Vital Signs: **Collaboration: “Commuting Space: Place in Transit”**

Trevor Morgan, RMIT University, August 2005.

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**Introduction**

“Commuting Space: Place in Transit” is an art project that investigates how people choreograph and inhabit the complex space/place of the commute\(^1\) and the impact of these choices and behaviors on identity. The Computer Graphics Systems Group of the Hasso-Plattner Institute at the University of Potsdam is developing a 3D city-model of Berlin, which contains visualizations of multi-dimensional information spaces based on non-affine, non-linear projections and transformations.

The collaboration between the artist and the Hasso-Plattner Group attempts to incorporate some of the video artwork created for the ‘Commuting Space’ project in the Berlin 3D city-model to develop a unique visualization tunnel, which introduces new avenues for interactivity. Challenges in the collaboration concern the different ways in which the collaborators approach the issues associated with navigation, along with the objectives that underpin our respective investigations.

Because the collaboration is in its early stages, the outcomes are as yet unclear, but the objective is to exhibit the 3D city-model with the incorporated artistic elements at a public museum installation in Berlin, and to extend the final installation of “Commuting Space: Place in Transit” to incorporate relevant elements of the 3D city-model in the same year.

**Background: “Commuting Space: Place in Transit”**

The origins of “Commuting Space” came about when I commuted for two years between Manhattan and the New Jersey Shore to complete my master’s degree in fine arts from RMIT while attending NYU. During these commutes, I observed my new home/work environments (as an outsider\(^2\)) and focused on the way I established my visual and social comfort, documenting these experiences, with video, satellite imagery, roadmaps and still photography.

I compiled the video documentation for one of these 2-hour commutes in a slow motion, 6-hour epic, PKWY/TNPKE/TUNNEL, which contemplates the physical spaces and ambiguous psychological spaces I experienced as a driver on my daily commutes; see figure 1 below. To capture the video, I mounted a stationery video camera to a tripod inside my car, which observes the journey ahead and its history in the rear-view mirror\(^3\). The objective was to invite the viewer to contemplate the traffic landscape of the car commute in more detail, and to enhance their awareness of their own commuter experience in terms of their spatiality in past, present and future commuter journeys. Excerpts from PKWY/TNPKE/TUNNEL were exhibited at “Flicker” (Socrates Sculpture Park, Queens NY, 2005) and at “Trans” (Dumbo, Brooklyn, NY, 2005).
Everyday, millions of commuters around the world float to and from home and work in self-enclosed mobile places that obviate the liminal space between origin and destination - a place of “difference, repetition, iteration and intervals of space” (Grosz, 2001). The isolated and shared experience of the commute encompasses fluctuating states of unconscious and acutely conscious space in repeated journeys. In the most banal places where nothing much is happening, and the dense landscapes where there is so much more to observe, we immerse ourselves in music, books, games and conversations, or drift into the ambiguous spaces of our day dreams, relying on an experienced perception of specific and learned attentions, or alert wakefulness, to respond to a set of signals - the next stop, inconvenient delays, imminent assault, love at first sight or terrorism. All the while, our cumulative perceptions interplay with intrusive and ambient public signals. This interplay of movement from one space to the next, this “in-betweenness” (Grosz, 2001), combined with the physical movement of the commuter journey within the geographical landscape and our location within it, creates a complex environment in which to investigate our perceptions and experience of place – what it is and what it means to us in this mobile environment.

What is space/place in the commute? Tuan Yi-Fu (1977) says that “if space is that which allows movement, place is pause … and each pause in movement makes it possible for location to be transformed into place”. But while place is experienced in the present and the past, movement projects our experience toward the unknown future. The commuter journey and the pauses along it
nonetheless acquire a meaning and stability that are characteristic traits of place, which together constitute a larger place that Tuan calls a kind of home. In this context, the process of navigating the commuter journey can be seen as a process of defining the boundaries of a space we think of as home, and the architecture of this home as the commuter pod. I continue to document portraits and still-lives in and from commuter pods with still photography as part of my project work; see figure 2 below.

