CONVERSATIONS WITH MAPS

Location technologies and digital displays have changed what maps look like, where we find them and what we do with them. On dynamic maps, cities and continents are set in motion, animated by data that changes at the speed of the network. ANDREA MOED, ALEX TERZICH and JANET ABRAMS look at recent experimental interactive maps that demand iterative querying rather than mere reading, provoking the user into conversations with maps.

THE ELASTIC SPACE-TIME CONTINUUM

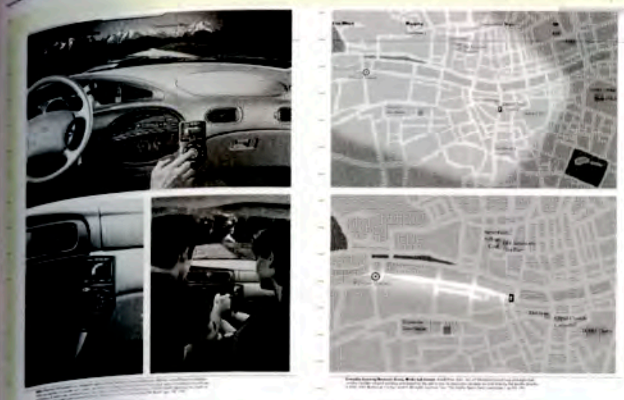
Created at the late-lamented Media Lab Europe in Dublin, Amble Time offers an update on the Situationist "dérive," providing urban wanderers with a purposeful way to experience "walkable time" as they meander round the city. By ANDREA MOED.

My route from the hotel to the station is described by a pool of light. The light falls on a portion of the city map on my handheld computer screen as if a follow spot were pointing down from the heavens. The shape and size of this bright spot is determined by a simple algorithm of rate, time and distance: it contains my hotel, the train station from which my train departs in one hour, and every place I can walk to and still have time to catch my train. Still seated in the hotel lobby, I feel my heavy backpack and tired feet and I tell the map to assume a slower walking pace. The pool of light narrows from a circle into an oblong shape with hotel and station at either end. Getting to my feet at last, I set off on a stroll, keeping to the streets in the lighted part of the map to assure that I won't be late. As time passes, that lighted space contracts further and further. Finally, at the point when I really must hurry, only the most direct path to the station remains bright. This scenario is made possible by Amble Time, a prototype "map with a sense of time" created by the Everyday Learning research group at the erstwhile Media Lab Europe in Dublin. Amble Time is an engineered answer to an increasingly popular question in the media business: how are footloose urbanites, seeking adventure but pressed for time, to maximize their returns of aesthetic pleasure and fun?

Book and software publishers have answered with a host of personal navigation aids: websites like CitySearch, magazines like Time Out, software applications like Vindigo, endless specialty guidebooks targeting various demographics and interests. All promise to let busy people in on some precious local secret that they used to discover by ambling: the underground club around the corner, the best bargain shopping, the extraordinary little museum—the ideal thing to be doing in this neighborhood at this moment. Many of these guides include collaborative feedback features in which patrons rate restaurants and other destinations and the system constantly crunches the numbers and promotes the winners. The idea is that if we blunder around but then pool our knowledge, the fun will rise to the top where we can claim it expeditiously.

<www.citysearch.com> <www.vindigo.com>

Amble Time makes no such claims to urban intelligence; instead, it privileges the blundering for its own sake. It imparts to travel the sense of "softened time" that the mobile phone brings to social situations where being able to call friends in transit makes



gazetteer E 5-6/10 pp. 120–121

Conversation maps

being on time a matter of consensus. Where cell phone socializing relies on a flexible sense of presence, Amble Time exploits the unique flexibility of the pedestrian condition: the freedom to wander aimlessly, proceed directly or do anything in between. It suggests a notion of walkable time as a companion to that urban planning grail of walkable space. In its Newtonian functioning, it paradoxically allows time to be subjective, at least until one's train draws near.

CAN YOU FIND ME NOW?

On the road, digital maps seem destined to outmaneuver printed maps. In-car satellite navigation systems purport to assist drivers, but they may also reduce our sense of self-reliance. And despite the smooth promptings of their synthesized voices, they often turn out to be less than "expert systems." By ANDREA MOED.

Driving and map reading are activities with a long and troubled relationship. On a car trip to an unfamiliar place, fights between the driver and the map-wielding navigator inevitably create a hazardous environment for everyone else in the car—unless, of course, the driver and navigator are the same person, in which case it's those outside the car who had better watch out.

It's no wonder that computer-generated driving maps and directions are among the most popular applications on the Internet. Websites like MapBlast and MapQuest combine route-finding software and road data gathered by map companies to find a path between any two U.S. addresses and describe it in words and custom-created maps. This free service can feel like a miraculous gift to the direction-impaired driver, even when the route the software comes up with turns out to be circuitous or fails to account for changes to the road system. In fact, some users may trust web maps a bit more than they should, judging by the disclaimers posted on the sites. One warns, "If the directions tell you to make an illegal turn, please don't do it!"

<www.mapblast.com> <www.mapquest.com>

If web maps partially automate the navigation process, in-car satellite navigation systems promise to finish the job. These on-board computers incorporate GPS receivers and their own map databases. They let the driver input his destination while in the car, then they constantly track his position as he drives. A computerized voice calls out each turn as the driver approaches it, while a small screen displays a view of the intersection. In the event of changed plans or a wrong turn, the system recalculates the directions to put the driver back on track.

