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University of Newcastle upon Tyne

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Towards Urban Cyberspace Planning
Grounding the Global Through
Urban Telematics Policy and Planning

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By Stephen Graham
Centre for Urban Technology
Department of Town and Country Planning
University of Newcastle
Newcastle upon Tyne NE1 7RU

Contact: kim.mccartney@ncl.ac.uk

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Abstract

Notions of 'city-ness' and urbanism hold an important place in the current media-hype and debate surrounding cyberspace and the Internet. The importance of the urban/spatial is also growing in technological debates within academia. But specifically urban issues of *policy and planning* have been largely absent from both these popular and academic debates. This paper attempts to help insert the idea of local agency into debates about new technologies and the future of cities. It has three sections. In part one, I try and explain why the concept of local agency has been so ignored in the rhetoric about cyberspace, cyberculture and the many allegations that we are moving toward a more tele-mediated society. In the second section, I build on this discussion to explore the recent wave of experimentation at the urban level with information technology and telematics. Three broad areas of such policies are discussed: 'global positioning' policies aimed at projecting a city as a global node for investment ; internally-focused telematics initiatives aimed at 'reconnect the fragments' that increasingly characterise cities ; and strategies aimed at developing electronic linkages between citizens and municipal authorities. I conclude, in section three, by assessing the significance of these policies for our treatment of the 'local' for understanding of cities; and for our conceptualisation of telematics-based innovation more broadly.

1 Introduction

Vague notions of 'city-ness' and urbanism hold an important place in the current media-hype and debate surrounding cyberspace and the Internet (Featherstone and Burrows, 1995). Popular commentary on the growth of telecommunications-based social interaction, shopping and information retrieval is peppered with the use of urban/spatial metaphors for describing the electronic spaces which people increasingly 'enter' and interact 'within'. Beyond the most obvious spatial metaphors - cyber*space*, electronic *frontier*, information super *highway*, web *site* - remarks about 'cybercities', 'virtual cities', 'virtual communities', 'virtual shopping malls' and 'cybervilles' are increasingly common.

The importance of the urban/spatial is also growing in technological debates within academia. General debates about cyberspace, telematics and the future of cities are currently proliferating within disciplines as diverse as architecture, cultural studies, communications studies, science and technology studies, and urban sociology and geography. Attention is increasingly directed to exploring how the economic, social and cultural aspects of cities interact with the proliferation of advanced telematics networks in all walks of urban life (see, for example, Shields, 1996; Architectural Design, 1995; Mitchell, 1995). Here, the common 1980s assumption that the new communicational capabilities of telematics will somehow 'dissolve' the city has waned. Rather, it is now clear that cyberspace is largely an urban phenomenon. It is developing *out of* the old

cities, and is associated with new degrees of complexity within cities and urban systems, as urban areas across the world become combined into a single, globally-interconnected, planetary metropolitan systems (Graham and Marvin, 1996). Research here now centres on the degree to which city economies can be maintained in a world of on-line electronic flows ; the ways in which place-based and 'virtual communities' interact ; and the related interactions between urban cultures rooted in traditional public spaces, and 'cybercultures' operating within the virtual spaces accessed from computers (see Mitchell, 1995 and Graham and Marvin, 1996, for reviews).

Despite the central importance of the 'urban' in cyberspace debates, however, specifically urban issues of *policy and planning* have been largely absent from both these popular and academic debates. Questions of agency and local policy tend to be ignored in the simple recourse to either generalised, future-oriented debates, or to macro-level, binary models of societal transformation. In these, new technologies are seen to be somehow autonomously transforming society *en masse* into some new 'information age', 'information society' or 'cyberculture'. The implications is that local councils, policy makers and planners are little more than irrelevant, even anachronistic, distractions in this exciting and epoch-making transformation.

With utopianism and crude technological determinism still often dominating popular (and, in many cases, academic) debates, it is not surprising that the potential roles of urban policy makers and planners in 'socially shaping' new technologies in cities at the local level are usually overlooked. This neglect, however, is problematic. It means that a fast-growing wave of urban experimentation with telematics, which is emerging across advanced industrial cities, is almost completely ignored. This is a problem, because such innovation promises to have major practical and theoretical implications for how we might consider the future of cities, urban policy and planning. It may also offer lessons on the broader question of how we might best understand the relations between cities and telematics, and how we might address the crucial question of thinking about the 'local' and the 'urban', in an increasingly tele-mediated and globalised era.

This paper attempts to help insert the idea of local agency into debates about new technologies and the future of cities. It has three sections. In part one, I try and explain why the concept of local agency has been so ignored in the rhetoric about cyberspace, cyberculture and the many allegations that we are moving toward a more tele-mediated society. In the second section, I build on this discussion to explore the recent wave of experimentation at the urban level with information technology and telematics. Many of these initiatives are attempting to use telematics to help underpin the emergence of the more socially 'progressive', culturally enlivening and economically beneficial scenarios at the urban level. Three broad areas of such policies are discussed: 'global positioning' policies aimed at projecting a city as a global node for investment; internally-focused telematics initiatives aimed at 'reconnect the fragments' that increasingly characterise cities ; and strategies aimed at developing electronic linkages between citizens and municipal authorities. I conclude, in section three, by assessing the significance of these policies for our treatment of the 'local' for understanding of cities; and for our conceptualisation of telematics-based innovation more broadly.

2 Explaining the Neglect of Local Agency in Cyberspace and Cites Debates

Why are general debates about cyberspace and the future of cities so buoyant, whilst the idea of there being local 'manoeuvring space' to shape local telematics development in cities is so rarely stressed? This, I argue, can be attributed to two problems. First, the dominant models of technology-society relationships which underpin cyberspace and city debates (technological determinism, futurism/utopianism and dystopianism/political economy) operate to deny the very *concept* that local agency can shape technological innovation in diverse and contingent ways.

Second, the urban studies and policy communities themselves have been very slow to become aware of telematics.

Technological Determinism and the 'Candy Store Effect'

As with the wider discussion of technology-society relationships, the analysis of the linkages between cities and telecommunications tends to be dominated by a set of approaches which can broadly be termed 'technological determinism'. More often than not, in this 'mainstream' of social research on technology (Mansell, 1994), new telecommunications technologies are seen to directly *cause* urban change (Edge, 1988;1). This is because of their intrinsic qualities or 'logic' as space-transcending communications channels. The forces that stem from new telecommunications innovations are seen to have some *autonomy* from social and political processes (Winner, 1978) - what Stephen Hill calls an "apparent intrinsic technological inevitability" (Hill, 1988; 2).

