

**Models of Power (the secret lives of buildings).**

**Mike Phillips**

*Arch-OS is an operating system for architectures. It represents an evolution in intelligent architecture, interactive art and ubiquitous computing. Arch-OS [<http://www.arch-os.com>] has been developed to interact with the inhabitants of buildings in order to provide dynamic temporal information on their activities and impact on the environment. In the process of realising these behaviors Arch-OS generates dynamic data models of the complex interactions within a building. This paper explores the heritage of these data models and considers the evolution of the 'model' as a mechanism of power.*

*Model, Intelligent, Architecture, Data, Operating-System, Ubiquitous Computing,*

"But the *Panopticon* must not be understood as a dream building: it is the diagram of a mechanism of power reduced to its ideal form; its functioning, abstracted from any obstacle, resistance or friction, must be represented as a pure architectural and optical system: it is in fact a figure of political technology that may and must be detached from any specific use."<sup>1</sup> (Foucault, 1975)

**1: A Model History.**

This paper discusses the 'model' as a mechanism of power with a particular focus on architectural design methods that involve processes of modelling to inform the construction of new architectures. This is against the background of the development of the Arch-OS system where new forms of model, models that generate complex relationships with inhabitants, and models that shift and redefine power relationships, are proposed and explored. In doing so it questions the notion of the 'model' as a tool for control or as a vehicle for enlightenment.

Arch-OS (figure 1) draws its inspiration from the affordances offered by the convergence of new technologies, debates around immateriality and virtuality, concepts of intelligence and interactivity (objects, environments, and systems) and the practice of interactive art and design. It also draws on strong historical roots. Most notable of these is the *Panopticon*, Jeremy Bentham's original designs for the *Panopticon* became much more than the architectural plan for a never realised construction project, they operate as a blueprint for an ideology of scopophilic paranoia that articulate contemporary technologies and cultural fetish. Contemporary interpretations of this 'diagram of a mechanism of power' both extrapolate and contradict Bentham's original vision. The 'Inspection House' (circa 1791) is a model for "all establishments whatsoever, in which, within a space not too large to be covered or commanded by buildings, a number of persons are meant to be kept under inspection"<sup>2</sup> (Bentham, 1843). Bentham's Utilitarian and consequentialist vision saw this process of 'inspection' as leading to individual and social enlightenment, an aspect of the original blueprint that has been conveniently forgotten in contemporary articulations.

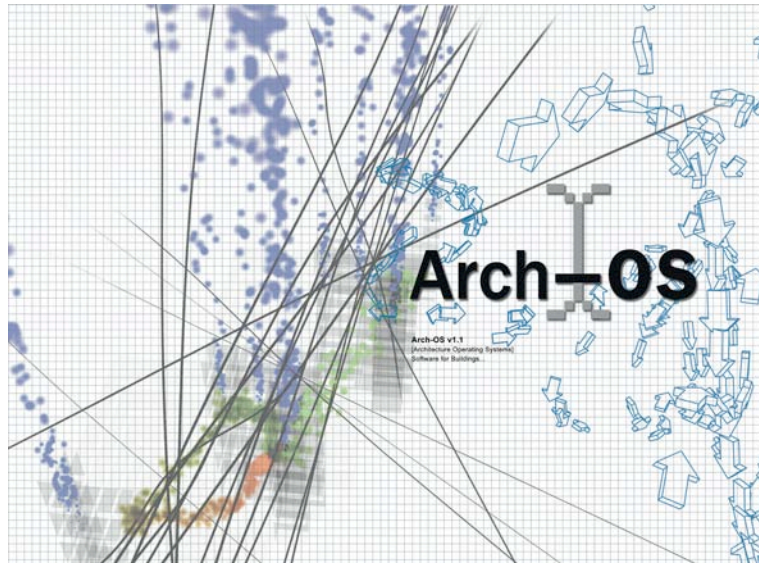


Figure 1: Arch-os splash screen.

Arch-OS employs and explores the power of the ‘model’ to re-establish Bentham’s original aspirations of the *Panopticon* as a mechanism for increasing individual and social responsibility. Arch-OS, 'software for buildings', has been developed to manifest the social, technological and environmental life of a building and provide a living laboratory for cultivating transdisciplinary knowledge. Arch-OS redefines the notion of an Architectural model by feeding on the diverse forms of dynamic data that are generated by a building, its environment and its occupants, Arch-OS transforms the architects drawings, the brick, steel, glass and fibre-optic infrastructure into a living breathing environment. Arch-OS provides users of buildings with a spatial and temporal consciousness, essentially re-programming human activity through a heightened social, architectural awareness. Arch-OS combines a rich mix of the physical and virtual into a new dynamic architecture, an 'intelligent' entity, that interacts, responds and anticipates: Arch-OS is a nervous system for multidimensional buildings.

