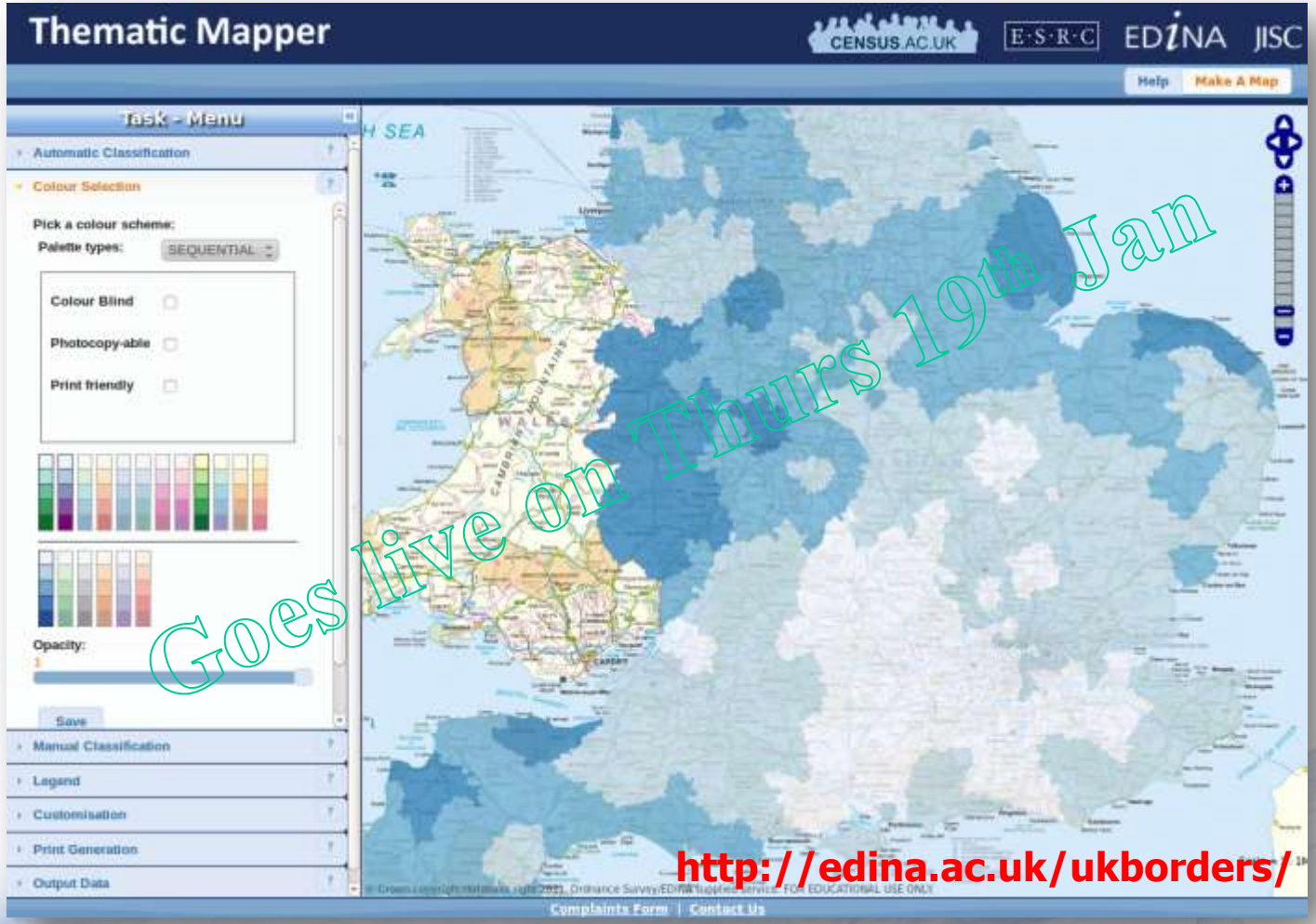
# Thematic Mapper

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.