Here, the social and the technical tend to be cast as two different arenas, the former being shaped by the latter. Machines and technologies are seen to arise and evolve in a separate realm and only subsequently come to alter the world (Thrift, 1993). Technological 'revolutions', such as the current one which many allege to be based on telematics, are seen as virtually unstoppable broad waves of innovation and technological application, which then go on to 'impact' on cities and urban life (Miles and Robins, 1992). As with much social research on technology, literature on telecommunications and cities still tends to invoke what Gökalp calls "grand metaphors" of the nature of telecommunications-based change in cities (Gökalp, 1988).

Most often within current debates about cities and new technology, modern telecommunications are seen as a 'shock', 'wave' or 'revolution' impacting or about to impact upon cities (Gökalp, 1992). In such scenarios, current of future urban changes are often assumed to be determined by technological changes in some simple, linear cause-and-effect manner. The use of simple two-stage models to describe changes in cities and society is common. Cities are seen to be placed in a new 'age' in which telecommunications increasingly have a prime role in reshaping their development. Most usual here are notions that capitalism is in the midst of a transformation towards some 'information society' (Lyon, 1988) or 'post-industrial society' (Bell, 1973), or that a more general 'communications revolution' (Williams, 1983) or 'third wave' (Toffler, 1980) is sweeping across urban society. The broad 'technological cause - urban impact' approach reflects very closely the 'common sense' view of technological change within western culture. As Stephen Hill argues:

"The experience of technology is the experience of apparent inevitability [...] the most influential critics who have sought to understand the experienced 'command' of technological change over twentieth-century life have turned to the machines for explanation, and asserted the 'autonomy' of technology [...] The technological determinist stance aligns with many people's everyday experience" (Hill, 1988;23-4).

Most (but by no means all) technologically determinist approaches centre on speculating the 'impacts' of such telecommunications 'revolutions' on *future* cities in a general and vague way. Within recent cyberspace rhetoric, in particular, there has been an especially powerful linkage between technological determinism and extremely optimistic, even utopianist, assumptions about the future impacts of telematics. As Kevin Robins suggests, such discourse has been "driven by a feverish belief in transcendence; a faith that, this time round, a new technology will finally and truly deliver us from the limitations and the frustrations of this imperfect world" (Robins, 1995; 136). The optimistic technological determinism of 'cyber Gurus' like Nicholas Negroponte (1995) and Bill Gates (1995), and the vast PR efforts of large telecommunications, IT and media companies, offer further tantalising glimpses of scenarios where their new technologies will impact beneficially on cities and urban life, to 'solve' urban problems. The message of such powerful rhetoric, endlessly repeated through countless newspaper stories and media outputs, seems to be that the proliferation of electronic spaces and networks is leading to an alternative reality which offers little less than the potential for "recreating the world afresh" (Robins, 1995; 153).

In this rush to describe this re-creation of the world, *actual* telecommunications-based developments in *real* contemporary cities are rarely analysed in detail. If virtual spaces are mythologised to be some 'point of departure' for society, then attention will always be deflected away from the detail of how they relate to real people, real economies and real communities in real cities. A related tendency is to assume that the 'impacts' of telecommunications on cities are *all the same.* In fact, the immaturity and neglect of urban telecommunications studies means that there has been a tendency to approach the whole subject without trying to justify the theory or methodologies adopted. In the excitement to address these neglected and important areas, Warren (1989) notes what he calls a 'candy store effect':

"The topic [of telematics and urban development] creates a 'candy store' effect by providing license to deal with a range of phenomena. The result is an effort to cover far too much with no logic or theory offered to explain why some consequences are discussed and others are not and why some evidence is presented and other findings are not [...]. We are left with an analysis which lacks any theoretical base and an explicit methodology, gives more attention to marginal than primary effects of telematics, and, in many instances, is in conflict with a significant body of research" (Warren, 1989; 339).

The crucial point for this discussion is that the current stress on autonomous technology, transcendence, positive scenarios, and future cities, suggests that analytical and policy debates centre around how society can *adapt to* and *learn to live with* the urban effects of telecommunications-based change, rather than focusing on the ways in which these effects may be altered or reshaped through urban policy initiatives. Implicitly, local social and political actors in contemporary cities are seen to have little or no scope to shape telecommunications developments within cities. Little space is left within these approaches for forces of human agency or urban and telecommunications policy making at the local level with which to alter the apparent 'destiny' embodied in the telecommunications-based development of a city. As Robert Warren argues, "benign projections give little indication that there are significant policy issues which should be on the public agenda" (Warren, 1989;345). Kevin Robins and Mark Hepworth elaborate on this point, by arguing that:

"It is this question of agency that is fundamental. Within this futuristic scenario, technology appears to have its own autonomous and inevitable force [...]. It is a force, moreover, that becomes associated with a higher state of human evolution [...]. Insofar as technological development seems inflexible and unquestionable, and the course of progress to be part of quasi-evolutionary destiny, then perhaps the only appropriate response is that of acquiescence and compliance" (Robins and Hepworth, 1988;157).

Critical Approaches and the Dangers of Social Determinism

A second range of more critical analytical approaches to city-telecommunications relations often also implicitly works to deny the potential for urban telematics policies. Such critical work encompasses several strands of work. 'Post modern' urban dystopias -- from Ridley Scott's Los Angeles portrayal in *Blade Runner* to William Gibson's 1984 *Neuromancer* -- co-exist with more analytical strands of research on urban political economy (Castells, 1989), the political economy of telecommunications (Sussman and Lent, 1991), and analysis of the urban/technological changes involved in the shift to post modernism (see, for example, Knox, 1993). Often, critical work offer disturbing visions and analyses of telecommunications-based urban life today and in the future (e.g.s Davis, 1990; 1992 ; Virilio, 1993 ; Brook and Boal, 1995).

