

Smart Cities

SESSION I : Lecture 1: A Walk Through the Smart City

Michael Batty

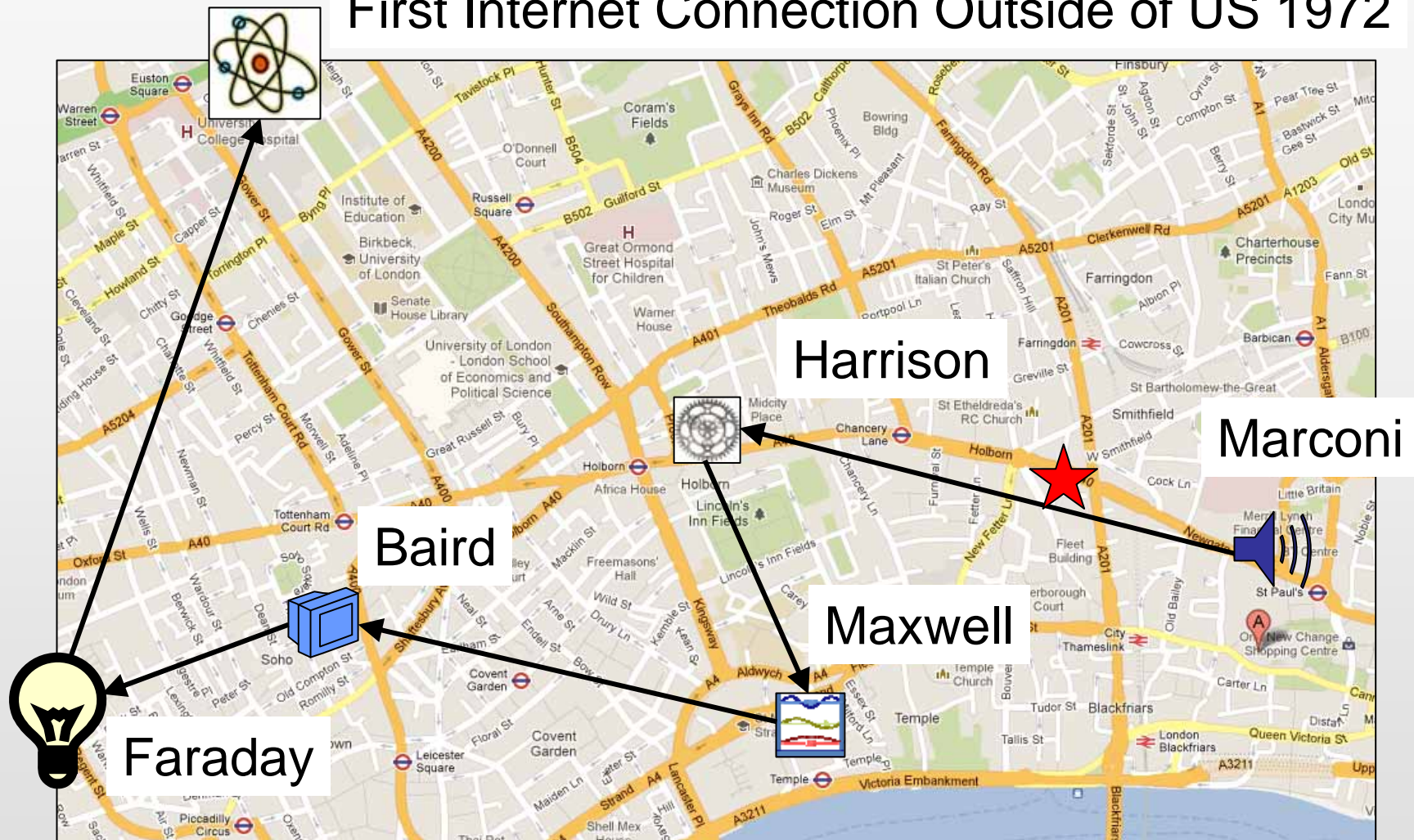
m.batty@ucl.ac.uk


 @j michaelbatty

<http://www.spatialcomplexity.info/>

<http://www.casa.ucl.ac.uk/>

First Internet Connection Outside of US 1972



Worth noting that after I had first presented this talk, I found out that the Edison Electric Company installed the world's first (little) power station at Holborn  to light nearby buildings such the central criminal court and the GPO