While the typical commuter pod in New Jersey is the car, the corresponding space/place in Berlin is the public transport system. The contrast between these pods is stark; the boundaries of each car commuter pod are clearly private, but the public commuter pod of the railway carriage requires that people create their own sense of place in and amongst strangers. Today, I physically engage in and observe the commuter experience by catching the Berlin S-Bahn (a train network that forms the backbone of the Berlin metro system). To capture this experience, I am developing a personal, multi-camera video documentation unit that records my own body spatiality within the pod (up, down, left, right, forward, backward, past, present, future), see figure 3 below.
All of this documentation will be incorporated in a multi-media installation (with photography, audio, smell, touch and video). The objective is to engage and immerse observers in the space/place of the installation so they can navigate and experience a commute, rather than vicariously observing a cinematic screen/window landscape (as was the case with my earlier work). I want people to heighten their perceptions of spatiality and movement through the past, present and future, as they participate in my aesthetic sense of the commuter-pod.

**Collaboration with the Hasso-Plattner Computer Graphics Systems Group**

The Computer Graphics Systems Group of the Hasso-Plattner Institute in Potsdam investigates the structure, nature, and visualization of spatial and spatialized information, which includes geo-spatial information such as networks, buildings, terrains and associated thematic information. The Group is developing rendering and visualization technology for large-scale, real-time 3D city-models such as the model of Berlin, which contains visualizations of multi-dimensional urban information spaces based on affine and non-affine, linear and non-linear projections and transformations using photorealistic and non-photorealistic rendering algorithms.

The 3D city-model is a set of differently categorized entities: terrain, streets, buildings, landmarks and vegetation, along with their appearance properties. Each of these categories has substantially different rendering properties and requires specialized rendering algorithms. In addition to this static geometry, dynamic parts can be added, like cars, trains, or people. The group has designed, implemented, and uses a software tool, LandXplorer, which is capable of visualizing typical elements of a city-model in real-time, *see figure 4 below.*

![Figure 4: Work in Progress at the Hasso-Plattner Institute on the Berlin 3D City-Model](image)

While many institutions are investigating online and on-demand mapping of spatial information from a technical viewpoint, the Hasso-Plattner Group is also exploring unconventional dimensions of visualizations, and how to make these visualizations more accessible. They intend to expand their 3D city-model to encompass soundscapes and white spaces. They are exploring interesting challenges such as how a thematic map, which interprets commuter-traveling time as terrain height,
could distort the geography of the city, leading to a representation that may approximate the cognitive maps people develop about their environment.\textsuperscript{13}

**The objective of the collaboration**

The artistic collaboration attempts to incorporate some of the video documentation I am creating for the “Commuting Space” project into the 3D city-model of Berlin, to develop a unique visualization tunnel. At this stage we are working on ideas that include: the use of video loops, which present reflections of commuter movement on building surfaces; and video from my personal documentation unit, which captures a subjective journey inside a commuter-pod. Incorporation of both of these elements into the 3D city-model could introduce new avenues for interactivity.

i. Locating and interpreting reflections

The 3D city-model in its present state of development is a clean and static world that lacks the dynamics of a city and a sense of the lived world, with pedestrians, cars, trains, sounds and wind. To overcome this clean and static world, we are incorporating a sense of these elements by using video of building surfaces to reflect the flow of movement in the city. The concept is to capture reflections of vehicles, people, movement and sounds in selected building surfaces.\textsuperscript{14} These video-loops could then be rendered into the corresponding photorealistic building locations in the 3D city-model, see figure 6 below.

To further simulate the experience of the dynamics of the reflection (video), the user would have a limited field of view and sound – move a few meters up, down, left, right, and the reflection changes or vanishes. But this would not be the case with forward or backward movement, as from the body’s perspective “open space is cone-shaped” (Tuan, 1977).\textsuperscript{15} By giving the user basic information about how many reflections can be found, we hope to create a further interactive challenge – some reflections will be easy to find, others near impossible unless navigating by chance.