Generalisation across such a heterogenous body of perspectives is a decidedly hazardous exercise. But one common starting point for such analyses is their stress on the ways in which the development and application of telematics technologies are not somehow separate from society. Rather, telecommunications are seen to be fully inscribed into the political, economic and social relations of capitalism. Following from this, telecommunications aren't seen as simple determinants of urban change. Nor are they cast as panaceas or 'quick fix' technical solutions to urban problems. According to this approach, city-telecommunications relations cannot be

understood without considering the broader political, economic, social and cultural relations of advanced industrial society and how they are changing (see Graham and Marvin, 1996).. Political economy, in particular, has a great deal more to commend it as a foundation for understanding telecommunications in cities than the simple technological determinism of the futurists or the 'cyber Gurus' (see Castells, 1989). Political economy centres on how society influences technology rather than the other way round. The 'effects' of telecommunications on cities are defined by the ways in which they are used to support wider processes of economic, political and spatial restructuring. Above all, especially in the Neo-Marxist accounts, the development and application of telematics are seen to be driven by the imperative of maintaining capital accumulation for firms, and the need to overcome crises that reflect capitalism's inherent contradictions. City-telecommunications relations are, in this approach, seen to be driven largely by the *economic* forces surrounding the globalisation of capitalism itself and to reflect and perpetuate capitalism's highly unequal social relations.
Whilst I would stress the value of critical perspectives, I would also argue that sometimes they can become over simplified and totalising in predicting some bleak urban future/present. For example, critical commentators like Paul Virilio (1993) and Michael Sorkin (1992) can ironically end up agreeing with many utopianistic technological determinists in their prediction of the supposedly inevitable evaporation of the place-based meaning of the city (Collins, 1995). Michael Sorkin (1992;xi) believes that "computers, credit cards, phones, faxes, and other instruments of instant artificial adjacency are rapidly eviscerating historic politics of propinquity, the very cement of the city". Paul Virilio predicts a total collapse in the physical, public aspects of cities. Urban residents, he argues, will soon become saturated with home-based, telemediated experiences accessed via interactive prostheses. All movement will be avoided as people fall victim to some all-encompassing "domestic enslavement" - what he calls the life of the "motorized handicapped" (Virilio, 1993;11).

Such approaches can be criticised for social rather than technological determinism (Collins, 1995). Often, the Neo-Marxist accounts are economistic -- their stress falls too heavily on the all-powerful influence of the globalising political-economic structures of capitalism in determining telematics developments. The problem for analysis of local and urban telecommunications analysis is that such social determinism, again, serves to reduce the apparent 'manoeuvring' space left for local innovation in telematics to alter the apparent destiny of the powerless urban locality, stricken by social polarisation and financial collapse. In this scenario, city planning and policy making become little more than functional local agents which are coerced into providing the needs required to tempt multinational capital into an urban area. In the more reductionist accounts, cities are often portrayed as little more than "helpless pawns of international corporate elites" (Judd and Parkinson, 1990; 14), who are coerced by the globalisation of capital to do little but mechanistically compete for corporate and state investments, favourable imagery and tourist and conference visitors (Judd and Parkinson, 1990; 14).

The Neglect of Telematics in Planning and Urban Policy Debates
A third factor which helps to explain the low profile of local policy in telematics and city debates is the neglect of communications infrastructures within urban policy and studies communities themselves (Graham, 1992; 1994). Telecommunications remain perhaps the single most underdeveloped area of urban studies and urban planning and policy making (Batty, 1990a). Communications studies, meanwhile, has long neglected the city as a focus of research (Jowett, 1993).
The effects of this divorce between urban studies and policy making on the one hand, and communications studies and policy making on the other, were compounded by the national dominance of telecommunications regulation, and their relative invisibility in cities. The result was that "the concept of an urban communication infrastructure was not expressed in local institutions comparable to those which realised public concerns with education, environmental quality, housing and transportation [...]. "Communication is not usually treated as part of the

local technical infrastructure of urban life" (Mandelbaum, 1986; 132-5). Whilst this is changing quickly with the emergence of new research, and the explosion of highly visible telematics networks like the Internet and cable networks, urban policy makers attempting to intervene in telematics are usually doing so for the first time, and with very little knowledge or experience. There are problems here because the foundation of planning education and skills still show the legacy of planning's origins in focusing largely on the *physical* mobility of people and goods within cities, and the location of physical facilities and land uses within a unitary, integrated city (Webber, 1968; 1093). Electronic forms of communications are rarely discussed, the implications being that they are ubiquitous, invisible and of little importance in shaping the city. To Henry Bakis (1995;3), telecommunications remain peripheral to urban and regional planning because of the "persistence of the traditional paradigm whereby the approach to regional development remains, to a a large extent, based on the logic of industrial development".

But the growing importance of electronic interactions, information exchanges and transactions within and between cities has called some commentators to talk of a 'paradigm crisis' in urban planning and policy making, because the old ideas of planning the 'industrial city' are not appropriate to planning the 'information city' (see Graham and Marvin, 1996). Ken Corey has commented that "urban and regional planning practice throughout many of the world's industrial market economies is in a state of paradigm challenge. In essence, the crisis exists because old planning procedures of how the industrial city functions don't seem to apply for today and tomorrow" (Corey, 1987).

The result is that, even with a massive current growth in urban communications policies, urban policy makers often still tend to remain wedded to crude versions of the 'grand metaphors' for explaining the shift to a more telecommunications-based society that we explored in the last chapter. Simple technological determinism is common. Most have, at best, a crude understanding of the technological and regulatory shifts that are underway in telecommunications. And because urban politicians and planners still remain firmly wedded to the tangible and salient aspects of cities, the arcane, mysterious and intangible world of telecommunications presents major problems as a focus of intervention. A senior politician within a UK city recently admitted that "within the council, we've got a lot of bright local politicians, but they're not very good at working within the conceptual frameworks [of telecommunications] ; they like to touch and feel, to know what's happening. They like to be very practical". There are some signs that this is slowly changing, however. The incorporation of advanced telecommunications into urban and regional planning has probably developed furthest in France. A recent communications plan for the French city of Lille, for example, comments that:

"The traditional concepts of urban and regional planning are today outmoded. The harmonious development of areas towards equilibrium, the correct sharing out of resources, providing support to complementary developments within the city ... these ideas have given way to the impression that spaces are fragmented, atomised and strongly competitive [...]. The insertion of telecommunications into the city makes the development of spaces more complex and introduces today a third dimension into urban and regional planning [after space and time] : this is the factor of *real-time*." (ADUML, 1991).