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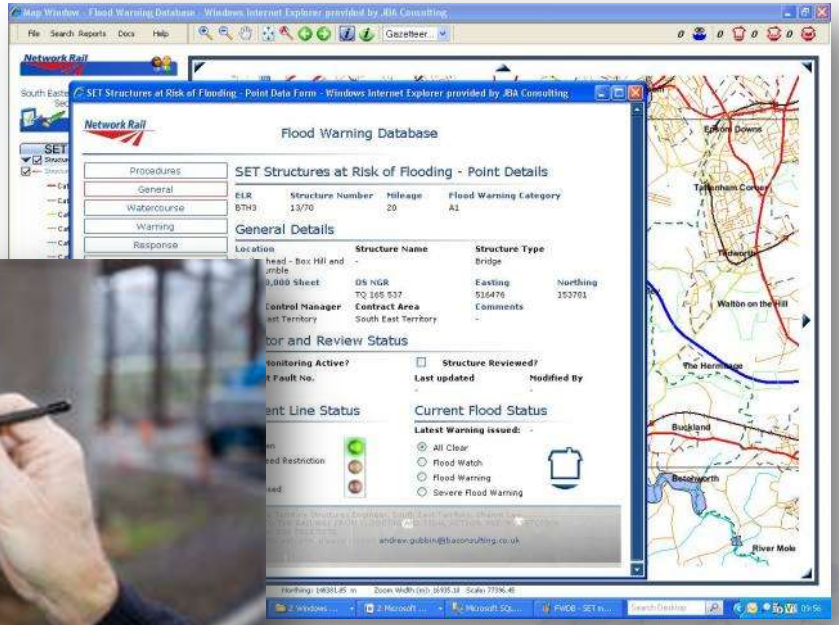
# Why are we teaching geospatial tech?

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.

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# 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

# 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.

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# 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

| Prduct | 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

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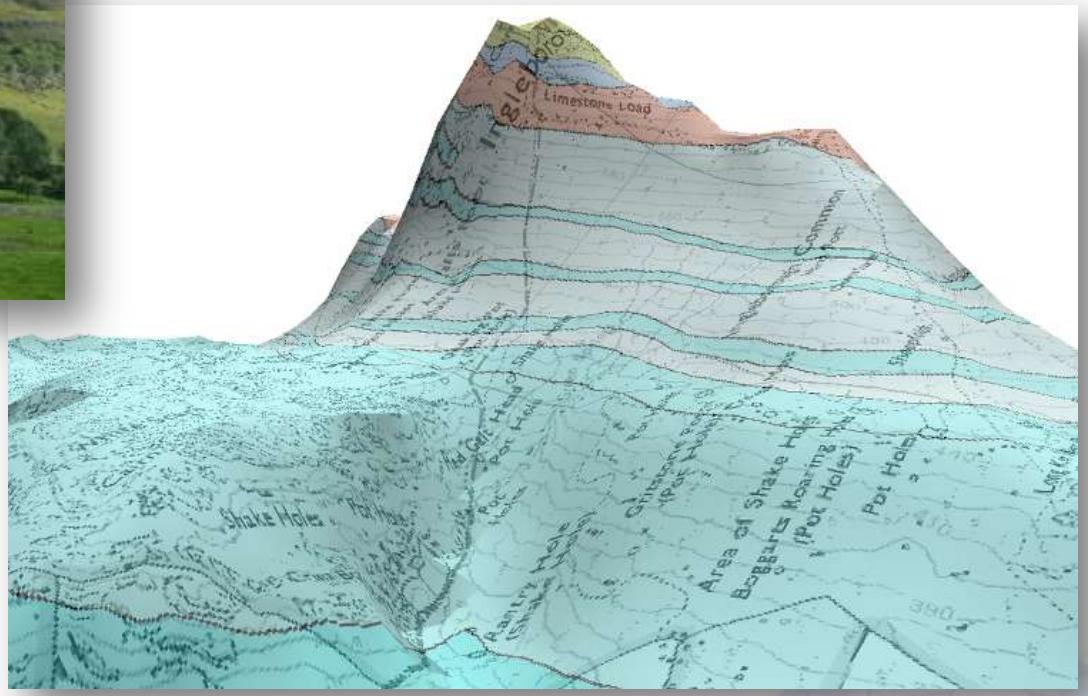
# AR – Enhance Fieldtrips

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?