What is so enthralling about the *Panopticon* is the fact that it only existed as a model, in fact, less than a model, a diagram. These diagrams were the catalyst to Bentham’s philosophy, both illustrating his ideology and manifesting his politics. The fact that the model has been stripped of its original philosophical context to the extent that pale imitations can now be found in most contemporary high security prisons does not lessen the impact or influence of this ‘diagram of a mechanism of power’. The dominant mechanism involved is the convergence of surveillance within an architectural space, the fact that the application has shifted from a process of utilitarian enlightenment to one of imposed control of freedoms does not alter the catalytic power of the Bentham drawings.

Bentham’s diagrams are a key to unlock a treasure chest of critical discourse, which once opened, floods the world with new ideas. Repacking or forgetting this diagram is impossible, it can only grow through the collection of cultural crustacea, or be transformed through a ‘sea-change into something rich and strange’. The diagram here possesses a generative quality, an invisible algorithm for exponential change. Within an architectural context it is this transitory power of the diagram or model that makes the device (whether in a 3D form or 2D form) such a powerful tool for creativity and innovation.

## 2: A Model Diagram.

“The diagram is not only an explanation, as something that comes after, but it also acts as an intermediary in the process of generation of real space and time. As a generator there is not necessarily a one-to-one correspondence between the diagram and the resultant form. There are many instances, for example, in Le Corbusier’s Modulor where the diagram is invisible in the building, yet it reappears as a repetitive element that occurs at many different scales, repeated in little segments of houses to large segments of urban plans, yet it is rarely an explicit form.”<sup>3</sup>

Somol, R. (2001).

As Somol suggests it is this invisible algorithmic quality of the model (**mod·el** (mdl) *n.* 1. A small object, usually built to scale, that represents in detail another, often larger object... 2. a. A preliminary work or construction that serves as a plan from which a final product is to be made... b. Such a work or construction used in testing or perfecting a final product. 3. A schematic description of a system, theory, or phenomenon that accounts for its known or inferred properties and may be used for further study of its characteristics. French *modèle*, from Italian *modello*, diminutive of *modo*, *form*, from Latin *modus*, *measure, standard*.)<sup>4</sup> or diagram (**di·a·gram** (d-grm) *n.* 1. A plan, sketch, drawing, or outline designed to demonstrate or explain how something works or to clarify the relationship between the parts of a whole. 2. *Mathematics*. A graphic representation of an algebraic or geometric relationship. 3. A chart or graph. Latin *diagramma*, *figure*, from Greek, *a figure worked out by lines, plan*, from *diagramhein*, *to mark out, delineate* : *dia-*, *dia-* + *graphein*, *to write*.)<sup>4</sup> such a powerful and vital tool.

In this fluid state the model occupies a particularly pertinent position in *Activity Theory*, which articulates the subtle relationships that exists between humans and the tools they use, and explores the complex feedback loops between the impact the use of a tool has on the environment and the impact the modified environment then has on the human.

“The idea is that humans can control their own behaviour – not ‘from the inside’, on the basis of biological urges, but ‘from the outside’, using and creating artefacts. This perspective is not only optimistic concerning human self-determination. It is an invitation to serious study of artefacts as integral and inseparable components of human functioning”<sup>5</sup>  
(Engeström, 1991)

Within this context the concept of the model or diagram as ‘artefact’ or tool to impact on the world is problematic. Because, as with Bentham’s more ‘optimistic’ interpretation of the *Panopticon*, the model occupies a peculiar status as an ‘artefact’. Its power lies in the mind of the viewer or maker of the model as much as any 2D or 3D artefact. Its purpose is to transcend the fixed state of an artefact and to operate as a medium for human expression or as an experiential process to realise an artefact. The impact is on the psyche or mental world of the rather than the external world. The model or diagram blurs the distinction between the ‘outside’ and the ‘inside’; the ‘outside’ becomes a manifestation of the ‘inside’, and the ‘outside’ is reconstituted in the mind, a continuum of blended internal/external reality. Within this continuum of mutual reinforcement of the inside/outside the model’s immateriality is at its most solid and powerful.