3 Current Innovation in Urban Cyberspace Planning

The last decade has seen a world-wide upsurge in urban attempts to use telecommunications as policy tools for economic, social and cultural development. That this has occurred despite the powerful influence of futurology, technological determinism and dystopian scenarios, and the lack of debates on telecommunications in urban studies and policy making is a measure of the magnitude of urban crises across the advanced industrial world. Telematics have become a natural policy focus as policy-makers everywhere have struggled to reinvigorate city economies, physically regenerate urban areas, market urban spaces as global sites for investment, address social polarisation, and restructure public services to address funding crises (see Healey et al,

1995). Three areas where telematics and telecommunications have emerged as key policy foci can be highlighted:

* The 'global positioning' approach, where telematics are used to attract inward investment into cities;
* The 'endogenous' development approach where telematics are used to try and 'reconnect' the economic, social and cultural fragments that increasingly characterise contemporary cities; and
* The delivery of public services via telematics and the establishment of new channels of city-citizen communication

Global Positioning: Teleports and Urban Marketing Strategies

As the global shift towards market-based development of telecommunications gains ground, an increasing number of urban telematics strategies in the United States, the United Kingdom and Western Europe are emerging aimed at positioning cities as attractive global investment nodes for advanced service and manufacturing industries. As in the national-led 'future city' strategies such as those that developed in the 1980s in Singapore, France and Japan, gaining better telecommunications infrastructures than competing cities, or at least generating the *perception* of better infrastructure, is seen as an increasingly important policy objective for city authorities in these nations (Batty, 1990b).

The result of these shifts is rapid current growth in urban strategies aimed at using telecommunications to improve the economic competitiveness of individual cities as sites for the operation of global and multinational corporations. At the same time, there is a tendency for debates about 'urban regeneration' to centre on the need for *property-led* initiatives, and the perceived social, cultural, economic and environmental needs of corporate business elites (Imrie and Thomas, 1993). The much-vaunted 'public private' partnerships behind these initiatives often represent what Derek Shearer calls the "edifice complex". Here, he argues, 'progress' is equated with "the construction of high-rise office towers, sports stadiums, convention centres, and cultural megapalaces, but ignores the basic needs of most city residents" (Shearer, 1989; 289).

Teleports -- satellite links associated with property developments and links to local telecommunications networks -- are one such body of initiatives. The thirty or so operational teleports in western cities actually involve a variety of different kinds of initiatives (IBEX, 1991). But most teleports effectively consist of nodes for advanced national and international telecommunications services, implanted into a part of a city and linked to local telecommunications networks for distributing access to the services locally. Often teleports form the centrepiece of ambitious urban redevelopment plans, with new office, industrial and high-status housing property developed around the facility. This is the case at Amsterdam, New York and Cologne.

Through their catalytic function, and their potent marketing potential (Richardson et al, 1994), municipal authorities see teleports as potential centres of excellence and innovation in business telematics. Their 'high tech' and 'switched in' imagery is especially useful to certain cities suffering the effects of industrial decline. In Roubaix, France, for example - the town with the worst inner city crisis in the whole country - an ambitious teleport-based redevelopment plan goes under the banner of the phrase "on the networks of the future" (Graham, 1995a).

Teleports aim to emerge as centres for the diffusion of innovation into the wider urban economy, through the creation of 'hot spots' of telematics demand in these key sectors, as well as providing new linkages between the urban and the global economy. This may improve economic competitiveness and the chances of attracting inward investment as a result. and linking these new services to the needs of key sectors of the city economy. Often, it is linked with the

construction of sophisticated optic fibre networks within cities, known as Metropolitan area Networks (or 'MANs') distributing access to high band width telematics services to large firms, higher education institutions and large government organisations. A common approach is to tailor the teleport to the specialised needs of a key local economic sector, whether it be media industries (Cologne Media Park), broadcasting (London Docklands teleport), financial services (New York and Edinburgh Teleports), textiles (Roubaix teleport), high technology research and development (Sophia Antipolis in France) or maritime, port and logistics industries (Le Havre maritime city initiative and Bremen teleport).

A more recent set of global positioning strategies that is bound up with the explosive growth of the World Wide Web, is the construction of Web sites aimed at marketing cities to elite tourists and conference organisers. A growing range of cities are setting up hosts and servers on the Internet containing maps, information, photographs, transport information, information on arts and culture, and guides to their facilities which real and potential visitors may access. Closely linked with the range of 'virtual cities' now under development (see below) such Web sites make the most of the multimedia performance of the World Wide Web to market cities as products in the global 'image space' of the Web (Graham and Marvin, 1996). They aim to construct convivial, cosmopolitan and animated images for cities in the minds of influential decision makers in conference bureaus, inward investing firms and the highly mobile, largely elite tourist classes that dominate use of the World Wide Web. The example of 'Virtual Nottingham' is shown in Figure 1. This city server and over 2000 others are linked up into a specialist, global World Wide Web network called 'City.Net' through which Internet users can 'visit' a list of cities all over the world just by clicking their name. Not surprisingly, City.Net is geared to the international travelling elites who dominate use of the Internet.

Re-Connecting the Fragments: Telematics for Endogenous Economic, Social and Cultural Development

There are some signs that the 1980s fashion for large, infrastructure-led telecommunications strategies such as teleports is being eclipsed by strategies aimed at using telematics as tools of *endogenous* urban planning and policy. Here the aim is to construct telematics applications which help 're-connect' the economic, social, geographical and cultural fragments that increasingly characterise contemporary cities. The logic here is that telematics applications supporting computer-mediated communication, information exchange and transactions may help reinvigorate and reintegrate the 'local' when all trends seem to be fracturing metropolitan regions within a globalising world.

This, the theory goes, may help underpin the development of a 'virtuous circle' where improved social cohesion is linked with a renaissance of urbanism, local economic development and civic culture. In this scenario, telematics may help to break down the barriers and fear between social, cultural and geographical groups within cities. They may help ground urban community development in an increasingly globalised context. They might support new tele-mediated dynamics of local economic growth within the city. And they might generate new spaces for interaction, debate and cultural development which feeds back positively to help support a renaissance in the urban social and cultural life.

Key here is the complex blending of place-based and placeless 'virtual communities'. Some argue that the multitude of specialised virtual communities on the Internet is evocative of a sense of convivial urbanism that has been lost in the physical and social transformations toward postmodern urbanism (Rheingold, 1994). This is critical because social networks and the ties between people and places now often transcend the often arbitrary definitions of 'neighbourhoods' and 'the city'. In recognising this urban fracturing, locally-based telematics initiatives may help to 'attach' virtual communities to the dynamics of individual cities. Geoff Mulgan, for example, argues that "given that the architecture and geography of large cities and

suburbs has dissolved older ties of community, electronic networks may indeed become tools of conviviality within cities as well" (Mulgan, 1991; 69). He urges local policy makers to explore this potential by adding telecommunications polices to their more familiar remit on education, planning, transport and housing.