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# 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

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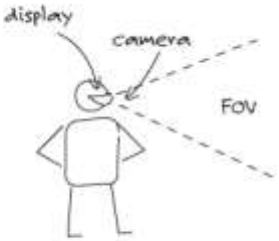
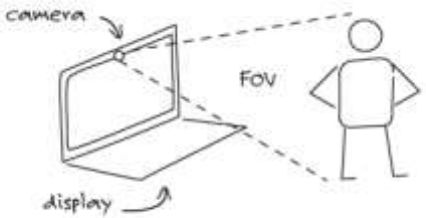
# AR - Pico Projectors



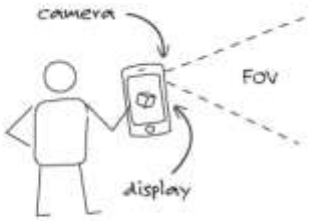

PRIVATE

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



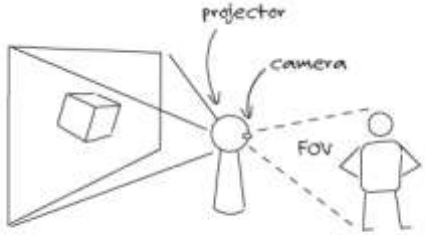

INTIMATE

- 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

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# 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**

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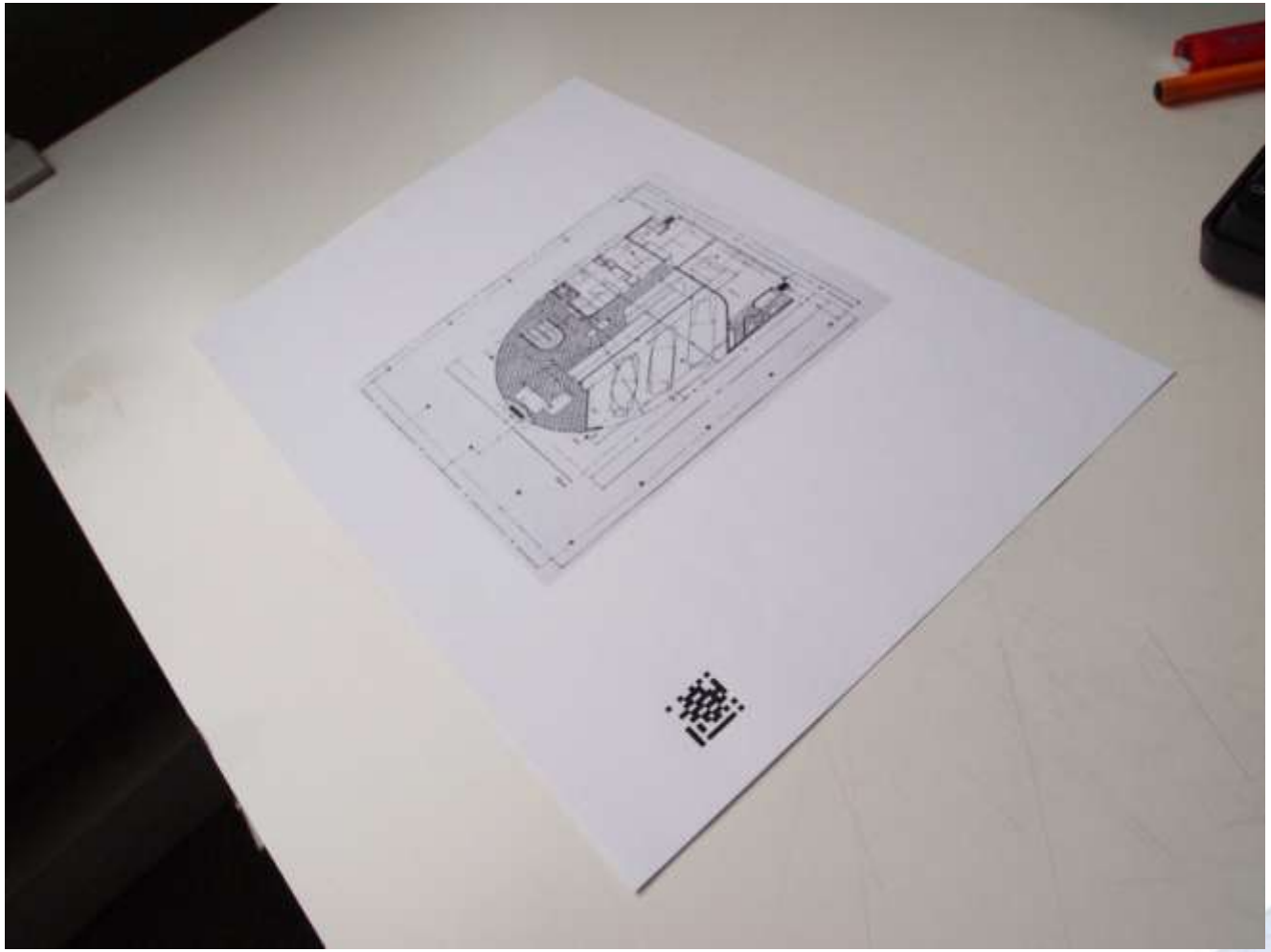
# CMOS → AR