Marconi, 1890s



Marconi made the first public wireless transmission from the General PO Office to PO Office South in 1896



John Harrison, Clockmaker to the Board of Longitude, 1750s



John Harrison invented mechanical clocks that worked at sea so position could be determined accurately

Maxwell, Physicist, 1860s



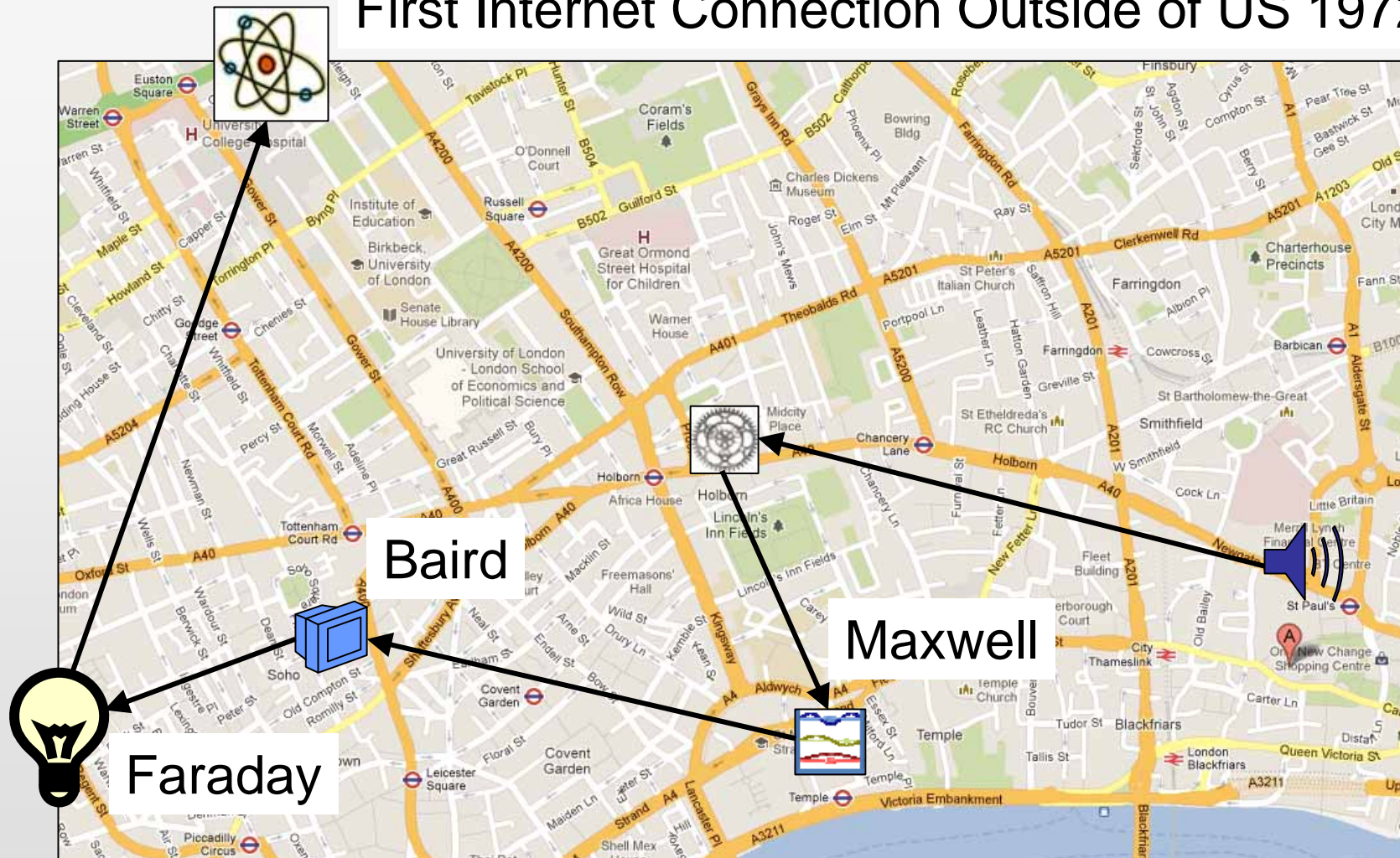
$$\begin{aligned}dU &= TdS - PdV \implies \left(\frac{\partial T}{\partial V}\right)_S = -\left(\frac{\partial P}{\partial S}\right)_V \\dA &= -SdT - PdV \implies \left(\frac{\partial S}{\partial V}\right)_T = \left(\frac{\partial P}{\partial T}\right)_V \\dH &= TdS + VdP \implies \left(\frac{\partial T}{\partial P}\right)_S = \left(\frac{\partial V}{\partial S}\right)_P \\dG &= -SdT + VdP \implies -\left(\frac{\partial S}{\partial P}\right)_T = \left(\frac{\partial V}{\partial T}\right)_P\end{aligned}$$