This is increasingly happening. Four broad types of initiatives are emerging from urban policy innovations to use telematics to boost the endogenous development of cities: community cable networks, videotex applications, 'Freenets', and city host computers and 'virtual cities' based on the World Wide Web. On the cable front, a wide range of community access initiatives involving cable have recently been developed by city authorities in the USA. Using the First Amendment and local regulatory powers, cable access programming involving channels dedicated to community TV production has been developed in the most politically-liberal US cities. These channels can be considered as 'electronic public spaces', which offer a counter to the commercial imperatives of the marketplace (Aufderheide, 1992). These policies, however, have resulted from long battles against the centralisation of control over cable and the overwhelming power of the market imperative in shaping their development. Only 10-15% of networks have such facilities. Far from being an automatic benefit of the supposed diversity of cable services, they have only developed where "municipalities and citizens carve out public spaces with ingenuity, against the odds, and rarely noticed in the national media" (Aufderheide,1992; 53; see Strover 1989).

Second, similar ideas are supporting a wide variety of videotex experiments in France linked with the ubiquitous Minitel system. The initiatives of the municipality of Marne la Vallée, near Paris, is typical (Weckerle, 1991). Aiming to structure a whole new set of 'modern public spaces' based on publicly-accessible information and communication services on Minitel, the city authority has made efforts to develop a diversity of local social applications on the system, aimed at widening participation in telematics as much as possible. The hope is to support new approaches to local democracy, through Minitel-based networks between citizens, centres of education, social organisations and municipal departments (Weckerle, 1991).

Third, electronic 'Freenets' use commercial and municipal sponsorship to develop freely-accessible electronic civic telematics networks. These services, which offer electronic mail, conferencing, information services, bulletin boards, and - often- wider Internet access, are becoming increasingly common in North American cities (Winner, 1993). There were over 25 at the end of 1994 ; 8 others were being developed in Western Europe. Special equipment is often provided for people with various forms of disabilities to use Freenet services. The objective of 'reconnecting' the fragments of cities is shown by the fact that many Freenets are actually set up with structures that are analogous to the different physical elements of cities themselves. Figure 2 shows the main menus of the Cleveland Freenet system, one of the first systems to start up. Complementing American Freenets are a wide range of simple urban bulletin board services (or BBS), most delivered by computer enthusiasts from their own personal computers. It is estimated that there are 300 BBS services in Los Angeles alone. SF Net, a BBS service with 3000 regular users in San Francisco, has set up 20 coin-operated terminals in cafes across the city. These are aimed at people without normal access to personal computers and modems.
Finally, a wide range of other 'electronic public spaces' are being based on networks of municipally-controlled Host computers and 'virtual city' web sites (Graham, 1995b). The Manchester Host, for example, offers a wide range of electronic mail, bulletin boards and database services to registered users through computers attached to phone lines. Whilst its services are charged - unlike those of Freenet - excluded groups are being supported through a network of 'Electronic Village Halls' in the city. These are physical centres where training and Host services are supported for '*communities of interest'* - for example, the Bangladeshi community, women's' organisations, disabled groups and old people - and also distinct *geographical* communities.

But the most influential, and fastest growing range of initiatives, currently, are the so-called 'virtual city' initiatives based on the World Wide Web. Again, the urban analogy is usually used here to provide the interface between the user and services - a tangible, superimposed image of how the use of electronic spaces relates to the home city of the user. Virtual cities, which again are linked into the City.Net network, often mix urban marketing applications (tourist and conference information), with an integrated 'web' home for any World Wide Web server that falls within the city boundary. Many virtual cities are also developing as part of broader regional strategies aimed at boosting educational, cultural, economic and social development of regions through broad-based telematics-based strategies. The various European-backed initiatives within the 'Tele-regions' and "Inter-Regional Information Society Initiative" (IRISI) are examples of these broad strategies aimed at developing telematics -cultures in cities and regions. A particularly interesting and complex virtual city is the Digitale Stad (DDS or 'Digital City') initiative in Amsterdam (Figure 3), which is one of an integrated network of virtual cities or digital towns in the Netherlands (see Figure 4). Funded by Amsterdam city council, the Ministry of Economic Affairs, Dutch telecom and the Ministry for Home affairs, DDS defines itself as a "test bed where the roots of electronic community can grow" (Digitale Stad, 1996). By late 1994, the system had 7000 users were registered, 120,000 monthly 'hits', and more than a million consulted "pages" every month. Its main objectives are three-fold:

* First, to widen participation in telematics ("it is of paramount importance that each and everyone wishing to participate in this new digital society is enabled to do so in full measure" - Digitale Stad, (1996)).
* Second, to develop and disseminate knowledge ("DDS engages in the dissemination of knowledge towards citizens, project partners, providers of services, civic organisations and other digital cities in the Netherlands and in Europe" - Digitale Stad, (1996)).
* Third, economic development ("the globalization and automatization of the economy are putting employment, and hence, the cohesion of society under heavy pressure. The Digital city wishes to actively participate in the renewal of small and middle-sized enterprises in the Amsterdam Region in order to strengthen its economic structure" - Digitale Stad, (1996)) .

The most interesting point about DDS is that it provides a carefully planned set of virtual spaces which are intended to act as a powerful metaphor rebounding onto the development of Amsterdam. The spaces within DDS are designed and allocated to reflect the sort of convivial urbanism, fine-grained mixtures of public, private and domestic space, social democratic values, organic development and mixed use urban landscapes that Amsterdam embodies physically. The balance between information and communication, and between public and private uses, are carefully balanced to try and match that in the city itself. The 'Digital City' analogy, however, is both sanitised and unrepresentative. DDS does not encompass analogies to Amsterdam's red-light districts, for example, and it's user population overwhelmingly excludes the City's poorer populations.

The virtual spaces on DDS are constructed as a series of carefully-iconed "Town squares" -- meeting points for people sharing the same interest in that particular theme (the book square, culture square, gay square, education square, kids square, technology square, television square, tourist information square, world square, political square, ports square, European square etc). In a pattern reminiscent of the famed urban layouts of Christaller, every square has four others bordering it, allowing easy web-style exploration (see Figure 3). Each square also has its own 'cafe' or 'pub' where visitors may, within a WWW environment, engage in (archived) discussion in real time about the the square's theme. 'News-stands' at each square allow global Internet newsgroups and web sites to be accessed related to the square's themes, so blending local and global. Every square also has a function bar which employs sophisticated search programs to allow visitors to obtain key-word indexed information.