*Figure 6: Reflection Video-Loop Within the Current Hasso-Plattner 3D City-Model*\textsuperscript{16}
ii. Video from the personal documentation unit

I also thought it would be interesting to incorporate a few of the space/place commutes captured with the personal documentation unit. Each video stream would be presented as a separate visual environment that could be accessed within the 3D city-model at various locations (designated markers at train stations). The end user could click a designated marker to enter the video interface and ride in the commuter-pod. By doing so, they would release all navigation control (the ability to traverse the city-model in virtual time), to sit back and experience the temporal, visual and spatial experience of a commuter journey, or part of one, in real time. The user would return to the navigational environment of the 3D city-model at the next station (designated marker).

If the collaboration is successful, we intend to exhibit the 3D city-model with these incorporated elements at a public museum in Berlin, and to extend the final installation of “Commuting Space: Place in Transit” to incorporate relevant elements of the 3D city-model.

The collaborative expertise

The Hasso-Plattner Group comprises researchers in the field of computer graphics and geo-visualization. Their work focuses on 3D rendering techniques and their application in virtual cities and landscape processes. Main research topics include city planning and the use of geo-information for entertainment.

I am an artist with a background in commercial photography and digital imaging, and a strong interest in observation and philosophical discourse about space, place, spatiality and habitation. Theirs is primarily a European consciousness: I am a continual traveler with significant life experience in developing and over-developed economies.

We share interests in how we define, perceive and navigate multidimensional information space. We also share an interest in ways to extend the experiences of observers/users by enhancing interactivity.17

Issues to be challenged and negotiated

Our collaborative challenges and the issues we negotiate arise from the particular ways that we perceive and approach the issue of navigation, along with the objectives for our respective investigations, which are of course, quite different.

The Hasso-Plattner team are strongly influenced by market forces that are pushing city-models toward ubiquity. The “push” factors arise from the availability of data - contemporary scanning tools and technologies are enabling commercial feasibility, with varying levels of data quality and completeness. The “pull” factors arise from demand for highly detailed virtual cities in movies, simulations, urban planning, training and location-based services on mobile devices. Nonetheless, basic problems
concerning rendering and navigation are yet to be solved (for example, there is nothing like an out-of-the-box application, which could facilitate city modelling like Photoshop facilitates work with images).

In this context, the objective of the Hasso-Plattner project is to facilitate a superior 3D city-model, with optimum usability for the end-user. They achieve this by creating a library for real-time out-of-the-box visualization, regardless of the size of a model. Their goal is to develop a flexible tool, which comprises state-of-the-art algorithms in a black box, so the user need only supply local data in an authoring software format to realize an interactive visualization, which can be augmented with additional information (Doellner, 2005). Currently, their library is unique in its ability to handle kilometres of textured terrain, together with tens of thousands of textured buildings, in real-time.

By contrast, my objective is to develop artworks that enhance the idea and perception of the everyday space/place of the commute and to mediate a better understanding of how location reflects our sense of self, because “in an age of time-space compression, we are made increasingly aware (that) place matters” (Adams, 2001). By contemplating these spaces as networks of places, we might better understand our place in them and how that affects us and who we are - as purposeful “movement and perception, both visual and haptic, gives human beings their familiar world of disparate objects in space” (Tuan, 1977). In this context, a map is not only a guide that helps people to geographically locate and orient themselves, but also a framework to choreograph movements to better understand space/place in relation to spatial identity.

For the Hasso-Plattner Group a 3D city-model represents a complex, interactive image. It is an environment in which people can simulate real processes and experiment with new processes that might be intended for life in a real city, and observe the outcomes in an artificial yet familiar way. My work is a journey of self-discovery; the Hasso-Plattner group is facilitating the journeys of others.

We are also negotiating photo-realism. As a former commercial photographer and digital imager, I eschew photo-realism and look beyond the obvious to create a novel aesthetic. The Hasso-Plattner Group is tackling the need to gather and incorporate vast amounts of high definition photorealistic information, because “without such detail, the visual results are not convincing” (Doellner, 2003). Their challenge is to meet the need for cognitive recognition by the end user, while managing visual overload. (The group is aware however, that the end user can become more critical of what they are observing in this context and drift into comparisons of the representation and the real world it depicts.)