Maxwell pulled it
all together at
Kings in 1860

Note Bush House, the original home of the BBC is nearby

First Internet Connection Outside of US 1972





Baird, Inventor of TV, 1926



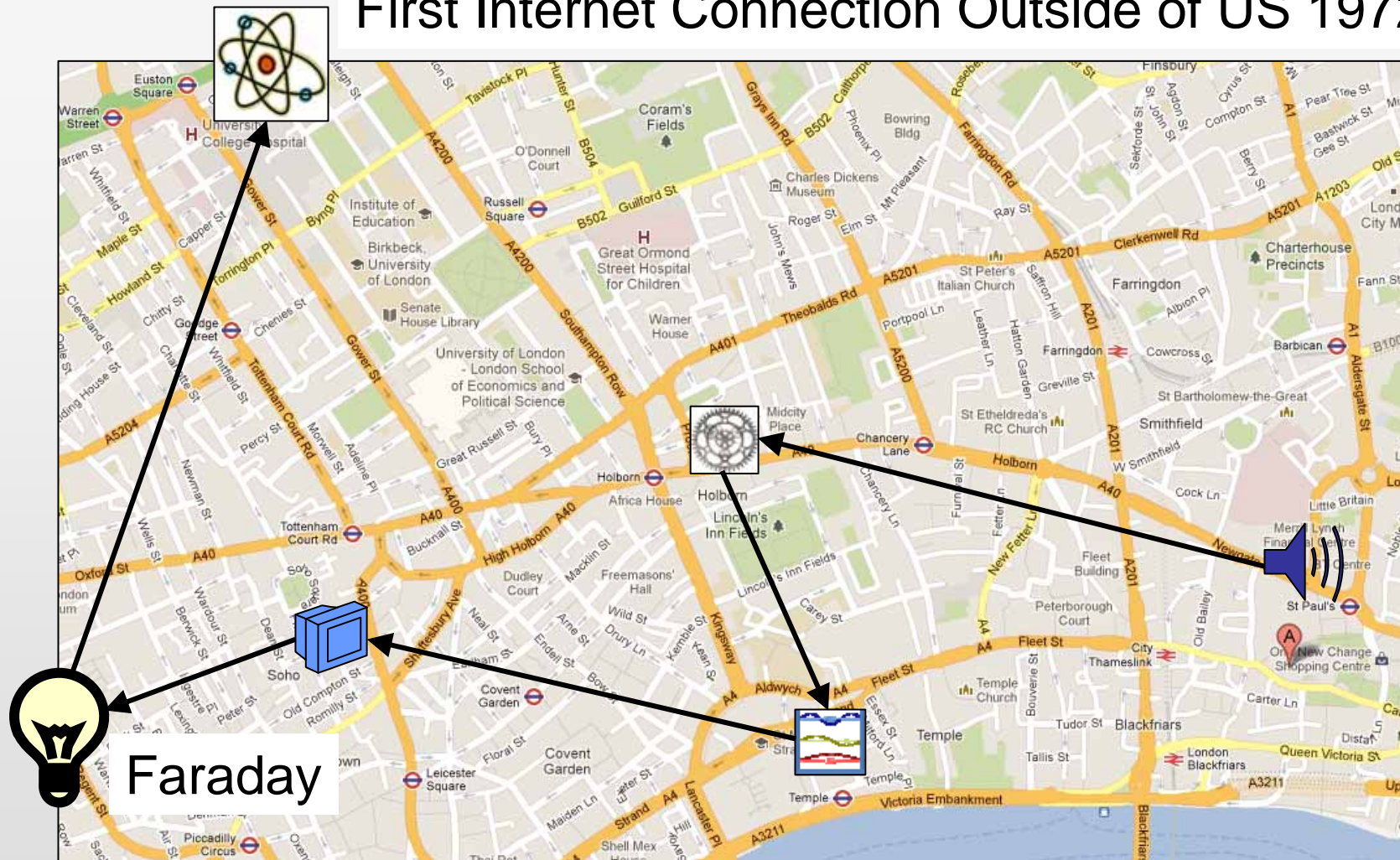
John Logie Baird demonstrated TV for the first time in 1925-1927 in London's Soho