Around each square are eight 'buildings' which are rented to information providers relevant to the themes. One of these is defined as a 'collective building', run by a public or not-for-[profit organisation. In this way, community centres and clubs could become junctions for community

processes and participation. Company's or organisations using these buildings can also advertise on the squares 'billboard'. Clicking the billboard accesses the information pages of that company. Finally, DDS offers residents of Amsterdam the opportunity to build their own "homes" between the squares, allowing individuals to produce their own information and have electronic meetings.

New Municipal Connections :
The Electronic Delivery of Urban Services

Finally, telematics provide new opportunities for changing the ways in which those services are delivered to citizens within cities. The information, communications and transactional capabilities of telematics are being explored throughout western nations as a new means of delivering urban public services (OTA, 1993). Increasingly, the Internet, electronic information kiosks, videotext terminals, automatic teller machines and smart cards are being used to cut the costs and improve the effectiveness of dealing with the millions of day-to-day information requests, communications, and transactions between urban government and citizens. In many American States, for example, government is following the private sector with advanced telematics systems development. These support the electronic delivery of benefits and replace the physical offices of certain government services with electronically-mediated kiosks (OTA, 1993).

But such innovations can be shaped in many ways, and the trade off between risks and benefits remain unclear. On the one hand, they may simply support the substitution of the physical apparatus of urban government with electronic spaces - a way of cutting costs and improving efficiency. In New York, the city's I-Net optic fibre system is already used for conducting remote video-conferences between prison inmates and their legal aid lawyers. 'Touch screens' and kiosks in shopping malls are rapidly emerging in the United States, but with a counter trend towards the withdrawal of public bureaucracies to fewer back-offices (Bellamy and Taylor, 1994). In California and Hawaii, for example, multimedia kiosks in shopping malls offer anything from advice on HIV and local services, through job listings to transactional capabilities such as offering local fishing or driving licenses. But such initiatives may lead to major job-shedding in local government. One company, markets them under the heading "fewer workers..." (North Communications, n.d). A Californian policy maker who uses them admits that "if hundreds of kiosks are answering routine questions[...] the bureaucracy can function with fewer workers" . An industry spokesman predicts that "they could eventually replace $6-$8 [per hour] workers" (North Communications, undated).

Other emerging examples of the possible substitution of electronic for physical space can be drawn from France. Here the ubiquitous Minitel system is supporting many information, communications and transaction applications linking citizens and municipalities: a theatre booking systems operates in Metz ; special graffiti removal hotlines have been set up in Bordeaux ; part of the Nantes job market has gone on-line ; and baby-sitting brokerage operates in Blagnac. The emergence of hundreds of specialised phone help-lines is also part of this trend.

It seems likely that these processes of change will parallel those in banking and retailing : electronic, home-based services could substitute for physical networks of offices. As well as the likely job losses, they bring with them issues of equity and privacy. How, for example, will people without phones or computer literacy fair in electronic service delivery, especially when their physical access to services may be lost through office restructuring ? As with shifts in banking and retailing, these processes may advance the interests of socially privileged, mobile and technologically-literate groups whilst compounding the many disadvantages already faced by marginal groups of 'information have nots' (OTA, 1993; Dutton, 1993). As Dutton (1993) argues "living in an information society, the educated public often takes exposure to information technology for granted. Yet information technology is invisible to many within the inner city [...]

In an era of so-called information overload, few managers or professionals can imagine a situation in which there is truly a lack of essential information, but this is precisely the case in the inner city". Huge demands for information within disadvantaged areas of cities thus often go unmet, a problem that can be compounded by regressive shifts in urban public support services.

On the other hand, though, telematics may be used to radically improve the delivery, user-friendliness and quality of public services to remote locations and people with poor mobility. For example, the kiosks mentioned above may improve the quality and timeliness of information delivery and make citizen-government transactions, in several languages if necessary, easier on both sides. The Santa Monica Public Electronic network (PEN) - a municipal network aimed at improving citizen-municipal links - "is widely perceived by city personnel to have enhanced the responsiveness of the city" to citizens (Dutton, 1993). An interactive cable service in Iowa City in the United States offers a wide range of seventy types of civic information to people's homes (Bankston, 1993). A teleshopping experiment in the 1980s in Gateshead, England supported the accessing of basic foodstuffs by groups unable to leave their homes (Ducatel, 1994).

The time-space flexibility of telematics may underpin truly beneficial systems for information exchange, communication and transaction between urban government and its citizens. These may be more appropriate to the wide-ranging needs of the diverse cultural, geographical, ethnic, social and gender groups that make up cities. People with poor physical mobility have potentially most to gain from the use of electronic services to overcome space and time barriers. The resource sharing potential of telematics may also support radically new innovations in distance learning and education, adult training, community-building and democratisation in access to information, services and skills. Local cable and telematics systems, for example, are being used in several American cities and in Birmingham in the UK to provide special educational services to pre-school children. In New York, a distance learning and video conferencing network, based on a NYNEX optic fibre infrastructure, offers remote access to the city's cultural and educational institutions to the city's schools.

4 Concluding Discussion: Grounding the Global - Urban Places, Electronic Spaces

"The history of communications is not a history of machines but a history of the way the new media help to reconfigure systems of power and networks of social relations. Communications technologies are certainly produced within particular centres of power and deployed with particular purposes in mind but, once in play, they often have unintended and contradictory consequences. They are, therefore, most usefully viewed not as technologies of control or of freedom, but as the site of continual struggles over interpretation and use"(Graham Murdock, 1993; 536-7).

"Why should we care about this new kind of architectural and urban design issue - [the 'urban' design of cyberspace] ? It matters because the emerging civic structures and spatial arrangements of the digital era will profoundly affect our access to economic opportunities and public services, the character and content of public discourse, the forms of cultural activity, the enaction of power, and the experiences that give shape and texture to our daily routines" (William Mitchell, 1995; 5)

Much popular and media debate on technology and cities implies that cities are merely passive victims of the 'impacts' of telematics. In most scenarios, cities simply serve (implicitly) as the empty arenas where some technological 'revolution' is being enacted. Often, telematics are seen to offer some simple transcendence from the familiar place-based world of urban life -- a solution to the perpetual shortcomings, imperfections and finitudes of the urban world. Here, ever-more realistic electronic simulations will emerge allowing geographical place, itself, to be transmitted, accessed remotely and --- by implication -- made obsolete (Negroponte, 1995; Pinney, 1992). On the other hand, some of the more socially determinist critical literatures

suggest that urban policy makers and planners are little more than helpless pawns in the struggle to meet the needs of international capital and international elites.