So, the model is fluid / solid, material / immaterial, process / form, inside / outside. Essentially it is a dialogue or critical discourse. However, in actuality, this dialogical process is at odds with the requirements of most professional model builders. In architecture the model is

undoubtedly part of a design process and forms part of a dialogue with the client, but it is also an object of power and a tool in reductive process. Neither of these features is particularly compatible with the meme like qualities of Bentham's treasure chest. The model on the client's desk both reinforces their ownership and provides a recursive sense of 'God-like' control. And for the architect it is a vehicle to establish what a building will be rather than what it might be. It reinforces the notion that a building is just a big 'object' that is finished at the point of handover. It rarely extends beyond this point to consider the active life of the building once it is inhabited.

Models fail when they are seen as artefacts, and succeed when they operate as a dialogical process. And that in a successful model the modelling continues as a process within the minds of the viewer long after any trace artefact is manifest.

### 3: Model Arch-OS.



Figure 2: Arch-OS System.

The Arch-OS (figure 2) system enables dynamic real-time modelling of the processes within a building. These models enable a greater transparency and understanding of the complexity of modern buildings. Arch-OS models enable a building's occupants (Figure 3) to reflect on the complexity of their own interactions as they move through time and space, both physically and through the extended social interactions enabled by communications technologies. Through the acoustic and visual re-presentation of their social activity, combined with dynamic representations of data generated by the electro-mechanical and environmental activities of the building, occupants are able to better understand the complex relationships that exist between each other and their environment. In doing so the building has the ability to enter into a direct dialogue with its inhabitants. It senses their presence and makes its awareness known. It creates a critical relationship between the space, the architecture and the inhabitants. Through this relationship inhabitants re-programme the building and the building re-programmes the behaviour of the occupants.

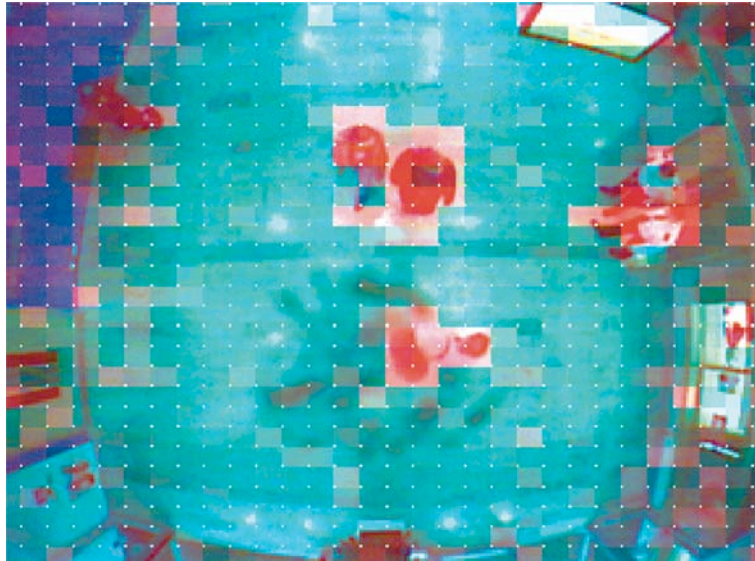


Figure 3: Arch-OS building occupants.

There are 3 system levels to the Arch-OS building: the 'Interface', the construction of the internal media networks and data collection devices; the 'Core', the processing and manipulation of the dynamic data generated by the 'interface'; and the Arch-OS 'Projects', artists commissions and scientist/technologists research projects. It is the convergence of these systems that enable Arch-OS to generate powerful models that that reverse the traditional notion of the architectural model. As a system of convergent technologies Arch-OS realises Kwinter's aspirations for digital modelling tools for "...the consideration of dynamical phenomena or dynamical morphogenesis, toward geometries or patterns that are not static but appear only *over time*..." and "the study of phenomena no longer in analytic isolation but as embodied within a rich and unstable milieu of multiple communicating forces and influences..."<sup>6</sup>

(Kwinter, S. 2001)

The Core can be seen as an extension of the architectural model or diagram. It is a dynamically generated software model that cannot exist without the data feed that spawns it. It has a symbiotic relationship with the building that hosts it. The Core Model is available as a live 3D model of this code and can be downloaded as a screen saver or as an online 3D model. Every computer in a building has the option of using the Core Model screensaver (Figure 4). This generates a dynamic recursive environment within the building. Sitting in the building the inhabitants can see a live, real-time 3D representation of the building, the space they occupy, on their screen. As a model its existence is dependant on the occupants of the building and the digital fall-out from their interactions with it.