Faraday, Electromagnetism, 1820s

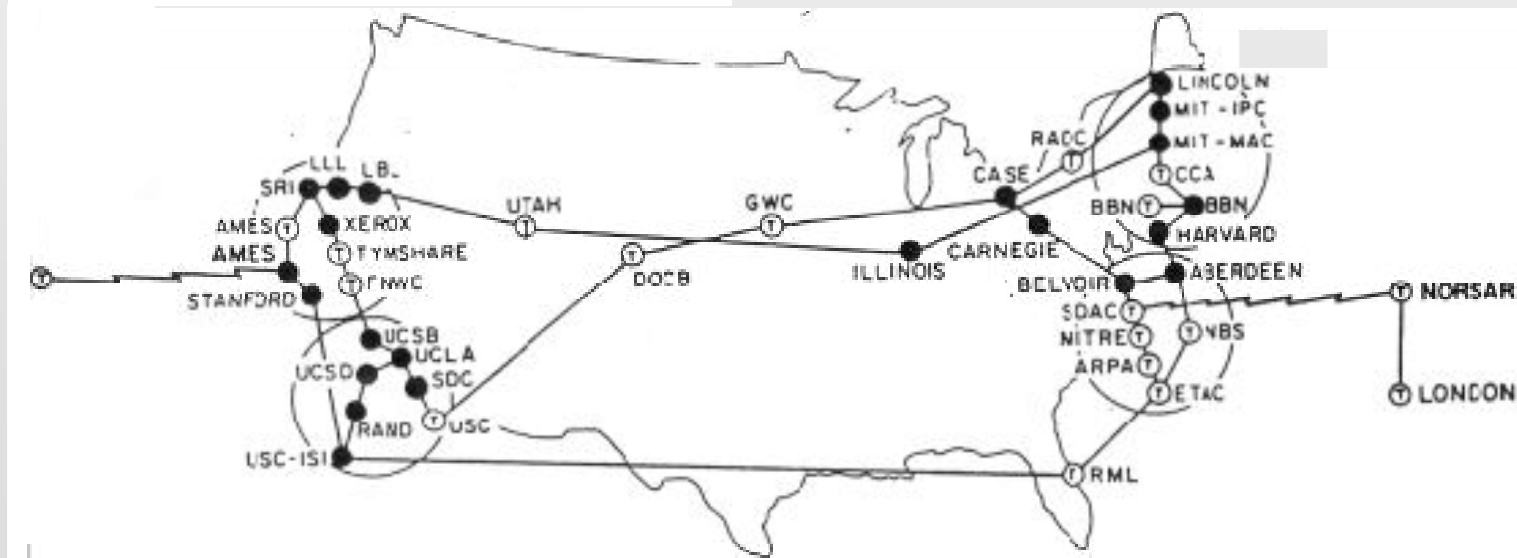
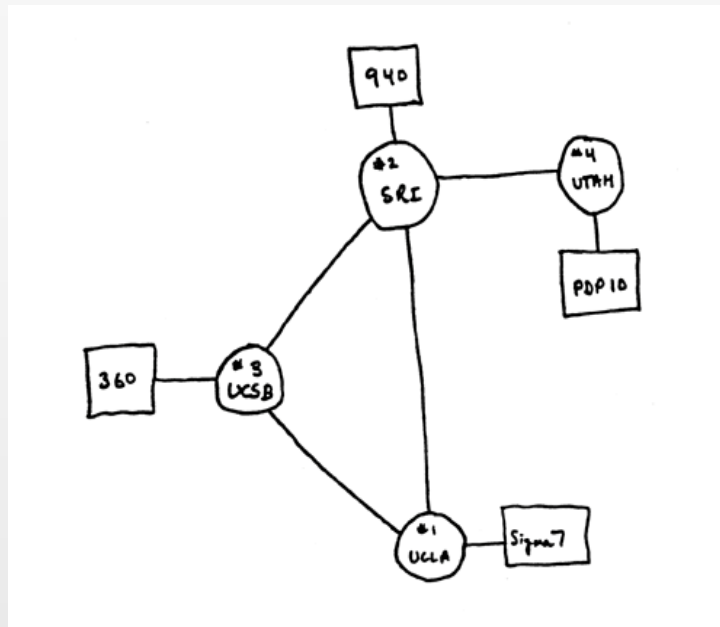