For a technology that automates the complex art of cross-country wayfinding, satellite navigation systems seem remarkably cheap. They can be integrated into the dashboards of new mid-to-luxury cars or purchased as stand alone devices for $1,000 to $2,000. Hertz even offers a version, dubbed NeverLost, in some of its rental cars. So why is it that the same American drivers who love Web maps rarely request navigation systems in new cars or rentals? As reported in the New York Times, J. D. Powers estimated that only 300,000 cars with these systems were sold in 2002, despite their being available in over 60 car models. Perhaps consumers are wary of satellite guidance precisely because of what the maps force upon them: a sense of self reliance. Both web maps and satellite navigation systems draw upon imperfect data sets. They don't always know about one-way streets or roads under construction, and their information about nearby services such as restaurants and gas stations is predictably incomplete. Nonetheless, the dynamic, talking satellite navigation device invites the driver to perceive it as an "expert system," more reliable than her spouse or other fellow traveler could ever be. This can lead some drivers to expect great subtlety: on the gadget review website <bythom.com>, one NeverLost user complains, "We attempted using the nationwide database to find the Legal Seafoods restaurant in Sunrise, [Florida], and [were] able to get no closer than the Legal locations in New England!" The man ultimately has to enter an address to make it clear where he wants to go—a minor inconvenience, but out of keeping with the sure-voiced guide he knew.

<http://hertzneverlost.com/>

In their very staticness, printed maps from any source demand a more active navigating posture from people, since the words and graphics in hand are all the driver is going to get. Instead of listening for the next cue to turn, one barrels forward as the world unfolds on the other side of the windshield. The map (long since unfolded, with no hope of proper re-folding) has nothing more to say. Course adjustment and re-calibration may soon become necessary, but they are up to the traveler — a rule of the road that most us don't seem quite ready to discard.

GAMES IN THE ELECTROSPHERE

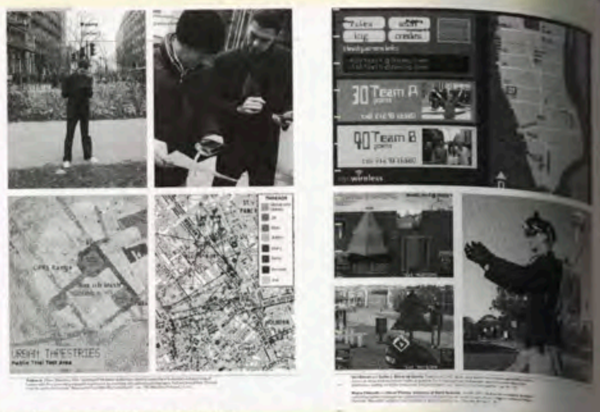
WiFi and the Global Positioning System (GPS) have spawned a new generation of pastimes. Noderunner and Geocaching offer two contrasting experiences of the wireless world, and reveal the hidden pleasures to be found in the playful (mis)use of panoptic technologies. By ANDREA MOED.

The designer and philosopher of technology Anthony Dunne has written of "Hertzian Space," the invisible topographies of electromagnetic (EM) radiation and transmission produced by objects such as cell towers, RFID tags and microwave ovens.[1] People don't inhabit Hertzian space directly; we know it only through perceptible effects such as radio connectivity (or the lack of it) and cell phone-induced brain damage (or the fear of it).

As wireless technologies multiply, Hertzian space figures more and more prominently in everyday life. We come to know where we can use mobile phones and where calls always get dropped, or we recognize twitters of interference where the computer's EM penumbra overlaps the stereo's. Certain neighborhoods of the radio spectrum have grown clamorous and complex, with hidden transmitters and antennae, mobile devices coming and going, and every person free to set up their own baby monitor or wireless home network. What we need to communicate reliably is a good map, but the numbers of private and competing interests involved make that all but impossible to make. One can curse this situation, or see it as an opportunity for subterfuge and play.

In the latter camp are Yury Gitman and Carlos Gómez de Llareña, the inventors of the game Noderunner, a kind of blind man's bluff in Hertzian space. Descended from the practice of "wardriving" — hunting for usable wireless networks by car — Noderunner challenges players to run around a neighborhood or city with WiFi-enabled laptop computers and search for places where open-access network nodes let them connect to the Internet for free. The winner is the team that locates and uses the most nodes before the game clock runs down. Open nodes are almost never labeled by signs or ads. To find them, teams feel their way using special scanning software and a trial-and-error process called stumbling. Gitman reports that to be good at Noderunner,

<noderunner.com>



gazetteer E 7–8/10 pp. 122–123

you need a computer with a strong antenna and an understanding of Wi-Fi technology and practice. For example, it helps to know that most open nodes are in residential areas and that to make a workable connection from the sidewalk, you may need to lift your laptop above your head.

Noderunner engenders a view of the wireless world as a no-man's land of home-brewed networks and ad-hoc connections. The opposite feeling pervades another species of wireless technology game based on the Global Positioning System (GPS). Long before GPS and its enabling network of satellites were launched, world maps showed the globe overlaid by a lattice of vertical meridians and horizontal parallels. Latitude and longitude has become humanity's least controversial shared frame of reference, equally useful and authoritative to hikers, sea captains, smugglers and generals. GPS technology makes this Cartesian consensus visible on the ground. By communicating with corporate or government operated satellite networks, GPS devices can tell exactly where on earth they are, and thus locate anything on a world map.