This discussion leads to three conclusions. The first is that both of these approaches -- the technological determinist and the social determinist -- are extremely unhelpful (Law and Bijker, 1992; 290). Both, in fact, are short sighted, and dangerous. Social determinism fails to recognise that a *range* of local possibilities can be socially constructed in developing contemporary urban policies, a point which has important implications for telematics debates. They ignore the fact that "cities can, to some degree, determine their own futures" (Judd and Parkinson, 1990). The more extreme forms of technological determinism and utopianism, meanwhile, in their infectious rush toward "world rejection" (Schroeder, 1994), serve to deny the continued importance of place, and the politics of place, as crucial factors in contemporary life. Often they ignore the fact that, no matter how 'telemediated' urban life becomes (even for the minority groups who dominate telematics use), it will never become truly placeless and free-floating in some electronic ether.

Rather, a complex *articulation* between life in urban places and interaction in electronic spaces seems to be emerging. "Constructed spaces", writes William Mitchell (1994), "will increasingly be seen as electronically-serviced sites where bits meet the body -- where digital information is translated into visual, auditory, tactile or otherwise sensorily perceptible form, and vice versa. Displays and sensors for presenting and capturing information will be as essential as doors". As Robins suggests, "through the development of new technologies, we are, indeed, more and more open to experiences of de-realization and de-localization. But we continue to have physical and localized existences. We must consider our state of suspension between these conditions" (Robins, 1995; 153). In other words, the contemporary city, while housing vast arrays of telematic 'entrance points' into the burgeoning worlds of electronic spaces, is still a *meaningful* place economically, socially and culturally (Wilson, 1995; Thrift, 1996).

In fact, cities and telecommunications stand in a state of *interaction*, recursively shaping *each other* in complex ways that have a history running back to the days of the origin of the telegraph and telephone (and as the continued urban dominance of telecommunications investment and use makes clear; see Thrift, 1996). Major urban places support dense webs of 'co-presence' that cannot -- and will not -- be mediated by telecommunications (Boden and Molotch, 1994). This is because they are vital supports to high level business activities in a risky and volatile global economy (Storper, 1995), the new urban culture relies on them, and face-to-face social life derives from them.

In this context, cities can be seen to act to *minimise space constraints so overcoming the time constraints* caused by distance barriers (which must be overcome by physical movement). Telecommunications, on the other hand, have the *opposite* effect - they *use time constraints to overcome space constraints*, through instant flows of electrons and photons across space. Because these two 'roles' are so complementary, future development in western urban societies seems likely to be about ever-more intimate and continuous links between urban place and electronic space, between local and global, between physical daily life and telemediated flow. What this means for cities and urban life, however, is currently very poorly understood (see Mitchell, 1995; Graham and Marvin, 1996).

The implication of such a view of city-telecommunications relations is that both technological and social determinism must be rejected. Theoretical models which conceptualise the 'social' and 'technological' to be caught up in complex and recursive interactions, rather than in separate realms, are required (see, for example, the Actor Network Theory of Latour and Callon; see Latour, 1987). The totalising and reductionist models of city-technology relations, at the root of current debates about the future of cities, need to be replaced. More sensitive frameworks allowing space for contingency and social innovation are required. These must acknowledge the

need to link debates about electronic spaces with the lived daily urban experience of the vast majority of people in western countries. They must incorporate the fundamental *indeterminacy* of the technological futures of cities, the fact that social action and agency shapes these futures in real places. And they must recognise that complex 'patchworks' of different social/technological innovations and effects are likely to be a key characteristic of this phase of urban policy innovation and experimentation. There is, in short, an "untidy reality' of diverse, contingent projects across the urban world. These make totalising and general assumptions about telematics, cyberspace and the future of cities unhelpful.

Second, telematics policies grounded in particular towns and cities are having important roles in shaping the articulation - or, in Robins' words, the 'suspension'- between place-based and electronically-mediated realms. They help, quite literally, to 'ground' the globally-integrated world of electronic spaces, making them meaningful in real places, real communities, real lives. There is growing evidence that a wide range of local, urban institutions and agents are emerging as key sites where the potential offered by the technology is being explored, experimented with and socially shaped in diverse and contingent ways. Mitchell calls these policies - which meld physical constructions in urban places and electronic spaces based 'within' telematics networks - "recombinant architectures" (Mitchell, 1995). In many towns and cities across the advanced industrial world, local policy and planning are significantly influencing this 'state of suspension'. Most cities now plan, regulate and shape urban place as well as electronic space. Municipal "recombinant architecture" is moving quickly into urban policy's mainstream.

Here electronic spaces such as hosts, Freenets and virtual cities are being used to try and feed back developmental effects into urban places, rather than simply exposing all the elements of the city to the apparently placeless logic of the global explosion of telemediated flows (Virilio, 1987). Such initiatives are helping to 'ground' and 'embed' new technological innovations in real places, rather than just supporting an ever- more momentous delocalisation through market-driven forces of globalization in the economy, society and culture. These policies are therefore important innovations - passage points if you like - between lived material life and the disembedded world of tele-mediated flows. Meaningful 'enclosures' need to be socially constructed in what Castells calls the global "space if flows" - the pan-global electronic spaces increasingly dominated by massive media corporations and their commodified, capitalised outputs and applications (Castells, 1989). Social need, the particularities of place, freedom of expression and local cultural diversity tend to be squeezed out of the corporate, commodifying logic of this globalization -- "media conglomerates will not fill the vital educational, civic, and cultural needs" of real places and real cities (Grossman, 1995).

Urban telematics policies are, in other words, important in attempting to, in Amin and Thrift's words, "hold down the global" (Amin and Thrift, 1994; 10). This might be done by maintaining meaningful economic agglomerations, synergies and linkages at the local level ; by animating urban cultures ; by supporting local democratic debate ; and by strengthening and invigorating local webs of social relations -- in an increasingly globalised world. Urban telematics initiatives are shaping diverse experiences of 'localization' as telematics technologies are used experimentally, in a wide range of ways, locally ; they are likely to feed back in complex (and uncertain) ways onto the development of places.

Such initiatives also hold important lessons for the crucial questions of how we might envisage the 'local' and 'urban' in a globalising culture, society and economy; how cities might find 'homes' for themselves within a globalising civil society. The experience of policies at this nexus between urban place and electronic space seem likely to influence much larger questions about the future of cities and urban politics more generally. How, for example, can cities and city regions respond institutionally to the instabilities and volatility brought by globalisation ? How can urban politics be remade in ways that fight the growing unevenness and fragmentation

of urban social and economic life ? What does the city and its politics *mean* within the global shifts now at work ?