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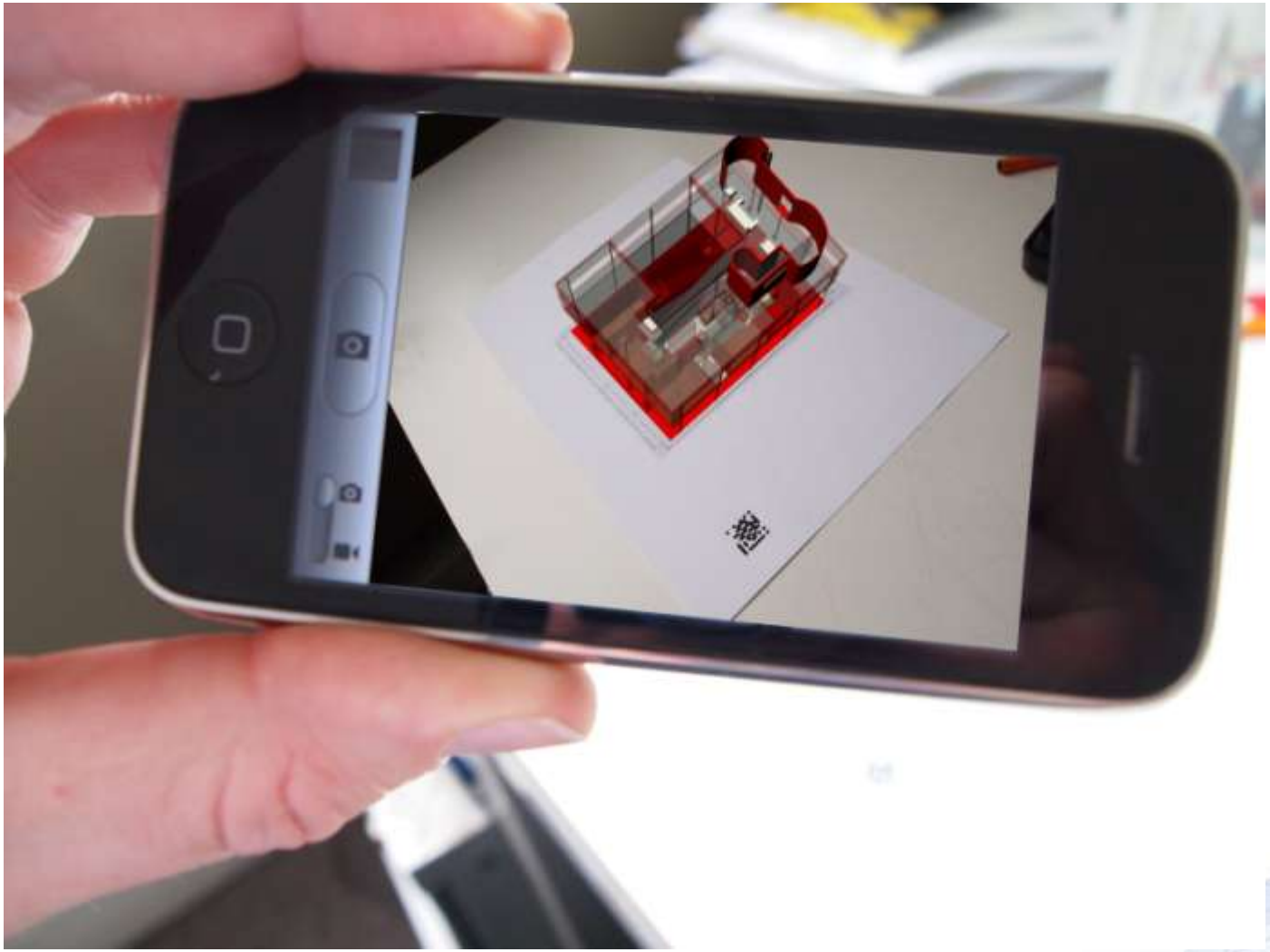