Lately, GPS receivers have become cheap consumer items, leading some hobbyists to come up with playful uses for them. Geocaching is a game where players hide treasure boxes in uninhabited areas and announce the treasure's coordinates on the Web, inviting anyone to hunt it down. GPS drawing is done by driving a specific path across a territory while using a GPS receiver to direct the journey. By recording her path, the drawer traces a virtual picture on the earth's surface. What's striking about GPS games is their communal, collaborative spirit. It would be logical to resist GPS as a military-industrial panopticon that enables smart bombs and Star Wars. But, instead, these gamers and artists see the benevolent consequences of the technology: an

<www.geocaching.com>

1. Anthony Dunne, *Hertzian Tales: Electronic Products, Aethetic Experience and Critical Design*. London: Royal College of Art, 1999/Cambridge, MA: The MIT Press, 2006.

orderly Hertzian space where no one and nothing need truly be lost.

THE MAP GETS PERSONAL

A new software application for urban exploration has interlaced London with narrative threads, as participants in trial runs of Urban Tapestries map their individual experiences of the city via a network of hand-held computers. By ANDREA MOED.

It's sometimes said that on the streets of historic cities you can hear the voices of the past kings, warriors, and fictional characters recalling the notorious events or lost landscapes of local history. That's all very poetic, but in truth it might be just as illuminating to hear from the person who was sitting on your park bench right before you arrived. Everyone has a story, after all, and it's the juxtaposition and intersection of citizens' many stories that creates the truest impression of a city.

The Urban Tapestries (UT) project makes that narrative conflux visible through the tiny screens of networked, handheld computers. Created by the London think-and-design tank Proboscis, UT is a PDA-based application that allows users to walk through the city and record their impressions of specific places in text, sound and digital photos. As they move around, they can also access the words, sounds and pictures created by others at those locations. The UT user can leave an isolated comment about a single place, or create a thread that connects multiple locations and annotations as a digital walking tour. In December 2003, Proboscis held the first public trial of UT. After constructing a £115,000 ($218,000) neighborhood wireless mesh network with collaborator Locustworld and configuring 15 PDAs provided by project partner Hewlett-Packard, Proboscis put the system through its paces on the streets of Bloomsbury in central London.

Like UT itself, the trial was designed to encourage many different kinds of geographic annotation. In the introduction for trial participants, the designers wrote: "Imagine building your own location-based game to play with friends and neighbours such as a treasure hunt or a spy game...Imagine creating a thread of local resources...specialist food shops, bookstores, places to learn new things...Imagine creating your own personal map of Bloomsbury." Testers arriving at the trial site were first given an explanation of the project featuring a large, table-mounted paper map of the area. Then they were given PDAs displaying pocket-sized, digital maps. The maps had no directions, points of interest or even street names. It was up to the participants to go outside and "write their city" by marking the places they visited and sharing their stories and impressions through the network.

Charged with this open-ended mission, the trialists mapped Bloomsbury in ways that no transport or travel agency could have dreamed of. They created threads with titles like "Arguments I Had With My Ex-Husband," "A Day in the Life of an Urban Knitter," and "Chocolate With That," a fictional journey. They endured damp, chilly weather and persistent problems with both the handheld devices and the wireless network, and still retained considerable enthusiasm for this new pastime of public authoring. As one tester reflected on the project weblog after returning from her walk, "without consciously trying, I became much more aware of things around me. I enjoyed being able to share my experiences. Normally, such passing thoughts would be forgotten or would seem insignificant by the time I had someone to share them with, but they make sense within the context of the environment. My [writings were] affected by an awareness of people reading them in the future. It was different than if it was just a personal device."

Interestingly, no one seemed to care whether the postings of public authors were factually accurate. Instead, their most frequent concern about content was that there would soon be too much to manage. "What will happen when we have a dense maze of threads?" wondered one tester. "How will we navigate them? How will we [find] interesting content?" Comments like these reveal a knowing disjuncture in the users' minds between the street map of Bloomsbury and its overlay of annotations. While they expected the base map to represent objective reality, they judged added threads on personality and shared interest. It was clear to these users that UT was no digital walking guide, but, as one person put it, "a new, physically rooted web." The map and the Internet had met in a deep kiss; lives had becomes lenses onto land.

WE CAN DO THAT, DAVE-G

A talking map developed at the GeoVista Center at Penn State University uses dialogue, gestures and gaze to articulate future scenarios. With its Sim-like characters, DAVE-G hints at the possibility that maps will soon be considered participants in everyday conversation. By ANDREA MOED.

People looking at maps seem compelled to talk over them. Displayed in communal spaces, maps become catalysts for storytelling, planning and argument. War rooms and archeological digs are the classic settings, but sociable mapping can happen anywhere. On a recent plane trip across the country, I watched a man in a row of silent strangers open his laptop and begin using a digital U.S. atlas. Within minutes he and his seatmate were engrossed in a chat about various places they had lived and traveled. As they spoke, the man moused back and forth across the country, zooming in and out of different areas.

A team of HCI researchers at the GeoVista Center at the Penn State University wants to unlock the community-building power of maps and it sees Geographic Information Systems (GIS)—the digital data-crunching tools of modern cartography—as the key. GIS mapping uses georeferenced information to add layers to a conventional map. It's the technology behind election return maps (with those now-famous Republican "red states" and Democratic "blue states"), demographic maps and weather maps. A GIS map can contain any number of information layers and display them in any combination. For example, one might juxtapose climate and voting data and look for correlations. Theoretically, that means people using such a map could share lots of complex information visually and socially, presenting findings, comparing perspectives and making decisions. The problem is that at present, most GIS's are unwieldy technical beasts that only trained specialists can use.