Michael Faraday explores electromagnetism in the 1820-30's at the Royal Institution

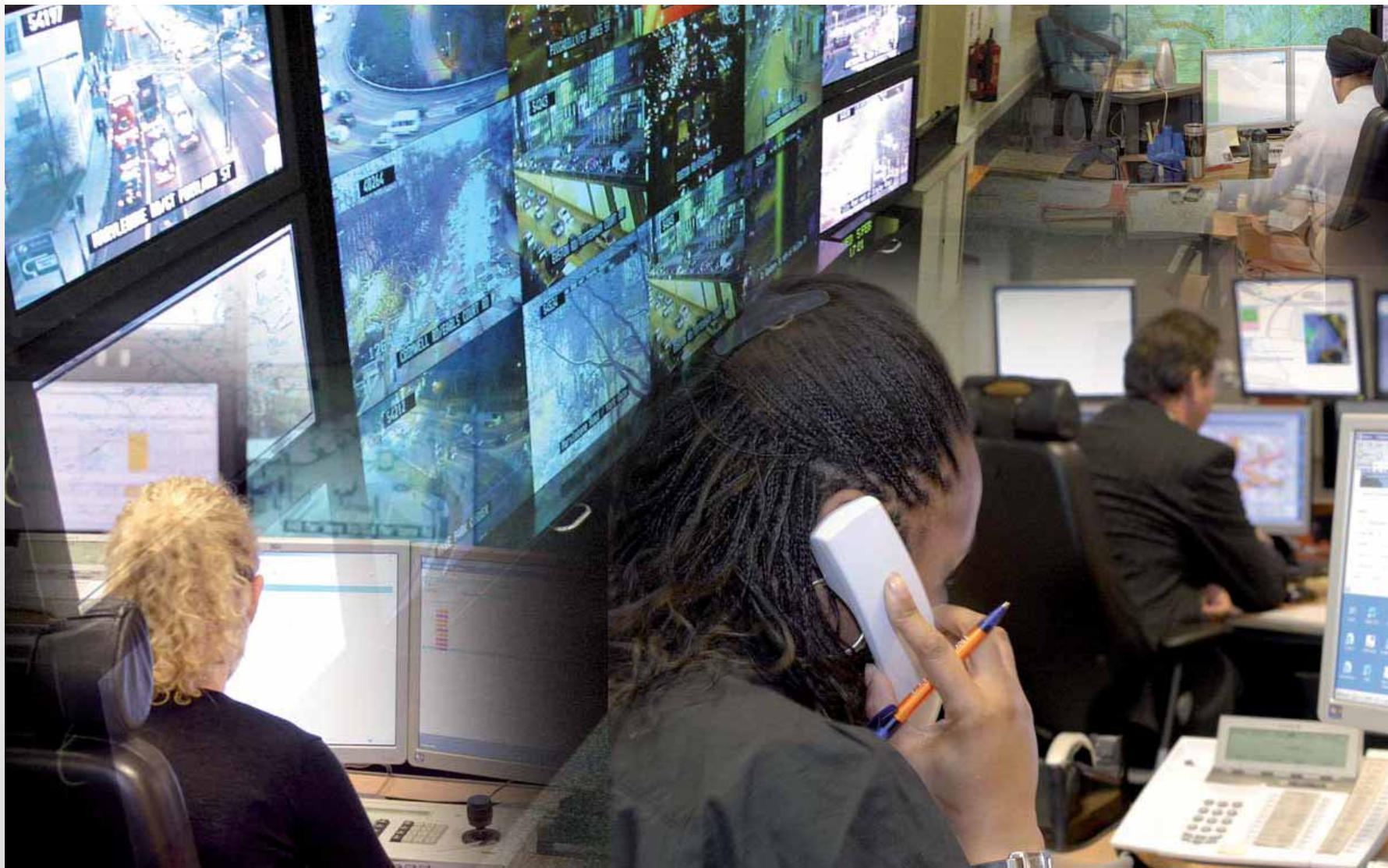
First Internet Connection Outside of US 1972