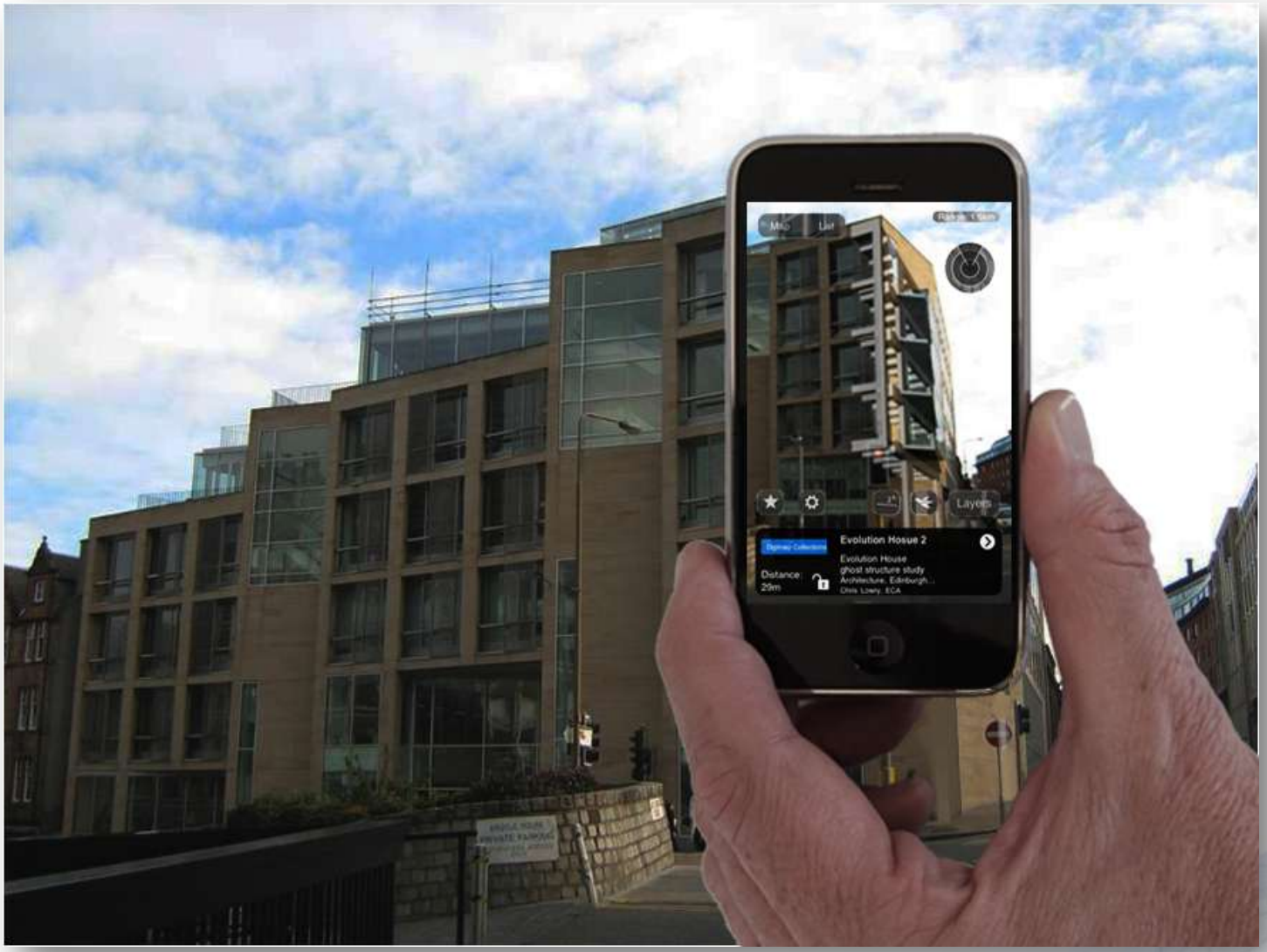
# CMOS → Virtual Reality