In a multi-year project called DAVE-G (Dialogue-Assisted Visual Environment for Geoinformation) the GeoVista Center team is devising ways for groups of laypeople to control a GIS and manipulate its maps—not by keying in data, as per usual, but through the intuitive human modes of looking, talking and pointing. According to the DAVE-G website:

> the project is concerned, specifically, with the use of computer vision and speech processing as a means of interpreting and integrating information from three modalities: spoken words, free hand gestures and gaze. It is also concerned with how to enable a human-computer dialogue with an interactive, multi-layered map in the context of a GIS and with map-mediated dialogue between human collaborators.

As an initial (and timely) test case, the project is building a DAVE-G for emergency management teams needing to make quick decisions. In a sample scenario from the website, two managers and a talking map discuss preparations for an approaching hurricane:

> JANE: (turns to Paul) What's the typical traffic density on Route 17 and these two parallel routes (turns back to map, makes gesture pointing first to one, then to the other road) into it? It looks like a potential bottleneck.
>
> PAUL: Let's find out. (looks at display) DAVE-G, let's see the weekday transportation model and the standard traffic patterns first.
>
> DAVE-G: OK, here it is. (an animation starts in which the width of the highway symbol changes with the ebb and flow of traffic during the day)
>
> PAUL: Now, we will close down this road (pointing to one of the two side roads), add the people who are typically home during the day and will evacuate, and see what happens.
>
> DAVE-G: (the resulting animation runs)

If you've seen the film Minority Report, you'll recognize the sexy tech part of this vision: the incredibly advanced sensors and software that know what Jane and Paul are looking at and instantly parse their rather complex sentences. But consider as well the rhetorical implications: by invoking an animation on the map, Paul implies that they can see the future. When he points to a road and "closes it down," the Sim-like "people" in the map behave as predicted. And who did the predicting? No one knows: the map visualizes data and conjecture alike and hides the distinctions between them.

Of course, maps have always portrayed opinionated and controversial ideas. Just recently, they've been used to depict global warming, electoral landslides, the threat posed by Palestinians to the State of Israel and the subjugation of Palestinians by the State of Israel. Still, maps today generally provide the ballast of the argument: its grounding, as it were. In a future of DAVE-Gs, maps may end up with the kind of oily reputation currently accorded to statistics. This will mean that they have matured fully as a communications tool. No longer neutral by default, maps will be understood as extensions of the people who talk with, through and over them.

CROSSING CAMPUS

In his design for the University of Virginia, Thomas Jefferson adopted the metaphor of the village to


C 1/6 pp. 124–129

Conversation maps

characterize the series of pavilions arranged around an open square of grass and trees. This academical village became a campus model for American universities, most of which have since expanded to become more like cities than villages. Today, it's not uncommon to find a central lawn and its flanking neoclassical buildings set like some historic downtown in an otherwise sprawling campus. As universities continue to expand, the difficulty of campus navigation has prompted the invention of new navigational systems. Two mobile computing applications offer opportunities to rethink the metaphor of today's university.

Software developers at UC San Diego have created ActiveCampus, an application designed to foreground the essential aspects of campus life—friends, colleagues, destinations and events—and mute out the crowds and undistinguished buildings that interfere with campus legibility. The application is built around a handheld device and pervasive wireless infrastructure, and allows users to locate and communicate with other users as well as digitally attach messages called "graffiti" to physical entities in space. This digital graffiti is invisible until a user calls it up on her handheld screen. Its appearance can reveal attributes embedded in a site: past events, personal stories, political statements. The result is a highly diverse and user-driven campus guide that allows one to see through physical appearances; the effect is a reconceptualization of the campus as a transparent city.

The Wearable Group at Carnegie Mellon has developed a considerably less social application in Metronaut, a system designed to link up users with campus computing infrastructure rather than other users. With a two-way pager, one can access the central information server and retrieve scheduling information and directions to sites on campus. In addition, a barcode sticker network is used to encode information across the campus, accessible to a geared-up user with a handheld reader. By scanning a barcode affixed to a building or roadsign, one can identify current location and receive directions to a final destination. Because the system is top-down, meaning that other users can't encode their own information or place barcodes around campus, Metronaut remains a limited application offering only orientation and expediency. Its cognitive side-effects, however, are much greater: landmarks are reduced to tracking checkpoints that verify the correct route; students and visiting scholars move through campus like so many packaged goods; the heterogeneity of an historic campus is recast as a homogenous space for the efficient circulation of academic commodities. The metaphor is that of the logistical city.

Thomas Jefferson was disappointed by schools comprising a single building, calling them "a large and common den of noise, of filth and of fetid air." The evolution of the campus metaphor from den to village to city clearly has a profound impact on the shape of education. New campus navigation tools come with metaphors already built-in, and will help determine for better or worse how we see and use our universities.

INSTRUMENTS OF UNCERTAINTY

At a May 2000 press briefing, the United States announced that it would stop its intentional degradation of GPS signals available to the public. By removing a feature called selective availability, civilian GPS receivers became 10 times more accurate overnight. A primary motivation behind the decision was to encourage private sector investment. As Department of Transportation Assistant Secretary Gene Conti put it, "Commercially, there's a lot of demand for accuracy. It's a very popular thing." Amidst the appeal for geographic accuracy, there have been several projects that exploit the inconsistencies of GPS to generate unpredictable results.