At this time only a small amount of the Berlin 3D city-model is presented in a realistic way. Other parts are photorealistic, but do not reflect the real world. This is changing as more data from outside sources is supplied, but it restricts the locations where my video loops can be photo-
realistically incorporated onto virtual building surfaces. Nonetheless, I am very interested in locating my video documentation within the cartoon-like, abstracted representations of the current 3D city-model.

The Hasso-Plattner Group also faces the perpetual challenge of incorporating vast streams of video and audio data in the rendering process. Their major technical problems are related to the scale of cities and their perception: even though cities cover huge areas, individuals always perceive them locally, or are interested in specific aspects, so highly detailed data like the information in my video documentation is necessary. While specialized algorithms exist for each data category within a city-model, the scale and combination of information sources makes life hard for the city-model renderer.

**Potential outcomes from the collaboration**

It’s fascinating to work with the Hasso-Plattner group and to see the impact of our collaboration on my own art practice. Because we are in the very early stages of idea exchange and alpha tests, our outcomes are not yet clear. But I expect benefits including opportunities to:

- Learn about mapping and programming ideas that could be incorporated in my future work to influence aesthetic aspects and interactivity
- Use 3D city-models to provide a forum for artwork to be viewed and experienced by wider audiences
- Incorporate new visualization methodologies, such as rendering abstractions and immersion projections, in my own artwork.

For the team at Hasso-Plattner, the benefits could be opportunities to:

- Extend ideas of potential usage of the 3D city-model into unexpected areas, such as the introduction of designated markers in the model as a gateway for contributors and audiences to access their own ideas
- Tackle technical challenges to incorporate dense information in the rendering process
- Test and apply the personal documentation unit to record simple real-time scenarios such as walking from one corner to the next
- Access audiences that would not normally be interested in this kind of technology, by embedding artworks in a game play interface.

Like many collaborations we started with a bold timeline regarding our outcomes and objectives. It soon became apparent that incorporating video streams in the 3D city-model was going to take a lot longer than originally thought. It seems now that the timeline of the collaboration will coincide with the timelines for my overall project, hopefully culminating in a public exhibition in 2007.
AUTHOR DETAILS: TREVOR MORGAN
Trevor Morgan is an Australian artist in Berlin, Germany. His work uses still photography, digital imaging, video, installation and performance to explore location (Commuting Space: Place in Transit, 2004 -), simulation/surveillance (Hearth, 2000-2003), habitation (Habitation: Human Form as Domestic Space, 1998) and observation, (Baw Peng Nyang, 1997). These intersecting themes reflect his experience as a continual traveller and as a child growing up in Australia, Papua New Guinea and the United States. Morgan completed a Masters in Fine Arts at RMIT and NYU in 2003 after working for 10 years as a commercial photographer and digital imaging specialist. He is now undertaking doctoral studies at the School of Creative Media, RMIT. Works have been exhibited in Melbourne, New York and Tokyo, and on-line at www.pixelartnyc.com.

For more information, see www.hearth.tv.

COMPUTER GRAPHICS GROUP AT HASSO PLATTNER INSTITUTE
The Computer Graphics Systems division is doing research, teaching and software development in computer graphics, visualization, and software engineering. It is providing academic courses within the Bachelor and Master programs in Software Engineering at the University of Potsdam. It is investigating principles and methods to analyse, design, and construct interactive graphics systems and techniques. The division has been founded in 2001; it is led by Prof. Dr. Juergen Doellner and publishes in all major computer graphics, visualization, and cartographic journals and conferences. The HPI group is focusing on computer graphics systems as ubiquitous components of today's software systems such as 2D drawing libraries, 3D rendering engines, 3D game engines, user interface systems, or multi-media processing systems.