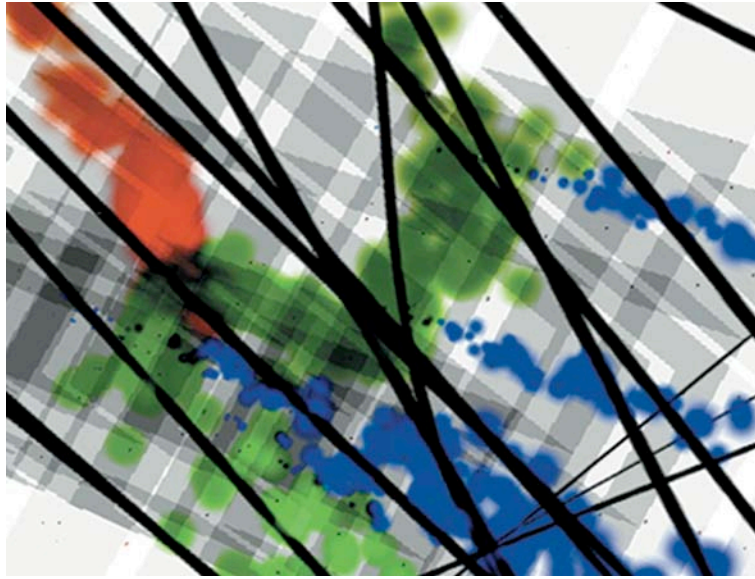


Figure 4: Arch-OS Screen Saver.

Arch-OS a model for all establishments whatsoever, in which, within a space not too large to be covered or commanded by a network, a number of persons are meant to be kept in a critical discourse.

#### **4: Model Project.**

The Arch-OS project is managed by the Institute of Digital Art and Technology and produced by members of i-DAT and CNAS research groups based in the University of Plymouth. Arch-OS is produced in collaboration with the Architects and Engineers: Feilden Clegg Bradley Architects, Buro Happold, Nightingale Associates, Hoare Lea, DrMM (Derijke Marsh Morgan), Signwave/CASM.

Arch-OS: is a collective of individuals working from the School of Computing, Communications and Electronics at the University of Plymouth. Mike Phillips (Director of i-DAT) here represents the Arch-OS development team that consists of: Birgitte Aga (web mistress), P. Anders (cybrid architect), Martin Beck (Intelligent Systems/Genetic Data), G. Bugmann (Autonomous Robotics), George Grinsted (Sys Op), Eduardo Reck Miranda (Generative Audio), Adam Montandon (Data Architect), and Chris Speed (Tele-Social navigation/Spaceman). Arch-OS is managed by i-DAT [<http://www.i-dat.org>].

#### **References,**

- 1: Foucault M. 1975. *Discipline and Punish, The Birth of the Prison*. Penguin Books 1991, p. 205
- 2: Browning. ed, *Bentham, J. Works*, IV, 1834, pp40 (The Bentham Collection University College London).
- 3: Somol, R. *Peter Eisenman - Diagram Diaries*. London: Thames & Hudson. 2001. p.28

4: <http://dictionary.reference.com/>

5: Engeström, Y. Activity theory and individual and social transformation. *Multidisciplinary Newsletter for Activity Theory* 1991, 7/8: 6-7.

6: Kwinter, S. *Architectures of Time*. London: MIT Press. p.13

Mike Phillips is the director of i-DAT [The Institute of Digital Art and Technology], and PhD supervisor for the Planetary Collegium. Following a BA (Hons) in Fine Art - 4D, a scholarship to the University of Massachusetts he completed postgraduate studies in experimental media at the Slade School of Fine Art, UCL. Operating collaboratively across the digital domains of pre-WWW global computer-networking and tele/kine/audio-matic performance/installation/object [such as 'UK EAT88' and Donald Rodney - ICA/TSWA 4 Cities/Psalms' Autonomous Wheelchair], Phillips initiated and coordinated the BSc (Hons) MediaLab Arts Programme [1992] with the support of Macromedia. More recently he founded the On-Line MSc Digital Futures programme and is now overseeing the development i-DAT. Private and public sector grant funded R&D orbits digital architectures, transmedia publishing and generative media. Recent projects include Autoicon (inIVA), STI Project (The Search for Terrestrial Intelligence - SciArt), 'Artefact' (V&A) and the 'Cybrid' architectural operating system [currently being integrated into the new Peninsula Medical School]. These projects and other work can be found on the i-DAT web site at: <http://www.i-dat.org>.

Mike Phillips: Director of i-DAT Institute of Digital Art and Technology, University of Plymouth, Drake Circus, Plymouth, PL4 8AA, Devon, UK.  
tel: ++44-01752-232549 / fax: ++44-01752-232540 /  
eml: [mike.phillips@plymouth.ac.uk](mailto:mike.phillips@plymouth.ac.uk) / www: <http://www.i-dat.org>