In 1995, long before the removal of selective availability, artist Laura Kurgan experimented with GPS as an instrument for exploring the displacements resulting from information technology. In her project You Are Here Museu, a single, stationary GPS receiver placed on the roof of the Museu d'Art

Contemporani de Barcelona became a drawing tool that recorded the scatter of points caused by military scrambling and atmospheric interference. The uncorrected position recordings provided an image of geographic instability: a receiver appearing in multiple positions even while remaining in a fixed location. The project acted allegorically; as Kurgan notes, "Even standing still, we operate in a number of overlapping and incommensurable networks, and so in a number of places at once."

Kurgan's project prefaced an approach to GPS visible in the work of architects John Randolph and Bruce Tomb of the Interim Office of Architecture, and graphic designer Tom Bonauro. In late 1996, their exhibition Gnomon was on view at the San Francisco Museum of Modern Art. The installation comprised a large polyurethane object described as looking like a rock, a cranium, or a whale housing a robotic system linked (via a power and data umbilical cord) to a GPS receiver mounted on the roof. The object was programmed to position itself at the coordinate location received by the static antenna. Due to the meander or skew caused by a degraded civilian GPS signal, the whale-like form was constantly being asked to relocate itself, often ramming walls as it tried to move beyond the confines of the 26-foot-square gallery. Deliberate or not, Gnomon was a physical manifestation of the cartographic studies Kurgan had produced the year before.

Given the availability of an improved civilian signal, the uncertainty of GPS continues to be a subject of exploration. British artist Jeremy Wood has created an extensive collection of GPS drawings, many of them figural (such as the elephant drawn on foot) or typographic (like the word "information" written while riding a bicycle through the streets of Brighton and Hove). Wood can be seen as extending the work of British walking artists like Richard Long, Gilbert & George, and Hamish Fulton. He's also clearly interested in GPS as a medium with its own built-in expressiveness. A series of motionless recordings titled "Single Line Stills" were made from a static receiver recording satellite signals and rounding errors. The result is a set of three-dimensional linear constructions that look like elegant wireframe models of some unbuilt architecture.

Back at the May 2000 government press briefing, Neal Lane, director of the Office of Science and Technology, remarked that should the occasion arise in which it is in the country's interest to block accurate GPS signals, the United States will have the ability to do so. Perhaps more alarming is the future possibility of an inescapable, faultless system.

See "Skywriting," p. 266.

gazetteer E 3–4/10 pp. 118–119

DESTINATIONS AND DETOURS

One of the pluses of printed maps — despite their propensity to crack along the folds, or rip from their spiral binding — is that you can scribble on them. Blurred by rain, these on-the-move jottings capture your own ramblings through a city, and designate personal rather than official landmarks: great local restaurants stumbled upon, a flea market that just happened to be in action, the opening hours of arcane museums. Through these handwritten vestiges, memory is congealed. Planning a new visit to the same place, you dig out the dog-eared map and travel back in time, as well as forward — to the next journey, the next layer of the palimpsest. It's exactly this quality of historical patina that is missing from most in-car electronic mapping systems.

Commissioned in 2002 to develop a prototype in-car navigation system for Nissan, the Japanese car manufacturer, Antenna Design New York thought carefully about how these attributes of printed maps might be transported into the digital realm. Working in collaboration with Nissan Design America, Antenna came up with an "Enhanced Navigation" system whose route planning and navigation functions are augmented by real-time location-based information, and capable of individual annotation.

The system was intended for new crossover vehicles (post SUV) for the American market, aimed in particular at so-called "Tattoo Dads" — men in their late 20s-to mid-30s who want to retain the freedoms of singlehood despite having become parents, and aren't easily impressed by new gadgets. "Technology itself is no longer entertaining," says Antenna partner Masamichi Udagawa. "It has to work, understandably."

Antenna's design anticipates the day when vehicles are able to receive real-time data, either from communications infrastructure embedded in the roadway itself, beamed from light poles with narrow-area wireless broadcast capability, or delivered via a car-borne device that is "dumb to the driver but smart to the system," as Udagawa puts it, based on a standardized communication protocol similar to the EZ-pass toll-payment system.

"We threw in a few things that are a bit further down the road," says Antenna partner Sigi Moeslinger, "because they rely on a bigger system to work, to show what possibilities might open up." Cognizant of the environmental implications of a system that might actually encourage more driving than is actually necessary, she points out that this prototype was intended for cities where cars are already a necessity rather than a pastime. "The current state of navigation is to help you go from Point A to Point B," she adds. "We thought, with all these kind of things available, we could make driving itself a destination."

With the touch-screen already established by other auto makers (such as Toyota) as their "brand" of interaction, and an internal group at Nissan already at work on this kind of interface, Antenna was asked to explore alternatives. "You want to minimize the shift of attention from driving to the touch-screen," explains Moeslinger. "To achieve this, it's better if the screen is more or less located on the windshield, so you don't have to adjust your eyes as much. But then it's far away. Toyota found a compromise where their screen is reachable but close to the console. Nissan wanted to push the screen itself further back and provide physical control, closer to the steering wheel."