For more information, see www.hpi.uni-potsdam.de/~doellner

NOTES

1 A noun is needed to provide the object on which the thesis is developed. There is no noun in English language dictionaries to collect the various forms of experience on public and private transport for regular (home/work/home) journeys. I decided therefore to coin a term for the purpose of my thesis, based on a US derivative of commutare (change wholly, exchange). The term commutate (an electric current) included regulating the direction of an electric current to make it a direct current, as in electric vehicles. From this derivative, regular travellers between work and home on the US electric (public) transport system vehicles could buy a commutation (season) ticket. The term also came to include commuter, and the US and the English terms were similarly used (see Archer in the Shorter English dictionary: "the 8:17 train so favoured by those who commute to London every day"). The further development of the Latin root to produce 'commute', the system of public and private transport involved in regular journeys, is a reasonable and appropriate linguistic progression that is readily accepted by my colleagues and communicants working in the issues involved in the phenomenon of the commute, including the people, systems, vehicles, routes, infrastructure. I found a useful quotation on the coinage of terms, from Norbert Wiener
"The human use of human beings" Avon Books 1950 pages 23/4: "Until recently, there was no existing word for this complex of ideas, and in order to embrace the whole field in a single term, I felt constrained to invent one. Hence 'Cybernetics' which I derived from the Greek word kubernetes or 'steersman', the same Greek word from which we eventually derive our word 'governor'."

2 Kimsooja presents passing crowds in Delhi, Nigeria, Mexico City and Lagos as a 6 channel silent video installation, which viewers observe through her gaze in “A Needle Woman” 2005,

3 The PKY/TNPKE/TUNNEL installation uses a projected video (scaled to real size of car windshield). Video stills depict the unconscious traffic landscapes that may or may not be noticed by the driver during the journey. Flipbooks reveal acute moments of consciousness within the landscape, as the driver experiences stressful moments overtaking trucks, waiting for traffic lights and negotiating pedestrians.

4 Grosz, E 2001 ‘Architecture from the Outside – Essays on Virtual and Real Space’ MIT Press, pp. 91-93

5 Xu Zhen captures the essence of boredom when he shocks small crowds of people into acute consciousness in the video series “Shout”, 2005

6 Grosz, ibid

7 Tuan, YF 1977 ‘Space and Place – The Perspective of Experience’ University of Minnesota Press, p. 6

8 Buelent Sangar draws the viewer to the everyday drudgery of social migration toward unknown futures in “Move Forward”, 2005, a set of 28 photographs.

9 These images represent hundreds of digitally captured photographs taken from commuter vehicles in many cities, including New York, Barcelona, Berlin, Budapest, Copenhagen, Melbourne, New York, Prague. These captured moments reflect the spatial and temporal landscape of the commute and our place in it.

10 The documentation unit incorporates hi-resolution, color, digital pinhole cameras that measure no more than 32mm, which are sewn into the fabric of a hat. Five streams of video will be recorded simultaneously to five mini-DV recording decks in a backpack. Sound will also be recorded digitally as a separate stream.


12 Screen captures of the Berlin 3D city-model captured in LandXplorer software. The left image depicts an overview of Berlin around the Brandenburg Tor. Red color indicates areas where building geometry is available. The right image shows a close-up of Alexanderplatz. As additional thematic information, train routes are highlighted. Data is provided by the Remote Sensing GmbH.

13 Historically, map designers not only used geographic reality as the principal coordinate system but also symbolic and allegoric topologies.


15 Tuan, ibid, p. 123

16 A video-loop of a reflection on a building surface of a train passing Friedrichstrasse railway station, which has been incorporated into the Berlin 3D city-model.

17 For example, the Hasso-Plattner Group has just installed a 180-degree cylindrical wall, which allows the display of 3D environments on a screen to totally immerse the observer.

20 Tuan, op cit, p. 12
21 Buchholz, H and Doellner, J 2005 ‘View-Dependent Rendering of Multiresolution Texture-Atlases’ IEEE Visualization
22 Doellner, J and Walther, M 2003 ‘Real-Time Expressive Rendering of City Models’ Hasso Plattner Institute at the University of Potsdam, 2003, p. 1