Complex interactions between global and local urban telematics developments will have a significant role to play in determining whether new, progressive urban visions can be developed that address the context of globalisation, fragmentation and polarisation (and within which, ironically, telematics are themselves heavily implicated). Equally, local policies have an important role to play in maintaining the public, social face of networks like the Internet, which seems likely to be commercialised through giant media conglomerates and electronic cash systems (Grossman, 1995; Brody, 1995). Without public access areas, civic applications, training and facilities for disadvantaged groups and areas - all developed within "recombinant architectures" linked with the planning of urban places - electronic spaces will become ever-more globalised, commodified and devoid of true public space (Davis, 1992; Schiller, 1994).

Conversely, though, this is not to imply that city policy makers have overwhelming power in influencing how telematics are used in cities. Nor is it to romanticise local policy makers as panacea solutions holding the key to ensuring that telematics support convivial, egalitarian and sustainable telematics innovation in cities. Far from it, in fact. Many difficult problems confront policy makers in this new area. Whilst local power exists, is often tightly circumscribed by funding crises and by the need to compete for economic investment in global 'place market'. Technological and regulatory change in telematics often outstrips the ability of local policy makers to innovate and adapt to changing circumstances, resulting in technological white elephants. Often, initiatives are unsustainable because they fail to meet the actual needs of users, rely too much on long term subsidy, on a blindly optimistic 'technology push' idea (see Qvortrup, 1988; Qvortrup et al, 1987; Cronberg et al., 1991). Good quality evaluation of these failures is rare, so often the same pitfalls are fallen into again and again.

The initiatives developed are often relatively insignificant compared to the broader forces of technological change. Urban policy makers are as prone as anybody to be seduced by notions of futurism and technological determinism (Strover, 1989). What they do achieve can sometimes be criticised as being socially regressive, over-ambitious and based on dubious assumptions about the genuine power of municipal level policy making over the global political economic forces of capitalism. Many mistakes result and projects can have unintended side-effects. Finally, telematics are being used in some cases as support for privatisation, reducing social services, and enhancing the degree of surveillance and control that dominant local institutions have over the socially powerless (see Graham and Marvin, 1996).

But it is equally clear that much promising policy innovation and exploration is emerging in which genuine social telematics innovation in cities is producing real benefits. There are many emerging initiatives where appropriate, low-cost applications of telematics are helping to open up new policy avenues based on inter-urban collaboration as well as competition, social empowerment and equalisation as well as social polarisation, and genuine attempts to address the social, economic and environmental problems of cities without falling into the traps of techno-hype and the language of the quick technical fix. Such local policies can clearly alter the technological trajectories of places against the backcloth of broader political economic trends. They can offer more sensitive, positive and appropriate innovations than either the hierarchies of the central state or untrammelled markets.

Third and finally, these policy innovations have implications for how we understand innovations in telematics and how these influence the technological future of urban society. On the one hand, the design and production of technologies is clearly biased. Transnational corporations gain access to optic fibre and private networks. People in disadvantaged ghettos are lucky to access a pay phone. But once technologies are available, political and social struggle and actions can redirect their application and change their effects -- just as political and social influences can redirect the shaping of urban politics and the built environments of the physical spaces of

cities. This means that the effects of telematics in cities can depend heavily on how they are *socially and politically constructed.* In other words, neither the utopianist 'vision of heaven' nor the dystopianist 'vision of hell' (Harrison, 1995) are useful because they imply an either/or future of all good or all bad. Good and bad implications for cities and urban social life are likely to be mixed up in complex ways. "The democratising potential of telematics [...] has to be fought for" (Healey et al, 1995) and local strategies seem likely to have a key role here. People may one minute be accessing teleshopping services which may indirectly damage their local high street and switch revenues to distant and unknowable 'back offices'; the next minute they may switch to the local municipal services for applications that actually help bolster their commitment to the place in which they live.

The key question, then, is this: how can sustainable, successful and truly beneficial telematics applications be *socially constructed* in real world situations and in real cities? How do we *translate* this technological potential -- or indeed, do we *want* to -- into sustainable applications that actually meet the day to day needs and demands of a largely urban society at large ? To quote Dave Spooner (1992), a former Technology Policy officer for Manchester City Council in the UK, "the problem is not one of technical development but the lack of appropriate applications. There are hundreds of technical telematics products that have enormous potential for economic [and social] development [in cities], yet they mostly lie on laboratory benches waiting for someone with an application -- a classic 'solution looking for a problem'". The implication is that it is *social innovation,* rather than just *technical* innovation, that shapes how telematics develop in cites. Specifically urban telematics policies are one small sub-set of these broader social innovations (the others are driven by technological suppliers, telecom operators, user firms, large organisations like universities, utilities and health services, and the myriad of small telematics users).

This quickly leads to broader *normative* questions about *conscious choice* : the sorts of cities 'we' want, how this 'we' might be identified from the disparate groups that make up cities, and the ways in which telematics might help us create those cities (Burstein and Kline, 1995). As William Mitchell (1995) argues, "the most crucial task before us is not one of putting in place the digital plumbing of broadband communications links and associated electronic appliances (which we will certainly get anyway), nor even of producing electronically deliverable "content," but rather one of imagining and creating digitally mediated environments for the kinds of lives that we will want to lead".

Useful World Wide Web Addresses

City.Net can be found at http://www.city.net/. Virtual Manchester is at http://www.u-net.com/manchester/. Amsterdam's digital cities is at http://www.dds.nl/. Other city government Web pages are linked from: http://rohan.sdsu.edu/infosandiego/examples/citygov/index.html and http://alberti.mit.edu/arch/4.207/anneb/thesis/addresses.html.

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Biography

Stephen Graham is a lecturer in the Centre for Urban Technology (CUT) in Newcastle University's Department of Town and Country Planning. He holds a B.Sc. in Geography (Southampton), an M. Phil. in Planning (Newcastle) and awaits decision on a Ph.D. in Technology Policy (Manchester). A qualified town planner, he has worked in Sheffield City Council on both physical development planning and the development of urban telematics policies. His research at CUT centres on the role of telematics in the social and economic restructuring of cities, technology and the future of cities, and the possibilities telematics offer for innovations in urban policy and planning. He has published widely on these areas. His recent books include Telecommunications and the City: Electronic Spaces, Urban Places, published by Routledge in February 1996 (co-authored with Simon Marvin ; see bibliography), and Managing Cities: The New Urban Context, published by Wiley in 1995 (co-edited with Patsy Healey, Stuart Cameron, Simin Davoudi and Ali Madani-Pour; see bibliography).