Of three options they designed for the physical controller, Antenna recommended one slightly larger than the gear stick, and positioned close to it. "It's a familiar gesture, easy to reach from the driving position, and you can rest your hand on it," says Moeslinger. The designers decided that scrolling through a list-based menu would be best in the in-car context, reducing the likelihood of inaccurate selections. "The more cursor freedom we give, the more attention is required, and the higher the chance of error." On-screen actions are effected by tilting the controller side-to-side, or by clicking a button beneath its tip; a built-in fingerprint scanner recognizes individual users and automatically resets the system to match their stored preferences. "Even though it was for a concept car, Nissan didn't want it to be a fantasy demo, but something grounded," she continues. "They wanted to get some knowledge out of it that could be implemented. So it's based on existing things — the iPod was always mentioned as one of the interfaces that this demographic likes because it's minimal but extended to include other functionalities."

Integrating communication functions usually accessed via desktop and hand-held devices, the system would draw on a central database to provide email, news and other live information. The console is equipped with a keyboard for composing email, though Moeslinger hastens to assure that "the idea is not for anyone ever to type while driving. Many times, there's a passenger who will do these things."

The navigation system computes the most efficient journey to a chosen destination, taking into account current traffic conditions. Having set a destination, the user can add multiple stops en-route (shown as numbered flags) then use the Show/Edit Route option to adjust the journey, eliminating certain stops in order to reduce travel time. The map can be easily viewed at different scales, to gain an overview of a journey, using the Zoom/Pan function, and seen from various perspectives; as the driver progresses along the chosen route, an elegant red compass icon marks the car's changing location. "It's a space-time continuum map," comments Udagawa.

The system includes two additional features that rely on real-time data: the Scanner looks out for friends driving nearby and signals their presence with the appropriate icon (logged in the address book). Then, by choosing the Squawk function, a one-minute voice message can be recorded and instantly sent to them. In map-mode, Targeting allows the user to select featured items on the map, such as the charges at the parking ramp at one's final destination. The driver can also plant flags on the map, to designate places of interest noted in passing; the system stores voice recordings, pegged to location, for future exploration.

Accumulating a patchwork of such annotations, the in-car map shifts from being merely a more efficient means of navigation to a container of personal impressions — a veritable Baede-Kar, as Reyner Banham once remarked (of his in-car audiotape guide to Los Angeles) for the flâneur behind the steering wheel.

CLICKIN'N'SCRAPIN'

The Skyscraper Museum is dedicated to tracing the evolution of the edifices with which New York has become synonymous. So it makes sense that the buildings themselves are used as the points of entry to the museum's growing online archive of historical documents and photographs in VIVA (Visual Index to the Virtual Archive), launched online in 2004.

VIVA's interface was developed with a $130,000 National Leadership Grant for Museums Online from the Institute of Museum and Library Services, a U.S. government agency. The project as a whole cost around $200,000. It is built on top of an interactive 3D map of Manhattan completed in 2000 by Urban Data Solutions (UDS), which became EarthData Solutions upon its 2004 acquisition by the geo-spatial information company. The museum's founding director, Carol Willis, came across the UDS model in a Columbia University urban history course, and first used it in the museum's 1999 Big Buildings exhibit.

"Our idea in the grant was that this project could serve as a paradigm: to use the web, an inherently visual means of communication, to make a visual index," says Willis. "So you click on an image rather than clicking on words. It seemed obvious that you should be able to explore the city via the buildings—if it could be done. Retrieving the historical city by clicking on postcards provides access in a very charming way." Since the museum has limited space for physical archives, digitization is "a logical way to proceed with collections management."

A successor of sorts to Robert Moses' 1964 wooden model of the city, the UDS digital model was developed over several years using various techniques, including LIDAR, ground and aerial photography, orthophotos and parcel maps to compile a massive database, accurate to within one meter of the physical landscape. EarthData has produced SIMmetry 3D models for some nine U.S. cities, showing the dimensions and shape of every built structure, with accurate rooflines and heights, and features such as floorplates, sidewalks and parapets. Their primary target markets are professionals in spatial information management industries—mobile telephony, real estate, urban planning, government, engineering and architecture—who may license a whole city, or just one particular chunk. According to Willis, the UDS model of New York City took a dozen people three years' full-time work to produce.

gazetteer E 1/10 pp. 116–117

While the UDS digital model is continuously updated, the VIVA interface uses a version showing the city as it appeared in 2000: the conspicuous presence of the World Trade Center towers cause an involuntary pang when one first encounters the site and realizes that, despite its use of seemingly up-to-date technology, the city as portrayed is already an anachronism. "It's very much an historic artifact, which is also aging," Willis admits. "The UDS graphic language is beginning to look like something that happened in the late 20th Century."

VIVA launches with an axonometric "aerial" view of Manhattan, which can be manipulated using an icon on the upper menu bar, to be viewed from all four compass points. For those accustomed to seeing Manhattan from the toe (its southern or, more strictly, southeastern tip), some of the other stiffly axonometric views provide strangely disorienting vantages, only vaguely recognizable from flying over the city on approach to landing at La Guardia Airport.

In the "Skyline" view, the alternative main mode, the city's Hudson and East River elevations are shown as line renderings against a black background; these can be cruised from several proximities with arrow keys that lure one to continue the tour or switch to the opposite side of the island. Archival snapshots are presented along the lower margin, easily enlarged and captioned with a click of the mouse.

To investigate a particular architectural gem, one mouses over the relevant area in "aerial mode," which highlights it in blue, and then clicks to zoom in to the next level of detail: from aerial, to neighborhood, to street, to building view. Given the historic concentration of skyscrapers in Lower Manhattan, this area of the map has so far received most of the museum's archival attention, though a few buildings

See "Perils of Precision," p. 184.

in Midtown have also been annotated. Users accustomed to SimCity speeds of development may find themselves frustrated by flags that pop up over other neighborhoods, declaring "Skyline Only" or "Area Under Construction."