# CMOS → AR

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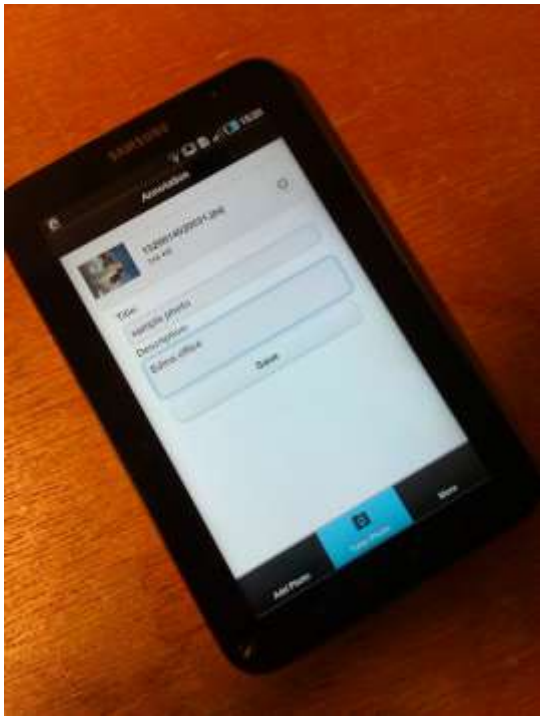
# Digimap Mobile

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?

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# Addressing History

App to explore the historic postal gazetteers of Edinburgh.

Still in development

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

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# Saviour or Slideshow?

**Location is necessary but it is not sufficient.**

**"Smartphones will eat the web"**

*Bruce Sterling ARE2011 Keynote*

# JISC

"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*

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

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***Addy Pope***
Email: addy.pope@ed.ac.uk
Twitter: @go_geo
http://www.gogeo.ac.uk

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

# Links

http://people.csail.mit.edu/kapu/papers/mobile_visual_computing_pulli_isuvr09.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