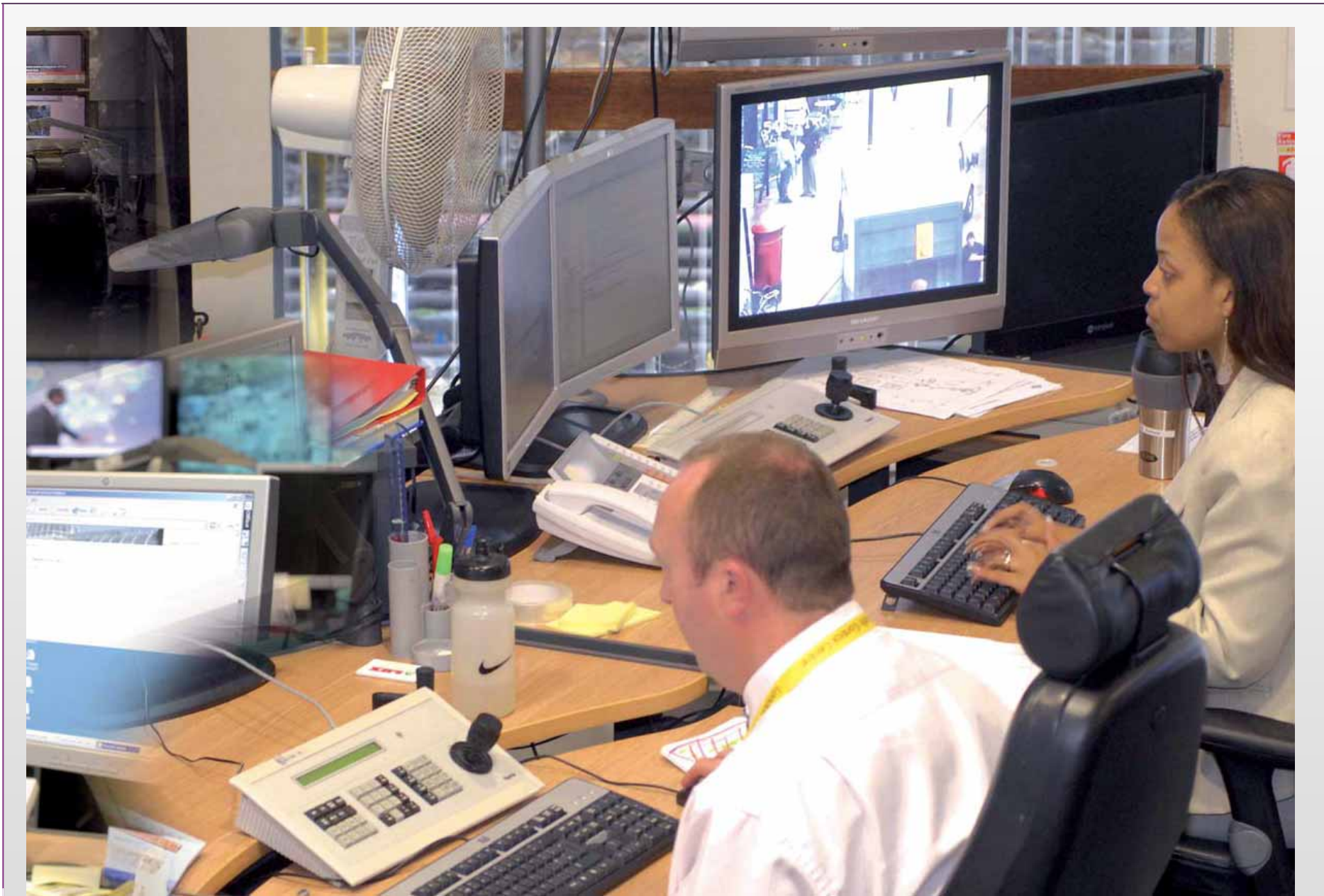


The first internet connection outside the US at UCL in 1972



The modern day – traffic control systems in London





The key messages can be easily seen from our walk through the city and we will list **five essential themes** that recur again and again.

1. Cities are about information and **smart cities in this context are about digital information, not about hardware per se** – how cities are shaped is about how we use information.
2. Information is comparatively invisible compared to past technologies and our second theme is that **smart cities tend to be invisible** – ICT is invisible –wires in the road and wires in the sky are not so easy to figure out in terms of what is being transmitted but of even greater invisibility are wireless communications, particularly social communications. Thus the study of smart cities is not like watching traffic on subway or the road system. We need instruments to sense it.

3. Cities grow from the bottom up by and large. There are millions of decisions that lead to cities, and ICT is being introduced from the bottom up – cities grow from the bottom up – ***cities and their ICT evolve and grow organically from the bottom up*** – there are lots of examples like new towns which are model smart cities like Masdar in UAE, these are the exception. Smart cities tend to be the bigger cities where ICT is being introduced slowly insidiously and quietly
4. Smart cities are not really just about computers in the built environment, not just about what have been called Wired Cities in the past. They are more about how we, not the city, use information, and how cities becoming smart which means us becoming smarter. So a fourth message is that ***smart cities are about how information services are best delivered*** and how citizens use those services.

5. Information is essentially costless – or the cost of transmission is very small compared to physical movements and transactions. Thus cities and citizens can acquire information from anywhere – that makes it global – ICT is intrinsically about the global city and **the smart city is thus a global city.**

To figure out how all this works need to know something about how ICT is physically configured in cities but this is only a bit of smart cities. ICT makes cities more efficient, we think, but it is unclear if it makes them more equitable – it might. Clearly all sorts of past technologies have increased productivity in cities but this is the third industrial revolution that deals with ICT is tending to generate lower productivity gains than the previous two revolutions. At this point we pause and then come back for our second theme which about the origins of digital information.