Once an area has been selected, groups of buildings can be pulled up at street scale, isolated in 3D against the city grid. One more click retrieves an individual building and its associated archival documents (antique postcards and construction shots), which appear in an album format to the right. The richly textured facades of the historic buildings, seen in photographic perspective, contrast pleasingly with the anonymous, plastic precision of their 3D block-model digital stand-ins. "Postcards are a cheap but rich visual repository of urban history," says Willis. "If you have 15 postcards from 1900 to 1930 of the same building, they all look a little bit different. Postcards mostly aren't dated, but we have the expertise to identify what is in each one."

The VIVA team included archivist Sueyoung Park and web designer Mark Watkins, who had worked with Brian McGrath on the Skyscraper Museum's earlier online project, Manhattan Timeformations. "The technology wasn't easy," says Willis. "We spent a lot of time thinking about what worked intuitively for the viewer, working on the compass, and on the ability to turn off the context. You can't cut a building out of a construction photo or a postcard. This map enables us to represent individual buildings in a way nobody could afford to do if it was just an academic project."

Besides the digital city interface, VIVA offers five other more traditional modes of exploration: via specific buildings, architects and developers' names, collections, visual timelines, or The Allstars—half a dozen canonic skyscrapers, still standing or (as the site discreetly puts it) demolished, ranging from the Woolworth Building to the World Trade towers, that symbolize New York.

VIVA II, now under development, will focus on the Empire State Building and the World Trade Center, using two photographic collections donated to the Skyscraper Museum: 503 photos from a paper notebook on the former, and color slides of the latter from engineers Leslie Robertson Associates. VIVA II will allow visitors to compare construction technologies in the 1930s and the 1970s using each building's elevation as the interface, by clicking either on a timeline, a floor, or a grid of photos in nine topic categories such as machinery and equipment, or views out. VIVA II is expected to debut in 2006.

VISUALIZING DEMOCRACY, $ BY $

During national elections, especially in the United States, maps come to the forefront of public consciousness: maps of redistricting; TV graphics showing hour-by-hour changes of party territory as the results come in; maps showing quadrennial patterns of blue/red quilting. In the run-up to the 2004 U.S. election, campaign strategists used digital mapping software to target swing voters down to their doorsteps, while New York Times website visitors could click on a U.S. map that morphed between the states' geographic dimensions and their markedly different proportions when measured in terms of Electoral College votes.

One experimental project created in 2003—04 by Michael Frumin and Jonah Peretti at Eyebeam, a New York media arts organization, used mapping to draw a different portrait of American political loyalties. Opinions varied as to whether Fundrace was merely entertaining or an intrusion into people's private lives. But it unquestionably tapped a popular nerve, by providing a new view of existing information. Drawing on data about individual campaign donations, collected and published by the Federal Election Commission (FEC), Fundrace reveals the political complexion of the country as a whole, and allows more detailed views of several cities, offering visitors the ability to drill down via zip code searches to individual addresses, and check on their next-door neighbors' political proclivities. Political candidates are required to file information with the FEC on any donor who contributes $200 or more, including their name, address, occupation and how much they gave to which party. "This information has actually been available for a long time, first on paper, more recently on the Internet," says Fundrace co-creator Michael Frumin. "But 'til now, it has been the domain of political analysts and reporters, not something the average person thought about or looked at." The information was available on such sites as Opensecrets and PoliticalMoneyLine, "but that does not necessarily mean it was accessible." Fundrace makes the data meaningful to ordinary people by mapping it, exploiting geo-coding technology that enables latitude/longitude coordinates to be attached to any piece of information.

"We used geo-coding to exploit the principle of locality," Frumin explains. "If you have a large set of information, and you want to find the parts most relevant to a particular person, then you need to find

See "Looking for a Less Imperial Gaze," pp. 114–115.

the information that is closest to them on some axis — such as time, space or issues. This principle has many applications, the first and most obvious of which is to make a map."

Fundrace offers two different kinds: maps of the entire country (showing how much money was donated to the two major U.S. political parties, county by county, and within three digit zip codes) and maps of individual cities. Initially, just the top 10 donating cities were mapped, but several more have since been added, including Minneapolis and close-up sections of New York and Los Angeles.

On the countrywide map, pie charts for key cities show percentages of donations to each party (blue equals Democrat, red equals Republican). On the city maps, thanks to geo-coding, the distribution of political support is instantly apparent: like urban EKGs of political affluence, these scatter plots reveal the geography of wealth and show political bed-fellows clustering in certain neighborhoods, though these patterns vary according to each city's urban morphology. Two different search modes allow users to enter a specific name, or zip codes (their own or any other), and pull up who gave how much to which party. It turns out that certain people donate sizeable amounts to both parties, hedging their bets. "Some people staunchly support one candidate, or one party," Frumin notes. "Sometimes people play both sides. They just want influence."

With his colleagues at Eyebeam Research Labs, Frumin conceived Fundrace in the fall of 2003, when Howard Dean's campaign was stirring excitement over the pace of its web-based grassroots fundrais-ing. Released in March 2004, the site immediately gained notice by the Associated Press, and within a week was getting hundreds of thousands of hits, and millions of searches. People gravitated to Fundrace to check out how much their namesakes and neighbors donated, bringing the drama of national politics down to a more immediate and personally perceptible scale. Celebrities' names could be plugged in find out their political affiliations. Concerns about invasion of privacy soon followed because some donors had not realized that their addresses and occupations were stored in the FEC database, and that this is public information. As geo-coding becomes more accessible, Frumin predicts, such applications will become more prevalent, for political and other purposes. "If there is a conclusion to be drawn" he adds, "it's that it's definitely possible to take open government information and make it way more interesting to people. And don't be surprised: if you give them the opportunity to snoop on each other, they will."

gazetteer H 4/12 p. 190

LOOKING FOR A LESS IMPERIAL GAZE

"Every map or presentation is a kind of lie. You draw certain things and leave out certain things. Depending on what scale it is, it tells a certain truth." So says architect/urban designer Brian McGrath who, with web designer Mark Watkins, created Manhattan Timeformations for the Skyscraper Museum in 2000. A computer animated model of Manhattan, it allows the viewer to look at certain things and leave out others, as they select layers of information about the city's urban history. Piloted in a series of public presentations in the museum's temporary spaces downtown during the summer of 2000, the project is presented on the museum's website and in its Battery Park City home.

Manhattan Timeformations consists of six sections: Perspectival Flythrough, Timeformations, Transparent New York, Downtown New York, Midtown New York and Manhattan Timetable. Funded by a grant from the New York State Council on the Arts, the project gave such a seductive demonstration of how interactive mapping could animate architectural history that it proved pivotal in helping the museum secure a subsequent grant to create VIVA.

Using data from real estate directories and other sources, McGrath — an architect and adjunct professor of urban design at Columbia University's Graduate School of Architecture and Urban Planning — entered the dimensions of 726 major skyscrapers into FormZ 3D modeling software. McGrath and Watkins then used Flash software to animate successive layers of the city's development so they hover like a Close Encounters spaceship then zoom impossibly towards you in zingy bright colors against a black background.

See "Clickin'n'Scrapin'," pp. 112–113.

The model incorporates time, using a scale of one hundred feet to a year (along the vertical axis), and offers a bar-graph of the city's upward mobility that clearly delineates the cycles of boom and bust in downtown and midtown Manhattan real estate. The clustering of skyscrapers into distinct bands of time corresponds, the site explains, to "frenzied peaks of investment and construction" separated by long speculative lulls. "This deceptive quiet masks enormous shifts: structural and economic adjust-ments along with technological changes, parallel government reactions, social and cultural shifts, recession, depression and war."

Manhattan Timeformations allows you to explore various eras and types of urban development and infrastructure, and superimpose them in contrasting colored layers. A dozen different types of map-based information can be selectively activated at the click of a button: for example, the dense cluster of early Dutch settlements at the southern tip of the island can be "switched on" along with elevated railway lines, monuments and parks, subways, and street grids of different eras. The intensive waves of skyscraper development in midtown and downtown are depicted as 3D wire frame buildings: click the button for a given period of intense speculation, and a new a crop of office towers springs into view, outlined in different colors, and comes to populate the island"s precious real estate.

The buildings in Manhattan Timeformations are deliberately shown as unrendered skeletons. "That's radical," says McGrath, "because commercial 3D images are emphatically rendered: they presume that the more realistic the light and the materials, the better. That's what all the time and money goes into. It's a new technology, there's a wow factor, and everyone jumps to verisimilitude. By dispensing with all that, you can be free to get at other issues."

Those other issues are public participation in the urban design process, and the possibility of maps that engage people in what McGrath calls "attentive circuits," instead of just being entertained or dazed by digital technology. Manhattan Timeformations is a prototype for a kind of urban design tool that would ideally be available not just to developers.

McGrath's perspective is heightened by his experi-ence teaching for four months a year in Thailand. "Cities are being developed in very different ways in S.E. Asia. It's a difficult situation, where public agencies don't have the same tools as the private developers. How do you build a sustainable city within a neo-liberal capitalist economy, with no master planning? You have to have tools that are not dazzling. Somehow, if you have more viewpoints, or the ability to interact from many viewpoints, you can get a different picture of a project. Imagine if a community could make a rendering so they could understand what a proposed development would look like from their street corner, as opposed to the privileged point of view of the planners or developers. A less imperial gaze is what I'm looking for."

Since completing Manhattan Timeformations, McGrath and Watkins have been working on a project for the U.S. Forest Service to develop an interactive map and related website of 9/11 memorials in U.S. towns and cities, including some 30-50 USFS-funded memorials (which had to include tree-planting to be eligible for its grants) and several hundred others. Erika Svendsen, a Senior Researcher at the USFS New York Field station, recognized Manhattan Timeformations as "a successional forest of skyscrapers," says McGrath. She asked his firm, Urban Interface, to develop a map that shows the geographic distribution of the memorials and links to a database of interviews and other information about the memorials. "What's fascinating is how bizarre the American city is," McGrath remarks. "There are all these college campuses, town centers, corporate campuses and edge cities that are sites of memorial gardens. They are small lenses into America today."

Manhattan Timeformations and this new project hint at the "deep-data" views of cities that will become feasible as urban and architectural render-ings converge with Geographical Information Systems (GIS). But McGrath is determined to get beyond the clichés of computer-generated urban imagery to a more nuanced representational language influenced as much by cinematography as cartography. "We're just beginning to see how architects and designers can use GIS. It's ubiquitous in planning and the sciences, but it needs an architect's imagination to untangle it. We haven't really scratched the surface of its capabilities."